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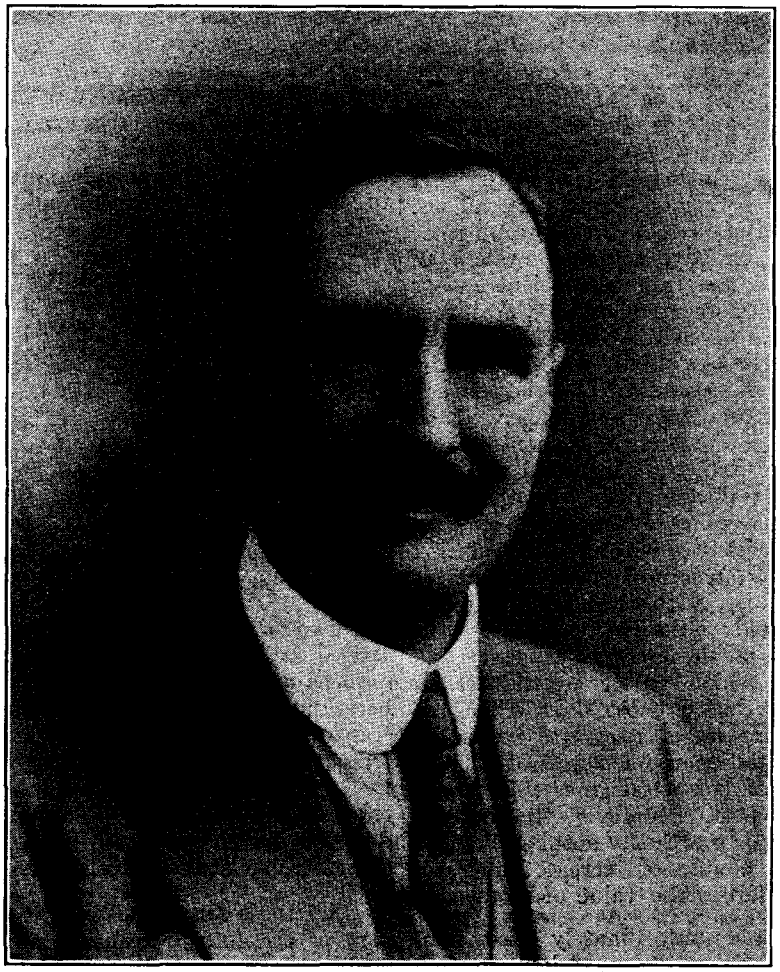
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XLV.—MR. A. L. CLOUGH.



MR. A. L. CLOUGH, whose portrait appears on this page, is the Chief Superintendent, Telegraphs, at the Liverpool Post Office. That invaluable compendium, the Establishments Book, records the particulars about Mr. Clough that he was born in January, 1868, that he became an established Post Office servant in 1885 and that he was appointed to his present post in October, 1925. It pays no heed to birthplaces and other interesting but non-essential facts, but we may surmise that from first to last Mr. Clough has been a Liverpool man and that he entered as a youth the particular department of which he is now in charge.

It is not an easy task to convey in a few sentences a true and adequate picture of Mr. Clough's many-sided personality. In telegraph circles, Mr. Clough is a man of note. He has a thorough knowledge of his business and a broad-minded grasp of current problems, and his views are held in such esteem that on several occasions he has been summoned to special conferences at Headquarters. In private life he is the best of good fellows, with a knowledge of affairs, a sense of humour and conversational gifts which make him the most charming of companions. The passage of time has brought no diminution of these qualities and only the authority of the Establishments Book can make one believe that the sands of his official life are running low. The fact that his retirement cannot be far distant will bring deep regret to his many friends in the Post Office service.

RECONSTRUCTION OF THE GERMAN FOREIGN TELEGRAPH SYSTEM AFTER THE WAR.

BY WALTER KRAUSE.

WHEN after the outbreak of the first flames of the great war, the apparatus on the great foreign telegraph communications connected with the East stopped, and when, on the following days, the instruments indicating the currents on the foreign circuits to the West also failed to operate, the telegraph operator could not help feeling at a loss. He knew the seriousness of the time and realised the critical moment of the world-crisis more impressively in the general telegraph office than in any other place of human existence. We remember how a year later the meshes of the European telegraph network, stretching to the south and south-east, broke off on the frontiers and lost connexion with their centre, the general telegraph office, so that from this point a few threads only reached to the small neutral neighbouring countries. Further, many friendly and helpful relations between officials of the German general telegraph office and their foreign colleagues were suddenly destroyed for years. Finally, the gradual withdrawal of the neutral countries was particularly painful.

He who believed that after the conclusion of peace the general telegraph office would regain as soon as possible its former important position, due to its central position in the European international telegraph system, had deceived himself.

Owing probably to political and economic motives, the nerves of the international telegraph traffic on the old and new empire frontiers were knotted only hesitantly and loosely. Thus the offices of the former hostile States were reached for the first time after the termination of the war, as follows: London, Aug. 23, 1919; Antwerp, June 14, 1919; Milan, Aug. 11, 1919; Rome, Sept. 5, 1919; Brussels, Nov. 16, 1919; Paris, Dec. 18, 1919; and Bukarest not until Feb. 13, 1924. Apart from the last-named telegraph office, Bukarest, where the reintroduction of the system took place by means of the effective Siemens apparatus, all the other offices communicated with the German general telegraph office by means of the slightly less effective Hughes system of communication. In consequence of the very insufficient means of communication, telegraphic communication with the places mentioned suffered extraordinarily. Especially on the London line (to which, however, a second Hughes circuit was added) the mass of telegrams destined for transoceanic countries caused serious congestion, because cable communications no longer existed and the German wireless communication to America, in consequence of atmospheric troubles and other imperfections, had not yet attained its world reputation. The traffic relations with the other foreign countries were, however, considerably more favourable, but the lines connected with those countries had lost much during the years of war with regard to their structural quality, and were therefore subject to interruptions and, with the use of Hughes apparatus, could not afford a rapid outlet for telegrams. In consequence of the gradual decay of the German currency, an inundation of telegrams occurred which partly overflowed on to the foreign circuits. Especially during those days when the Stock Exchange was opened, the masses of telegrams increased, not only in the inland lines where the enormous totals of 230,000 to 250,000 were reached, but also on some foreign circuits; and many of them had to be sent by post. Moreover, the gigantic work to be mastered daily was done for practically nothing, because the German Postal Administration could not increase the rates afst enough to keep pace with the fall in the value of money.

During this time of hard, and unfortunately also non-productive, telegraph work, the German Postal Administration accomplished the great work of repair and partial renovation of its extensive system, thereby desiring to obtain a security of operation as perfect as possible. The most important foreign circuits such as to London, Antwerp, Amsterdam, Rotterdam, Oslo, Riga, Basle, Zurich and Vienna, were gutta-percha cables nearly fifty years old. As these great telegraph cables would shortly become unfit for utilisation, an attempt was made to use the new toll-cables for simultaneous telegraphy by means of alternating currents. This gave excellent and successful results. Where cable circuits failed, excellent bronze wires were used and valuable reserve wires became available for foreign telegraphy.

In view of the fact that expensive communications can be fully utilized in an economical manner only by the use of efficient apparatus, the Siemens system on 19 foreign lines outgoing from the general telegraph office was reorganized, and Baudot working has been introduced by agreement with the foreign administrations concerned on five lines, whilst for six further circuits it is intended to use the Creed apparatus.

It may be said that the German telegraph system has now available a splendid set of telegraphic equipment, and has never possessed better.

The reconstruction work described above was finished in a relatively short time. Unfortunately, the economic success of these expensive telegraph arrangements was for a long time very small, owing to the insufficient utilization of the international telegraph lines through Germany. Even up to four years ago there was a danger of a further decrease of this traffic and a fear that the general telegraph office would lose its reputation as the greatest transit office of Europe. This danger was apparently due to the fact that offices of formerly hostile States as well as those of the neutral countries maintained till long after the conclusion of peace the custom initiated at the outbreak of the war, of directing their telegrams by roundabout routes. The motives for the deviation of the telegraph traffic over lines not passing through Germany were probably to be found in the fact that in foreign countries confidence in German telegraphy as well as in German currency had unfortunately decreased. The lost confidence in the German Postal Administration could only be restored if that Administration succeeded in convincing the foreign countries by the quality of German telegraph work of its speed and accuracy to such a degree, that the roundabout routes so far utilised would willingly be given up for economic reasons.

An organised work of reform aimed at the reduction of the circulation time as well as the securing of a rapid flow of the whole foreign telegram traffic on all-important German lines connected with foreign countries. The general telegraph office took the following steps:—

The staff engaged in the operation of the foreign lines was specially chosen, had a knowledge of foreign languages, and also tactfully guaranteed friendly co-operation with foreign offices. By avoiding a frequent change of staff, the operators became well acquainted with the customs and traffic relations of the foreign offices. The cultivation of foreign languages was promoted by a course of instruction.

The fact that the circulation time of the telegrams, from their arrival at the general telegraph office up to their dispatch, was reduced to 10 to 12 minutes by steps which need not be explained here, did not overcome the difficulty of lack of speed in the foreign transit traffic. A further reduction of the circulation time for this traffic was reached by the foreign telegrams received being brought by the receiving operator himself to the apparatus destined to transmit them onwards. To facilitate this method, the apparatus destined for offices with great exchange traffic was arranged alongside, so that the telegrams received could be handed over.

All these measures brought such success that for the greater part of the foreign transit traffic the circulation times are now negligible.

To regulate the flow of the telegrams over the great German foreign circuits an inspection point was established whose task, based on the advice given five times daily by the larger German telegraph offices, is to regulate the flow of the whole of the foreign telegram traffic by assigning lines on which the telegrams can reach quickly their foreign destination, so that stoppages at any point can be avoided.

The traffic conditions between each forwarding office and the principal foreign destinations are signalled to the general telegraph office by the following code :—

White	... ...	Waiting time of the traffic up to ½ hour
Green	... ...	,, ,, ,, ,, ,, 1 ,,
Red	... ...	,, ,, ,, ,, ,, 1½ ,,
Blue	... ...	,, ,, ,, ,, ,, 2 ,,
Black	... ...	Waiting time of the traffic more than 2 hours.
Star	... ...	The communication is temporarily interrupted.

At the general telegraph office these colours are reproduced on a chart which shows the destinations in columns and the forwarding offices in horizontal lines. The absence of direct communication is indicated by vertical strips.

In consequence of continuous practice, it is sufficient for the inspection point to cast a glance at the summary in order to effect the necessary regulations. Ten minutes after the arrival of the advices, most of the offices concerned have already received instructions as to which routes may advantageously be adopted.

The arrangement has stood the test extraordinarily well and has therefore found great approval not only by the greater German offices, but also by those foreign offices, which serve as intermediaries for German foreign traffic, e.g., Basle, Zurich and Vienna, which are interested in this method of announcement. London is included in so far as the general telegraph office daily communicates to it the incidence of the traffic between Great Britain and the European countries.

For a successful further evolution of the foreign transit traffic, it is of the greatest importance that the offices and the administrative headquarters are always kept informed as to the extent and the development of the foreign transit traffic.

For this purpose statistics are prepared four times a month as to the number of the foreign telegrams transiting Germany as well as to their waiting times. From this summary it can be determined if the value of the telegraph work has increased or fallen, if an increase of the traffic or a deviation has taken place, and if in a certain case steps can be taken to prevent such a deviation in traffic.

Finally, it may be noted that in this limited space only the most important works of reconstruction could be mentioned. But as regards the success attained up to the present, a few figures may be cited. The foreign traffic of the general telegraph office amounted before the war to about 32,000 telegrams daily, of which about 8,000 telegrams were destined for Russia and beyond. The volume of traffic for the years following the war up to 1923 was very unreliable in consequence of the continually changing economic conditions in Germany. Therefore it gives no clear picture for the critical examination of the success of the reconstruction, and hence is not taken into account. In January 1924, the total number of foreign telegrams at the general telegraph office, including the radio-telegrams, averaged daily 20,000, and of these about 6,000 were foreign transit telegrams, 3,000 arriving in each direction. To-day the telegraph traffic on the foreign circuits outgoing from the general telegraph office has already reached the magnificient number of nearly 33,000, 5,000 of which are foreign transit telegrams. The success obtained up to the present is evident and requires no further explanation.

THE TELEGRAPH SERVICE—PAST AND PRESENT.*

BY A. W. EDWARDS, O.B.E.,
Late Deputy Controller, Central Telegraph Office.

(*Continued from page* 241.)

IT would, of course, be very difficult to make a clear cut from the policy which has prevailed and has led up to our present difficulties, but the fact remains that the Telegraph Service to-day, as in the past, is not a revenue-earning concern. If it can be accepted as a partial public subsidy all might be well, but unfortunately it is not. If the Telegraph Service was a Commercial and not a Government undertaking it would have been bankrupt years ago unless steps had been taken to place matters on a commercial basis. It must not be overlooked, Ladies and Gentlemen, that telegraphs have a very vigorous competitor in the Telephone Service and that if Inland Telegraphs were set aside to-morrow the Telephone Service would take its place in the commercial and social world to a very considerable extent. There is room for both Services in the ordinary course, but it is, I suggest, up to everyone concerned in the telegraph interest to do everything possible to give it life. Can its existence as a revenue-earning concern be sustained under present conditions ? I venture to say it cannot. What, therefore, should be done to make it a reasonable paying proposition and thus give it increased vitality ?

In the first place I suggest that the charges for telegrams should be made according to distance. The zone system would assist materially in regard to this. Press rates should be revised and the multiple rate should only apply to single towns. The establishment of telegraph offices should be carefully overhauled and all possible should be done to simplify the machinery of control. As compensation for any necessary reduction of supervisory appointments positions on the Engineering side and in other Departments should, as far as possible, be thrown open to telegraphists possessing qualifications for such positions. There is, in my judgment, much fine material in the Telegraph Service for positions of this character, and if such positions could be given to the men and women on the Telegraph side and the matter of age be less rigidly applied, this would go far to reduce the dissatisfaction which now exists in regard to future prospects. The Engineering side, for example, has obtained many excellent officials from the operating classes in earlier times, and it was unfortunate when these higher positions were, to a great extent, closed to the operative side of the business. The co-operation of the operative staff should be obtained for securing the best possible output, even to the extent of the introduction of the bonus wire system, as it must be evident to all concerned that unless such improved output be secured it is not possible to carry anything like the impedimenta which at present exist and at the same time obtain the necessary revenue to make telegraphs self-supporting. Then, again, to secure the necessary loads for circuits, the question of greater concentration during *other than the peak hours* requires careful study. At present the Telegraph Service is like an over-rigged ship carrying too much sail, for in addition to the direct higher telegraph appointments it is required to carry a percentage of the Secretarial, Accounting, Engineering, Stores, Traffic-Managing, &c., staffs in the maintenance of the Telegraph Service, and this obviously cannot be done on our present telegraph operating output.

I was recently looking at an old picture of the Provincial Gallery of the C.T.O., dated 1891, and I could not help being struck with the orderliness of the Gallery as compared with the present day. Every one of the operators is depicted as being well down to his or her work and the only persons shown as being on their feet are occasional Supervising Officers with the collectors and distributors. The picture gives point to my statement that an operator was listed for his circuit for practically the whole of his duty, in contradistinction to that which now obtains when, apart from the large number of officers of varying grades required to be upstanding, we have the spectacle at each hour of a general uprising of the staff for change from one circuit to another with its resultant loss of time (very considerable in the aggregate) and consequent effect upon output. In this respect I would venture to suggest that the staff would greatly assist the Administration by being a little less insistent that these hourly changes should be made.

Another picture shows a Circulation Table—and here again the simplification of the then circulating methods is exemplified by the small number of circulators at the table as compared with now. In those days circulation work in the Central Telegraph Office was specialised and there was a circulation staff proper. Primary sorting for Provincial stations only was performed, the telegraph learners engaged upon distributing work being required to learn the respective transmitting station of all telegrams placed in his or her box, and when uncertain of this to consult a simple reference book kept at a particular spot in the division to which he or she was attached—excellent training for the budding telegraphist. As regards the more complicated Metropolitan marking, this was done at the various circulation tables where the staff was sufficiently expert to be able to mark telegrams to a large extent from expert knowledge and with but little reference to circulation books.

* Paper read before the Telephone and Telegraph Society of London.

This somewhat simple system went by the board in the earlier years of the present century when it was decided to mark all telegrams with the code of their transmitting office at the Provincial circulation tables and to abolish the circulating or code book in the Divisions. Later and in more recent years Metropolitan marking was specialised at a given point in the Metropolitan Gallery, and although this relieved the congestion at the Provincial tables the many changes of staff at this particular Metropolitan circulation point has not eliminated to any great extent the necessity for book reference.

Subsequent to the introduction of secondary marking at the tables it was found that the retention of women telegraphists on permanent circulation duties did not allow of a number of them being certified as able to perform efficiently all the duties of their class and so qualify for the Barrier increment. As a result it was found necessary to break down permanent circulation work and place telegraphists on part operating and part circulation work. As a consequence expertness on this particular class of work has greatly decreased, resulting in the necessity for the employment of more staff at the circulation tables by reason of increased book reference and adding much additional work in making the necessary corrections and increasing the number of books in use.

The establishment of a permanent circulation staff for the Central Telegraph office has on various occasions been considered, but for certain reasons, chief among which was that circulation duties provided relief from operating duties, it was not adopted. My own view is that not only would considerable economy be effected by such an establishment but that circulation work would be expedited by being in the hands of none but expert officers.

Some measure of economy might also, I think, be obtained in connexion with International working. In the year 1889 the various leases and concessions held by the Submarine Telegraph Company expired and the Post Office then took over the working of all their Continental cables together with the Company's staff. Under the Submarine Company's regime the traffic for the more important Continental cities had been signalled to a few transmitting centres in the respective countries, such as Paris, Havre, Berlin, Hamburg, Emden, Amsterdam, Brussels, Antwerp, &c.

Under Post office working further direct communication was established, and at the present time, apart from the Imperial Cable and Wireless working, London is working directly to many towns in France, Germany, Italy, Switzerland, Holland, Belgium and Norway. For example, London works direct to such French offices as Paris (Central *and* Bourse offices), Havre, Lille, Bordeaux, Calais, Boulogne, Lyons and Marseilles, and to such German offices as Berlin, Hamburg, Frankfurt, Emden, Leipzig, Bremen, and Cologne. While, however, London works direct to these and certain other towns in other countries, those countries work direct to London only, if we except Liverpool, which has direct communication with Paris, Havre and Antwerp. Consequently, while London is required to work with all these various towns, it has, on the other hand, to receive all traffic from such offices and re-transmit other than that for London. It does not seem quite consistent that, with the exceptions quoted, London should be the only town in the British Isles to which Continental cities work direct and yet has to feed France, Germany, &c., through many offices other than their capitals. It seems only fair, therefore, that direct communication between countries should be made, say, to their capitals, leaving the capitals to do their own re-transmissions to the towns in their respective countries as London is required to do for the British Isles and beyond. Unless international regulations are against this, considerable economy in staff, apparatus and lines could be obtained by direct working between capitals only, as it is obvious that the telegraph loads for the respective countries could be more economically handled between capitals than when one country is working to some 7 or 8 towns in another.

Ladies and Gentlemen, I could continue in this present strain at some length, but I do not wish to weary you. I have endeavoured to show that there is a good case for Administration and Staff alike to co-operate and do everything possible to put the Telegraph Service in such a position as to make it a revenue-earning concern. And in this connexion I feel that the Whitley machinery would prove a happy medium for co-ordination and co-operation and that much good would result if both the official and staff sides would discuss the ways and means of achieving this.

Nothing can be gained without some sacrifice. What is required is greater incentive, larger co-operation and increased output. It is true the Post Office Department as a whole yields a splendid revenue, but I feel sure that the staff of the Telegraph Service would infinitely rather that it should at least pay its way than be a dependent upon other branches of the Post Office Service for its existence.

It will, I think, be agreed that the past 56 years of Government Telegraphs provides an interesting study. During that long period the changes have been many and varied. Excellent public service has been rendered without, I fear, receiving the appreciation deserved. It is, perhaps, only in recent years that the ordinary public has been enlightened to any extent as regards telegraphy as a consequence of the introduction of wireless in the homes, and it is unfortunate for all engaged in the profession of Telegraphy that the mere sending and receipt of a telegram is looked upon by the public in little higher sense than the mere posting and receipt of a letter, except that it is more costly.

One can always be wise after an event, and there is little doubt that if the Telegraph Service was only now being established and could have the benefit of its 56 years' experience, much that has been done in the past would have remained undone. Blame for any errors of administration would be difficult to place and no useful result would now accrue were it possible to do so. The Service commenced in a small way, grew up very fast, and became exceedingly vigorous in its prime. At the present time it is in some sort of a decline and requires, perhaps, the essential tonic. If we to-night are able to provide at least one of the ingredients, our time will not have been spent in vain.

In writing this paper I have had no desire to be unduly critical of past and present methods. I have endeavoured to be strictly honest in my views both in regard to the Department which it has been my good fortune to serve for so long a period and to my colleagues of the Telegraph Service with whom it has been a pleasure to be associated. I have passed out of the Service, but I can venture the assurance that my interest in the Telegraph Service will ever be very keen.

I have every sympathy with the efforts made from time to time to obtain improved conditions of employment. Many of such efforts have been successful in the past and I think it will be agreed that there is now a vast difference in the scales of remuneration and conditions of service as compared with those when I first entered the Service. It is, however, fairly obvious that improved conditions cannot continue to be obtained while the loss on Telegraphs increases year by year, and it is therefore incumbent upon everyone connected with the Service to do all possible in his or her own interest and in the interest of the Department he or she is required to serve, to put Telegraphs on a revenue-earning basis. If anything I have advanced to-night will in any way aid the difficulties under which the Telegraph Service is labouring, I shall be the happier for it. On the other hand, if any of my suggestions may seem detrimental to the personal interests of anyone whose vocation is Telegraphy I must claim indulgence. Honesty needs no disguise nor ornament, and nothing is achieved before it is thoroughly attempted. I thank you for your patient hearing.

AUTOMATIC TELEPHONY.

BY C. W. BROWN.

(VI—*Continued from page* 246.)

IN Fig. 5 a more complicated scheme is shown. The area is assumed to contain a main exchange and four satellites of different capacities. The fig. is given to indicate the extent to which the scheme may be used and is an extension of the arrangement previously explained. Switching selector repeaters are provided at satellite No. 1 only. In the remaining cases, the satellite

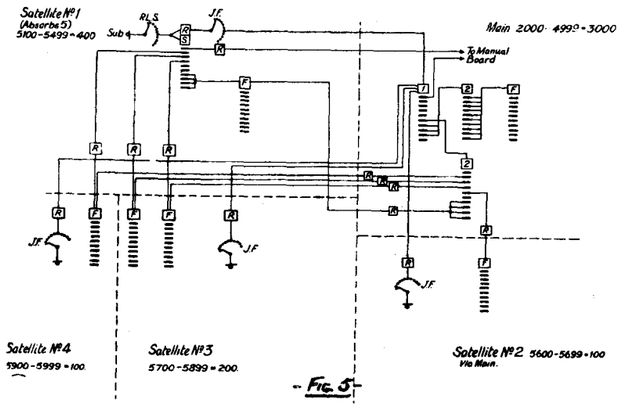


FIG. 5.

exchanges route all originated traffic via the main exchange. The digit 5 is individual to the satellite exchanges, hence on the 5th level of the switching selector repeaters at satellite exchange No. 1, this digit is "absorbed" and discrimination is arranged when the digit is dialled.

Calls from satellite No. 1 to the r
routed as follows :—

Satellite No. 1 *to Satellite No.* 2.

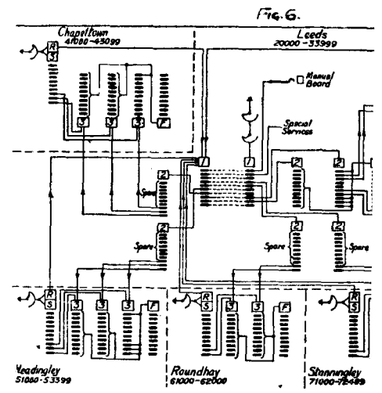
The S.S.R. (switching selector rep
the main exchange rise to the 5th level,
1st selector extends to a second selecto
is disconnected on the S.S.R. which no
level 6 of the main exchange 2nd selector
in satellite No. 2, the tens and units
final selector in satellite No. 2.

Satellite No. 1 *to Satellite No.* 3.

The S.S.R. and 1st selector in the
5th level, S.S.R. releases and 1st selector
The next digit will be 7 or 8, and the
level and extend to a final selector in sa
to and the selectors in the main exchan
functions as a second selector.

Satellite No. 1 *to Satellite No.* 4.

The operation will be similar to t
second digit is 9, from this level of th
extended to final selectors in satellite N



Satellite No. 1 *to the Main Exchange.*

The first digit will be 2, 3, or 4, so
occur, and the wipers of the S.S.R. re
passing into the main exchange network
as a repeater.

It will be left to the reader to
exchanges, if he so desires.

That economy in switches and junc
when a discriminating scheme such as

The application of a discriminatin
shown in Fig. 6 which gives the grou

The main exchange has a capacit
satellites are all large. In each of the s
selector repeaters are fitted and the firs
saving of selectors results in each c
unnecessary.

Mention has already been made o
numbers. The use of four digits enable
consequently four digits will be gener
exchange and the larger satellites, five d
requirements when the four digit n
any case, the use of four digits for e
and five digits for all or part of exchan
to be a sound economic basis for pr
frequently occurs in practice.

Calls from satellite No. 1 to the remaining exchanges will be routed as follows :—

Satellite No. 1 *to Satellite No.* 2.

The S.S.R. (switching selector repeater) and 1st selector in the main exchange rise to the 5th level, the S.S.R. releases and the 1st selector extends to a second selector. Digit 6 dialled, level 6 is disconnected on the S.S.R. which now functions as a repeater, level 6 of the main exchange 2nd selector is extended to final selectors in satellite No. 2, the tens and units digits therefore pass into a final selector in satellite No. 2.

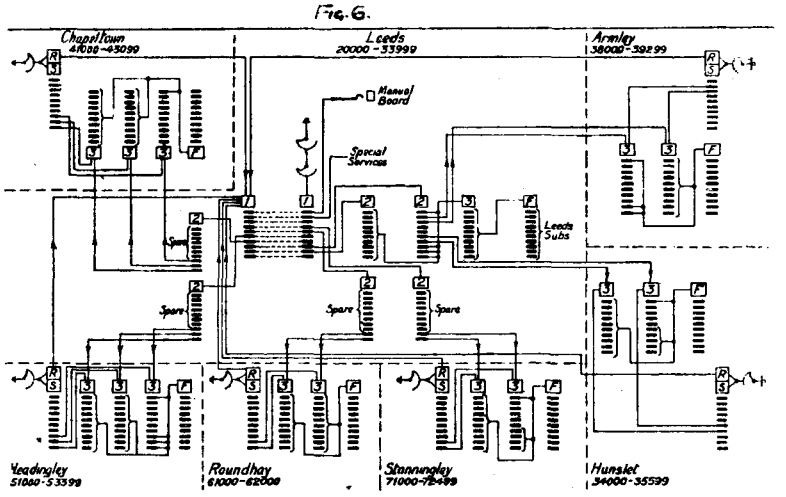
Satellite No. 1 *to Satellite No.* 3.

The S.S.R. and 1st selector in the main exchange rise to the 5th level, S.S.R. releases and 1st selector extends to a second selector. The next digit will be 7 or 8, and the S.S.R. wipers will enter the level and extend to a final selector in satellite No. 3. The junction to and the selectors in the main exchange are released. The S.S.R. functions as a second selector.

Satellite No. 1 *to Satellite No.* 4.

The operation will be similar to the above, except that the second digit is 9, from this level of the S.S.R. the caller will be extended to final selectors in satellite No. 4.

FIG. 6.



Satellite No. 1 *to the Main Exchange.*

The first digit will be 2, 3, or 4, so that discrimination does not occur, and the wipers of the S.S.R. remain disconnected, the call passing into the main exchange network with the S.S.R. functioning as a repeater.

It will be left to the reader to trace calls from the other exchanges, if he so desires.

That economy in switches and junctions occurs will be apparent when a discriminating scheme such as that described is applied.

The application of a discriminating scheme to a large area is shown in Fig. 6 which gives the grouping for an actual case.

The main exchange has a capacity for 14,000 lines, and the satellites are all large. In each of the satellite exchanges, switching selector repeaters are fitted and the first digit is absorbed, hence a saving of selectors results in each case, second selectors being unnecessary.

Mention has already been made of mixed four and five digit numbers. The use of four digits enables economy in selectors, and consequently four digits will be generally allocated to the main exchange and the larger satellites, five digits being used for ultimate requirements when the four digit numbers are exhausted. In any case, the use of four digits for exchanges with heavy traffic and five digits for all or part of exchanges with light traffic appears to be a sound economic basis for provision, thus such division frequently occurs in practice.

VII.

SOME indication of the limitations of multi-exchange working has already been given. The schemes mentioned cannot be economically applied to a large city, i.e., a metropolitan area, because of the special and distinctive requirements that have to be catered for in such cases. It will be apparent that in a city having a number of large exchanges, wholesale changing of numbers must, if possible, be avoided, and subscribers permitted to retain their existing numbers as far as possible. Other considerations that arise are :—

1. Dialling a large number of digits must be avoided, in order to reduce the risk of wrong numbers and to prevent imposing additional work upon subscribers.
2. A well defined junction scheme will already exist to meet manual requirements. It is unlikely that the junction scheme will fit in with the needs of a normal multi-exchange automatic system.
3. The change of system (manual to automatic) will of necessity be spread over a long period, so that for a long time manual and automatic exchanges will be simultaneously in use. The method of operating must be uniform, i.e., the automatic subscriber will obtain manual subscribers by dialling and the manual subscriber will obtain automatic subscribers with the assistance of an operator. It would be detrimental to smooth working if, after the automatic subscriber has dialled a number of digits to reach a manual subscriber, an operator should challenge with " number, please." The caller would not unreasonably resent it.

The introduction of a scheme of translation makes possible the use of standard step-by-step apparatus in the case of a metropolitan area with the minimum disturbance to the arrangements already existing.

Modern translation schemes provide facilities that include the following, and in addition can be merged into a standard step-by-step system without alteration to the fundamental switching methods :—

1. Numbering and junction routing are dissociated, thus a fully flexible trunking scheme is possible, which enables the retention of junction " lending " centres.
2. The exchanges in the automatic area may remain self-contained as regards numbering.
3. Traffic may be deflected from one route to another without difficulty, thus new exchanges may be opened up as desired.

The objection to the dialling of a large number of digits is met by using a dial that has letters as well as numbers, as shown in Fig. 1, a glance at which will show that by dialling the letters A, B or C, two impulses are transmitted, and nine impulses when the letters W, X or Y are dialled.

The dial shown in the illustration has been standardised in this country for use in areas where a translation scheme is necessary. The electrical and mechanical features are identical with those of the dial already explained, having figures only. In areas where the lettered dial is used subscribers will dial letters and figures when setting up a call, thus a portion of the call will be in letters and a portion in figures, hence the risk of errors in dialling is minimised, if not eliminated. The British Authorities have decided that the exchanges within the fee area shall be of 10,000 lines ultimate capacity, and that a " three-letter code " shall be used. Subscribers will, therefore, dial three letters followed by four numerals for regular calls, but facilities are provided for completing calls by dialling a three-letter code only in certain instances.

It will be observed that letters are not included in the digit hole containing the digit 1. The reasons already given for the non-allocation of level 1 in a straight switching system are responsible for this feature. The letters Q and Z are not included, it being unlikely that exchange names will include these letters. In passing, it is remarked that exchange names having the initial letter O will not be used.

FIG. 1.

As there is some advantage in associating the letters dialled with exchange names, it is arranged that the three code letters shall be the first three letters of an exchange name, the directory is therefore arranged as indicated in Fig. 2, which is an extract from the London telephone directory.

As the result of the use of letters on the basis indicated, it follows that exchanges must not have names the first three letters of which will clash numerically, consequently when converting from manual to automatic working, the changing of some exchange names, even with a translational scheme, is inevitable in a very large city such as London, as the following will show :—

Exchange Name.	*Numerical equivalent of first three letters.*
Croydon	270
Bromley	270
Hampstead	426
Hammersmith	426
East	327
East Ham	327

In the foregoing cases, the name of one of the exchanges whose numerical equivalent clashes, has been changed.

A number of translational schemes are available ; that standardised by the Post Office is known as the Director system. The basic principle of the scheme provides for the conversion of the trains of impulses transmitted when the letters of an exchange name are dialled, into another combination of impulses suitable for directing the call to selectors from which junctions to the required exchange are connected ; dissociation of numbering and junctions is therefore provided. Thus the Director (this is the name given to the translator) is only in use while the call is being set up, which on an average occupies 18 seconds ; standard selector switches are used throughout the connexion.

As already mentioned, the exchanges concerned will have a four-digit numbering scheme, subscribers' numbers which have less than four digits under manual conditions will need to have one or more ciphers prefixed, thus there is a minimum disturbance to existing numbers, but in practice the prefixing of more than two ciphers will be avoided.

The use of the Director (itself a self-contained unit) has resulted in the introduction of certain additional switches. The fact that some of the impulses transmitted represent a code also introduces the expressions " code " and " numerical " with reference to the selectors operated by impulses representing code letters (exchange names) or numerals (subscribers' numbers). Thus the selectors that are operated by code impulses from the Director are recognised as " Code " selectors, and those operated by numerical impulses as " numerical " selectors.

The letters dialled by subscribers are known as the " A," " B " and " C " digits, quite irrespective of their alphabetical location, thus, in the code CRO, the letter C is the " A " digit, letter R the " B " digit and letter O the " C " digit. Of the additional switches referred to earlier there is an " A " digit selector and a BC digits selector, the latter switch is contained in the Director and forms part of it. As will no doubt have been inferred, the dialling of the first of the code letters will result in the operation of an " A " digit selector and the second and third letters a " BC " digits selector. It follows from this that if the " BC " switch is contained in the Director, the " A " digit switch will be the channel by which the Director is reached. The " A " digit selector is sometimes referred to as the Director selector.

In the London system an important additional switch is the first code selector, which is the channel through which subsequent code selectors (second, &c.) and numerical selectors are reached. The first code selector is arranged to function as a repeater on calls routed over junction routes, thus the use of separate repeaters in the junction circuits is unnecessary. Associated with the first code selector is the rotary line switch that gives access to the " A " digit switches. The relative positions of the various switches during the setting up of a call is given in Fig. 3.

King F. J. L,Elm Dene, Green E.4 .....Chingfrd 179
King & Flack,Sign, Ticket Writers,
230 Hornsey rd N.7.....NORth... 3868
King F. L, L.D.S, R.C.S.(Eng.),Dental
Surgeon,1A Peterborough rd.....HARrow.. 0119
6 Cavendish pl W.1.....MAYfair. 0541
King F. N,Limes School 13 Pk rd W.4.... CHIswick 2038
King & Foa,Billbrokers, CITy.... 0911
11 George yd E.C.3.....AVEnue.. 1454
King F. R,5 College rd Isleworth.....HOUnslow 0372
King Mrs. Frances K,
202 Marylebone rd N.W.1.....LANgham. 3254
King Francis E,26 Rotherwick rd N.W.11.SPEedwll 3776
King Francis F. & Son,Accountants &
Auditors,143 High Holborn W.C.1....MUSeum.. 2712
King Fras. J. L,17 Church hl E.17.....WALtmsto 1061
King Frank,8 Leamington gdns SevenKngsILFord.. 0077
King Frank,112 Wembley Hl rd.....WEMbley 1537
King Frank A,6 Wellmeadow rd S.E.13...LEE Gn.. 3044
King Frank E,F.I.C, Analytical Consulting
Chemist,32 Brooke st E.C.1.....HOLborn. 1832
King Frank H,6 Cromford rd S.W.18.....PUTney.. 4684

FIG. 2.

The allocation of Directors from the levels of " A " digit switches is shown in Fig. 4. As already explained, the first level is spare and consequently the " A " digit switches are arranged to release should they be irregularly operated to that level. In order to cater for " O " (operator) calls and to avoid the use of special Directors, it is arranged to use certain of the Directors of other

levels and to connect the " O " level bank contacts to the selected contacts of the regular levels, the Directors so used are specially equipped with apparatus—actually one additional relay only is required—for dealing with single digit calls ; the wiring connexions between the bank contacts of the " O " level and the regular levels is so arranged that the special relay will operate only when the Director is seized from the " O " level.

In addition to single digit calls, the Director is arranged to give full translation on " code only " calls, such as :—

TRU for Trunk calls.

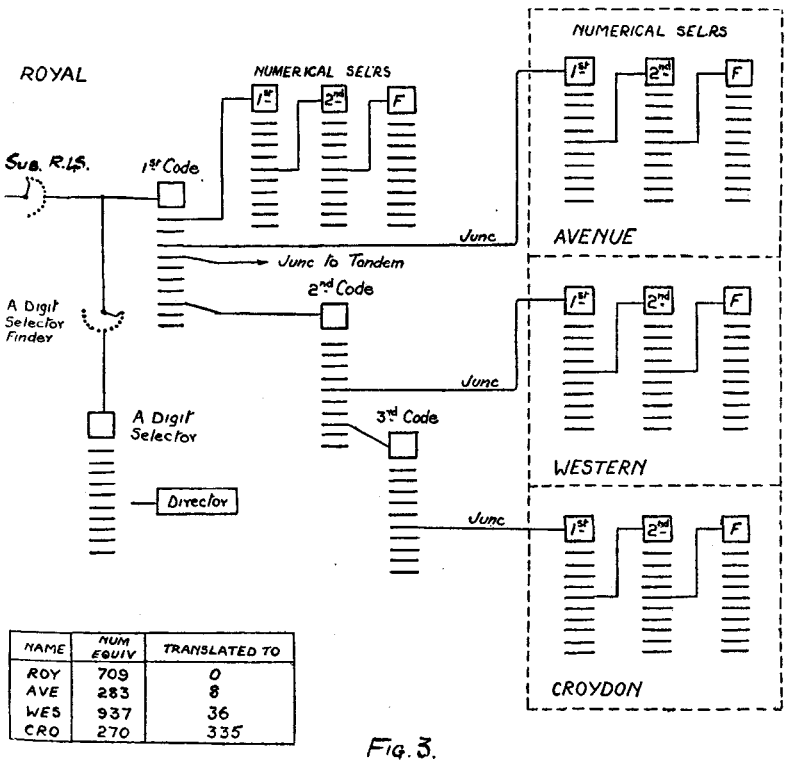
TOL for Toll calls.

TEL for Telegram service.

DIR for Enquiry calls. The absence of the letter Q from the dial precludes the use of the code ENQ for this service.

In each of the foregoing calls the caller is routed to the relative manual position, either locally or centralised as may be necessary.

It is, of course, possible to utilise the translational scheme and dial less than three code letters ; assuming that two code letters are concerned, the " A " digit selector would be dispensed with and Directors connected direct to the bank contacts of the " A " digit finder (rotary line switch) which would then become a Director finder. On the other hand, it is unlikely that translation would be necessary with a two-letter scheme, as the area concerned would be comparatively small and it would doubtless be economical to arrange the junctions on selector levels that can be reached by direct dialling of the letters concerned, but in very large areas economy in selectors results from the use of a translation scheme. As an example, in the case of a 3-letter code scheme without



NAME	NUM EQUIV	TRANSLATED TO
ROY	709	0
AVE	283	8
WES	937	36
CRO	270	335

FIG. 3.

translation, apart from the inflexibility of the arrangement, a large number of code selectors will be necessary on the local level (the level via which local calls are routed) that are unnecessary when a translation scheme is used. This will be clear from Fig. 3 from which it will be seen that 2nd and 3rd code selectors are not used for local calls.

Fig. 5 is a picture of a Director, which consists of the following main items of apparatus :—

1. A " BC " selector. This is a standard two-motion switch with three pairs of wipers and three-line banks—sometimes referred to as a 600-point switch, due to the total number of contacts being 600, three banks containing 100 pairs of contacts.

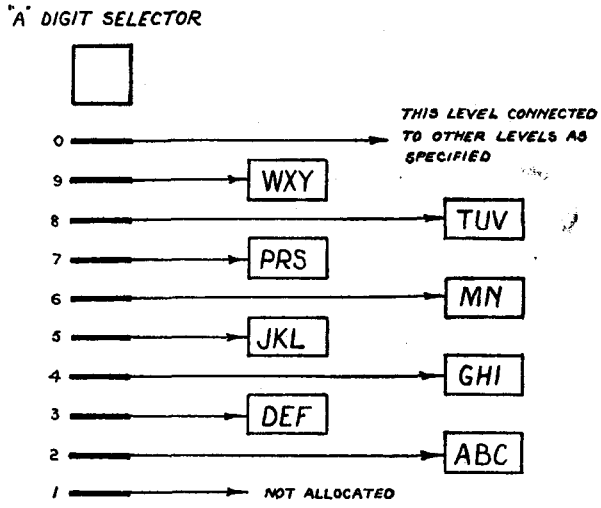


FIG. 4.

2. A digit or impulse distributor. This is either a 10-contact line switch or a " minor switch " already described. The distributor transfers the dialled impulses to the respective switch magnets and is released when the Director has fully discharged a call.

3. Four registers. These are either 10-contact line switches or " minor switches." They are operated respectively by the thousands, hundreds, tens and units trains of impulses, i.e., the called subscribers' number. The registers are released when the Director has discharged a call.

4. A sender. This is a standard 25-contact rotary line switch and bank. The sender operates—steps—while impulses are being sent out by the Director. The wipers are stepped to the bank contact corresponding to the number of impulses sent out and then return to the " home " position. The sender might be said to open and close the source of impulse supply, as the actual impulses are sent from a machine, hence the word " sender " should not be misunderstood.

5. A sender control switch. This also is a standard 25-contact rotary line switch and bank. The wipers are moved one step after each train of impulses passes out from the Director. It controls the sequence of the trains of impulses sent out by the Director.

6. A number of relays for the establishment of the many circuits, supervisory lamp, testing jack and a key complete the items.

The director has associated with it a cross-connexion field, in which the necessary connexions for translation are made. The cross-connection field will be seen at the right of Fig. 5. Fig. 6 is a diagrammatic representation of the cross-connection field and shows also the connexions for a typical translation. The six blocks of tags on the left of the Fig. are wired to the bank contacts of the BC switch. As level 1 and contacts No. 1 of each level are not used (there are no letters in the No. 1 digit hole of the

dial, as already explained), they do not appear on the cross-connexion field. The centre group of tags numbered 1 to 6 are used for the purpose of maintaining an alphabetical sequence for exchange codes, jumper wires are connected between the BC bank contact positions (six in number) and the exchange terms tags allocated to the various exchanges. On the right are six blocks of tags numbered horizontally 1 to 0; these contacts are commoned

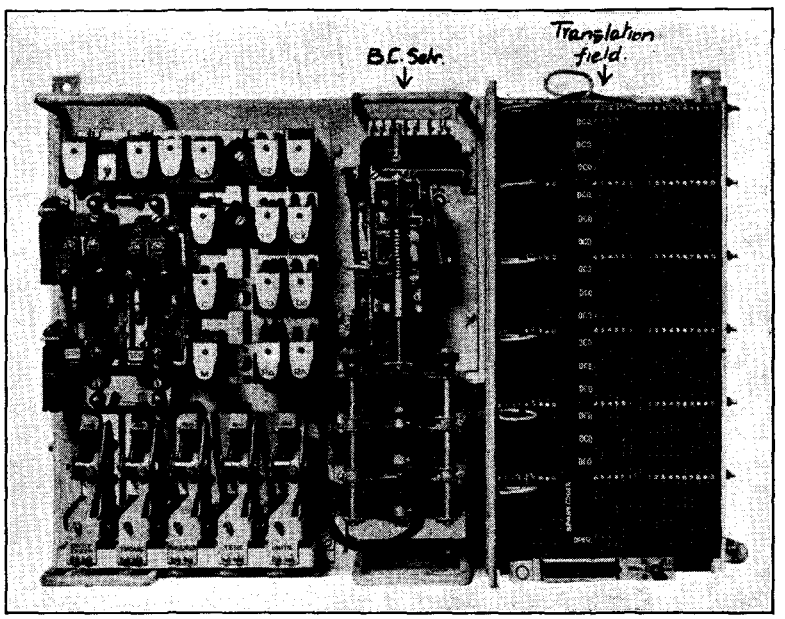


FIG. 5.

vertically and are cabled to the sender bank and also to the four register switch banks. Connexions are made between the exchange terms tags and the sender bank tags by means of short lengths of wire, as required. It will be seen that the maximum number of impulse trains that can be used for any exchange is six, but less than this number can be used. For instance, the numerical equivalent of ADDiscombe is 233, which, when dialled, will have operated the BC switch to third level and the third contact. Assuming that it is required to send out six trains of impulses to reach Addiscombe exchange, that is the junctions are located on the banks of a switch that can only be reached via five preceding switches, then it will be necessary to connect the six exchange terms tags allocated to Addiscombe to the six adjacent sender tags in such a manner that the correct trains are sent out in succession. Let it be supposed that it is necessary to send 357238, the following connexions will be required between the two groups of tags :—

Exchange terms tags.		*Adjacent sender tags.*
1	connect to	3
2	,,	5
3	,,	7
4	,,	2
5	,,	3
6	,,	8

Junctions to Addiscombe will therefore be located on the 8th level of the 6th switch ahead of the Director.

Referring again to Figs. 5 and 6, it will be observed that interspersed between the exchange terms tags are rows of tags marked DCO; this is an abbreviation for "digit cancel out." If it is not required to send out the full six trains of impulses to reach an exchange, the number short of six are cancelled. If, instead of the six trains already mentioned for reaching Addiscombe, it is only necessary to send, say, three, i.e., 357, then exchange terms tags 4, 5 and 6 will be strapped to the DCO tags immediately below them. A typical translation using two trains is given in Fig. 6. In passing, it is mentioned that the impulses transmitted from the Director are standard, i.e., the break-to-make ratio is 2 : 1, and are derived from machine operated cams.

In order to reduce the holding time of A digit selectors and Directors to a minimum, the circuits are so arranged that upon the receipt, in the Director, of the C digit, sending of the translated code impulses commences, the calling party will be dialling the numerals of the wanted subscriber at the same time, so that, assuming the call is proceeding normally, the code selectors are being set up to extend the connexion to the numerical selectors in the required exchange, without waiting for the whole of the call to be received in the Director.

The number of exchanges that can be reached from a Director on a three-letter code basis is 81. This will be clear when it is appreciated that the number of possible positions to which the BC switch wipers can be directed is 81, i.e., 9 levels of 9 contacts. It is unlikely that such a large number of exchanges per A digit switch level will be required, hence, the cross-connexion field of Directors is constructed to accommodate 54 exchanges, i.e., by eliminating the special tags (DCO and Operator) there will be available for exchange terms, six blocks of 9 sets of tags, i.e., 54. Without disturbing the special tag allocation, there is capacity for 35 exchanges, which in the case of London is expected to meet all requirements.

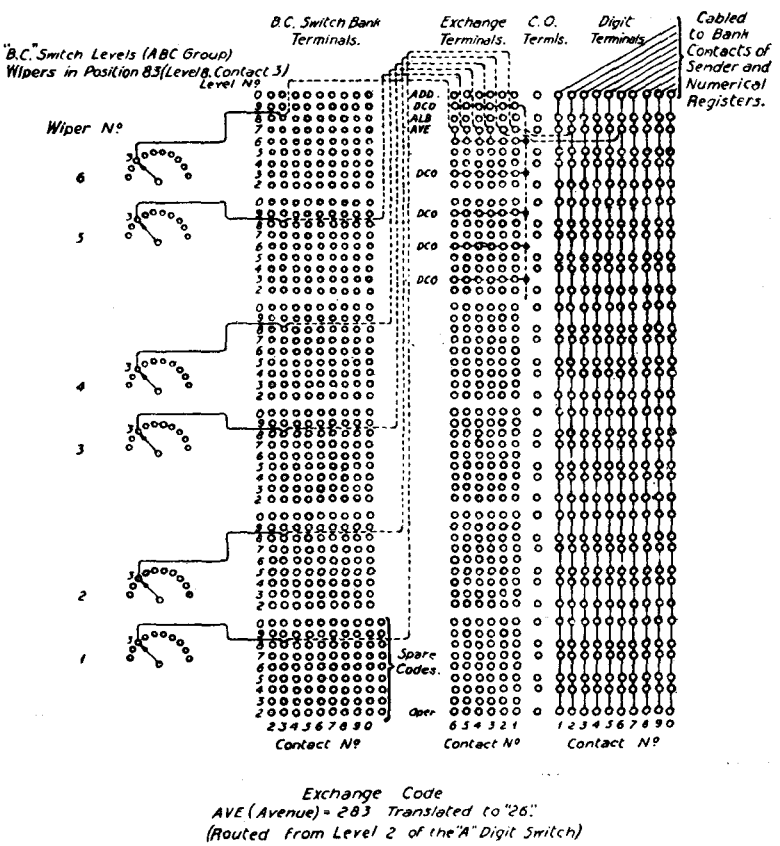


FIG. 6.

It follows from the foregoing that the number of exchanges that can be reached by a caller will be determined by the number of levels available on the A digit switch; these are eight in number (levels 1 and 0 are not used for A digits) and as the level capacity is 81, the theoretical capacity of A digit switches is 81 by 8, i.e., 648 exchanges. Even after excluding combinations that would

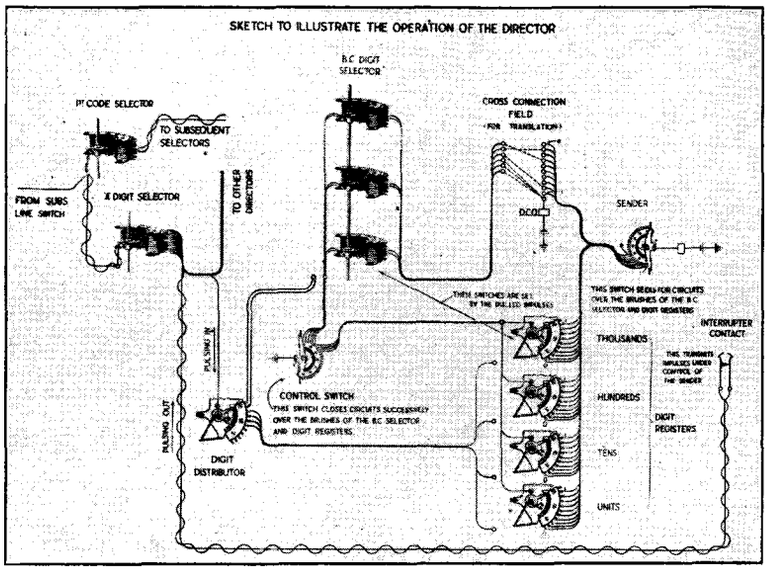


FIG. 7.

not normally be used, it will be seen that a very large number of exchanges can be catered for under translational conditions.

The situation of A digit switches and Directors in a "bottle-neck" makes it necessary to provide adequate safeguards against "blocking" channels due to the existence of abnormal conditions. The following summary indicates the facilities provided accordingly :—

Nature of abnormal condition.	*Resultant effect.*
1. Sub. removes receiver but delays to dial—or a fault occurs that extends a sub.'s line to an A. digit switch.	A digit switch released after 29-59 seconds. If dial is operated, caller receives N.U. tone.
2. Director seized, but sub. delays to dial remainder of call, or Director operated and sub. delays.	A digit switch and Director released after 29-59 seconds. Caller receives N.U. tone. All switches set up beyond the 1st code selector are released.
3. Impulsing springs of Director faulty.	Director released and made "busy." Director supervisory lamp flashes at 0.75 seconds intervals. Audible alarm given.
4. Director fails to release after discharging a call.	A digit switch released and caller receives N.U. tone. Director made "busy" lamp flashes as above, audible alarm given.
5. Sub. dials prematurely ...	Receives N.U. tone.

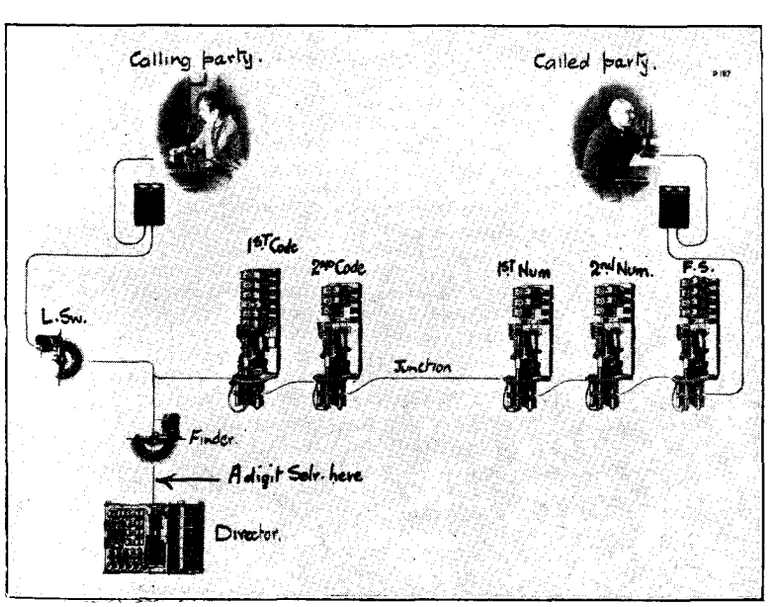


FIG. 8.

Figs. 7 and 8 show the position occupied by the various switches involved in the setting up of calls under the translational conditions adopted by the Post Office.

(To be continued.)

EXTENSIONS OF THE ANGLO-CONTINENTAL TELEPHONE SERVICES TO NORWAY AND OF THE TRANSATLANTIC SERVICE TO CANADA.

As we go to press, we learn that telephone service will be opened between the London district and Oslo (NORWAY) on Oct. 1. The charges for a unit call of 3 minutes will be £1 2*s.* 6*d.* from 8 a.m. to 9 p.m., and 13*s.* 6*d.* from 9 p.m. to 8 a.m.

On Oct. 3 telephone service will be opened between the hours of 12.30 and 11 p.m. (British time) between the London Telephone Area and Ottawa, Quebec, Montreal, Toronto, and Hamilton (Ontario) in CANADA. The charge for a 3-minute call will be £15, and £5 for each additional minute or part thereof.

"THE G.P.O. PLAYERS" DRAMATIC SOCIETY.

THIS Society is presenting Karel Capek's R. U. R. ("Rossum's Universal Robots") at King George's Hall, Caroline Street, Great Russell Street, W.C. (two minutes from Tottenham Court Road Station), on Friday and Saturday, Oct. 28 and 29, 1927, commencing at 7.30 p.m. The play is being produced by Major H. Hodgson-Bentley (founder and director, Southend Repertory Theatre). The prices of admission are : Orchestra Stalls, 5*s.* 9*d.* and 3*s.* 6*d.*; Circle, 3*s.* 6*d.*, 2*s.* 4*d.*, 1*s.* 6*d.*; Pit Stalls, 2*s.* 4*d.* and 1*s.* 6*d.*; including tax. Tickets may be obtained from any member of the Society or from the Honorary Secretary, Mr. C. N. J. Leigh, Room 12, Third Floor, G.P.O. North, E.C.1.

THE EARLY DAYS OF THE TELEPHONE.

IT is interesting to see how little impression the telephone made on people when it was introduced here fifty years ago, says the *Manchester Guardian*. Lady Frederick Cavendish has two casual references to it in her recently published diaries, but she herself does not seem to have taken it seriously at first. When staying at Battle Abbey in February, 1878, she notes : "Sun. evening a wretched new craze called a telephone was brought into play, and F. kept at work shouting down it for a long time ; on the whole a failure." That she became more reconciled to it seems evident, however, for, the second time it is mentioned (in 1881) is in less unflattering terms. "That enchanting new marvel, a *telephone*, has been put up, whereby Castle and Rectory converse *ad libitum*. Uncle W., who is in some respects the greatest Tory out, will have nothing to say to it." This was at Hawarden, and "Uncle W.," of course, Mr. Gladstone.

BLOOMSBURY AND ITS KIOSKS.

BLOOMSBURY has been subjected to as many cheap and pointless witticisms as the town of Wigan, the inhabitants of Aberdeen, and mothers-in-law.

At first glance it is not easy to understand why the district should be chosen from among the residential neighbourhoods of London to be the target of the flippant attack and the threadbare gibe. It is an accessible and, in many respects, a desirable district in which to live. It has wide squares and spacious thoroughfares. It possesses streets of dignified Georgian and Early Victorian houses. It contains the British Museum—the grandest concentration in the world, as Ruskin tells us, of the means of human knowledge—University College, and many other educational and literary institutions. Authors, artists and members of Parliament live in it. It may fairly lay claim to an atmosphere of culture superior to that enjoyed by any other locality in London. Lastly, it stands on high ground and is healthy in consequence.

In proportion to its size Bloomsbury contains more boarding and apartment houses than any other locality or town. Due to the fact that all three great railway routes from the north terminate on its fringe, these houses are much frequented by visitors from Lancashire, Yorkshire and Scotland, and, as such visitors have little difficulty in more than holding their own when it comes to a question of bargaining, the prices charged for accommodation and food have become more or less stabilised at moderate levels. Probably it is this fact—for Bloomsbury is known to the outside world, not by its squares and gardens and colleges, but by its boarding houses—*that has given rise to the prevailing impression that it is a second-rate neigh*-bourhood, a rather cheap, rather tawdry, neighbourhood, a shabbily genteel neighbourhood, a dowdy and frowsy neighbourhood, a neighbourhood which stands relatively to other parts of London as, shall we say, Southend-on-Sea to the general run of seaside resorts. People who write books refer to it in apologetic, if not actually slighting, terms. In plays it is invariably held up to invidious remark. "They call the place where I live 'Bloomsbury,' the old second-hand bookseller in "Liberty Hall" says, in disgruntled tones which in themselves constitute a libel on the neighbourhood. "They call my 'ouse a ramblin' one," he goes on to say, "though why it ain't rambled away to some nicer place, I can't think."

It may be as well to explain, before passing on to the subject of the kiosks, that there are two Bloomsburys, not one, as is generally supposed. The first, the better Bloomsbury, lies on the western side, between those two great avenues of traffic known as Tottenham Court Road and Southampton Row. It contains many beautiful and imposing squares, of which Bedford and Russell Square are the best known. The second Bloomsbury lies between Southampton Row and Gray's Inn Road. It is, it must be admitted, a shabbier Bloomsbury. It is a poor relation of the other Bloomsbury. Pre-eminent in it is Mecklenburgh Square, preserving a calm, collegiate air amid surroundings from which the old-time quiet dignity and charm have departed. The inhabitants of the square will tell you that the neighbourhood is not what it was. But then, according to the people who live there, no neighbourhood ever is what it was.

The best point to start for a walk through Bloomsbury is from King's Cross, the north-eastern corner of the lesser Bloomsbury. It is the best, I mean, from the point of view of kiosks, for there, almost immediately opposite the great towers of St. Pancras Station, which rises out from its drab surroundings like a cathedral,, with arched windows, turrets and belfry complete, boldly, and almost impudently facing it, are two—two—of the Gilbert Scott kiosks. It is well to stress the number because, of the six hundred kiosk sites in London, not more than a dozen are group sites, sites, that is to say, each of which accommodates two or more kiosks. At the moment of writing I can recall eleven group sites—there may be one or two more. They are the sites at the Giltspur Street side of St. Martins-le-Grand, the Law Courts in the Strand, Mount Pleasant, the Embankment beside Telephone House, Vere Street in Mayfair, Sloane Square and World's End in Chelsea, Portland Street Station, Church End Finchley, Acton (the Mount), and this one at King's Cross. Here we started with one in September, 1926. Eight months later we added the second. There is no reason why we should not go on adding. The pavement is extraordinarily wide—thirty feet or thereabouts between the kerb and the building line—there is room for more, and there is a steadily increasing demand for the facilities afforded.

The site of the next kiosk in the list is not quite so prominent. It is further along Euston Road—half a mile or so. It stands at the end of a quiet street called Churchway, and faces St. Pancras Church. "There," I said to Barling—I was referring to the church—"is a disappointing work of art." Oh—I don't think I mentioned that Barling accompanied me on this walk. Barling is much interested in kiosks and, when he heard of my projected tour, he asked to be allowed to join. I could hardly refuse—not, of course, that I wanted to. You will want to know something about him. There are five departments of the Post Office, in addition to the London Telephone Service, which have to do with kiosks in some way or another—the Secretariat, the Accountant-General's Office, the Engineering Branch, the Stores Department, and—when it is proposed to erect a kiosk outside a Post Office—the Postal Service, and Barling is in one of these Departments. He is slightly above middle height, on the lean side, with a pale, intellectual cast of face, and slightly rounded shoulders. His hobbies are architecture and golf. He is by way of being an authority on ecclesiastical architecture, and has played golf patiently for a long number of years without having attained more than a humdrum efficiency in the game—his handicap is fifteen. He has a curious habit of wearing horn-rimmed spectacles out of doors, invariably wears suits of a slate-coloured material, and, for some reason which I have never been able to divine, still adheres to the double-breasted jacket. That is all, I think, I need say about Barling—at the moment, anyhow.

"It is handicapped by its surroundings," Barling observed, in reply to my remark. He went on to furnish quite a lot of interesting information about the church, to which, although I recognise that it is incumbent for a description of kiosk positions to take cognizance of the nature and purpose of neighbouring buildings, I am unable to make more than very brief reference here. I gathered that it was the first church in this country to be fashioned after the strict Grecian style, being modelled after one of the Athenian Temples. The pillars of the portico, Barling admitted, were ponderous and rather depressing, and the net result of the building of the church, he said, was a strong reaction in favour of the Gothic style. In sharp contrast, a little further away, stood a cool, grey, brick building, with a Doric portico facing the road. "The newly erected headquarters of the Society of Friends," Barling explained, "and the building which was awarded the medal of the Royal Institute of British Architects for the best London building of the year." I glanced at it with added interest. There was something of the Quaker lady about its look of grey composure and prim charm.

The next kiosk in the list was one in Tottenham Court Road, along which busy thoroughfare we turned a little further west. At its junction with Euston Road—a rather congested spot at which we have tried hard to find a site for a kiosk—stands the Adam and Eve tavern, interesting because it is the inn shown in Hogarth's celebrated "March to Finchley," a picture which may be seen in the picture gallery at the Foundling Hospital. The original inn is said to have been built on the site of a structure known locally as King John's Palace, though whether that unfortunate monarch ever lived there is open to question. Not much more than a century ago, a fact of interest to students of town development, the inn was quite a rural one, surrounded by gardens, a popular resort of jaded Londoners out for a walk into the country, and "Tothnam Court," which gave its name to the street, was originally a quiet secluded manor in the fields.

The Tottenham Court Road kiosk is hard by the Whitefield Memorial Church, a conspicuous red brick edifice, built on the site of the chapel put up by George Whitefield. The kiosk stands by the gate of what used to be the churchyard, but is now a public garden. Less than half the size of the Postman's Park, it is probably the smallest of the parks or open spaces under the jurisdiction of the London County Council. The immediate neighbourhood of the kiosk is rather dingy. Tottenham Court Road itself is not an inspiring street. It possesses neither the atmosphere of the city nor yet the repose of the West End. It has been described in many ways—mostly uncomplimentary. It is a street of varying widths of pavement. For irregularity of building line, the west side of the road is hard to beat among London streets The pavement varies in width from a few feet to twenty and it reaches its widest point where the kiosk stands. While I think of it, Barling, whose memory for these things is a continual source of wonder to me, mentioned that the original building of the famous old dissenting place of worship, built in 1756, was pulled down in 1890 to give place to the present building, but that the pulpit in which Whitefield—and also John Wesley—preached was still in existence.

To reach the next kiosk in the series we turned east to Southampton Row. The intervening territory is at present kiosk-less, but two sites have recently been obtained, one outside the Museum Exchange in Chenies Street, and another in Store Street, in front of a large building housing the staff of one of the big Oxford Street drapery firms. Both these streets turn off Tottenham Court Road.

The Southampton Row kiosk stands on private property at the end of Sicilian Avenue, a short modern arcade or, rather, colonnade, with a marble slabbed floor and some dozen shops of the bijou type on each of its two sides, connecting Bloomsbury Square with Southampton Row. It is closed to the public on one day of each year. The distance to the junction of Southampton Row and Holborn—from which the kiosk is plainly visible—is a hundred yards The site is a good one and another kiosk about here—possibly at the other end of the short avenue, although preferably standing side by side with the existing structure—may mature as soon as shopkeepers and frontagers realise that the facilities constitute an asset to their neighbourhood. In this connexion I spoke—soon after the present kiosk was put up—to the proprietor of a small restaurant in the area of influence. He was doubtful about the effect of the kiosk, guarded in his utterances. His wife was more outspoken. "It looks pretty when it's lit up," she said. It was not much but it was something—the Post Office get few bouquets of any kind nowadays. It indicated—although the reason given was not too substantial—that in this matter of the kiosk she had ranged herself on our side.

A few minutes' walk along Theobalds Road, a congested, irregular, tram-lined thoroughfare, brought us to the last kiosk in the series. It stands prominently at the north end of Bedford Row, a fine, wide, Georgian street with a pronounced legal atmosphere—it is, indeed, now tenanted almost entirely by solicitors. Ask any half-dozen men with a fair knowledge of London why Bedford Row is so called. Each will tell you that it is because the Duke of Bedford is the ground landlord. That ought not to be wrong, but it is ! In the seventeenth century a Bedford boy—Harpur by name—came to town, made a fortune, became Lord Mayor, and left ten acres of meadow land north of Holborn for the benefit of his native town. Hence the Harpur Trust, hence the famous Bedford School, and hence—Bedford Row.

The Row, which has several curious old passages leading into Holborn from the other end, flanks the western side of Gray's Inn, the most northerly of the four Inns of Court, described by Hawthorne as "a large, quiet domain close beside Holborn, with a large space of green sward enclosed within it."

The territory covered by Gray's Inn, which takes up the whole of this south-eastern corner of Bloomsbury—some writers will have it that Bloomsbury stops just short of the Inn—is at the moment unrelieved by the hospitable colouring of a Gilbert Scott kiosk. It is good to know that this reproach will shortly be removed, certain scruples on the part of the Benchers having been overcome, and that in the near future one of the familiar structures will be erected on the northern side of the Inn. Enter the Inn from Holborn, and you will emerge into the first and smaller of the two squares, the one containing the statue to Bacon. Do not take the opening leading through the archway at the end of the Chapel, which will take you into a second and larger square called Gray's Inn Square, but turn to the left, through the narrow passage at the north-west corner. You will come out into Field Court, with the large garden on your right. On the west side of the garden, at the northern end, you will see a block of buildings. In front of these, which are known as Raymond Buildings, will stand the kiosk.

Oh, before I close, I ought to mention that Barling had quite a lot to say about Gray's Inn. The Inn, he recalled, had been in existence as a School of Law since 1371. Bacon was its most illustrious member, and its Treasurer for nine years (1608-1617). Other eminent members were Thomas Cromwell, Archbishop Laud, and Burleigh. Bacon, whose memory is preserved in the name—Verulam Buildings—given to a block on the Gray's Inn Road side, planted some elm trees in the garden. With their disappearance—they have within recent years been superseded by planes—is said to have gone the last rookery in the middle of London. The spacious garden, no longer open to the public, was a fashionable resort during the seventeenth century, a fact to which, Barling thought, Pepys makes reference in his diary.

Barling's memory is pretty sound on points such as these, but, to make sure about the last item, I turned up my copy of Pepys when I got home. Barling was right—several entries in its pages showed that Gray's Inn Walk, a pleasant avenue through the gardens, was a favourite walk of the notorious gossip. Sometimes he was accompanied by his wife. More often, it would appear, he went alone. The earliest of the entries states that he went "after dinner to Graye's Inn Walk, all alone, and with great pleasure seeing the fine ladies walk there." Some time later Samuel appears to have gone to the same spot, this time with his wife, "to observe the fashions of the ladies, because of my wife making some clothes." Further on in the diary there is yet another entry. "Beside the sermon I was very well pleased with the sight of a fine lady that I have often seen walk in Graye's Inn Walk, and very pretty and sprightly she is."

C. W. M.

GUILDFORD.

THE Second Annual Cricket Match between the Guildford and Reading District Managers' Staffs was played on the Sports Ground, Guildford, on Sept. 3, and a most enjoyable game ended in a victory for the Guildford staff by 59 runs. The Reading staff took first knock but could not withstand the bowling of Stewart and Plant, the former taking 6 wickets for 12 runs and the latter 4 for 8, all being out for 25 runs. The Guildford innings reached a total of 84, Garrood 23, Ballam 18, and Stewart 16, being the chief scorers.

During the interval tea was partaken of when over 70 members and friends were entertained.

Reading Team.		*Guildford Team.*	
Luscombe, b. Stewart	0	Plant, c. Parsons, b. Beesley	12
Bradley, b. Stewart	1	Stewart, c. Luscombe, b. Beesley	16
Werry, b. Stewart	0	Freeman, c. Drescher, b. Miller	3
Beesley, b. Stewart	0	Ballam, b. Miller	18
Miller, b. Plant	1	Garrood, run out	23
Drescher, b. Plant	2	Turner, b. Beesley	2
Leeke, b. Stewart	5	Bartleet, c. Lane, b. Bradley	0
Parsons, b. Plant	0	Combes, c. Werry, b. Lane	2
Amey, b. Stewart	10	Bald, c. Bradley, b. Beesley	2
Stevens, b. Plant	0	Bayley, c. Bradley, b. Werry	0
Lane, not out	1	Gardner, not out	0
Extras	5	Extras	6
	25		84

RETIREMENT OF MR. WATERSTON.

JAS. A. WATERSTON, Head Postmaster of Evesham, who retires on the 16th inst., took first place at Open Competitive Examination in London in December, 1881, and was appointed 2nd Class Telegraphist in April, 1882, at the age of 14 years 6 months. He has been successively Head Postmaster of Glossop, Maldon and Evesham. Retires, at the age limit, after 45 years 6 months established service.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations in the Post Office system at July 31, 1927, was 1,548,716. The new stations added during July numbered 20,154 and the cessations 13,708, resulting in a net increase of 6,446 stations.

The growth for the month is summarised below :—

	London.	Provinces.
Telephone Stations—		
Total at July 31	547,238	1,001,478
Net increase for month	2,325	4,121
Residence Rate Subscribers—		
Total	120,458	195,061
Net increase	787	1,467
Call Office Stations—		
Total	4,843	17,771
Net increase	14	105
Kiosks—		
Total	576	2,964
Net increase	11	64
Rural Party Line Stations—		
Total	—	10,020
Net increase	—	—
Rural Railway Stations connected with Exchange System—		
Total	—	796
Net increase	—	13

The number of inland trunk calls dealt with during June (the latest statistics available) was 8,462,399, an increase of 377,625, or 4.7%, on the figure for the corresponding month last year.

Calls made to the Continent during June numbered 25,937 and from the Continent 27,707.

Further progress was made during the month of August with the development of the local exchange system. New Exchanges opened included the following :—

LONDON—Tandem Junction Switching Exchange (preliminary position).

PROVINCES—Burnley (automatic).

And among the more important exchanges extended were :—

LONDON—Buckhurst, Clissold, Finchley, Mount View.

PROVINCES—Birmingham (Western), Birmingham (Victoria), Colwyn Bay, Hanley, Liverpool (Waterloo), Slough, Smethwick, Wokingham.

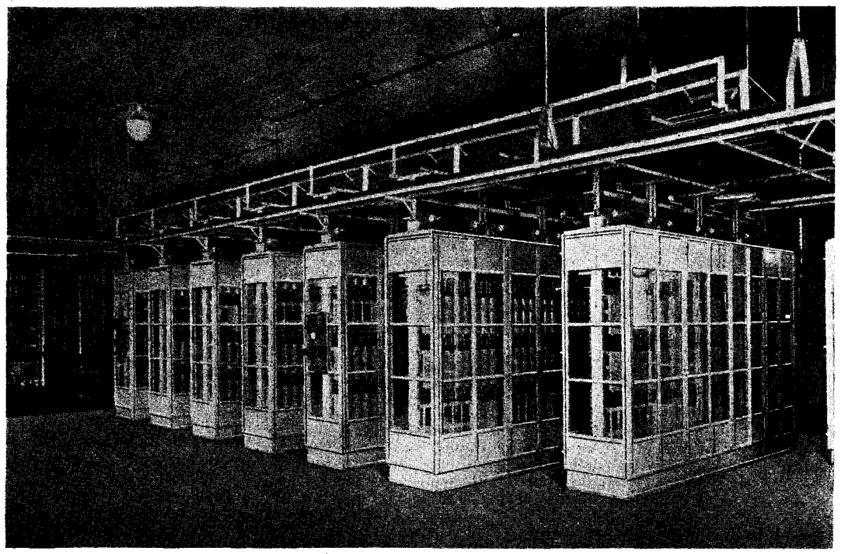
During the month the following additions to the main underground system were completed and brought into use :—

Tonypandy—Pentre,
Chester—Hawarden,
London—Dorking,
Junction Hengoed—Bargoed,

while 67 new overhead trunk circuits were completed, and 74 additional circuits were provided by means of spare wires in underground cables.

STROWGER AUTOMATIC TELEPHONE EQUIPMENT

Long Life and Durability.



Part of Strowger Automatic Exchange at Philadelphia, Pa., U.S.A.

STROWGER Automatic Telephone equipment has an inherently long life. This is due not only to manufacturing precision and careful inspection of raw material and finished product, but also to a design that permits of easy growth, expansion and increased traffic as changing conditions may require.

In even the oldest Strowger exchanges, some of them in operation twenty years or more, the service rendered is still satisfactory even when compared with modern standards. The equipment is kept up-to-date and adequate at all times by means of simple and economical readjustments and by easily installed additions as needed.

A telephone exchange which starts with Strowger can continue with Strowger, no matter what demands are made upon it.

Automatic Electric Inc.

Originators and Pioneer Manufacturers of the Strowger Automatic Telephone System
Chicago, Illinois, U.S.A.

The
Telegraph and Telephone Journal.

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Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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TELEGRAPH DEVELOPMENT.

THE statistics for 1925, just published by the International Bureau of Berne, show, despite the more rapid development of the telephone system, what a very considerable part the telegraph service plays in the communications of the world. Great Britain's route mileage has increased during the year from 166 to 177 thousand kilometres, and her mileage of wire from 439 to 447. That of France has increased from 212 to 224 thousand kilometres of route and from 820 to 845 thousand kilometres of wire. Germany's total length of route has decreased slightly to 222 thousand kilometres, while her development of wire has risen from 3,064 thousand to 3,537. Russia possesses over 623, Italy 364, and Japan 283 thousand kilometres of telegraph wire.

Turning to the traffic handled, we find that 49.7 million inland telegrams were dealt with in Great Britain, and 40.1 in France (representing a decrease of about 2 million in each case) while 32.8 million were despatched in Germany, an increase of 2½ million. Over 67 million were despatched in Japan, 20 in Russia and 26.8 million in Italy, representing an increase of 8 and 3 millions respectively.

International traffic has risen in Great Britain and in Germany to upwards of 27.4 and 17.4 million messages respectively, forming, in both of these countries, more than one-third of the total handled. Last year's increase in Great Britain amounted to over half a million messages. France dealt with 14½ million such messages, Czecho-Slovakia with 11 million, Italy with 7.25 million, Switzerland with 5.1 million, Sweden with 3.7 million, Poland and Norway with over 2 million, and Japan with 2½ million. It is interesting to note that in some States the international traffic is considerably heavier than the internal traffic. In Denmark, for example, there were 3.6 international telegrams to 1.3 internal, in Holland 6.3 to 2.5, in Sweden 3.7 to 2.9 and in Switzerland 5.1 to 1.3—all these figures representing millions of messages. In the Czecho-Slovakia service there were actually over 11 million international messages to 3.4 million inland, and in that of the Free city of Danzig 1,592,957 to 128,263 ! In some countries, too, the transit messages exceed in number those originating in or destined for their own people, Czecho-Slovakia, owing to its geographical position between Germany and the North and Austria and the South, having transmitted over 8 million telegrams across its territory from one foreign State to another.

The statistics dealing with apparatus show a general preponderance of Morse and sounder instruments, with telephones as a good second. Indeed, in Germany the first-named number 9,498 and the telephones employed in telegraph work 35,479. In France the figures are 18,474 and 8,901 respectively, in Great Britain 6,921 and 11,853, in Italy 12,683 and 779, in Japan 6,235 and 2,772, in Poland 1,996 and 2,197, and in Russia 7,134 and 739. Telegraph enthusiasts will gather from the formidable figures of mileage and traffic which we have cited that in Europe and Asia the elder of the electrical services is still a growing concern, and that for long-distance messages especially its sphere of usefulness is undiminished.

HIC ET UBIQUE.

WE have received from the Northampton Polytechnic Institute, St. John Street, E.C.1, a booklet of excerpts from announcements for the session 1927-28, giving particulars of evening classes in civil and mechanical engineering.

The courses comprise: Mechanical Engineering, Civil and Structural Engineering, University Degree Course in Engineering, Automobile Engineering, Aeronautical Engineering, Engineering Workshop Course, Pattern Making, Moulding (Brass and Iron), Brass Finishing, Smithing, Die Sinking and Press Tool Making, Oxy-Acetylene Welding and Cutting, and Scale Making.

The Institute, which is well known to our London readers, was open for enrolment from Sept. 19, and the classes commenced on the 26th.

Under the heading "Tele-talkative America," the *Electrical Review* says: "Statistics published by the American Telephone and Telegraph Company show that the telephone user in the United States makes an average of 191 calls each year, whereas the English subscriber makes an average of only 23 calls. Thus, in six weeks the American gets as much value from his telephone as the Englishman gets in twelve months.

"Tele-Talkative" is about the root of the matter. Does the number of calls always represent the value of the telephone ? If a man has but 1 yearly call for his doctor or 1 call in five years

for the fire brigade, he will still value the telephone because of the sense of security and the feeling of its availability.

The following reports, mostly from the *Electrical Review*, indicate the development of long-distance telephony which is proceeding in all parts of the world :—

JUGO-SLAVIA.—The Jugo Slavian Government propose to lay a series of new telephone trunk cables to link up important centres in different parts of the country, and to increase the facilities for conversation with important cities abroad, such as Vienna, Budapest, Prague, Brunn, and others. The main trunk lines to be established are four in number : one from Belgrade to Subotica and Horgos, on the Hungarian frontier ; the second between Ruma, Brod and Zagreb ; the third from Zagreb via Sevinca to Maribor and the Austrian frontier, and the fourth between Belgrade and Nish.

RUSSIA.—The Mukden and Soviet authorities have concluded agreements for providing long-distance telephone services between Harbin and Chita, and Harbin and Vladivostock. The total cost is estimated at $1,500,000, which will be borne equally by the Russian and Mukden authorities.

According to the *Financial Times*, a telephone cable service between Berlin and Moscow is to begin next autumn.

FRANCE.—The recent inauguration of telephone cables between Selestat and Basle and between Strasburg and Appenweier marks the completion of the underground system connecting Paris with eastern France and with European central and eastern countries. The Paris-Nancy underground cable, with an extension via Strasburg and Mulhouse, has also been linked up with the German underground system and with the Swiss system, with the result that Paris can now be quickly connected up to Luxemburg, the Saar district of Germany, and with Italy.

AUSTRIA.—Following the completion of the long-distance telephone line between Vienna and Passau, work is now in hand on the establishment of similar lines between Halbthurn, Vienna, Linz, Salzburg, Landeck, and the Swiss frontier, and between Innsbruck and Scharnitz Innsbruck and Brenner, and Brenner, and Wörgl and Zell-am-See.

BELGIUM.—As a result of the recent completion of the laying of underground telephone cables Brussels is now in telephonic communication with Berlin, Frankfort-on-Main, and Vienna. Antwerp is also now connected up with Berlin and Hamburg.

BRAZIL.—The Brazilian Telephone Company has now established interurban communication between most of the important cities and towns in the States of Rio de Janeiro, Sao Paulo, and South of Minas.

The following letter from a lady was recently received in the Secretary's office :—

Could you please oblige me by informing me the cost of a telephone directory (for Canterbury and District) dated 1830 to 1835.

This goes to show that many people fail to appreciate that so widespread an institution as the telephone was unheard of in this country before 1876.

In a letter to the *Spectator*, Mr. A. R. Kimball says :—

" Will you permit an old-time American reader, for the moment a visitor in London, to call your attention to the fact that in the States there are many more motor-cars owned than telephones ? I have just received from the Bureau of the American Census significant figures. During the year 1926 there were registered 22,001,393 individually and commercially owned motor vehicles of every description.

"The most recent statistics available for the calendar year 1922, show that at that time there were 14,347,395 telephones in use. [There are now 17¾ million.—EDITOR.]

" Perhaps the explanation of the fact that Americans have so many more motor vehicles, a luxury, than telephones, which many would regard as a necessity, is due to the extensive advertising of motor-cars as contrasted with the entire absence of advertising of telephones."

We rub our eyes, thinking at first that the writer is complaining of the alleged absence of advertising telephones in this country. We wonder what our friends, the A.T. & T. Co., think of this allegation.

An enquirer asks whether the proper function of the carbon granules in a telephone transmitter is that of rectifier, and, if so, whether it will convert an irritable " go to blazes " into the more formal and placid " sorry you have been ter-r-roubled." There is no prize for solving this conundrum !

The opening of Daventry Junior and the closing of the Birmingham Broadcasting Station by the B.B.C. has not pleased everybody. The chief difficulties of those in central Birmingham are due to inefficient receiving sets. We have it from Capt. Eckersley himself that on investigation of the complaint of one prominent resident, the troubles were traced consecutively to the use of an iron wire aerial, to a " flex " earth one wire only of which adhered to the water pipe, to a gap between the " cat's whisker " and its holder, to a variometer with a rotating knob and immovable works, and to inefficient headphones. That this contraption ever afforded reception of the Birmingham Station was indeed a miracle !

According to the *Times*, the automatic telephone service in Prague, inaugurated last year, now comprises 30,399 subscribers, and further extensions are planned. The service is working satisfactorily.

KINDNESS TO MACHINES.

By an unfortunate printer's error the second stanza of the verses published last month under this title was made to commence " Engines, automatic," which spoiled both the sense and the metre. The line should read :—

Engines, automata, are found to be
Amenable, &c.

A critic has pointed out that a calculagraph merely registers the time of calls but does not multiply. But it was only suggested that there is no knowing what a semi-sentient machine (*pace* Signor Azari) might not do if properly coaxed.

REVIEW.

" *Easy Lessons in Wireless.*" *By Robert W. Hutchinson, M.Sc., A.M.I.E.E. (The University Tutorial Press, Ltd., High Street, New Oxford Street, W.C. Price* 1*s.* 6*d.*)

This book, which is designed for the information of those possessing little or no technical knowledge of electricity and magnetism, is couched in simple language and, though based on sound scientific principles, carefully avoids the heavy reading and mathematical expositions so confusing to the beginner. It is written by a man who fully understands the art of imparting knowledge, and it can be recommended confidently to those on the threshold of the fascinating study of wireless.

THE RELAY AUTOMATIC TELEPHONE COMPANY LIMITED.

THIS company recently secured, in open tender, two important railway contracts.

The London & North Eastern Railway have placed a contract with them to replace the existing manual telephone system at King's Cross and Liverpool Street, and link up Marylebone with the new automatic system. The installation will be of the Relay P.A.B.X. type, and will follow the standard G.P.O. practice of giving conversations from the manual and automatic exchanges over the same lines.

The other contract is one placed with them by the Great Indian Peninsular Railway for the automatisation of its system into one network of interconnected exchanges, some of which are several hundred miles apart.

TELEGRAPHIC MEMORABILIA.

AUSTRALIA.—In the Australian Courts recently the Associated Telephone and Telegraph Co. (United States) applied for the extension, by 3½ years, of nine patents relating to automatic telephony, on account of loss incurred by reason of the war. Five of the patents were given a 2½-years' extension, but the applications in connection with the others were rejected.

We are informed that the first attempt to broadcast to the Empire from Australia was made on Sept. 4, from the Sydney station 2FC. The programme was received by the B.B.C. at the Keston station and relayed to all stations with excellent results, but for further information, reference should be made to the notes under Great Britain.

BULGARIA.—The preliminary contract for the erection of a wireless station at Sofia has been signed. The contract calls for the erection of two transmitting sets, one capable of communicating with London, and the other with Vienna, the latter to be telephonic as well as telegraphic. The receiving set is to be capable of picking up messages from any part of Europe. The cost of installation is to be approximately $2,400,000, and the contract specifies that the plant is to be in operation by May 16, 1928.

CANADA.—*Radio Development.*—A Reuter message from Ottawa states that every thirtieth Canadian owns a wireless receiving set, according to official figures. There are 55 broadcasting stations in the Dominion, and, in addition, the Government has established a chain of 48 coastal and lake transmitting stations as aids to navigation on the Pacific and Atlantic Oceans and the Great Lakes.

CZECHO-SLOVAKIA.—Radio apparatus was a special feature of the Sample Fair at Prague, held from Sept. 18 to 25. More than 80 foreign and home firms manufacturing and dealing in radio apparatus were represented in the section.

DENMARK.—Reuter's Copenhagen correspondent reports that the new wireless station built by the Government near Kallundborg in the north-west of Zeeland, was opened on Aug. 29 by M. Stensballe, the Minister for Public Works, and M. Chambellan Lerche, the President of the Wireless Council. The station works on an output of 7 kw., and broadcasts daily on a 1,153 metres wavelength.

EGYPT.—From a recent report of Mr. E. Homan Mulock to the Department of Overseas Trade, London, the following interesting paragraphs should prove both authoritative and interesting :—

"In September, 1926, an agreement was concluded between the Egyptian Government and the Eastern Telegraph Co., whereby, *inter alia*, the royalties per word payable to the Government were doubled, while the company was given permission to lay five additional cables between Port Said and Alexandria. This has made it possible for the company to operate its regenerator system right through from London to Bombay and to accelerate telegraphic communication between England and Malta, Egypt and India.

At the end of 1926 a commencement was made with the changing over of the Cairo telephone system to automatic working. In the meantime the provision of additional trunk facilities between Cairo and Alexandria has been still further delayed.

An agreement was also made, in May, 1926, between the Government and Marconi's Wireless Telegraph Co., Ltd., whereby the latter was authorised to exploit for purposes of commercial radio-telegraphy the station at Abu Zabal, near Cairo, which is at present operated by the British Post Office. An Egyptian company was to be formed within six months, but there have been delays in connexion with the securing of a suitable site for a receiving station."

FRANCE.—The Société de l'Energie Electrique de la Basse Isère and the Société de Transport d'Energie du Centre, which jointly operate two 120,000-v. transmission lines, one between Beaumont-Monteux, St. Etienne and St. Chamond, and one between St. Etienne and Monistrol-d'Allier, have recently installed in connexion with these lines the Marius-Latour system of high-frequency wireless telephony. The installation is described by M. R. Dubois in a recent issue of the *Revue Générale d'Electricité*, where he states that the communication instruments are located in wooden cabins, in which all the high-frequency circuits and the amplifying and modulating valves are grouped. The installation has so far worked with equal regularity to an ordinary telephone system, messages being transmitted with great purity and sufficient intensity. The automatic devices have given no trouble, while valve renewals, the only item that enters into the cost of maintenance, are very low, having regard to their degree of operation. Thus, over a period of six months, the valves in each cabin have had to be renewed but six times, at a cost of 600 fr., and this for an average daily use of six hours. M. Dubois remarks that the total cost of the installation was lower than that of an ordinary telephone line, and that it possesses many advantages, notably as regards immunity from storm damage, &c., the ease with which repairs can be effected, and low cost of maintenance.

M. Dubois, it will be recalled, described this particular carrier-wave system before the International Electrical High Power Conference held in Paris a couple of months ago.

GERMANY.—The radio-telephone tests between Germany and South America have been continued to an extent from which it would appear that the inauguration of a regular service between the two ports of Hamburg and Buenos Aires is likely soon to be an accomplished fact.

"German wireless manufacturers," says a special correspondent of *The Times Engineering Supplement*, "rely to a considerable extent upon the annual wireless exhibition held in Berlin each autumn for stimulating their exports during the winter season. As the greater portion of the foreign trade in wireless is done with European countries either immediately adjacent or within easy distance, the Grosse Deutsche Funkausstellung (held this year from Sept. 2 to 11) is visited each year by a large number of wholesale buyers from practically all European countries. To Great Britain, German exports during 1926 were about 33½% down, which resulted in increased efforts on the part of the exhibition authorities and the trade to secure the attendance of British buyers.

So far, the wireless exhibition hall at Kaiserdamm, Berlin, is the only large hall in the world built especially for wireless exhibitions. It has been constructed without the usual iron or steel framework or roof, which would have a prejudicial effect upon wireless reception. The Berlin gathering contains receiving sets, loud speakers, and telephones, the majority of which are ready for instant demonstration. By the side of the hall is erected the wireless tower, which is about half the size of the Eiffel Tower, and serves to support the sending aerial of the Berlin broadcasting station, as well as being provided with a powerful searchlight at the summit for the purpose of guiding night-flying aeroplanes. The tower is served by an express electric lift, and a large restaurant is installed at 160 ft."

A particularly interesting item was that regarding multiple valves. Says the correspondent :—

"Numbers of multiple valves are exhibited containing within the one bulb the essential parts of three or even four wireless valves, as well as coupling resistances and other parts, thus immensely reducing the cost of receiving sets. For instance, one set embodying a single 'multiple valve' (a 'Dreifachröhre') was claimed to give loud-speaker reception from a local broadcasting station equal in strength to a normal three-valve set, and was priced at 39.50 m. retail complete with the valve."

The Karolus-Siemens apparatus for the transmission and reception of photographs, documents, &c., described in the *T. and T. Journal* of March last, was also shown in actual operation by the Reichspostamt Wireless officials. The latter, says *The Times* man, have a strong feeling that this system will in the near future render obsolete all existing methods of communication by Morse code, more especially with distant countries, as the transmission of a document or picture measuring 4 in. by 4 in. takes no more than 20 seconds, and the speed of working is being steadily increased.

GREAT BRITAIN.—The British Broadcasting Corporation states that the present position regarding Empire Broadcasting is that, while considerable progress is recorded particularly on the transmitting side, difficulties of reception are still to be overcome. Results up to now have been purely sporadic and fortuitous. The recent experimental relay of Sydney was recognisable; the parallel attempt to relay Melbourne yielded complete silence. At the present rate of progress a new series of experiments will be attempted this month (October), and upon the results of these will depend the date of the inauguration of an Empire service.

The first full experiment in Empire broadcasting from Great Britain took place on Sept. 11 from the experimental station, 2NM Caterham, owned by Mr. Gerald Marcuse, when a programme designed for reception in Australia was given. Arrangements were made in Australia through the Melbourne *Herald* and the Sydney *Sun* for the relaying of the programme by the principal broadcasting stations in the Dominion. Sir Granville Ryrie, the High Commissioner for Australia, gave a short address, and all the artists who took part in the programme were Australians resident in this country. The Wellington correspondent of *The Times* reports that the broadcast was received, but the speeches were not clearly intelligible, and the music was faint. It is understood that the generator failed and that it was necessary to resort to the electric light mains during the programme.

It is reported that Mr. H. Anthony Hankey, representing the Wireless Association of Great Britain, is shortly to visit the Dominions and Colonies in connexion with Empire broadcasting. According to *The Times* it is the hope that the visit will culminate with the formation of an Empire Broadcasting Association to deal with every aspect of the matter.

The *Electrical Review* is informed that within a few weeks there will be a further development in the opening, by Marconi's Wireless Telegraph Co., Ltd., of commercial "beam" telegraph services between England and South America, and between England and the United States of America. The "beam" stations for direct communication between Canada and Australia are also nearing completion, and this latter service is expected to be opened in the near future.

The B.B.C. has announced that changes are to be made in the hours of the morning transmissions from 2LO and 5XX. From Sept. 26 onwards the Daventry station will transmit from 11 a.m. to 2 p.m., and the London station from noon to 2 p.m. daily, from Monday to Friday inclusive. The present temporary arrangement for Saturday broadcasting will be revised on the 1st of the present month, both London and Daventry transmitting from 1 p.m. to 2 p.m.

The new 30-kw. experimental station (5GB), after tests on Aug. 19 and 20, commenced to transmit at a frequency of 610 kc. (wavelength 491.8 metres) on Aug. 21. Transmission continues good, cone-speaker reproduction 8 miles west of 2LO being equal in quality to that of the London station and decidedly stronger than that of the long-wave Daventry plant. The new station is situated a few hundred yards from Daventry (5XX), and at first will use two "T" aerials supported on two pairs of 110-ft. masts; energy will be supplied to the aerials by transmission lines a few hundred yards long. Two

325-ft. masts are being erected for further experimental work. The transmitter has been designed and erected entirely by the B.B. Corporation's engineers, and at present it is in rough form, having been built up as experiments proceeded; it is not equipped with spare machinery in the same way as are other stations, and for this reason it may not have the same degree of reliability. The transmitting circuit differs from that used in the older stations of the B.B.C., since modulation takes place at comparatively low power and the modulated carrier is magnified by a power amplifier using water-cooled valves. A constant wavelength is maintained by a master oscillator, isolated from every influence which might tend to vary its frequency. The low-power and modulator valves are of the ordinary glass type; the anodes of the power valves are energised partly by a high-voltage direct-current motor-generator giving 10,000 volts, and partly by a bank of six water-cooled rectifying valves working directly from the supply mains and giving, with the aid of a smoothing circuit, the same d.c. voltage. This unusual arrangement has been adopted purely for experimental purposes. The supply mains are the same as those used for 5XX, and an additional sub-station has been built for supplying 5GB. It is not working in full power at the time of writing.

The *Wireless Trader* reports that during July the value of radio apparatus exported from this country was £71,558 (including valves, £12,132), which was considerably below this year's monthly average. Australia was our principal customer, taking goods to the value of £22,031 (valves, £5,400), and the Netherlands was second with a share valued at £3,236.

CONTINENTAL RELAYS.—Experiments, says the *Electrical Review*, are in progress to determine the possibility of relaying radio programmes to this country by land line from the Continent. It is considered that the best route for such programmes is via Ostend, whence a new submarine telephone cable has lately been laid to England. Accordingly a "repeater" station has been installed at Ostend, so that programmes may be amplified before crossing the Channel. On this side the programmes will be conveyed to Savoy Hill by real "wired wireless," whereby a number of signals can be sent simultaneously along one wire, each group of signals being modulations of a carrier wave of a certain wavelength. The advantage, apart from economy in the number of cables necessary, is the elimination of much land-line distortion. Recent tests were conducted with music played in Ostend, which thus did not have to travel any considerable distance on Continental cables which, it is feared, would introduce new factors of distortion.

The reference to "*real* wired wireless" is not particularly clear, and as for the reversion to the use of cable lines, would not this appear to denote something in the nature of a defeat for Radio engineers?

GREECE.—The Posts, Telegraphs and Telephones Department is, says the *Financial News*, considering the installation of wireless stations for communication with the Islands and Crete. It is proposed that there should be stations at Athens, Chios (Scio) and at Candia (Crete). Further stations would be established at Laurium and in Crete for communication with vessels in the Archipelago and in the Mediterranean Sea.

HUNGARY.—The Hungarian postal authorities are reported to have recently placed an order with the German Telefunken Gesellschaft, of Berlin, for the equipment of a powerful wireless transmitting station which is to be established about 7½ miles from Budapest, where two 492-ft. antenna masts about 980 feet apart are at present in course of erection. It is expected that the new station will be ready for operation early in 1928.

IRELAND.—*The Times* states that the Irish Lights Office has recently informed the Imperial Merchant Service Guild that the Commissioners of Irish Lights have under consideration the erection of a wireless direction-finding beacon on the north coast of Ireland. Opinions are divided as to whether it should be on Tory Island or Inishtrahull. The beacon will probably have a useful mean range of about 100 miles for vessels fitted with a high-class, well-placed wireless direction-finding compass, down to about 50 miles where conditions on board are less favourable. The Commissioners ask the opinions of navigating officers of vessels which habitually pass the north coast of Ireland as to whether Tory Island or Inishtrahull is likely to be the more useful site for such a beacon, and steps are being taken by the Guild to obtain the views of their members on the subject. The Commissioners have also informed the Guild that the Irish Free State Post Office has notified the Commissioners that it intends to erect a wireless direction-finding station at Malin Head, which, it is expected, will be in operation in about six months' time.

ITALY.—On Monday, Sept. 12, the International Congress of Electrical Science was opened at Como, under Government auspices, in the presence of descendants of Volta's family. An address was delivered by Senator Garbasso, relating to the consequences which had resulted from Volta's invention of the primary cell and his discovery of current electricity. A paper was read by Sir Ernest Rutherford, president of the Royal Society, in which reference was made to Volta's communication to the Society in 1793 and to the medal awarded to him for his discovery. Other papers were read in honour of Volta, and his statue in Como was visited.

The International Convention on long-distance telephony inaugurated its proceedings at Como on Sept. 6. Representatives of all the principal European states and of several railway companies were present. Engineer Milon, Director-General of the telephone service of France, was elected president, and Professor Giovanni Di Pirro, Director of the Italian Institute of Experimental Work, was made vice-president. The meetings were to be held continuously during the week.

As we go to press the new radio transmitter at the Milan station, which is to take the place of the present one, is still continuing its nightly tests from 11 to 11.45 p.m. The frequency is 950 kilocycles (wavelength 315.8 metres).

Among the concerns recently organised in Italy in connexion with the electrical industry is the Società Fabbrica Nazionali Apparechi Telefonica (the National Telephone Apparatus Manufacturing Company), Milan, with a capital of 200,000 lire.

INDIA.—As all the world knows, the Anglo-Indian Beam Wireless Service was opened for public traffic on Sept. 6. The new service places London in direct wireless communication with Bombay, and is available for telegrams to all destinations in India, Burma, Ceylon, Iraq, Persian Gulf, Siam, &c. The reduced rates per word to India by this route are 1*s.* 1*d.* for ordinary telegrams, 6½*d.* for deferred telegrams, 3½*d.* (with a minimum of 20 words) for daily letter telegrams, and 3*d.* (with a minimum of 20 words) for week-end letter telegrams. In addition to the reduction in the rates for public traffic the beam service offers a reduced rate of 2½*d.* a word for Press messages. All telegrams intended for this route should be routed "Via Empiradio."

So far, the service has proved wonderfully effective, especially when one considers the mingled hopes and fears which were naturally associated with the inauguration of this the completion of the Empire chain of communications, an effective chain without equal in the world's history.

Under the Government contract with the Marconi Company, the "beam" stations for communication with India were to be capable of sending and receiving at the same time at a minimum speed of 100 words per minute during a daily average of twelve hours. During the seven days' official test the Marconi Company estimated that an average speed of between 130 and 150 words per minute was maintained during from 18 to 21 hours per day, and that the capacity of the Indian "beam" circuit during the test was about 180,000 words per day in each direction. It is well known that during the monsoon period India is one of the worst countries in the world for atmospheric interference; hence the fact that the Indian "beam" stations have been able to work at high speed for hours on end during that period is a remarkable testimony to the freedom from atmospherics that is obtained by the use of "beam" receiving aerials.

The transmitting installation at Grimsby for the England-India service is in the same room as the transmitter for the England-Australia service. Transmission to India takes place on wavelengths of 16.216 and 34.168 metres, and from India to England on 16,286 and 34,483 metres. At Grimsby a five-mast aerial system, quite distinct from the three-mast aerial system of the Australian service, has been built. The masts are 277 feet in height, with a distance of 650 feet between them. Two bays are used for one wave-length, and the other two bays for the second wave-length. The masts are erected in a straight line at right angles to the great circle from the transmitting station at Grimsby to the receiving station in India, and the reflector behind the active aerials focusses the main energy in a south-easterly direction on to the receiving aerials in India. A similar aerial system has been built at Kirkee to carry out the transmissions to this country.

In the case of the Kirkee station this latter is "controlled" from Bombay by means of "*wired wireless*," while Grimsby is "controlled" from London over an ordinary telegraph circuit.

The receiving apparatus for the signals from India is installed at Skegness in the room where the receiver for the Australia-England service is also placed, while the receiving station at Dhond in India is identical in design with that at Skegness.

Mr. Keith Murray, of the Calcutta Broadcasting Station, proposes to carry out extensive tests for the purpose of gathering data, in order to gauge the possibilities of intercommunication in coal mines by means of wireless. The present method of communication is by means of the telephone, which has serious drawbacks. It was hoped that the experiments would commence about the end of September; the information obtained therefrom will be sifted and alterations will be effected in transmitters and receivers before a further attempt is made. The wavelength used will be 30 metres, and another wave will be between 1 and 6 metres; the latter seems to have been specially licensed by the Government.

NORWAY.—It is reported that a broadcasting station will shortly be in operation on the Tyholt heights, near Trondhjem. A wireless-telegraph station for communication with Great Britain is also to be erected on the heights.

PERU.—It is reported that Marconi's Wireless Telegraph Co., Ltd., has inaugurated a wireless station at Oaz.

PORTUGAL.—The directors of the Anglo-Portuguese Telephone Co., Ltd., state that the Connaught Trust, Ltd., has acquired about a third of the company's 7% first mortgage convertible debenture stock (which carries an option to subscribe to a further £100,000 of stock) and more than half of the issued ordinary capital. "The directors and the new majority shareholders believe that the company's business in Portugal admits of profitable development on a considerable scale" and it is consequently proposed to reorganise the capital. The suggestion is to increase the capital to £1,100,000 by the creation of 200,000 new ordinary and 100,000 "A" ordinary shares of £1 each, the latter class to be exchanged for debenture stock. The ordinary shares will rank for dividend before the "A" shares, being entitled to the first 8% declared. The "A" shares will then receive the next 8%. Any future advantages will be shared between the two classes.

RUSSIA.—According to a note published by the *British Russian Gazette and Trade Outlook*, there are now 56 broadcasting stations in Russia, of which nine are in Moscow and five in Leningrad.

SOUTH AFRICA.—The Postmaster-General announces that a week-end letter telegram service to the Union of South Africa has been introduced by the Anglo-South African beam wireless service at the reduced rate of 3½*d.* a word, with a minimum of 5*s.* 10*d.* for a message not exceeding 20 words. Telegrams for the new service can be handed in at any postal telegraph office.

SPAIN.—Reuter's Madrid agency informs us that the inauguration has taken place of the cable factory at Maliano (Santander) constructed by the Standard Electric Company to supply the needs of the Spanish telephone service and to export to South America. The necessary copper will be obtained from the Cordova works, the lead will also be supplied from national resources.

TURKEY.—In a recent report by Col. H. Woods, O.B.E., Commercial Counsellor at Constantinople, it is stated that the construction of radio transmitting and receiving stations at Angora and Constantinople is now practically completed. The contract for the undertaking was secured by the Compagnie Française de Télégraphie sans Fil.

U.S.A.—*World Radio* affirms that twenty radio stations in the New York metropolitan area have been notified by the radio supervisor of the Department of Commerce that because of repeated deviations from the wavelengths assigned to them their licences will not be renewed unless they can "show cause." About twenty-five stations are expected to discontinue broadcasting when new licences for sixty days are issued by the Federal Radio Commission. Over one hundred stations, the Commission says, declare they cannot continue broadcasting unless better wavelengths are given to them, but the Commission does not expect them to discontinue operation. Some stations, however, in the opinion of a member of the Commission, are continuing to operate merely because of the belief of their owners that they have something which sooner or later they will be able to dispose of advantageously.

The *Wireless World* states that long and expensive litigation has been ended in the United States by an agreement which has been reached between the Radio Corporation of America and the Atwater Kent Manufacturing Co. Under the agreement 7½% of the sale price of all radio receiving sets manufactured by the latter company since January, 1923, and to be manufactured in the future will be paid to the Radio Corporation. The Corporation's claim was on account of basic patents in its possession.

According to *Commerce Reports*, the total value of exports of radio apparatus from the United States during the first six months of this year was $3,705,961, as compared with $3,247,802 in the first half of 1926. There was a considerable decline in the value of transmitting sets, but substantial rises in receiving sets, components, accessories, and valves. The exports during 1926 (totalling $8,794,453) are fully analysed, and it is seen that the largest share of United States exports was taken by North America (Canada)—38% of the total. Australia and New Zealand took 22.2% of the total. The shares of Europe and South America each represented 14.4%. The Netherlands and the United Kingdom together took 68% of the exports to Europe. In South America the sales of United States accessories have declined, probably because European competition is very keen in these items.

The opening of the Beam service to India, mentioned elsewhere, was tragically marred so far as the Central Telegraph Office, London, was concerned by the sudden death of Major Vincent Smith, press representative of the *Times* newspaper, who collapsed during one of the speeches and who expired before he reached St. Bartholomew's Hospital, practically only a few yards away.

Nature gives an account of a new type of electric cord which it is stated is coming into use in Berlin in connexion with bells, &c., and for starting and stopping machinery. It is the invention of Mr. Oscar Nagy, a Hungarian engineer. The wires are woven into a loose braid separated by an elastic non-conductor, but contact is made when pressure is applied. It is anticipated that this device will prove useful in the case of machinery where actual or threatened accidents necessitate an immediate stoppage, as—so it is stated—pressure can be easily operated by the knee or elbow. Other uses are suggested, but the idea seems somewhat fantastic, and judging from some of the most recent developments of wireless, an alternative would be the application of the "audible control" system employed by Major Raymond Phillips at the recent Model Engineer Exhibition held last month at the Royal Horticultural Hall, London, where the major by shouting into a microphone the word "stop," immediately brought a couple of model trains to a standstill, reversing their direction by the word "back," and so on.

The major believes that ultimately :—

"Train alarm bells will give place to microphones which, upon registering an exclamation of alarm, will stop the train.

"Doors will actually open to the command of 'Open Sesame.'

"Machinery will stop instantaneously in the case of an accident upon a cry from an endangered person."

A Southampton firm have also developed a burglar alarm system which—provided the burglar has not previously disconnected the circuit!—brings into operation a small wireless transmitter of 600 to 800 metres. This in turn automatically operates a 5 or 6-valve receiving set at any point within a radius of 50 miles. The buzz from a small instrument at the transmitting end is reproduced by the various receiving points with an enormous volume through a loudspeaker.

The *Electrical Review* states that this system was recently adopted in a French village, where the volunteer fire brigade is called out by wireless. When a fire occurs the central fire station sends out a special and selective signal which instantly brings into operation all the sets installed in the houses of the volunteers within a radius of 20 miles. Local relays installed in the firemen's premises are kept continually in circuit by a 3-w. lamp, and are so adjusted that on a certain wavelength and at a particular note they release a local switch which brings the tuned wireless set into operation. The central fire station announces the location of the fire and then switches off. The relays are then replaced by hand.

The following paragraph is excerpted from the Financial section of a recent issue of the *Electrical Review*.

"The market in Eastern cable stocks and shares is heavy. Eastern Telegraph ordinary has lost 5, dropping to 173½. Globes, Westerns and Eastern Extensions are decidedly dull. The explanation is that the market is suffering from one of its periodical attacks of nerves caused by wireless developments. Dealers say that the Eastern quartette has been attacked by 'Beamitis,' the opening of the wireless service to India, and the benediction that this received from the Postmaster-General, having led to doubts as to the security of the cable system's profits. Similar heartsearchings have been experienced in this department of the miscellaneous market, at various times, for the past 15 years, and it seems hardly necessary to recite, once again, the reasons for assuming that the cable companies are well able to hold their own in this branch of industry."

The special committee of the Association of British Chambers of Commerce appointed to enquire into the basis of the present International Telegraphy Convention has submitted a number of recommendations, of which the principal are the following :—

"That the length of the standard code word be reduced from ten letters to five letters, at 50% of the present charge for ten-letter words, but that it would be detrimental to trade if on the adoption of the five-letter unit more than 50% of the present ten-letter rate were charged.

"That that portion of the regulation of the Paris Conference, 1925, by which, as from Nov. 1, 1926, numbers in deferred cablegrams when written in words may not exceed one-third of the number of chargeable text words should be rescinded.

"That code words should be admitted in deferred telegrams.

"That the pronounceability test, provided for in Article 9, section 2, of the regulations made under the Convention, which is already practically a dead letter, be formally abolished.

"That the limit of 15 letters to one word for place and street names in the address of a telegram should be abolished."

Dr. S. C. Bradford, of the Science Library, South Kensington, London, in describing the resources of this marvellous collection of scientific information, states that by the autumn of the present year the preparation of the subject-matter index will have advanced sufficiently for it to be made available to the public. The library will contain over one million references, and of these 61,000 are directly connected with electrical engineering and no less than 2,700 specifically related to telegraphy and telephony. This is, indeed, as the title of Dr. Bradford's article describes it, "A National Bureau of Information."

The reference to other sections of engineering, including steam, locomotives, machine tools and workshop practice, number over 83,000.

The Central Telegraph Office, London, was pleased to greet Herr Feuerhahn, of the German Telegraph Administration, during his visit last month to G.P.O. West, and to wish him every success on his trip to the United States of America.

Among the "Books in the Press" of Messrs. Macmillan is noticed an illustrated "Text-Book on Telegraphy," by A. E. Stone and A Fraser, and would-be telegraphist students should need very little further introduction.

The retirement of Mr. Mansbridge from the Vice-Controllership of the Stores Department removes another outstanding figure among the telegraphists of the early eighties which Slingo's School of Science brought to the front. The service cannot but be poorer for his withdrawal from its activities. That Mr. Mansbridge is likely to enter into an inactive retirement is not likely. Among other hobbies he is a great lover of flowers, the affection for which is reflected in the kindliness of his nature, hidden, maybe, under his towering exterior, but there nevertheless. Welcome, then, G. M., to the swelling ranks of the "eighties" who, like yourself, have passed the 60th milestone!

It is gratifying to learn how great has been the appreciation of the article by Mr. Phillips on the Verdan modification of the Baudot apparatus which appeared in our last issue. That the arrangement may not be *the* solution of "atmospheric" difficulties is more than probable, as telephotography offers certain undeniable advantages. On the other hand, there can be no doubt that the devices of M. Verdan are very effective, and, what is more, they are at this actual moment in daily use between France and Algiers.

Women and Unequal Laws.—It has been the great error of men—and one that has worked bitterly on their destinies—to imagine that the nature of women is, I will not say inferior, that may be so, but so different from their own, in making laws unfavourable to the intellectual advancement of women. Have they not, in so doing, made laws against their children, whom women are to rear? against the husbands of whom women are to be the friends, nay sometimes the advisers?

—Ione, in "The Last Days of Pompeii," by Lord Lytton.

J. J. T.

THE MODERN CENTRAL TELEGRAPH OFFICE AT ZARAGOZA, SPAIN.

BY ESTAN. RODRIGUEZ (TELEGRAPH ENGINEER).

[The history of this little article is an interesting one. The original was written by Señor Rodriguez in Spanish, and was then done into Esperanto and published in *La Interligilo de l'P.T.T.*, Paris. The editor of the latter journal subsequently translated the article into French, and in that language it reached this country, being again translated as below. The illustration blocks were loaned by M. Ullrich, of Bürgstein, Czecho-Slovakia, who kindly forwarded them free of charge for the use of the *T. and T. Journal*.—J. J. T.]

THE installation of the telegraph services in the Palace of Communications, Madrid, will bear comparison with any other central telegraph office in the world. That new centre was completed at the beginning of 1922, and marked the point where the Spanish exploitation of the telegraphs entered into a new path, sustained by the courage and capacity of its telegraphists. The telegraph *technique* of our country seeks to create forms and processes purely Spanish, rejecting completely all the old methods. Thus is being created, little by little, a national *technique*, adapted at all points to the service of our country.

Already in the international contests, the Spanish telegraphists have shown their progress and their capacity. By the good work which they have done at the Scientific Congress of Salamanca, the new Central offices of Bilbao, Valladolid and Burgos prove their high worth.

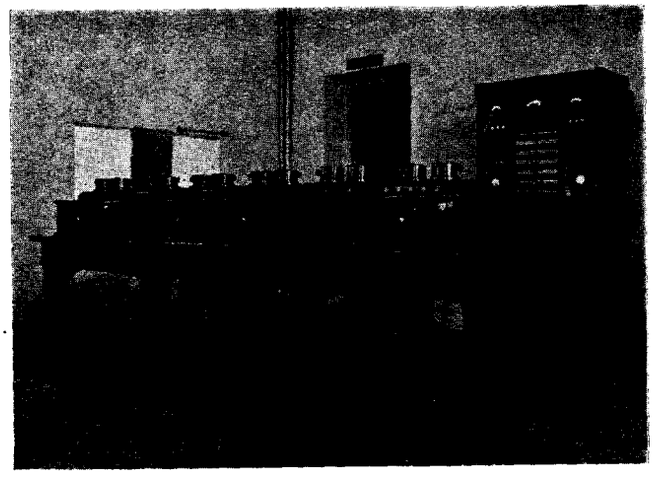


FIG. I.—TEST TABLET AND REPEATERS.

The last proof, if another were needed, is the new C.T.O. of Zaragoza, designed to be one of the principal centres of the Spanish telegraph network on account of its geographical situation and the importance of the town.

The postal and telegraph services of Zaragoza are now housed in a new and vast building. The style of the exterior is that of Aragon renaissance, and could well outrival the finest palaces of that period. The interior, however, gives more modern evidences, due to the use of ferro-concrete for the frame-work. Nothing has been neglected, the various services are comfortably placed—[Notice the arm-chairs for Baudot operators, for example! Fig. III.—ED. *T. and T. Journal*.]—and in the best hygienic conditions.

Let us, however, briefly study the lay-out of the telegraph services.

The instrument room is over 100 feet long by nearly 30 feet wide and is excellently lighted by windows on both sides of its length. The apparatus is placed at right angles to the length of the room and the necessary wires are led to the various tables by means of troughing covered by metal plates fixed into position by means of screws.

At one extremity of the room (Fig. I) is placed the commutator, or test tablet, fitted with the usual telephone jacks and cords. All the necessary facilities for the ordinary testing of the lines, &c., are available at this point, and here are also to be found all the usual protective devices against damage to apparatus, &c. The whole was designed and constructed in the Government works at Madrid, and is therefore a purely Spanish production due to the eminent and modest director, M. Ramón Miguel Nieto, who is, indeed, responsible for the entire technique of the Spanish Telegraphs.

By the side of the test-tablet is placed the power box from which, *au moyen de résistances appropriées*, each apparatus is provided with the necessary voltage.

In front of the test tablet are to be found six Lorenz relays and certain auxiliary testing apparatus.

The second section, Fig. II, accommodates ten Hughes circuits connected to neighbouring centres and provincial towns, also ten Morse circuits which serve eighteen lines to points of minor importance.

The remainder of the room is occupied by a simplex quadruple Baudot fitted with re-transmitters. There are also other Baudot re-transmitters for "through" working, Fig. III.

All apparatus is fitted on tables covered with black fibre, the table-legs being suitably grooved to permit of the wiring being hidden from sight. This wiring is carried out by means of lead-covered cables containing wires of varying gauges suitable to their various sizes.

FIG. II.—HUGHES AND MORSE SECTION.

The telegraph lines leave the office by a small underground cement channel entirely covered with asphalt, and are contained in three lead-covered cables of twenty paper-insulated conductors each. This channel terminates in a column 40 feet high, which constitutes the junction box between the covered and aerial systems and contains the necessary fuses, &c.

At the test-tablet end of the Instrument Room, and in close proximity thereto, is the Test Room where the usual facilities are provided for more closely examining and testing faulty or suspected lines, &c. Adjoining the latter is an admirably equipped workshop for the repair and maintenance of apparatus.

At the other end of the Instrument room, in a specially chosen position, is to be found the generating machinery and accumulators for the power supply of the office.

The batteries for the long-distance lines consists of two groups each of 99 cells of 49 amp.-hours at 110 volts. The current for the shorter circuits

FIG. III.—BAUDOT AND BAUDOT RE-TRANSMITTERS SECTION.

is similarly supplied by two groups each of 19 cells of 90 amp.-hours at 30 volts. The whole of these cells are of the Tudor type, and can be charged either from the town supply or by two local dynamos driven by a 3½-h.p. petrol engine giving 190 and 90 volts respectively.

The equipment of the office is completed by the installation of a small PBX, while all clocks on the building are electrically driven and controlled.

This glance, though a rapid one, over the Zaragoza C.T.O., would tend to show that the Spanish telegraphs are reaching a high level.

PRESENTATION TO MR. JOHN LEE.

A FURTHER striking tribute to Mr. John Lee, late Controller, Central Telegraph Office, has been paid on the occasion of his retirement.

A number of friends and colleagues in the provinces combined to present Mr. Lee with a suitable memento of the occasion, and a large number of postal, telegraph, and telephone men and women contributed towards the cost of a handsome upright grand gramophone and a number of gramophone records.

The gramophone bears the following inscription :—

"Presented to JOHN LEE, Esq., C.B.E., M.A., M.Com., "Controller, Central Telegraph Office, London, by Postal, Telegraph, "and Telephone Colleagues in Great Britain and Northern Ireland "on the occasion of his retirement from active service.
"June 1927."

The following letter of acknowledgment has been received from Mr. Lee :—

[COPY.]

Mulgrave Lodge,
Sutton, Surrey.
Sept. 10, 1927.

My dear Clough,—To-day there was delivered at this house a beautiful 1928 model gramophone of the H.M.V. type ; it is cased in exquisitely prepared walnut. Together with it there were records such as will give us real pleasure again and again for years to come. I want to thank you and those whom you represent for an act of thought and kindliness which is much more to me than I am able to say. It comes just as I was feeling that the restrictions which have been placed upon my reading and writing bore very heavily upon me. You have given me a source of great joy which will more than take the place of joys which I have had to surrender. Archibald also sends to me a brass plate and we are arranging with a local cabinet maker to affix it in a suitable way. It will be an additional source of pride.

It brings back to me the many years of the past. There is Liverpool, of course, and all that it has been and all that it is and will be to me. And there are the other places which I visited as an official visitant and where also I found the preciousness of deep friendships. It is hard to leave such a service, but it is one of the compensations for the break to have the experience of your tenderness of judgment and your faithfulness of friendship.

It happens, too, that this comes on a day when I am allowed to think that I have made a step forward in health. I was sent to Bath for a "cure," as they call it. The process was severe and perhaps depressing, but I think I can now say that I am seeing the benefit. I shall never be restored but within certain limitations it is possible that I shall be able to do some little work in the world.

I beg you, my dear Clough, to accept yourself, and to convey to the others, my deepest sense of regard, appreciation and indebtedness, and my great pride in the gift which they have chosen to make to me.

I am, my dear Clough,
Ever yours most sincerely,
(Sgd.) JOHN LEE.

CORRESPONDENCE.

BAUDOT-VERDAN.

TO THE EDITOR OF "THE TELEGRAPH AND TELEPHONE JOURNAL."

Sir,—I find some need of a little further explanation of the Baudot-Verdan apparatus described by Mr. Phillips in the September issue of the *Telegraph and Telephone Journal*. His article, as do some of the French descriptions which have appeared, leaves me a little puzzled as to the exact method of operation, and perhaps the shortest way of arriving at a correct understanding would be to set down what I have assumed actually happens. First, it is clear that the repeaters store up to six letters, and this explains why they run at one-sixth the distributor speed. The operator sends out letter signals continuously in accordance with the usual cadence signal, one letter per revolution. Assuming for simplicity that the operator at the right moment sends out one letter signal only and the transmitting and receiving system is then left to itself, the operation, as I understand it, is as follows:—

Sending End.

First revolution	...	Signal sent to line and stored in first repeater.
Seventh "	...	Signal repeated to line from first repeater and stored in second repeater.
Thirteenth "	...	Signal again repeated to line by means of the second repeater and also recorded on the control traducteur.

Receiving End.

First revolution	...	Letter signal received and stored in first repeater.
Seventh "	...	Letter signal again received, cancelling the effect of any extras set up on contacts of first repeater and setting up second repeater.
Thirteenth "	...	Signal again received, correcting for any mis-setting of second repeater and operating traducteur magnets.

Revolution 2-6, 8-12, 14-18 would of course be used for five other letters.

I should be greatly obliged if Mr. Phillips would either confirm the above or set me right.

If my assumptions are correct, one can only admire the ingenious improvements Mr. Verdan has made to his system by which the same signal is repeated at intervals sufficiently remote to minimize the possibility of the same signal element of a letter being mutilated by atmospherics.—Yours faithfully,
H. H. HARRISON.

Automatic Telephone Mfg. Co., Ltd.
Liverpool, Sept. 19, 1927.

[Mr. Phillips says "Mr. Harrison's description of the functioning of the 'Baudot-Verdan' is quite correct. Six signals are stored during each revolution of the discs and automatically repeated seriatim every two seconds." He sends an explanatory chart which we shall publish next month.]

THE POST OFFICE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

SESSION 1927-28.

AN interesting and varied programme has been arranged by this Society for the forthcoming Session. The opening meeting will be held on Monday, Oct. 17, at 5.30 p.m., at the Institute of Electrical Engineers, Victoria Embankment, W.C.2, when T. A. Prout, Esq. (late Secretary's Office, G.P.O.) will give an address entitled "Fifty Years with Telephone Pioneers." L. Simon, Esq. (Assistant Secretary, Inland Telegraphs) the Chairman for the Session, will preside. Prior to the meeting, from 5 p.m. to 5.30 p.m., tea and light refreshments will be provided for members and visitors in a convenient room adjoining the Lecture Hall.

Particulars of the other meetings during the Session are as follow :—

Meeting Place.—INSTITUTION OF ELECTRICAL ENGINEERS.

1927.			
Monday, Nov. 21	...	"Telegraph and Telephone Finance."	Sir Henry N. Bunbury, K.C.B. (Comptroller and Acct.-Gen., G.P.O.).
" Dec. 12	...	"Press Telegram Work" ...	J. Newlands, Esq., C.B.E., C.I.E., I.S.O. (The Press Association, Ltd.)
1928.			
Monday, Jan. 16	...	"The Working of the International Telephone Services."	H. G. Trayfoot, Esq. (Telegraph and Telephone Traffic Section, Secretary's Office, G.P.O.).
" Feb. 20	...	"Voice Frequency Telegraphy."	W. D. Hamilton, Esq. (Engineer-in-Chief's Office, G.P.O.).
" Mar. 19	...	"Determination and Distribution of Time."	F. Addey, Esq., B.Sc., F.R.A.S., M.I.E.E. (Wireless Telegraphy Section, Secretary's Office, G.P.O.).
" April 16	...	"Telephone Contract and Development Studies."	H. J. Maclure, Esq., M.B.E. (Secretary's Office, G.P.O.).

By permission of the Governing Bodies, members of this Society may attend meetings of the Post Office Institution of Electrical Engineers, and of the London Telephonists' Society.

All members of the staff of the Post Office are eligible for membership on approval by the Committee. The annual subscription, payable in advance, is 1*s.* 6*d.* for women and 2*s.* 6*d.* for men. Application for membership should be made to the local agent, or to the Hon. Secretary, Mr. D. H. Thomson, Secretary's Office, G.P.O. North, E.C.1 (Central 3,600, Extension 298).

THE TELEGRAPHS OF SOUTH AFRICA.

BY E. EGLETON, C.T.O., CAPE TOWN.

THE Postmaster-General of South Africa, speaking recently, urged that "the telegraphs be given a chance." The words must have a familiar ring to service readers in the old country who, no doubt, sometimes wonder what the telegraphs in other lands are like, and whether they are in the same state as their own. To those so minded a short account of the South African telegraphs may possess some interest.

The first telegraph line in the country, between Cape Town and Simonstown (21 miles), was opened in 1860, and in 1864 a line from Cape Town to Grahamstown, in the Eastern Province, 100 miles from Port Elizabeth, was completed. These early lines of the South African telegraphs belonged to the Cape of Good Hope Telegraph Company, and were transferred to the Cape Government in 1873. In Natal the Government took over the only existing line between Durban and Pietermaritzburg (60 miles) in 1874. Communication with Kimberley was established in 1876, Natal and the Cape Colony were linked by wire in 1879, while the first offices in the Transvaal were opened the same year. From these small beginnings the present widespread telegraphs of South Africa have grown, the network covering the whole Union, the neighbouring territories, and reaching as far north as the Belgian Congo and Uganda.

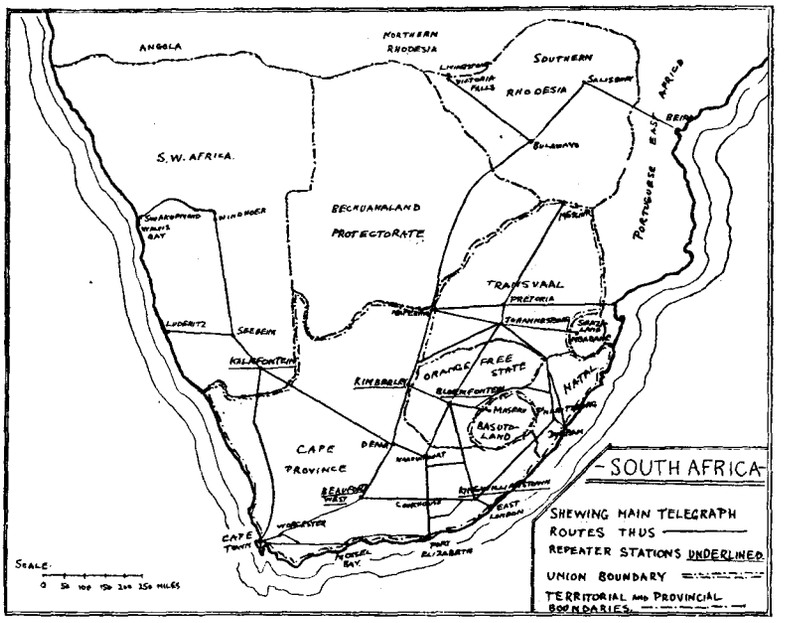
Prior to the unification of the Colonies in 1910 there were four telegraph services in what is now the Union of South Africa. They were similar in organisation and mainly followed British practice. Before the Anglo-Boer war practically all circuits were sounder worked, both single and double-current and duplex, all had a printer attached, and a tape record was kept. Many long station lines were worked single current, and on nearly all of them the intermediate stations called only half-hourly or hourly. Although some of the chief centres were in direct communication a good deal of handing over was done at intermediate points which were mainly transmitting stations. For example, Kimberley transmitted the whole traffic from the rest of the country to and from Rhodesia and beyond, and between the Cape Colony and Free State. And at Kingwilliamstown, purely a transmitting office, which had a staff of one hundred in the days of its greatest importance, the major portion of the Cape Eastern Districts traffic and that between Cape Colony and Natal was transmitted. The war years from 1899-1902 saw the introduction of Wheatstone working, and fast repeaters made direct Wheatstone working possible over long lines, e.g., Cape Town—Durban. The decline of the purely transmitting offices, such a feature of the early days, began at this time. There were few changes in the years following the Boer War, the principal being the abolition of the tape record, and the installation of secondary cells at a few of the larger offices.

The amalgamation of the services in 1910 rendered considerable reorganisation possible. The rigid separation of the old colonial areas ceased with the effacement of political boundaries. Traffic circulated into more natural channels as outlets were rearranged and new ones provided, and by 1914 the Union telegraph system could be regarded as completely unified. Something had been done to bring the organisation up-to-date, single-current working on long lines and calling stations were abolished, and in 1913 the Creed reperforating and printing apparatus, together with keyboard perforators, had been introduced at Cape Town and Johannesburg, but before full advantage could be taken of the many changes in the telegraph world the Great War broke out. In common with other countries the South African Administration had to face many difficulties during the war period. Staffs were depleted, although additional services had to be undertaken, while shortage of material also contributed its handicap. The staff shortage was met to a certain extent by a great extension of female labour, and from the later war years dates the employment of women in the larger instrument rooms on a considerable scale.

After the war there was lee way to make up, and the next few years witnessed the introduction of machine telegraphy, and other changes of various kinds. These changes have brought the system to its present state, of which some details may be given.

When considering the South African telegraphs, however, and making comparisons with other countries, the great area and small population should be borne in mind. The total area of the Union, and mandated territory of South West Africa, is 795,289 square miles, and in addition there are the contiguous territories of Rhodesia and Mozambique for whom most of the transmitting is done. The white population of the Union and adjacent territories is approximately 1¾ millions, and there are about 7½ million non-Europeans, but for telegraph purposes the total population can be reckoned as under two millions, in a country nine times as big as Great Britain, and with only 250,000 whites in its most populous district (Johannesburg).

Distances in South Africa are great, the large centres few and far between, and, although there are lines of greater length in other parts of the world, the main lines generally are very long. The main routes are given on the accompanying map. There are 9,335 miles of telegraph route and about 42,000 miles of wire. Cape Town and Johannesburg are the chief centres, with Durban and Port Elizabeth next in importance. The heaviest traffic is between Cape Town and Johannesburg, 960 miles apart, with two repeaters in circuit; and both the Western Electric Multiplex typeprinting and Creed eperforating systems are in operation. The former is worked quadruple duplex at a channel speed of 35 words per minute, and the latter duplex at about 90 words per minute each way. Between Cape Town and Durban approximately 1,250 miles distant via one route, and 1,100 miles via another, also with two repeaters in circuit, Creed apparatus is in use. The same apparatus is operated between Johannesburg and Durban (450 miles), and this "Creed triangle"—Cape Town-Johannesburg-Durban—may be regarded as a sort of backbone to the whole system. The Western Electric Multiplex is also worked from Cape Town to East London and Queenstown, forked at Kingwilliamstown to start-stop extensions, the line being about 700 miles long. A channel speed of 30 words per minute is obtained. This circuit is shortly to be rearranged and diverted to include Port Elizabeth. Cape Town will then work quadruple duplex, two channels to Port Elizabeth, and start-stop extensions to the other two offices. A similarly arranged circuit of about 650 miles, from Johannesburg to Bloemfontein (two channels), with extensions to East London and Queenstown is also Western Electric Multiplex. Western Electric Teletypes (duplex) are in use on several circuits, e.g., Johannesburg-Pietermaritzburg, Port Elizabeth-Queenstown, as well as on shorter lines, and are being introduced wherever traffic conditions allow, while between Johannesburg and Durban, the Western Electric "carrier" system is to be installed at an early date. By the "carrier" method one Creed and two duplex teletypes, as well as several telephone trunk circuits, will be obtained.



The longest line in the country is that between Cape Town and Bulawayo (1,360 miles), worked key duplex with one repeater in circuit. At certain times of the day this wire is repeated at Buluwayo to Salisbury, for "YQ" press, making it 1,650 miles long. The normal resistance of this line between Kimberley (repeater) and Buluwayo is 8,200ω., and the running speed only about 60 words per minute, but as the Rhodesian Administration is to introduce another repeater north of Mafeking the working of the circuit will be improved. Other long lines are between Cape Town and Pretoria, 1,000 miles (with two repeaters), Cape Town-Windhoek (South-West Africa), about 900 miles (one repeater), Johannesburg-Buluwayo, 700 miles (no repeater), Cape Town-Bloemfontein, 750 miles (one repeater), Port Elizabeth-Johannesburg, 700 miles (one repeater), and Durban-Port Elizabeth, 600 miles (one repeater). There is ordinary Wheatstone working on some of these circuits. Quadruplex working, ordinary as well as A side relayed and forked arrangements, are in use in a few instances. An example of this is Cape Town to Kimberley (650 miles) and De Aar (500 miles), forked at Beaufort West.

The repeater stations referred to are Beaufort West, 340 miles from Cape Town, relaying chiefly all Transvaal, Free State and Natal lines from Cape Town; Kimberley, in on the Cape Town-Transvaal and Bulawayo lines; Bloemfontein repeating Cape Town-Durban and Port Elizabeth-Johannesburg; Kingwilliamstown relaying Cape Town-Durban, Port Elizabeth-Durban, Port Elizabeth-East London and, with Beaufort West, traffic on the Eastern Telegraph Company's land wire from Cape Town to Durban, which is worked Creed between the Company's offices in these towns. This line is the only private wire rented from the Administration. The other repeater station is Kalkfontein, in South-West Africa, on the Cape Town-Windhoek circuit. Some of the "station" lines, with as many as six offices in circuit are over 200 miles in length. At Cape Town and Johannesburg concentrators, both single current (Central Battery) and double current, for suburban and local circuits, are installed, and switching facilities, although not in use at present, are provided at the latter office.

The methods of operating circuits are similar to those in force in Britain. Typewriters are not used. There is no under-copy of the message, the original being delivered to the addressee, and a combined B and C form is in use. On machine and automatically worked circuits messages are numbered and sent in serial order, the serial numbers being checked and confirmed by Service message when the circuit is closed. On other duplex circuits "Rts" (Receipts) are acknowledged half-hourly, the total with the last "name to" being given. On "single" lines, working "up and down," and "station" lines the total with the last "name to" is given at the end of the batch. The "revised" or batch system of delivery, areas being divided into "walks" and messages taken out at regular intervals, is in force at the largest centres.

At many of the smallest offices telegrams are telephoned, and phonograms, although not very numerous as yet, are increasing and will require additional facilities. The standard attendance is 9 a.m. to 1 p.m., 2 p.m., 5 p.m., with half-hour extensions in some cases. At the larger places the offices are open from 8 a.m. to 6 p.m., and in the largest towns they are open from 8 a.m. to 8 p.m., so far as the public is concerned, with attendance up to 1 a.m. for Press traffic. Johannesburg is open all night during the week, closing at midnight on Saturday and on Sunday nights. At Cape Town there is continuous attendance. These two offices are the most important and have staffs of about 180 each, dealing with an average of 13,500 messages daily. Durban and Port Elizabeth handle about 6,500 and 5,500 messages per day with staffs of 75 and 65 respectively. The busiest day in the year is Christmas Eve, when the traffic reaches huge dimensions, nearly four times the normal, due to the popular custom of exchanging greetings by wire.

The press traffic, which amounts to about 31,000,000 words a year, has grown considerably of late, the inland press especially having greatly increased. This is partly due to the establishment of Afrikaans' daily newspapers receiving press in Afrikaans in addition to the news services in English already in operation. Most of the press traffic centres on Cape Town. All the overseas news, and much of the inland, including Parliamentary press, is handed in and transmitted from there. In conjunction with Reuter's Agency a classified distribution system is in operation from Cape Town only. The Parliamentary press traffic, fostered by the special Parliamentary rate, reaches large proportions. On Budget days and similar occasions it amounts to as much as 150,000 words, while 250,000 words have been transmitted from Cape Town on certain very special days. The principal offices are equipped with Creed apparatus for press reception and with Kleinschmidt and Creed typewriter keyboard perforators and perforators preparing three and four slips simultaneously are installed at Cape Town for the press traffic mentioned.

Overseas telegrams are transmitted at Cape Town and Durban, where they are handed over to the cable company who deal with cablegrams for these towns at their own offices, and to the Wireless Telegraph Company at Cape Town for transmission via "the Beam." There is also another route via the "Radio Directa" (Portuguese Wireless Company) at Lorenço Marques, Johannesburg being the Union handing-over office. A feature of the traffic is the large volume to and from Johannesburg, amounting to nearly a thousand messages a day. There are wireless stations at Cape Town, Port Elizabeth and Durban, in the Union, and at Walvis Bay in South-West Africa.

The rate for inland telegrams in South Africa (Union, South-West Africa and Lorenço Marques) is 1*s.* 3*d.* for the first 12 words or portion thereof, and a penny for each additional word, in effect a penny a word with a surcharge of 3*d.* per message. The surcharge is the increase compared with pre-war rates. Press telegrams are charged 1*s.* for 48 words (minimum) and four words a penny thereafter, but for Parliamentary press, which includes lobby gossip, notes from the House, &c., as well as reports of the debates, the charge is 100 words for 1*s.* (minimum) and eight words a penny afterwards. There is no difference between day and night press rates. Charges on all classes of telegrams are increased by 50% on Sundays, Christmas Day and Good Friday.

At the time of Union—1910—the number of telegrams handled by the South African Union telegraphs was 4,133,000 and the figures for the ensuing years are given in the following table:—

1911	...	5,119,000	1919-20	...	7,646,000
1912	...	5,629,000	1920-21	...	6,995,000
1913	...	5,864,000	1921-22	...	6,091,000
1914	...	5,999,000	1922-23	...	5,520,000
1915	...	6,166,000	1923-24	...	5,381,000
1916	...	5,693,000	1924-25	...	5,452,598
1917	...	6,175,000	1925-26	...	5,905,063
1918	...	6,620,000	1926-27	...	6,055,679

The war years 1914-1918 were followed by a boom period, 1919-1921, succeeded by a slump from 1921 to 1924, after which conditions approximating to normal were reached. The totals for the last two years are higher than the last pre-war year 1913, and an increase of nearly 25% over 1910. During this period the number of telephones in the country grew from 13,650 to 87,000, so that telephone competition has been keen. It has had considerable effect on short-distance traffic in the closer-settled areas, but although the telephone is increasing so rapidly and the trunk system is extending in all directions, in many cases by the utilisation of telegraph wires, the statistics given show that it is doubtful whether the telephone will have the same effect on the telegraph as it has had in Great Britain. Numerous reasons, such as the increase of multiple shops in all classes of trading, are said to be responsible for the decline of traffic in Great Britain. These conditions do not exist in South Africa, and all kinds of businesses with branches in different towns use the telegraph freely. Government Departments, both Union and Provincial, find the telegraph indispensable in administering the affairs of the country, and it is used by them as is never done nor is necessary in England. The growth of Press traffic has been mentioned. This traffic is exclusively handled by the Administration, and likely to remain so, as there are no private newspaper wires. Distances being great, and average train speeds, with corresponding postal facilities, much slower than in the old country, the telegraph holds its own in regard to medium and long-distance traffic. And even with a development of aerial mail services, which is likely in the future, present indications are that it will continue to do so, and that fluctuations in the volume of traffic will be due to the state of business and not to absolute loss. Changes there will be, both in apparatus and in conditions, witness what has taken place even in the last five years, and it is not safe to prophesy, of course, but provided that a fair balance is kept between the two branches of the service, and attention given to the needs and requirements of the telegraphs, there is every prospect of their remaining what they are, a very necessary factor in the economic life of the country, and an efficient part of the communications of South Africa.

OBITUARY.

MR. W. STURMAN.

IT is with deep regret that we record the death of Mr. W. Sturman, late Overseer, which took place in May shortly after his retirement from the Service. The operation, from which he did not recover, was performed so pathetically soon after his retirement, that he was not able, for one moment, to sit back to enjoy the comforts of the armchair which was presented to him by the staff on the occasion of his well-earned retirement. Throughout the 43 years of his service he performed his duties with a devotion so characteristic of a good-living man, while his kindly and sympathetic nature engendered a deep affection amongst the whole of the staff.

"He fought his fight, which is acclaimed well done!"

MR. W. J. CLOUGH.

ALL ex-National Telephone Company men who have served in the Liverpool and Manchester Districts will be sorry to learn of the death of Mr. W. J. Clough, Clerical Officer.

Mr. Clough retired under the age limit in February last, he had been in very poor health for some time and was recently removed to the Baguley Sanatorium, where he died on Sept. 6. He was buried at the Southern Cemetery, Manchester, on 10th idem, many of his old colleagues paying their last tribute by their presence.

THE HOP EXCHANGE SUNSHINE FUND.

THE sixth annual outing for the poor children of Southwark was held on Saturday, May 28.

Four chars-a-banc loads of excited youngsters were conveyed to Eastcote, where they were turned loose to play amongst the wild flowers in the meadows or to revel in the merry-go-rounds, swingboats, coker-nut shies, and all the other amusements to be found there.

After a very good tea, which was served in the pavilion—and to which everyone did ample justice—races were run and Tug-o'-war "heaved."

The prizes, numbering sixty, were presented to the winners by the Chief Supervisor of "Hop."

On being marshalled for the return journey each child was given a bag of sweets, which did not in any way deter them from exercising their vocal powers, although, at times, their articulation may have been somewhat "slurred."

So: back again to the bricks and mortar, tired but very happy; although not as comfortably seated as before owing to the space which had to be found for the huge bunches of buttercups, &c., which "must be taken home to mother."

Could all those who subscribed to the fund have witnessed the pleasure and excitement of these kiddies, into whose lives so little pleasure ever comes, they would have felt amply rewarded for their generosity.

ON A VISIT TO "TANDEM."

THE impressionist on entering the room would be struck first of all by the silence, then by the seeming immobility of the seated figures, and lastly, by the alert expression on the faces of those same figures.

Closer observation might disturb slightly the first two of these impressions but the general effect would remain.

Yet this quiet room is a symbol—an incongruous one without doubt—of the machine age. It is for London the "Alpha" of what has become known as the Automatic; whether the "Omega" will ever be reached is doubtful, as "in the bright lexicon" of the technician there's no such word as finality.

It is now a commonplace that telephone subscribers on visiting an exchange for the first time are surprised by the quietness with which everything is done. Here the quietness is superlative. Occasionally a whispered voice; occasionally the click of a key—that is all.

Somehow this quiet atmosphere cannot become associated in our minds with machines. We expect noise and tumult. Perhaps it is an allegory. The noisiest revolutions in history have often been the shortest-lived; the quietest have been the most deeply-rooted.

A neat, dustless table, a few keys, a few points of light flashing, a deft movement of the fingers by the operator—and the tiny lamps tell that the genie of the machine which the moving fingers have summoned has performed its task. If one could only think of it as an abstract proposition what a wonder it is.

Then we have unfolded strips of papers marked with short longitudinal lines in groups of seven. From the comparative lengths and spacing can be judged the efficiency of the finger-work at each of the neat tables. To the question "Do you preserve these as a reminder of the sins of the past?" how relieving to be told, "Oh no, I wouldn't be so cruel." Otherwise it would indeed have been a case of recalling the frailties of youth to chasten the pleasures of success.

In the basement are the robots of the new service. Here there is a little more sound, but more a restless click-clack than a noise. All these orderly rows of selectors and other ministers who do the will of the machine, the thousands of neatly laid-out wires, the shining wiped joints of the massive cables, the huge cells which speak of hidden power, have an inanimate beauty—a beauty of use rather than art. There is in this great hall the wonderful material of a new MacAndrew's Hymn could we find our Kipling to give it voice.

And even machines cannot live unto themselves. They require the human touch and care and interest. The engineer tells with pride of its planning and building up. The chief supervisor shows delightedly the best of her observation records. The traffic superintendent, when it is suggested that he must have enjoyed it all, answers smilingly that he would not have missed it for anything.

It is a fascinating place. J. F. S.

PRESENTATION TO MR. G. J. CLARK.

MR. G. J. CLARK, Assistant Traffic Superintendent, South Wales District, was the recipient of gifts in the form of a camera, bowls bag and presentation Eversharp Pencil, on the occasion of his retirement on Aug. 31, on reaching the age limit, after a period of 44 years Post Office service.

The esteem in which Mr. Clark was held was indicated in appropriate speeches by Mr. Waite, District Manager, who made the presentation, Mr. Marsh, Traffic Superintendent, Mr. McDonald, Traffic Superintendent, Class II, and other members of the staff. The hope was expressed that Mr. Clark will have better health to enjoy his well-earned leisure.

Mr. Clark suitably responded.

TELEPHONE NOTES.

FOG flying experiments with the leader cable system, says *The Electrical Review*, are now in progress at the Royal Aircraft Establishment, Farnborough, and the scheme is now being tried on a large scale in the Woking-Basingstoke area with five miles of cable laid in the form of an oval within the aerodrome. Two sides of the oval are nearly straight, and along one of them is an auxiliary cable giving a signal of a different frequency. This indicates the area around which a landing can be made with the greatest ease. The aircraft is fitted with two search coils in the wings connected with an instrument in the cockpit, which tells the pilot, by means of oscillating lights on vertical scales, whether he is to port or starboard of the cable. The newer instruments have enabled the amperage to be reduced to 50, the horse-power to 3 per mile, and they are sensitive to signals from a height of 1,500 ft. downwards; they are, in fact, so delicate that they respond to a signal of 0.005 microwatt.

* * * *

As the result of successful trials, direct telephone communication between Prague, Stuttgart, and Paris has been established, and a regular service has been opened. Tests are now being carried out between Paris and Budapest, the underground cable between Paris and Vienna being utilised, and then the overhead wire between Vienna and Budapest; so far the tests have been considered quite satisfactory.—*The Electrical Review.*

* * * *

A new automatic telephone exchange at Stratford, New Zealand, has been completed by Siemens Bros. & Co., Ltd., Woolwich, and was lately opened. The exchange has an initial equipment for 600 ordinary lines and 50 rural and party lines with an ultimate capacity of 900 and 100 respectively. The exchange equipment includes a two-position manual board and a one-position test deck. The automatic equipment is the No. 16 type with several novel and interesting features, which include revertive calling on 4-party lines and special signalling arrangements for the rural lines.—*The Electrical Review.*

* * * *

The first automatic telephone exchange in Egypt, says *Telephony*, has been completed by Siemens Brothers & Co., Ltd., London, and is now in operation. This exchange, named Ataba, is situated in the important town of Cairo and serves a busy commercial area where the telephone traffic is exceptionally high and is complicated by reason of the problem of mixed languages.

The dial switches of the telephones bear numbers in Arabic and English.

* * * *

According to *Telephony*, impatient users of the telephone are to receive prompt punishment in Paris. Calls are to be numbered as they arrive at the exchanges and will then be dealt with in order.

If a subscriber grows impatient and agitates the hook, thereby distracting the attention of the operator, he will lose his turn and his name will be placed at the bottom of the list. H. J. E. S.

IMPRESSIONS.

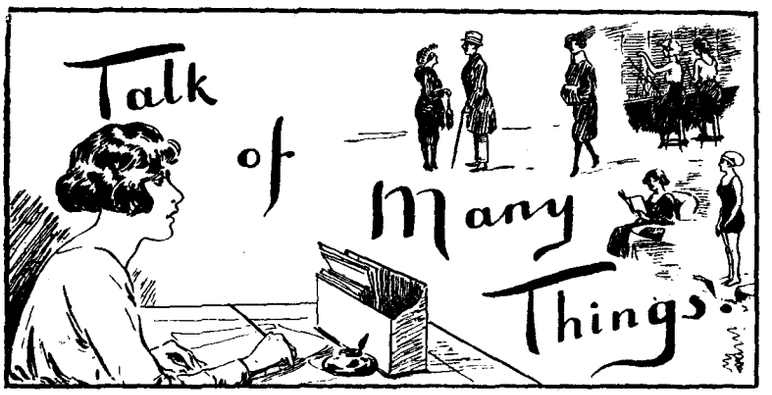
BY J. R. RAMSAY, *Contract Officer in Training, Glasgow.*

MY impressions were formed during instructional visits to different subscribers with another contract officer, while in training as a contract officer. I was primarily impressed with the comparative easiness of dealing with subscribers—apart from commercial canvassing. There still appears to be some hostility on the part of certain classes of the public when approached with agreements which entail payments in advance.

During the course of conversation between the contract officer and the "prospect," I was impressed by the psychological atmosphere created, and saw how simply the members of the public could be brought to realise difficult points.

I suggest that to become a successful contract officer one must have a goodly share of personal qualities, coupled with tact and diplomacy, and to be capable of conversing intelligently and sympathetically, if necessary, with prospective subscribers who show signs of amiability. The human factor, no matter how difficult, can undoubtedly be brought to bear on negotiation and the "prospect" brought to appreciate and accept the views or ideas of the canvasser, by the application of practical psychology, patience, and determination, bearing in mind always not to force arguments which may undermine one's chances of success. It will be readily observed that the general deportment and manner of the canvasser will have a great effect upon his or her work, and on no account should there be any lapse into an attitude of "ennui."

WE TELEPHONISTS



Who is Sylvia ?

THE gracious compliment so neatly conveyed in verse by "D.D. of Central" put me "all of a twitter," and I am blushing still.—[Is that why you wrote this in red ink ?—ED.]—I have out-crimsoned the rambler and have uprooted the beet, and for the moment I don't know where I am, let alone who I am. I ought to reply in verse, of course, but as there is generally neither rhyme nor reason in what I write, verse is clearly out of the question. I cannot tell a lie. I am not the P.M.G. By that I don't mean that the P.M.G. can or does lie or that if I were the P.M.G. I could or would lie. With regard to the question as to whether I deal with subscribers' accounts, all I need say is that I have too much trouble with my own to want to be bothered with those of others. At the present moment my finances are T.O.S. and my bank account is O.C.B. According to some I am benighted, but I am not yet a Sir, although there is nothing a miss about me.—[No puns, please.—ED.]—This is as near as I will go to reveal my identity. I have to be cautious, you see, because when I last confessed, the anxious enquirer promptly presented a final demand for income tax. "Where ignorance is" miss, "'tis jolly to be wise"—or words to that effect.

I am delighted to feel that I have been the means of removing D.D.'s Double Depressions—I presume that is what "D.D." signifies, unless she is a Doctor of Divinity—but if she knew me or even met me they would return. Then, of course, she would "register" grief and pain.—[I've warned you once about puns, P. F. !—ED.]—It's thrilling, however, to think that perhaps we may have met. Possibly we have been together in a District "jam" and I may have trodden on her foot. If so, I apologise now, because doubtless I was too breathless to do so at the time. Perchance we have jostled in Woolworth's, or she may have seen me standing stork-like and utterly bored in a ladies' hat shop in Oxford Street pondering the inner truth of the words "they also serve who only stand and wait." Yes ! perhaps all these things, and yet we have not recognised each other. Isn't it tragic ? Let us take heart, however. Because of your curiosity, D. D., this column has been enriched with your verse. Send a poem every month.

PERCY FLAGE.

"Lines" to "Tandem."

A simple fact, dear colleagues all,
A great invention, too—
So turn your minds from bat and ball,
Or going to the Zoo.
For telephones are up to date
And speculation's rife and great,
But do not judge at random
The working of new TANDEM.

Keys are depressed by maidens fair
And junctions are allotted ;
Then eagerly, with greatest care,
The numbers are all spotted.
Some may get lost, but what of that !
The Engineers are on them pat,
So do not judge at random
The working of new TANDEM.

But wait awhile, and you will smile
When all is working gaily,
And dockets *de*crease in the file
You used to wade through daily.
So cheer up all—do not be sad
For quite soon now you'll all be glad
You did not judge at random
The working of new Tandem.

And so tho' junctions get engaged
These days when we hus*band* 'em,
You must not fret or get enraged,
'Tis not the fault of *TANDEM*.

E. H. B.

A Telephone Romance.

A pretty wedding "Service" was celebrated at "Hornchurch" when Mr. "Rodney Fitzroy" led Miss "Primrose Hill" from "Croydon" to the altar.

The church was prettily decorated, the "Speedwell" predominating, and the "Selector" of these blossoms, Mr. "Colin Dale" stated that he gathered them in "Grangewood."

The Rev. "Kelvin" officiated, and the happy couple "Listened in" awe to the advice he "allotted" and placed great "Reliance" on his words.

The best man, Mr. "Frank Lyn," and his friend, Mr. "Harold Wood" (who travelled from "Willesden" and "Wallington" respectively), took up their "positions" early.

The bride, who had "Maida Vale" unaided, had been a ward in "Chancery" ; she was attended by Miss "Ann Cillary," Miss "Fan System" and Miss "Mayfair." When proceeding down the "Central" aisle a slight "disconnexion" occurred, namely, the bride's "Edgware" became unfastened, and one of the guests, Miss "Mary Land," had to come forward and "Pinner."

The "Ambassador" for the "Admiralty" sent a "Telegram" from "Grosvenor" Square, near "Victoria," wishing the happy couple a "clear" future.

They left the church to the strains of "Oh, what will the 'answer' be ?" and proceeded to "Waterloo," where they paid "Toll" for their three "Trunks." Here they entered a carriage "in error," labelled "Royal," but "cleared" out when they saw the "Guard Signal."

The journey to "Battersea" was very uneventful, and on the first day there they visited the "local" "Museum," which stood in a beautiful "Park" approached through an "Avenue" of trees.

On leaving the building, they met a "distant connexion" of the wife's, lately arrived from Canada, who gave them a "Canadian beam" and, as you can imagine, a wholesale "distribution" of "messages" followed.

(For further adventures of the happy couple, see our next issue.)

D. D., Central.

New Versions of Old Songs.

No. 3.—UNTIL. (To a visiting T.O.)

No glows on all the boards
Until you came—
No lengthy clears but those
You chanced to see—
No unrequited flash that you observed—
No clears, but you put all the blame on me !

No labels missing from the order-wires,
No failure of the staff to time subs as they ought—
No truant ticket lying on the floor,
But you took note, and entered it in your report !

T.O.'s loom ever in my fevered dreams—
Their eyes scan fiercely everything in sight—
No matter how preposterous it seems,
They are convinced that everything they write is right !

C. A. S.

The Telephone Play.

Some misapprehension has probably been caused by the description of the Telephone Play as printed on the membership cards of the London Telephonists' Society for the forthcoming session, on which, by inadvertence the word "musical" was deleted—but only by inadvertence. The play *will* be a musical play, in which we hope again to hear the voices of our accomplished artists, Miss Street and Mr. Hemsley, and the bright and tuneful singing of our Telephonists' chorus.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), London, E.C.1.

LONDON TELEPHONE SERVICE NOTES.

Contract Branch.

THE volume of business done by the Contract Branch during the month of August was as follows :—

New business obtained	6,220	stations.
Ceasements	3,539	„
Net gain	2,681	„

The net gain for August last year amounted to 2,816, and that for August, 1925, to 2,988, so that this year's figure cannot be regarded as satisfactory, but its smallness is mainly due to the general complaint that business is slack and suffering from the effects of last year's industrial disputes.

Superstition is not yet dead in this 20th century London of ours. The other day a contract officer came across a subscriber who refused to sign forms of any description on a Friday, owing to superstitious fears. It is understood that this same subscriber invariably refuses to pay his accounts until he receives a final notice, but there is no evidence to show whether this is due to superstition or a Northern ancestry.

In the May number we referred in this column to the strenuous game of Kiosking, which is now being played all over the country, and especially by members of the London Contract Branch. At that time the number of Kiosks in London amounted to 474, but the number has now increased to 634 and Advice Notes have been issued for the erection of another 114.

On the whole, it is thought that this progress is fairly satisfactory, considering the large number of local authorities and other bodies involved. At any rate, it indicates that the number of Kiosks actually in use in London has increased by 33⅓% in the last five months.

Mr. J. P. Bissell, Clerical Officer, attached to the Western Contract Office, was married on Saturday, Sept. 10.

His colleagues in the Office and friends presented him with a handsome case of cutlery, on which was a silver plate suitably inscribed. The presentation was made by the District Contract Manager.

* * * *

Football Notes.

It was a happy decision on the part of the considerable and increasing number of cricket enthusiasts to push on with the formation of a Football Club before the pleasing atmosphere created by the Cricket Tournament had evaporated.

For the present, at any rate, only one team will be run by the L.T.S. The range of selection for football players is less extensive than for cricketers, due, no doubt, to the "youthfulness" of the L.T.S. male staff. Already one practice game has been held, and perhaps two others will be arranged before the League tournament opens.

The Contract Branch is likely to be well represented in the team, but there is room for others, and if more than sufficient players are forthcoming for one team efforts will be made to fix up additional team matches. The ground and accommodation, which includes baths, have now been finally settled at Raynes Park, and the following is a list of the engagements for September and October :—

Sept. 20	Possibles *v.* Probables ...	Trial game.
„ 24	Borough Polytechnic ...	Away.
Oct 1	National History Museum	At Raynes Park.
„ 8	Middlesex Hospital ...	Away.
„ 15	Fixtures not yet arranged.	
„ 22		
„ 29	Colonial Office	Away.

As previously announced, the Club will play in the Civil Service League. The honorary membership subscription has been fixed at 2*s.* 6*d.*, and it is hoped many members of the Contract staff will join the section.

* * * *

Bowling Club.

With the 1927 season at an end it may be of interest to place on record the results of the Club's first year. It was ambitious to enter for the Banbury Cup Competition, especially as the number of active members made it difficult to turn out at full strength on all occasions. Six matches were played, two being won and six lost. It was a great distinction to inflict defeat upon the cup-holders, the C.T.O. The other victory was over the Cavendish Club, whilst the defeats were at the hands of A.G.D., L.P.S., S.B.D. and L.E.D. The margin of defeat was very narrow in each case, and the total number of shots scored by the L.T.S. in the competition was 318, against 351 scored by their opponents.

The results warrant every confidence in the future, and players of the game are urged to get into touch with the Captain, Mr. P. J. Mantle, or with the Hon. Sec., Mr. J. E. Collins, 14 Gilpin Avenue, East Sheen.

With a larger membership it will be possible to arrange a fuller programme for next season.

* * * *

Tennis Competition.

Unfavourable weather and holidays have delayed the progress of the competition for Miss A. E. Cox's Cup.

In the third round, Trunks (B) beat A.R.3 B., Kingston beat Central (A), Clerkenwell beat Hop, whilst the match between Avenue and Trunks (C) remains to be played. Trunks (B) will therefore meet Kingston in one of the semi-finals and Clerkenwell will meet the winner of Trunks and Avenue in the other.

The date and venue of the Final will be announced as soon as the finalists are known.

* * * *

Swimming.

The "Rana" Ladies' S.C. (Controller's Office) will hold their third annual gala at St. George's Baths, Buckingham Palace Road, on Monday, Oct. 10.

A very attractive programme has been arranged, which includes the Ladies' Breast Stroke Championship of the Civil Service.

Miss F. K. Nettlefold, Cornwall House, will be pleased to attend to applications for tickets.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Promotions :—

Miss A. LIDDELL appointed Supervisor at Brixton Exchange.
Miss F. M. NIGHTINGALE appointed Supervisor at Riverside Exchange
Miss E. M. MELDRUM appointed Asst. Supr., Class I, at Hop Exchange.
Miss M. E. B. SMITH appointed Asst. Supr., Class II, at East Exchange.
Miss L. LEA appointed Asst. Supr., Class II, at Trunk Exchange.
Miss G. E. NEGUS appointed Asst. Supr, Class II, at Avenue Exchange.
Miss D. I. POOLE appointed Asst. Supr., Class II, at Victoria Exchange.
Miss N. F. M. CLIFFORD appointed Asst. Supr., Class II, at Clissold Exchange.
Miss A. D. RANSOM appointed Asst. Supr., Class II, at Avenue Exchange.
Miss E. L. FULLELIVE appointed Asst. Supr., Class II, at Gerrard Exchange.
Miss E. M. MARTIN appointed Asst. Supr., Class II, at Toll Exchange.
Miss W. A. BINDER appointed Asst. Supr., Class II, at Victoria Exchange.
Miss L. L. FLINT appointed Asst. Supr., Class II, at North Exchange.
Miss E. M. FULFORD appointed Asst. Supr., Class II, at Sloane Exchange
Miss E. G. RUCK appointed Asst. Supr., Class II, at Park Exchange.
Miss W. N. PROVIS appointed Asst. Supr., Class II, at Tottenham Exchange.
Miss M. L. HORNE appointed Asst. Supr., Class II, at Primrose Hill Exchange.
Miss M. EASTLAKE appointed Asst. Supr, Class II, at Regent Exchange.
Miss B. G. DUNKER appointed Asst. Supr., Class II, at Grangewood Exchange.
Miss M. E. RICHMOND appointed Asst. Supr., Class II, at Museum Exchange.
Miss H. BURKE appointed Asst. Supr, Class II, at Paddington Exchange.
Miss G. M. BAYLISS appointed Asst. Supr., Class II, at Paddington Exchange.
Miss E. A. HOOPER appointed Asst. Supr., Class II, at Bishopsgate Exchange.
Miss V. I. FRANKLIN appointed Asst. Supr., Class II, at London Wall Exchange.
Miss E. M. CARVER appointed Asst. Supr., Class II, at Holborn Exchange.
Miss E. B. ARCHER appointed Asst. Supr., Class II, at Western Exchange.
Miss E. PHEBY appointed Asst. Supr., Class II, at Park Exchange.

The Secretary has approved the following appointments :—

Captain W. L. C. RATHBONE, Executive Officer to Higher Clerical Officer.
Mr. A. E. HUTCHISON, Acting Executive Officer to Executive Officer.
Mr. P. W. FOLLETT, Clerical Officer to Acting Executive Officer.

THE

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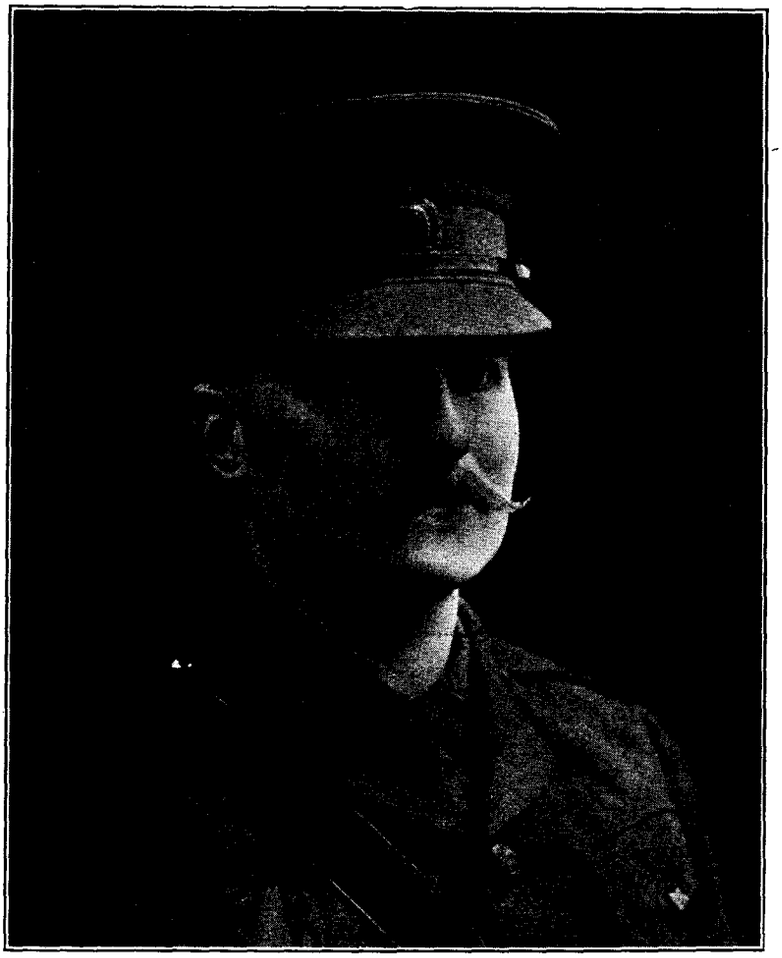
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XLVI.

LIEUT.-COL. A. C. BOOTH.



LIEUT.-COL. A. C. BOOTH is, and has been for many years, the Staff Engineer responsible, under the Engineer-in-Chief, for the mechanism of the British telegraph system, overseas as well as Inland, and that responsibility could not be in more enthusiastic hands. He is himself an ex-telegraphist bred in Morse and Wheatstone traditions, but he was broad-minded enough, early in his career, to recognise the merits and potentialities of the Baudot multiplex system as used in France, and it is largely due to his initiative that "machine," or "printing," telegraphs occupy so prominent a place in the British inland telegraph system of to-day. To him we are indebted for the duplex method employed on multiplex installations and for many improvements in machine telegraph design and operation. Lt.-Col. Booth lives and moves in a world of machines. Their structure and idiosyncracies are open books to him, and possibly at times he wonders why other men, especially that body known as "dirigeurs," find machines which are so tractable in his hands at times peevish and fractious in theirs.

During the war, Lt.-Col. Booth served as second-in-command to Col. Sir Andrew Ogilvie, Director of Army Signals (Home Defence).

TELEPHONES AND A REVOLUTION.

USUALLY a revolution in Portugal is of no moment to those outside political circles; sometimes we others are unaware of the occurrence until we read of it in the papers, and on occasions the first information has come from our home papers. That of February last, however, was a very serious affair and, in the opinion of those who should know, quite the most sanguinary in the history of the Republic.

When, in the very early hours of the third day of the month, the Chief Operator rang to inform me that a revolution had broken out, I was prone to regard it as of the usual type and was shortly again in the arms of Morpheus. It had taken but a few minutes to ascertain that, although the traffic was well within the capacity of the normal force on duty, some emergency staff had arrived without let or hindrance and that the streets were apparently safe and quiet. The British members of the staff were warned and the motor-car was brought round to the door.

Nothing further transpiring, we went to our Central Office some hours earlier than usual, the journey being made without incident. The trams were running and most people appeared to be going about their business in a normal manner. Our way, however, did not traverse the vicinity of the principal public offices, which, I shortly learned, were the centre of the movement. Enquiry showed that a military rising had taken place, the major portion of the troops stationed in the city being involved. The Civil Governor had been arrested or abducted, his offices, the Military Headquarters and the Post Office being in the hands of the rebels, as also was the railway on the north side of the river. At one or two points the troops remained loyal and turned down the various overtures made to them.

Towards mid-day the telephone traffic became quite out of control, but the girls rose to the occasion and kept going. A reconnoitre in the affected quarter showed that whilst the side streets were available for traffic, the main roads leading to the public buildings were occupied by armed rebels, who had cut trenches across them, erected barbed wire entanglements and mounted machine guns. Business houses began to close their shutters and send home their staffs, and the trams ceased running within the centre of the city. No mail was delivered and both the telegraph and the trunk telephone service, which are operated by the Government, were discontinued.

As the afternoon wore on our traffic died down and it was possible to rest the staff. Those operators due to go off duty were informed that if they chose to remain on the premises they could do so, the best arrangements possible being made to feed and sleep them.

In the meantime the outside staff had been sent home, as it was clearly impracticable to supervise them and there was risk of contact with the troops.

Desultory rifle fire had been heard during the afternoon, and we learned later that arms and ammunition had been issued to several hundred civilians, some of whom appeared to wander round at their own sweet will. This put a very serious complexion on the whole matter, as the streets, with armed irresponsibles patrolling them, obviously became unsafe, and particularly so after sunset.

I should perhaps here state that on the first sign of any disturbance of a political nature all taxis, private cars and motor lorries make a bee line for home to avoid being commandeered, and this was the case in the present instance.

As a precautionary measure I had put this Company's car in the garden of the Oporto British Club, a couple of hundred yards from the office. It was thought that there was some risk in sending it out with the chauffeur alone, and I therefore decided to go in it myself to obtain the necessary rugs, blankets, &c., for the staff. A Union Jack was flown on the bonnet of the car, and although challenged at various points by the rebels a plain statement of my nationality and position evoked on every occasion a courteous permission to proceed. We made a point of using the main streets in an open manner, and although one rifle or machine-gun bullet hit the ground a few yards in front of the car, I am of opinion that it was a stray shot only and not intended for us.

For the remainder of the period we used the car as necessity arose, but always with one of the British staff in it, and I think that, apart from those actually in use by the military, our Austin was the only motor-car to be seen on the streets.

Matters became very quiet towards 8 p.m., and from the nature of the parleying which went on over the various lines a number of girls decided to go home for the night, those living close to the office taking with them as many companions as the sleeping accommodation at their homes would allow. In this way the strain on our own resources was relieved.

The night passed quietly enough, but Government forces began to congregate on the south side of the river. Communication over the bridges and by boat was prohibited at an early hour. The opposing sides swept opposite ends of the bridges with machine gun fire and persons attempting to cross the river by boat from the north were subjected to independent rifle fire from the rebels.

The Government forces dropped an occasional shell round the rebel headquarters, but without doing much damage.

At about 8 a.m. on the 4th a number of wounded civilians were carried past our office, from which it was clear that the matter had got beyond the firework stage.

Round about the usual time those girls who had gone home for the night turned up all serene and smiling. One bright damsel commandeered a Red Cross motor ambulance, which brought her along in state.

From 9 a.m. onwards traffic began to pile up very heavily, obviously due to a desire to ascertain or discuss the progress of the movement.

About 10.40 a.m. some bullets from a misdirected machine gun penetrated our switchroom skylights, and this very naturally caused a panic. Quickly ascertaining, however, that there were no casualties, we rallied and chaffed the girls into resuming their work. Some had not attempted to leave their positions, but the general circumstances had predisposed one or two to hysteria. These we led to lower rooms, where shortly they recovered and on their own initiative returned to their places.

By midday practically every business house was closed and the streets were deserted, our traffic requiring only one-third of the normal force. For some hours hardly a soul was to be seen in any of the streets visible from our windows. An occasional wayfarer might be observed gliding from doorway to doorway or scuttling from point to point probably making for home or for some place of fancied security.

Beyond desultory firing in various directions the night passed without incident if we except an occasional bullet through the skylight. Instead of being alarmed on these occasions the girls made scrambles to secure them as mementos. Those operators not required for duty camped out on the floor of the inner rooms below.

On this night we received several messages from rebel headquarters to cease service on various lines. We accepted the messages but ignored them.

Advantage was taken of the darkness to obtain provisions from shops close by, whose proprietors lived on the premises and who were only too pleased to sell what we required and at the usual prices.

On the morning of the 5th the police station a little below our premises closed its doors, the staff going away. At about 10 a.m. our most southern sub-exchange was taken over by the Government troops arriving from Lisbon, and a little later the

exchange two miles south of the river followed suit. We learned that during the night large forces had come up by train, bringing with them heavy field artillery, which took up positions of advantage on the south bank of the river.

A meeting of responsible British residents had been arranged by the Consul for 11 a.m., but I had no sooner reached the Consulate, some 200 yards away, than I was informed by 'phone that rebels had entered our place. I immediately returned, to find a lieutenant and six armed soldiers had taken possession. They caused some consternation in the switchroom, but on request withdrew to the lower floors. The officer was not at all sure as to the object of his visit. He talked wildly about turning us all out, but after I had pointed out to him the ridiculousness of such a proceeding, he quietened down and contented himself with posting two of his men at the street door. He was not a very cheerful soul, and from his talk not hopeful of the result of the rising. He seemed to know very little of what was happening and went very down in the mouth when told of the massing of Government troops on the south side. As this information was already in the newspapers, though he had not read it, there was no breach of telephone confidence in giving it to him. If I added a nought or two to the number of troops or a few millimetres to the size of the guns, it was worth while, as he sent the information by hand to his headquarters.

During the afternoon he conceived the idea that it would be useful to listen to the conversations passing over the lines in use by the Government forces, but I declined to permit this. I pointed out that, being a British concern, we had no interest other than to give a telephone service to all our subscribers, irrespective of their politics or of the particular side which they supported. He became somewhat truculent at this, but I maintained the attitude that it was service for all or for none. As the staff had already intimated that they would decline to accept orders from other authority than myself, I felt that I was on safe ground. He began to talk wildly about what he would do unless facilities for listening were afforded, and eventually I asked him if he had any knowledge of international law and usage. This was too much for his pessimistic mood and, perhaps seeing visions of the British lion aiding the Government troops, he quietened down and troubled us no more. (I must here admit that I have no knowledge of international law.) In casual conversation afterwards he endeavoured to convince me how good a thing it was for us that he was there to look after us. I let him think so.

Truly, matters savoured of Gilbert and Sullivan.

By 5 p.m. the Government troops had got some of their heavy artillery into position and began to try the range. The screams of the shells as they passed high overhead were rather terrifying to begin with, but by the time it was dark we had become accustomed to them. One of the first shells carried away the major portion of our aerial route to the sub-exchanges on the western side, together with a number of subscribers' lines. Needless to say, we gave no thought to any attempt at repair.

The evening editions of the newspapers were full of "the ruthless savagery of the Government troops," but as they had been censored by the rebel H.Q. it may be assumed that all their information was inspired. They were throughout very complimentary to the telephone staff.

On this night the heavy guns were to be heard every few minutes, but as no shell came near us we passed a not too nervous time. Coffee in the small hours is a good reviver of spirits.

At about 2 a.m. on the 6th, Sunday, we were informed that the newspapers had been instructed by the Minister of War, who commands the Government troops, to publish a warning, advising the population to remain indoors from 9 a.m. It was his intention to bombard the city at that hour. This, of course, was not a cheerful prospect and some of the girls wanted to go home. One could not blame them; but I advised them to wait for daylight, which they decided to do, and they settled down again to get what rest they could. In the meantime I turned the matter over in my mind. The situation was certainly serious. As the central exchange serves both sides of the river, to close down would deprive the Government (and rebel) troops of their telephone service. To hold the girls and risk casualties was a course not lightly to be taken. However, in conference with one of the local directors who was sleeping at his office a few doors away, it was decided that we would persuade the girls to stay, if we could do so, but offer no objection to those who insisted on going home.

I then talked over the matter with the Chief Operator, who expressed her intention to remain under any circumstances unless I sent her away. We afterwards approached the remainder of the staff, all of whom decided to remain, with the proviso that should they change their minds at a later hour they would be free to leave. To this there was not the least objection, you may be sure. Those who had announced their intention of going home hung about in a state of indecision for some time and finally stated their intention to remain. No calls of any moment were passing at the time and so, neglecting the service for a minute or so, we had a little talk. I told them that I thought they had made a right decision in electing to remain, and I expressed the opinion that should bombardment actually take place we might be as safe here as elsewhere. The Government forces knew just exactly where our building was and had intimated that so far as possible they would avoid shelling our immediate neighbourhood. It was pointed out that casualties and fire might result from the shelling, but without a telephone service the work of ambulances and fire brigades would be very seriously hampered. I also reminded them that the thing had lasted longer than most other disturbances and that the end could not much further be delayed. This talk had a good effect, and when the newspapers appeared announcing that the bombardment would take place from 9 to 10 a.m. very little interest was displayed, although as the hour drew nearer there were not many smiles to be seen. However, it passed without incident, and there was a general feeling of relief. The soldiers who, in their way, had taken charge of the building were missed about 9.30, but I gather that on the arrival of the newspapers, about 7.30, they decided that there were healthier spots than our premises, and without "By your leave" or "Good morning" they vanished.

Our information was that most of the principal rebels were making tracks for Spain. Rifle and machine-gun fire continued intermittently throughout the day, but the heavier guns were silent. We understood that the terms to be asked by the rebels were unlikely to be entertained; it therefore seemed clear that the movement would last another day. At 3.45 p.m. the Minister of War announced the turning down of the rebel proposals and his definite intention to bombard at 4 p.m. Precisely at this hour the racket commenced. Being directly in the line of fire of two guns, but much below the level of their objective, from our windows we could actually see the shells falling in the neighbourhood of the rebel headquarters. Traffic at the boards was practically non-existent, but the girls remained seated at their positions. Some tears fell, but the supply of handkerchiefs was equal to the occasion. After the first few salvos, smiles took the place of the looks of apprehension and we carried on.

There was, however, evidence of some damage, and we could see that the roof of the Post Office building was in flames. The fire brigades had moved their apparatus well away from the centre of the town, but, when called, lost no time in getting to work, in spite of the continued firing. Ambulances also drove up to the scenes of casualties and brought away a number of injured.

After an hour of shelling the firing ceased, and parleying again took place. Apparently the rebels were still dissatisfied (or unsatisfied), as an exchange of salvos every few minutes occurred from 6 p.m. After dark the larger guns spoke every 15 or 20 minutes, the rifle and machine-gun fire continuing intermittently as before throughout the night, defeating all our efforts to sleep.

With the coming of day a little more activity was displayed by both sides. The newspaper reports and other rumours were

rather alarming, giving the impression that the rebels were holding more than their own and that there were great prospects of reinforcements, but obviously the statements were inspired. The Staff got very down in the mouth and it was necessary to talk with them.

By 10.30 a.m. the Government commanders had made all their dispositions for taking the city that night, by storm if necessary.

A rumour circulated that a similar rising had taken place at Lisbon, but although this turned out to be true the fact that further troops had come up by train discredited it, at the time.

Business houses remained closed, the streets were still deserted and, although spasmodic firing continued, I deemed it safe to essay a visit to other exchanges and to my home. Although challenged when passing any military point, I was allowed to proceed in whatever direction I wished and eventually returned to our Central Office without the least difficulty. During my absence, however, a party of armed rebel police entered the building with an ex-employee of the Company, who showed them how to listen in at the test desks, to which he connected two or three Government lines. This upset the girls very much and they were disposed to leave the switchroom *en bloc*. The chief operator, however, persuaded them to remain at least until my return, which they expected every minute. On arrival I was informed of what had occurred. I saw immediately that the lines under observation were not the most important ones and that of the three observers one could not write and the others could do so but slowly. No cleverness is necessary to show that in the circumstances not much harm could be done. It takes a good trained shorthand writer to record an ordinary conversation, and it was impossible for these observers to listen and write at the same time. When I returned to the switchroom the chief of the rebel squad kept me under surveillance, presumably with the intention of interfering should I attempt to communicate with Government H.Q. I must say that the Government officials played up handsomely to the situation. Other lines were used for anything of importance and those under observation were used for fictitious talks and for any messages which it would be useful for the rebels to hear. Certainly some of the things they heard put their tails down very sadly.

Shots were now heard only very occasionally, and some hours passed without any of the bigger guns being fired.

The announcement of the Lisbon rising was passed round to various rebel positions, but fortunately none would credit it. I say fortunately, because had they believed the report (which was in fact quite true) they might have resisted for another day or two and this would have delayed the Government troops being withdrawn to Lisbon to put down the revolt there. In fact, it might have resulted in a complete victory for the rebels, both in Lisbon and Oporto.

Shortly after midnight the Government plans matured. The river was crossed. Loyal officers took charge of the various barracks and the rebels were made prisoners. At 2.30 a.m. the Republican Guard turned out for street patrol work and the revolution was over, having lasted 5 days and 5 nights. The normal night staff being sufficient for the traffic passing, the rest of us sought what sleep we could get in the hours left to us before the opening of a day which was expected to be exceptionally busy. And it was so.

The few male staff who were required remained on duty throughout, and by their calm demeanour and constant presence contributed very considerably to the smooth running of things.

It will be agreed that we have reason to be very proud of our people and of the way in which they stuck to their work. The case was quite different from a war, in which the whole country fights a common enemy. Further, it embodied the fact that the side which comes out on top becomes the Government, hence an attitude devoid of partisanship was the only one proper to the occasion.

Our colleagues in Lisbon had an equally exciting time, and although it did not last quite so long I feel quite sure that their ability to maintain the service would, like our own, have found its limit only in the destruction of the apparatus, or in the use of brute force. Obviously it would have been futile on our part to attempt physical resistance to armed force and such a course never occurred to us. A smooth tongue and some imagination carried us through the events without casualties, and for such mercies we were very thankful.

H. A. H.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations in the Post Office system at Aug. 31, 1927, was 1,557,389. The new stations added during August numbered 17,387, and the cessations 8,714, resulting in a net increase of 8,673 stations.

The growth for the month is summarised below :—

	London.	Provinces.
Telephone Stations—		
Total at Aug. 31	549,782	1,007,607
Net increase for month	2,544	6,129
Residence Rate Subscribers—		
Total	121,480	196,887
Net increase	1,022	1,826
Call Office Stations—		
Total	4,931	17,880
Net Increase	88	109
Kiosks—		
Total	623	3,035
Net increase	47	71
Rural Party Line Stations—		
Total	—	10,052
Net increase	—	32
Rural Railway Stations connected with Exchange System—		
Total	—	806
Net increase	—	10

The number of inland trunk calls dealt with during July (the latest statistics available) was 8,795,162, an increase of 435,673, or 5.2% on the figure for the corresponding month last year.

Calls made to the Continent during July numbered 24,980 and from the Continent 26,585, representing increases of 8.7% and 3.2% respectively over July, 1926.

Further progress was made during the month with the development of the local exchange system. New exchanges opened included the following :—

LONDON—Fulham, Frobisher (theoretical exchanges on the Western Manual Exchange); Prospect (theoretical exchange on the Richmond Exchange).

PROVINCES—Amersham (Relief), Hereford (Strowger Automatic), Govan, and Preston, Lancs (Relief);

and among the more important exchanges extended were :—

LONDON—Chingford, Edgware, Erith, Harrow, Hornchurch, New Cross, Reigate, Riverside, Tottenham.

PROVINCES—Douglas (Liverpool), Falkirk, Hereford, Lark Lane (Liverpool), Malvern, Old Swan (Liverpool), Scarborough, Wavertree (Liverpool).

During the month the following additions to the main underground system were completed and brought into use :—

Westerham—Orpington (Section of London—Orpington cable).

Mansfield—Clown (Barlborough);

while 61 new overhead trunk circuits were completed, and 85 additional circuits were provided by means of spare wires in underground cables.

AUTOMATIC TELEPHONY.

BY C. W. BROWN.

(*Continued from p. 9.*)

VIII.

DURING the period of transition from manual to automatic working the following services have to be catered for in a metropolitan area :—

(*a*) Calls from automatic exchanges to manual exchanges.

(*b*) Calls from manual exchanges to automatic exchanges.

(*c*) Calls between manual exchanges.

The methods adopted in the case of the London area are given in the following, which may be assumed to be representative of the most complicated case.

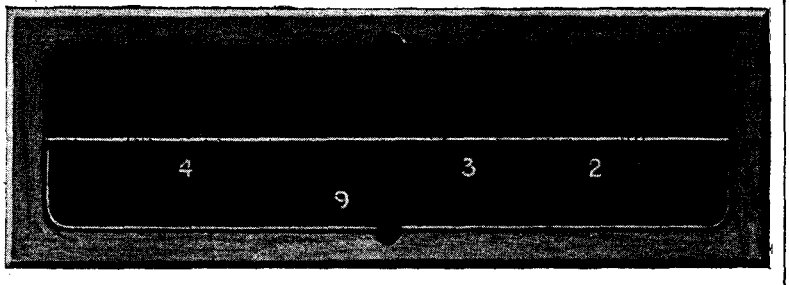


FIG. 1.

Automatic to manual.

In a non-translational area, calls from the automatic exchange usually pass via 1st, or 1st and 2nd, selectors, the calling party reaching a junction by dialling one or two digits, referred to as a "dialling out" code. The call is extended to normal junction calling equipment at the manual exchange and is operated on a manual basis. Such a scheme would be difficult to apply to a very large area on account of the large number of exchanges that will exist side by side with automatic exchanges. It has already been stated that the change from manual to automatic working will occupy several years. It might be thought that in the large city the case would be met by the automatic subscriber dialling the three letters of the exchange code and the call routed to the required exchange to be attended to on a manual basis. In such a scheme two methods of operating would exist, with confusing results. A definite slowing down of calls would occur due to the manual operation, which would be reflected in the number of junctions necessary; the need for advising subscribers of changes as manual exchanges were converted to automatic working would require an expensive and difficult organisation. The fact that subscribers would be required to dial in order to reach an operator, whereas under manual conditions the operator is reached by removing the receiver, would not unreasonably be resented besides creating in the minds of subscribers an entirely wrong impression of automatic working.

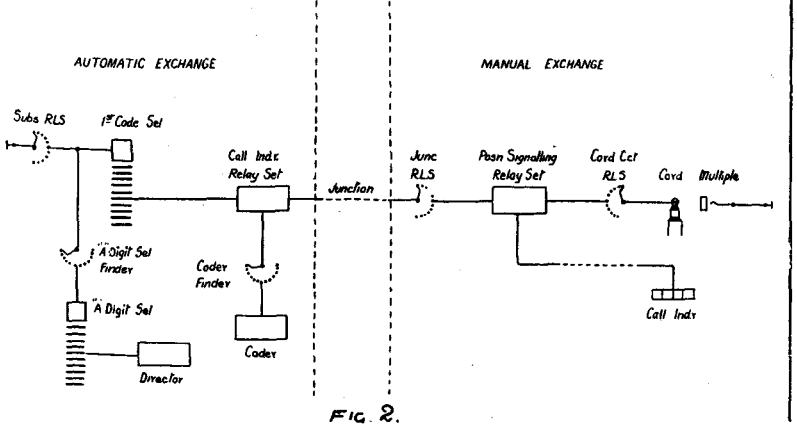


FIG. 2.

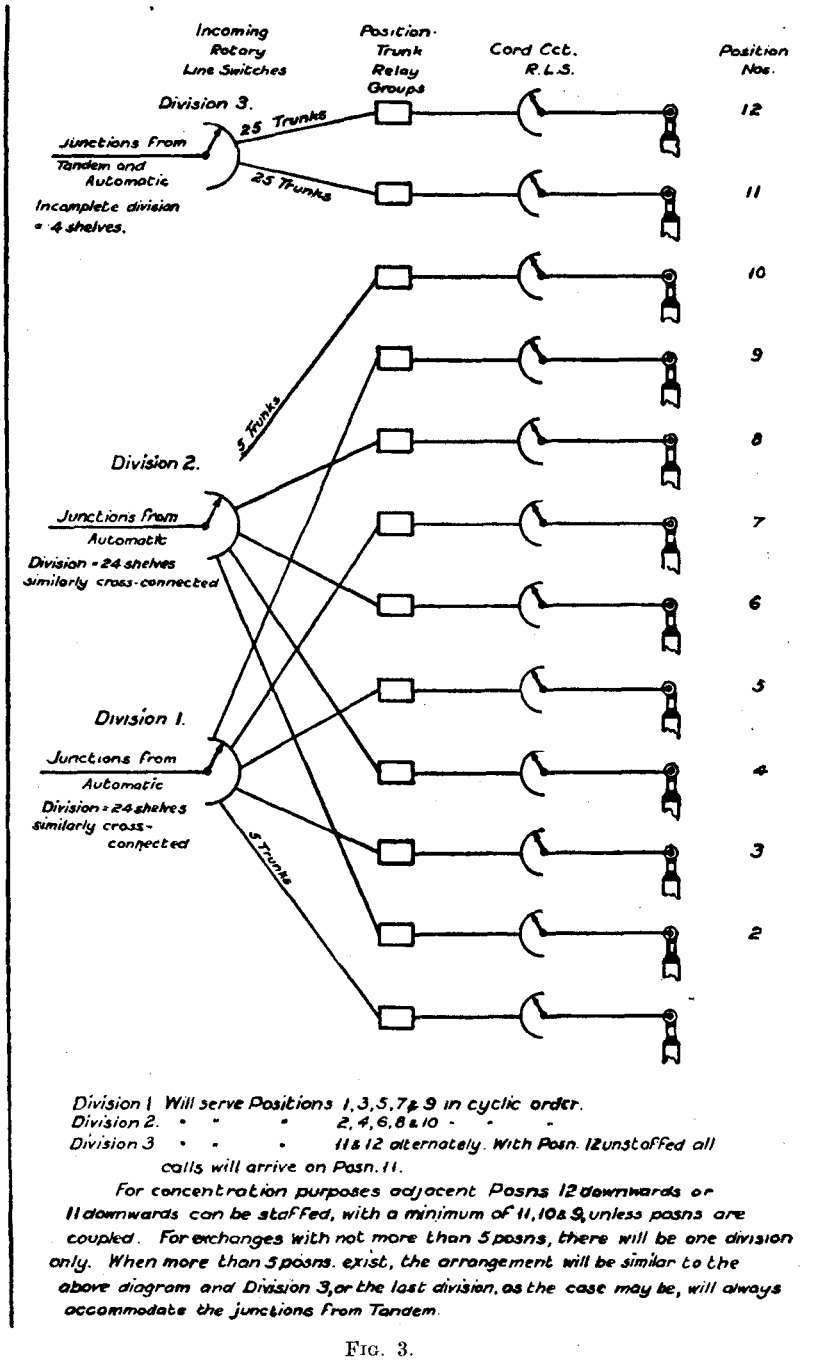


FIG. 3.

With a view to avoiding expensive and difficult alterations to existing manual exchanges and to reduce the quantity of switch equipment necessary, a "call indicator" system of signalling is used. By the use of this scheme, the numbers dialled by a calling party are received by the manual operator in the form of an illuminated "display" as shown in Fig. 1. The operator

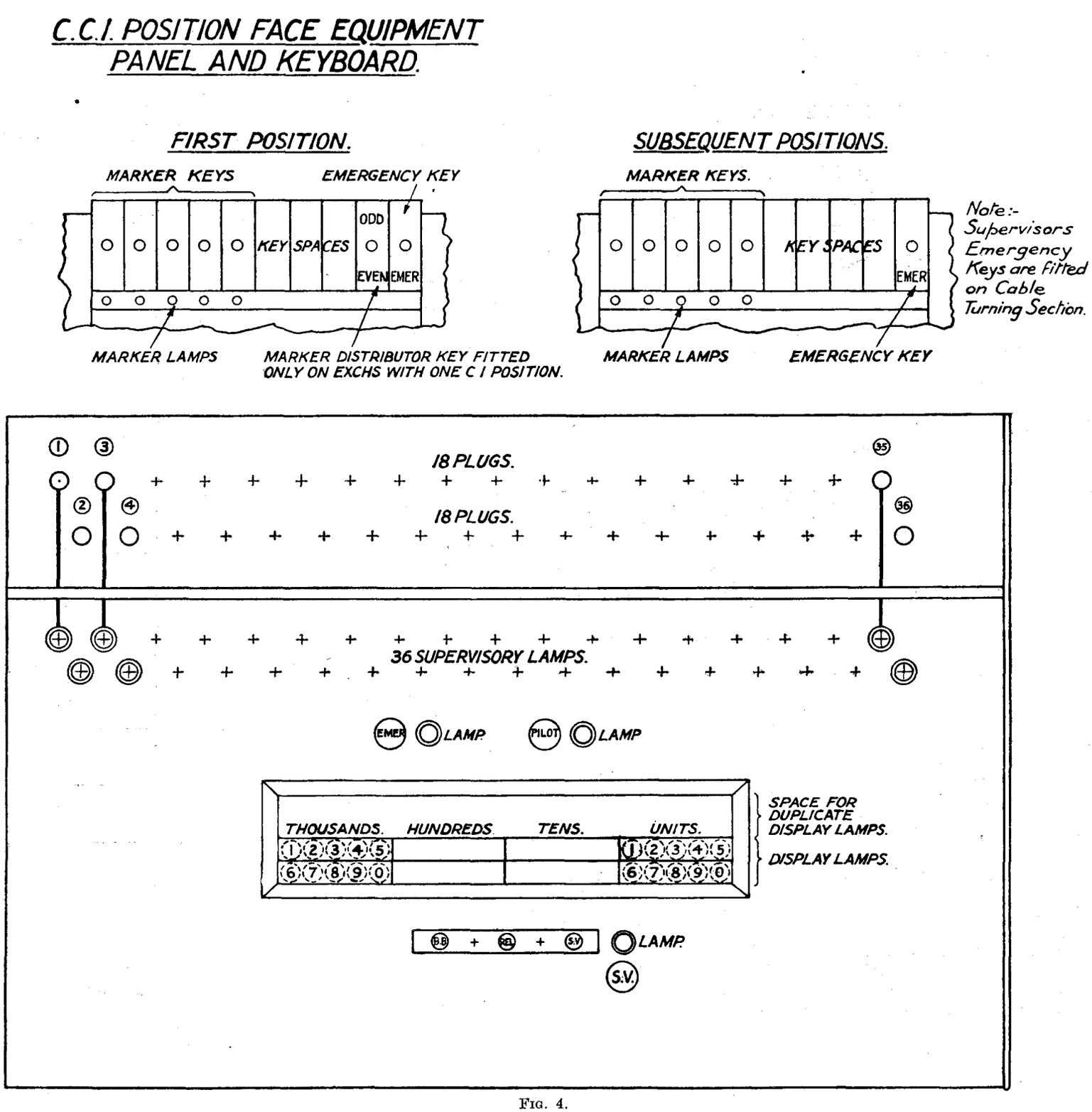


FIG. 4.

completes the call by inserting a plug into the multiple jack of the number displayed. The operator does not speak to the calling party, so that from his point of view the call proceeds as an ordinary automatic call, ringing tone being given when the plug is inserted in the required party's multiple jack.

To speed up operating, and owing to the absence of stepping equipment at the manual end, the standard Strowger impulses passed out from the Director do not pass over the junction, they are converted into battery currents having differing characteristics, before leaving the automatic exchange. A different current combination is assigned to each of the ten digits which are thus said to be coded. The battery currents pass over the junction, which has already selected the position into which the call will be routed, and operate relay equipment which " decodes " the call, setting up other relays that are responsible for lighting the individual lamps in the display panel. The call passes from the automatic exchange to the manual in just over a second. As the result of coding, the system is referred to as " coder call indicator " working.

Fig. 2 is a schematic diagram showing the disposition of the apparatus on such a call.

With the scheme as applied by the Post Office, the junctions are terminated on standard line switches at the manual exchange, the bank contacts are connected to relay signalling sets associated with the manual positions (each position will accommodate 50 such relay sets). The cord circuits—36 per position—are not connected to junctions but are terminated on standard line switches, the banks of which are connected also to the relay signalling sets associated with the junction line switches.

The suite of positions is grouped into divisions containing five positions, and calls are automatically distributed in cyclic order to the five positions, thus providing for load equalisation. The positions are automatically closed to traffic when :—

(*a*) All cords are in use.

(*b*) When the position has five calls waiting attention and one call " displayed."

(*c*) When the operator's head telephone is not in the position.

Provision is made for storing five calls in the position, such calls are disposed of in cyclic order, so that the calls are, in effect, queued up for attention. Although the word " stored " has been used, the calls do not leave the originating exchange until the display apparatus is free to receive them. The calls actually " mark " the manual position that they propose to enter and place themselves in the " queue," discharging themselves from

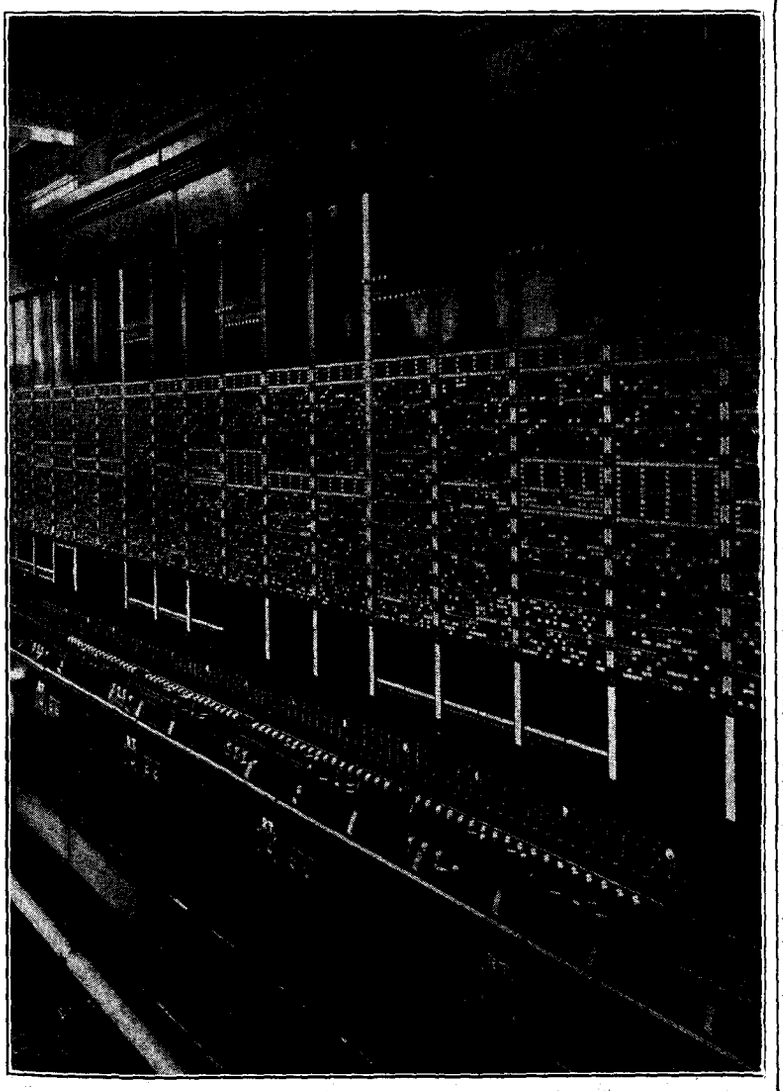


FIG. 5.

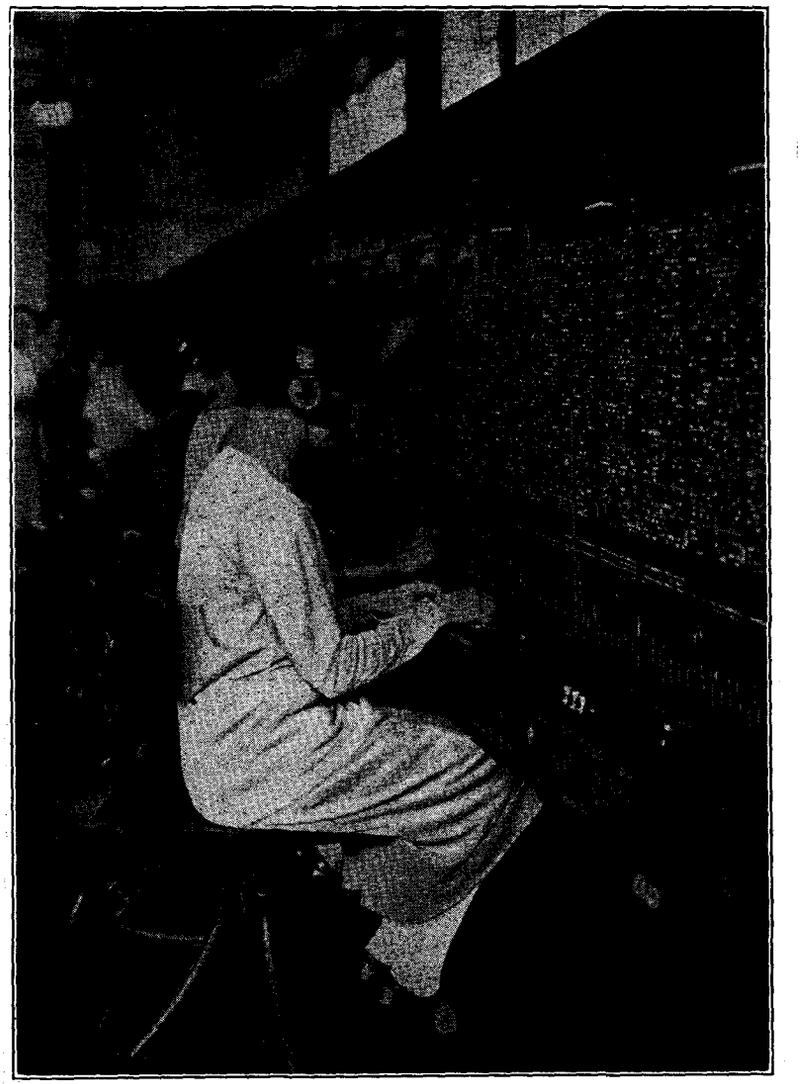


FIG. 6.

the automatic exchange when the " B " operator signals them to proceed. It is interesting to note that the " B " operator has *no indication of the exchange from which a call originates.*

From (*c*) above it follows that the whole of the traffic in a division may be concentrated to one position by having only one head telephone in position. Also if adjacent positions are in different divisions, by keeping open one position per division the traffic for a large exchange may be concentrated to a few positions. The arrangement is shown schematically in Fig. 3. The feature is useful during slack hours and enables economy in staff without loss of efficiency to the service.

1. Amongst the many facilities provided are the following :—

Special keys are provided for (*a*) disposing of callers when the wanted number is busy, thus freeing the display and avoiding the provision of " busy back " jacks in the jack field—the busy signal is connected at the relay signalling set ; (*b*) for connecting callers to service points when service numbers are dialled, thus avoiding the use of cord circuits for the purpose ; (*c*) for disposing of calls that enter the position but, owing to faulty conditions, fail to " display." The key is used in conjunction with the service key and artificially completes the cycle of operations. Such cases are routed to service points.

2. Congestion signals are provided to indicate when a position is " full." Although, owing to the rapidity with which

calls can be dealt with, the congestion condition is usually of very short duration, the frequent operation of the signal is an indication that further positions should be opened.

3. In event of a breakdown of automatic working, the position concerned can be worked on a manual basis, by the operation of a key. Under "manual emergency" conditions, callers enter the position but the display lamps do not light, the caller, however, is connected to the operator's receiver, the latter challenges and connects the required line in the multiple from any available cord. Under these conditions not more than two calls can be in a position simultaneously, one connected to the operator and one waiting, the waiting call is connected to the receiver immediately the previous call has been dealt with.

4. Positions can be automatically "routined," i.e., the decoding and relay signalling apparatus can be tested for correct functioning from the position.

Fig. 4 shows the face equipment of a call indicator position and Figs. 5 and 6 show a suite of positions unstaffed and staffed.

FIG. 7.

Manual to Automatic.

For this class of service, junctions from the manual exchange are terminated on selectors in the automatic exchange and two methods of operation are available. Calling devices may be provided on the manual positions, calls being passed direct to the selectors, or the junctions may be "teed" to B positions located at the automatic and order wire working adopted, the call being set up by the B operator. To prevent fatigue to the operator and to speed up traffic, key sending equipment is usually provided, the operator setting up calls by depressing keys, instead of operating a dial. Fig. 7 is a photo of a key set.

(To be continued.)

PRESENTATION TO MR. H. R. C. HICKISH, SOUTHAMPTON.

IN the presence of a large and representative gathering of the Southampton Telephone Staff, the District Manager, Mr. O. G. Lee, presented Mr. H. R. C. Hickish, Assistant Traffic Superintendent, with a handsome inlaid mahogany scroll clock on the occasion of his marriage.

Mr. Lee in a short speech said what pleasure it gave him to make the presentation and wished Mr. Hickish and the future Mrs. Hickish a happy married life.

Mr. A. L. May, Traffic Superintendent, Class I; Mr. J. W. Stelling, Traffic Superintendent, Class II; and Mr. D. Wallace, Contract Manager, spoke on behalf of Mr. Hickish's married colleagues and extended their best wishes. Mr. F. J. Tanner, speaking for the single members of the staff, wished Mr. Hickish "all the best."

In an amusing little speech, Mr. Hickish thanked the District Manager and those present for their very acceptable gift and kind wishes. Mr. Hickish has also been the recipient of individual gifts from Postmaster's and Engineering Staffs in the Southampton district.

OUR TELEPHONE SERVICE FROM WITHIN.*

BY A. E. COOMBS (*District Manager, Glasgow*).

Glasgow Post Office Organisation (Telephones).—AT the head is the Postmaster Surveyor, Col. Westbury, who has, under his general control, the Postal, Telegraph, and Telephone Services, each of which, for administrative purposes, is self-contained. At the head of the Telephone Branch is the District Manager whose department is organised in three Branches—Accounts, Contract, and Traffic. There is, again, the Engineering Branch which works separately and independently of the foregoing; the functions of this branch do not come within my purview, but needless to say, perhaps, in actual work we are closely interwoven and co-ordinated.

Accounting Branch.—The Accounting Branch deals with the rendering and payment of telephone accounts, with counter enquiries, issues of Telephone Directories, Call Office collections, and kindred matters. Approximately 130,000 accounts are rendered annually, divided evenly over respective quarters. I made a public statement last year that Glasgow compared favourably with other places with regard to prompt payments. It is a pleasure to confirm that statement although it is still necessary, unfortunately, to forward reminders to one out of every three of our subscribers. The telephone revenue of the Glasgow District is in a very healthy condition too, and is rapidly approaching the £750,000 (¾ of a million) per annum mark. This income is divided roughly into equal parts in respect of installations and calls.

Contract Branch.—The Contract Branch is, in effect, our Publicity Section. Amongst other things it deals with the extension of the service by the securing of new subscribers and improving the facilities of those already connected. This section is particularly concerned with development work. It is not enough that it should secure new business to-day but it must, through its experts, project itself into the future. The supplying of estimated telephonic growth figures on which plant, equipments, and buildings are provided in advance of immediate requirements, is not the least important of the duties of a Contract Officer.

Street Kiosks.—Another feature of telephone publicity is the fact that during the past two years one of the most remarkable aspects of development in Glasgow is the increased popularity of our Street Kiosks. There can be no doubt whatever as to the usefulness of these call offices, nor as to their stimulating effect on the telephone habit. First impressions were that the placing of these kiosks in our suburbs would mean that nearby residents would not bother to have the telephone installed in their houses. It is strange, but nevertheless true, that precisely the opposite has occurred, for wherever we install a kiosk in a residential position it tends to become a centre of intensive telephonic development in its immediate neighbourhood. We are increasing the number as rapidly as the necessary negotiations will permit, and during the past few years have improved those already erected by the installation of artificial lighting in about 100 cases.

Special Coin Boxes.—We hope at an early future date to install at our City Call Offices a special type of coin box which will collect shillings, sixpences, and pennies so that long-distance as well as local service facilities may be available. There is the further improvement both from a public and a Post Office point of view, that when these new coin boxes are fitted it will not be possible to call the exchange operator until two pennies have been placed in the box. If the call is ineffective the coins will be returned to the caller. I need hardly enlarge on the trouble that will be saved by reason of these boxes preventing small boys taking the receivers off and leaving them so, thus putting the call offices out of commission for the time being. This interference by small children and sometimes irresponsible adults is one of the greatest handicaps to this type of service, and I can assure you it would be of great and mutual assistance if members of the public would co-operate with us to prevent this abuse.

Traffic Branch.—The Traffic Branch is, however, the one with which you will be most directly concerned, as this is the section responsible for the service rendered at our exchanges. The attention a subscriber gets from the operator and the way in which calls are effected make other considerations appear of minor importance, for, if the calls are not handled with courtesy, efficiency, and celerity, what else matters?

Indifferent Operating at Subscribers' Offices.—I hope also that you will forgive my saying that one of the things that occasions great surprise to us is the indifference of so many of our subscribers to the part they play in the building up of an ideal telephone service. The time has long since arrived when a telephone call should take its place as a prime factor in the running of our business, yet there is an extraordinary difference in the manner of treatment meted out to a call and to a caller. It is a matter for wonder and some misgiving that the position of the telephone in many of our offices has not yet been given the status of a typewriter. It would be a good thing in this respect from your point of view, and it would certainly be most helpful to us, if you had only the best employee attending to your incoming telephone calls. I do not want to give you an impression that all the putting in order

* Extract from paper given to the Publicity Club, Glasgow.

is to be on your side. It is not. What I do ask is a better realisation by the business community generally as to the part they can and should play in the attainment of the ideal we are out to achieve. It is not my desire either to suggest that we do not receive co-operation and help from our subscribers. In the main this is forthcoming, but there are many to whom I would earnestly appeal for more assistance, as our troubles are due to lack of thought on their part and to the non-observance of simple regulations. There is not a member of the telephone staff but who would do anything in reason to afford every facility to you in the conduct of your telephone business. Is it unreasonable to ask for similar consideration on your part ?

Need for Publicity.—There is paramount need for publicity from an inside point of view so far as our Telephone Service is concerned. Most of us are familiar with the popular conception which is as far removed from reality as are the poles asunder. I am sure this erroneous impression is largely due to the unfortunate fact that the natural tendency amongst humans is to think by proxy. The man who will not trouble to think for himself relies on scraps of information which he may read or hear from time to time. If these are humorous, cynical, or otherwise funny, all the better, but it is the case that, unfortunately, in the final arbitrament, many folk build their opinions on foundations laid by others. Hence the allegations about the "Telephone evil" and the jokes about the "Service." It is full time someone told a few stories from the other point of view.

Need for Mutual Education.—While we feel, therefore, that the public need educating as to the factors and organisation behind the Telephone Service, we are not losing sight of the fact that "charity begins at home" in this, as in every other case. We are ourselves taking lessons every day. We are open to take them ; we welcome new thoughts, fresh angles of vision, stimulating criticism, and the hundred and one other things that go to assist in the study and performance of our work.

Staff Meetings.—You will be interested to know that we have in Glasgow carried out an elaborate and intensive scheme of staff education recently, on matters pertaining to the service, especially from the public point of view. Every available exchange officer in this district has attended one or more official meetings at which the principles of service efficiency and organisation have been expounded and the effect of good or bad operating explained by means of charts, which on a smaller scale were similar to those before you. The service from the subscriber's point of view was explained in detail, and the conditions that obtain at the subscriber's end of the wires discussed and illustrated in every practical way. In all, about 900 officers attended the meetings, of which over 50 were held, and I venture to suggest that at this moment there is no member of the Post Office Exchange staffs in this district but who is conscious of the part she is playing in the rendering of a satisfactory service to the business community of this great centre, and who is at heart anxious to "do her bit" in the matter. Those of us who had the pleasure of conducting these meetings have not the slightest doubt as to their usefulness, and that they were appreciated by the staff is illustrated by the fact that we had nearly 500 questions put to us (on matters pertaining to the service, the administration, and the organisation). These questions have either been answered or are being considered, but the desire for information, the intelligent questioning of the staff, and the enthusiasm with which the various points were followed speak for themselves. It is the desire of the Department to interest its staff in their duties, to explain difficulties, to look at things from their angles of vision quite as much as it is our policy to look at the service from your point of view. This is being done so that we may get matters into focus and pursue only that which will make for mutual betterment and service progress.

Cost of Ineffective Work.—May I illustrate the point by one example ? At all times we emphasize upon our staffs, and ourselves, the serious cumulative effect of what may appear trivial defects, when taken individually. At the present moment, we are effecting, at the first attempt, 86 out of every 100 calls we receive from our subscribers. We are trying to increase this to 90 out of every hundred. In itself this figure means very little to the individual subscriber or operator, but if we applied the improved percentage to the total Glasgow Telephone traffic we should not only improve the service to you but we should eliminate no less than 2 million waste transactions every year and save in our exchange costs alone a sum of money approximating to £4,000 per annum. Why, if we could only cut out 1% of our ineffective traffic, we should gain directly and the public—that is yourselves—indirectly, at the rate of something like £1,000 a year ; and this, mark you, in respect only of the telephone traffic in Glasgow and district.

"*Number Engaged*" *Waste.*—It may be apropos at this point if I pointed out what the "Number engaged" bogy really means to us. Lots of folk are under the impression that our operators wilfully and wrongly report "Engaged" to callers. There was never a greater fallacy. It is easier for the average call to be effected right-away than it is for it to be delayed in any way. No operator gains anything by delay ; on the contrary, there is always a possibility of trouble on that type of call. What exactly does this "engaged" trouble mean, therefore, in "terms of efficiency and cost" ? At present 10% of our operating effort is waste labour because the required number is busy. Of what this means to you business men you are the best judges, but look at it from a Post Office point of view for a moment. We are now getting from our Glasgow subscribers about 57 million calls per annum. Nearly 6 million of these are lost (or ineffective) owing to the number required not being available when wanted. The operation of these calls from our point of view alone is thus waste of time and money, but it has to be paid for all the same and to the tune of about £11,000 per annum in operating costs alone ! Need I emphasize this ? May I suggest that when we are accused of deliberately misrepresenting that numbers are engaged, we consider the smile to be with us ? Would you not feel amused if similar suggestions were made to you regarding the conduct of your business ? If we can eliminate waste in any public service is it not the public who will ultimately benefit, and when I put it to you that, in so far as the "Busy" number is concerned, the remedy is largely with you, I feel that the figure regarding the waste it means will carry its own lesson to those who are prepared to learn.

Extensions of Trunk Calls.—There is another aspect of wastage which I am sure is not clearly appreciated by the general telephone user. I refer now to the use of our long-distance circuits. Most of you are familiar with—and are perhaps irritated by—the operator's "Time's up, will you take another call ?" intimation, and I have no doubt that, in all good faith, you have often suggested to the operator that you have not spoken for three minutes, and that the Post Office could well allow you a few extra seconds. Shall we assume for a few minutes that the operators allowed these extra seconds as a matter of course on the Glasgow—London service, and further assume that this meant an average extension of thirty seconds only on each Glasgow—London call. There are about 200 of these calls each day or about 60,000 per annum. The approximate charge per 30 seconds amounts to 1*s.* 1*d.*, so that the loss of that amount of time on each London call alone would cost the Post Office £3,250 per annum. Need I say anything further as to the necessity for insistence on time limits even if pressed to the point of seeming curtness, and further to emphasize the fact that all these calls are timed from the moment the called and calling subscribers are on the line, whether or not the "persons required" are talking. This latter aspect is a point that is often overlooked by trunk users. I will not weary you with figures as to the wastage of revenue if we lost 30 seconds on every long-distance call originating at Glasgow, as I feel that the foregoing illustration will suffice for that particular point.

Additional Causes of Waste (*Ineffectiveness*).—Before we leave the "Wastage" side, however, will you permit me to submit one or two additional points regarding the effect of this on our service and operating costs ? We have already seen that "Engaged" troubles lose us about 6 million calls a year and cost us about £11,000 for manipulation and supervision. Other unsatisfactory features are :—

	Per Annum.	
	Number.	*Cost.*
No replies	1,000,000	£2,200
Cut-off's	250,000	550
Wrong numbers connected ...	500,000	1,100
Junctions engaged and sundries	250,000	550

The total loss to the Post Office, therefore, in Exchange charges only and by reason of ineffective or delayed telephone calls, is estimated in the Glasgow District alone to exceed £15,000 per annum.

Personal Figures.—I should perhaps say that all the figures given up to now, and those which follow later, as to costs, waste, and so on, are based on a recent and unofficial investigation as to our service and its organisation. They are not for general application, neither can they be quoted in any way as representing the official word on such an important subject. They are given, however, for what they are worth and in the hope that they will, at least, afford an interesting and perhaps instructive item of information to all present.

Operating Costs.—Every time one of our telephonists answers a calling number there is a certain operating cost to the Post Office. So far as our local studies on this matter have taken us, up to the present, this cost averages about one halfpenny, which has to be paid whether the call is effective or not. This figure refers only to the Exchange Staffs and takes no account of Capital, Equipment, Engineering, Maintenance and Overhead charges. I am sure it will be obvious that, for our own sake, we must strive and keep on striving, to reduce and if possible eliminate, the ineffective call. We are doing this and will continue to do it so long as we can do anything at all. There is already evidence that our efforts are bearing fruit. We have been making local enquiry, for instance, as to the revenue value of each originating call. I cannot give you figures previous to 1925, but for that year we calculated the average money value of each call to be 1.49 of a penny. For 1926 this figure had risen to 1.53 of a penny. Just an increase of .04 of a penny on each call or 1*d.* on every 25. Not much, truly, if taken by itself, but vital when applied to the 57 million calls of last year. What does this improvement mean ? It can be expressed in varying ways. One, for example, is that we earned ¾*d.* more for every 1,000 calls we operated in 1926 as compared with 1925. We handle about 200,000 originating calls every normal weekday in Glasgow. It does not call for a mathematical genius to calculate that, for equivalent traffic, we now earn about £33 more per day than in 1925 just because our efforts towards improvement have resulted in a saving of one pennyworth of waste labour on every 25 calls. Don't you think it is worth worrying over trifles so far as we are concerned ? I hope I have made this clear. We are not actually earning more money on each call (except in so far as the proportion of our "Long Distance" traffic has slightly increased), neither are the subscribers paying any more, but by the elimination of waste and the natural result of a greater percentage of effective work the revenue value to us of each call has improved, and it is you who will reap the ultimate benefit of this.

Written Complaints.—The figures I have given hardly need confirmation from an independent quarter relating to the number of written complaints. In 1925 we received one letter for each 28,688 calls; in 1926 the ratio was 1 to 41,661. Even if subscribers do not complain every time they feel they should, the comparison is gratifying and is as much a credit to our subscribers as to ourselves.

Lost Calls in Terms of Population.—We have already said that in the Glasgow District during 1926 approximately 57 million calls were originated by our subscribers. This works out at a little over a million a week or, as near as doesn't matter, one call per week for each man, woman, and child of this city. As, however, 14 of every hundred of those calls are ineffective, it means that an area approximately equal in size and density to Partick does not get an efficient service; that is to say, in this city at the present time the waste work going on in our telephone exchanges is in the same relation to our total work as the whole of Partick is to Glasgow.

Busy-Hour Telephone Loads.—During the Busy Hour of a normal weekday in Glasgow we estimate that at least 500 calls* a minute are originated by our subscribers. Suppose we were out of action for ten minutes! What do you think would happen? We have a fairly shrewd idea, for we know what commotion results when we have fire drill practice. The girls are then away from the switchboard for about 45 seconds, and when they come back ——; as one subscriber facetiously remarked, he thought we had been observing a ten minutes' silence! No doubt it seemed like that to him, but it makes us very critical of sweeping statements as to the number of *minutes* it takes to call an exchange. As a general rule we measure our "day" from 8 a.m. to 8 p.m. Our "peak" hour happens, as a rule, between 9.30 and 11.30 a.m.; it varies at the different exchanges, of course, but all our staffing arrangements and circuits are based on maximum requirements. When I say that, broadly, the public rush one-sixth of their total telephone work into one hour, you will, I am sure, realise that unless we are extremely careful we shall have considerable waste of force and plant at other periods of the day. The study of traffic and the staffing of telephone exchanges to meet the ebb and flow of calls might well form the text of a separate address. I can assure you it has a fascination of its own if only for its ever changing nature and the newness of the problems which keep cropping up. A competent duty and load officer has a great deal to do with the quality of the service.

Duration of Calls.—The average duration of a call to a subscriber on the same exchange as the caller is 2½ minutes; of a junction call, that is a call to another Glasgow exchange, 3 minutes, and of a trunk, or long-distance call, 4½ minutes. It may be superfluous to talk of a lost second or so, but it is these elusive pimpernels that we are constantly chasing, and if we can discover just where they all go we shall have made a great step forward. Time is literally money to us. Would you credit, for example, that a loss of one second only in operating time on each call means a waste in Glasgow alone of a sum approximating to £1,300 per annum?

Improving Trade.—You will be glad to know that the telephone glass is rising, and as I consider this barometer fairly reflects trade conditions, the outlook in that respect is improving, and has been for some time. Last year, for example, our Glasgow traffic increased by no less than 2½ million calls and our telephone stations by 2,849. This latter figure represents the greatest advance for many years past, and we are hoping that this year of grace will see even that beaten. The present signs are most favourable, particularly in so far as calls are concerned. It is a great joy to feel that, despite the Jeremiahs, we are accelerating our onward march; there is plenty of room and ample reserve equipments and plant in this district to double our present rate of growth, and no one will be more pleased with progress than the members of the telephone staff to whom you talk every day.

Use of Long-Distance Services Outside the Busy Hours.—Will you permit me again to direct attention to our very fine long-distance services and to urge greater use of these circuits during the afternoon hours. The charges, as you know, are reduced from 2 p.m. onward, and if this can be arranged between your clients and yourselves, prolonged use of certain of our Trunk circuits would be granted. I shall be glad to quote terms to anyone caring to make enquiry. Then again, there is a very fine service now available to the Continent. I am sure the facilities available in this regard are either insufficiently known or are not yet properly appreciated. The Transatlantic service, about which much has been said recently, is a wonderful achievement which has not yet been appraised at its real worth to the British and American business community. The American, at any rate, seems to be getting the idea now for he is putting more calls through to us than we are to him.

Conclusion.—I could say much more, but time will not permit; perhaps, however, you will allow me to say again that, despite cartoons to the contrary, we still put a smile into our work and we try to get it into our voices too. It is difficult sometimes, but the effort is made. You will be glad to know also that our exchange staff speak very highly of their treatment by the Glasgow public. There are exceptions, but these only prove the rule, and they stand out the more prominently because of the courtesy and helpfulness of the average caller. I hope we too shall always convey to you by word and deed that we have a personal, as well as an official, interest in the attainment of a telephone service as nearly perfect as it is possible to make it.

* This means that 1,000 folk are making use of the service (500 callers; 500 called).

THE WASHINGTON CONFERENCE.

THE Radiotelegraph Conference at Washington was opened by President Coolidge on Oct. 4. The Secretary for Commerce, Mr. Hoover, was appointed President of the Conference and delivered an eloquent oration on the development of wireless and the need for its wise regulation and control.

The British delegation to the Conference is composed as follows:—

Colonel T. F. Purves—*Post Office* (Head of the Delegation).
Air-Commodore L. F. Blandy, C.B., D.S.O.—*Air Ministry.*
Mr. C. H. Boyd—*Board of Trade.*
Capt. A. L. Harris, M.C.—*War Office.*
Major F. W. Horne, R.M.—*Wireless Telegraphy Board.*
Mr. J. Louden—*Post Office.*
Commander F. Loring, R.N.—*Post Office.*
Commander E. W. Money, O.B.E., R.N.—*Admiralty.*
Mr. F. W. Phillips—*Post Office.*
Mr. E. H. Shaughnessy, O.B.E.—*Post Office.*
Lt.-Commander E. W. H. Travis, R.N.—*Foreign Office.*
Mr. A. J. Waldegrave, M.B.E.—*Post Office.*

The following additional British representatives are present in an advisory capacity and not as delegates:—

Lieut.-Col. E. Gold, D.S.O., F.R.S. (International Commission for Synoptic Weather Information)—*Air Ministry.*

Capt. P. P. Eckersley (International Radiotelephony Union)—*British Broadcasting Corporation.*

Senator G. Marconi, G.C.V.O., LL.D., D.Sc. Rt.-Hon. F. G. Kellaway, P.C. Mr. C. E. Rickard, O.B.E. Mr. F. S. Hayburn Commander J. A. Slee, C.B.E., R.N.	*Wireless Companies.*
Mr. A. W. Hibberdine Mr. W. Dover Mr. P. Eschbaecher	*Cable Companies.*
Captain W. A. Soutar Mr. M. Brett, B.C.L., M.A. Mr. D. A. Cleminson	*Shipping Interests.*

Mr. T. J. O'Donnell—*International Federation of Radiotelegraphists.*

The British delegates made their way to Washington via Canada. Following the good example of the Prince of Wales and Mr. Baldwin they travelled by the "Empress of Australia," a very comfortable and well-appointed ship. After spending a few days at Ottawa they found, strangely enough, that the most convenient way to reach Washington was by way of Niagara, and naturally they could not go through Niagara without seeing the Falls.

The Washington Conference has already done one remarkable thing. French has hitherto been the only language permitted at Postal, Telegraph and Radiotelegraph Conferences. The United States delegation, however, represented that insistence on this rule would render most of their representatives practically dumb. Alarmed at such a prospect, and as an act of courtesy to their hosts, the Conference decided that English should be permitted, Speeches in English are translated into French, and those in French are translated into English if any delegation so desires.

There are about 400 members of the Conference and about 1,800 formal propositions to be considered. The Conference at its second meeting appointed ten Committees, the second Committee, under the title "General Regulations," being placed under the Chairmanship of Colonel Purves.

Possibly as a delicate hint to their guests, the United States authorities have announced that the farewell banquet will be held on Nov. 15. With its unwieldy size and its large programme the Conference will find it difficult to live up to this expectation. But delegates may be relied upon to do their best. It must be remembered that the United States is a dry country.

F. W. P.

CORRESPONDENCE.

BAUDOT-VERDAN.

TO THE EDITOR OF "THE TELEGRAPH AND TELEPHONE JOURNAL."

Sir,—Mr. Harrison's description of the functioning of the "Baudot-Verdan" is quite correct. Six signals are stored during each revolution of the discs and automatically repeated seriatim after an interval of two seconds.

For elucidation I have added a chart of the transmissions, &c., during three revolutions of the discs.

I should like to add that the working of the apparatus between Paris and Algiers has shown a speed generally of 90 words a minute. During the greater part of the time one repetition only has been necessary. From 20,000 to 25,000 words have been dealt with during each daily session. So well, in fact, has the apparatus functioned that it is being installed for working between Paris and Morocco, Tunis, and some European countries.

Enquiries have been made as to the effect of atmospherics of a "spacing" character. M. Verdan says that no trouble has been experienced from this cause during the working of this apparatus.

M. Verdan may certainly be complimented on his contribution to the advance of the use of printing instruments in Wireless Telegraphy.

E. PHILLIPS.

CHART.

DETAILED EXAMPLE OF TRIPLE TRANSMISSION BY THE "BAUDOT-VERDAN."

Assume that "Manchester Eng." is to be sent.

Distributor brushes:	1st revolution	... ...	**M**	sent to line from key via segs. 11/15, and stored in repeater 1.
	2nd „	... ...	**A**	„ „ „ „ „ „ „ „ „ „
	3rd „	... ...	**N**	„ „ „ „ „ „ „ „ „ „
	4th „	... ...	**C**	„ „ „ „ „ „ „ „ „ „
	5th „	... ...	**H**	„ „ „ „ „ „ „ „ „ „
	6th „	... ...	**E**	„ „ „ „ „ „ „ „ „ „
		(The discs have now completed a revolution.)		
	7th „	... ...	*M*	sent to line from repeater 1 via segs. 6/10, and stored in repeater 2.
			S	„ „ key „ „ 11/15, „ „ „ 1.
	8th „	... ...	*A*	„ „ repeater 1 „ „ 6/10, „ „ „ 2.
			T	„ „ key „ „ 11/15, „ „ „ 1.
	9th „	... ...	*N*	„ „ repeater 1 „ „ 6/10, „ „ „ 2.
			E	„ „ key „ „ 11/15, „ „ „ 1.
	10th „	... ...	*C*	„ „ repeater 1 „ „ 6/10, „ „ „ 2.
			R	„ „ key „ „ 11/15, „ „ „ 1.
	11th „	... ...	*H*	„ „ repeater 1 „ „ 6/10, „ „ „ 2.
			Blank	„ „ key „ „ 11/15, „ „ „ 1.
	12th „	... ...	*E*	„ „ repeater 1 „ „ 6/10, „ „ „ 2.
			E	„ „ key „ „ 11/15, „ „ „ 1.
		(The discs have now completed another revolution.)		
	13th revolution	... ...	M	sent to line from repeater 2 via segs. 1/5, and local control actuated.
			S	„ „ „ 1 „ „ 6/10, and stored in repeater 2.
			N	„ „ key „ „ 11/15, „ „ „ 1.
	14th „	... ...	A	„ „ repeater 2 „ „ 1/5, and local control actuated.
			T	„ „ „ 1 „ „ 6/10, and stored in repeater 2.
			G	„ „ key „ „ 11/15, „ „ „ 1.
	15th „	... ...	N	„ „ repeater 2 „ „ 1/5, and local control actuated.
			E	„ „ „ 1 „ „ 6/10, and stored in repeater 2.
			Blank	„ „ key „ „ 11/15, „ „ „ 1.
	16th „	... ...	C	„ „ repeater 2 „ „ 1/5, and local control actuated.
			R	„ „ „ 1 „ „ 6/10, and stored in repeater 2.
			Blank	„ „ key „ „ 11/15, „ „ „ 1.
	And so on.			

In reception the sequence of movements is the same. The first transmissions are received via segs. 11/15, and stored in the first repeater; the first repetitions are received via segs. 6/10 and are stored in the second repeater, false signals being corrected, the second repetitions are received via segs. 1/5 and actuate the electro-magnets of the printing apparatus.

"CODOC" AND "MERRIE ENGLAND" AT THE KINGS HALL.

THE Central Telegraph Office Operatic, Dramatic and Orchestral Club was laudably ambitious, firstly in arranging for so difficult an effort as Hood and German's far from facile work, and secondly, in boldly venturing two nights in a larger hall than any available in the City of London itself. Courage and hard work were rewarded by a full house on each occasion and enthusiastic audiences.

"Don't go the first night," said someone, "they are sure to be a little ragged," but although the writer did not accept the advice offered and became a First-nighter, there was nothing in the performance to indicate that the entire company had not been playing together for a week and more.

Florence Pennichard made a stately Queen Elizabeth, and Marjorie Bryan a convincing Jill-All-Alone, while The May Queen's part well became Miss Lenthall as did that of Bessie Thockmorton by Adeline Paterson. The Earl of Essex, as one would have anticipated, well-fitted Sydney Moore, while Frank Barker's courtly mien and not less courtly voice ably presented that side of Raleigh's personality which one generally associates with the cloak incident and which the authors of the work no doubt wished to emphasize. Bertie Figg, well, Bertie excelled himself in the part of Walter Wilkins; versatile and tireless from start to finish.

The choruses were well kept together and came solidly over the foot-lights, while the "crowd" work more approached the naturalness of a real crowd than some I have seen (and *heard*) from more distinguished companies.

Mr. Gwynn is to be congratulated as Musical Director for the excellent results produced by the orchestra.

In one word, as an "outsider" put it, "There was really scarcely an amateurish touch throughout the whole performance," and there I cannot do better than leave matters. J. J. T.

FIFTY YEARS WITH TELEPHONE PIONEERS.

SUCH was the interesting title of an interesting paper read before the P.O. Telephone and Telegraph Society by Mr. T. A. Prout, at their inaugural gathering held at the usual rendezvous on the Victoria Embankment on the 17th ult.

Mr. Prout, who has only retired from active service in the Secretary's Office, G.P.O., but a few months, had evidently spared considerable time from his hobbies of golf and gardening in the preparation of a paper which was crammed with interesting matter and could well have occupied two evenings instead of one. The task of crowding the telephone history of half a century into one hour was a task that only a brave man could have attempted.

A hearty round of applause greeted the reader of the paper as he resumed his seat, and the criticism—if such it could be called—then followed, being opened by Mr. Powell-Jones of the Telephone Development Association, whose remarks furnished just that outside point of view so much needed in meetings of this description.

The meeting augured well for a successful session under the genial chairmanship of Mr. L. Simon. The next gathering will take place on Monday, 21st of the present month, when Sir Henry N. Bunbury, K.C.B., Comptroller and Accountant-General, G.P.O., will deal with "Telegraph and Telephone Finance." J. J. T.

Where Strowger Automatic Leadership Begins—

—In Strowger Automatic's Proving Ground

THE telephone business is a constantly growing, constantly developing business. Every day new and better materials are being developed which must be adapted to existing equipment. Every day brings new service and traffic conditions for which new circuits and new combinations of apparatus must be designed.

To keep Strowger Automatic telephone equipment abreast of the times—ready to meet not only the needs of to-day, but also those of to-morrow—demands a keen appreciation of modern methods tempered with the conservative wisdom that comes from long experience.

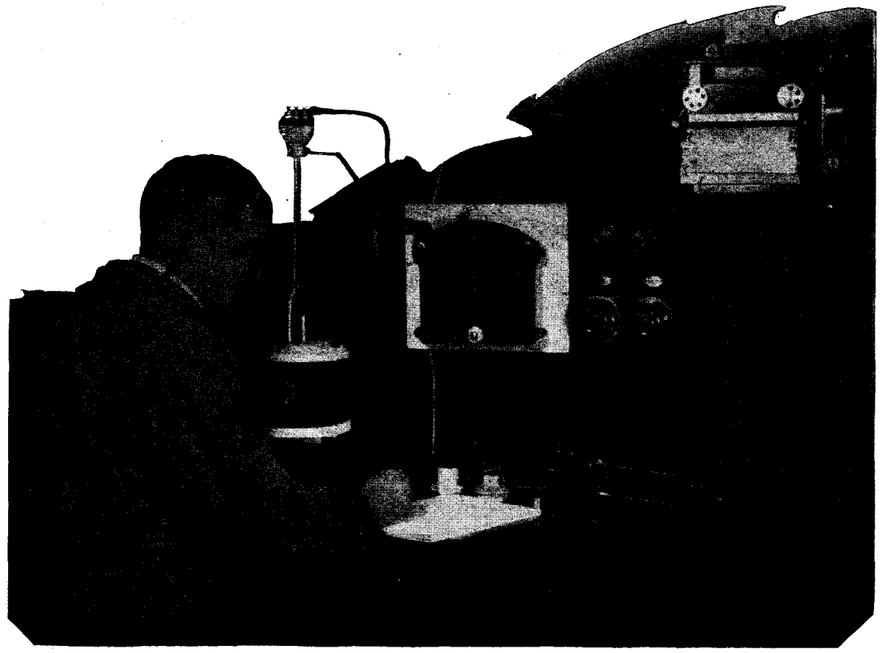
The Research and Development Departments of Automatic Electric Inc. are composed of men who, for the most part, have devoted their lives to the development of Strowger equipment, to the end that it may meet the needs of to-day and to-morrow better and more economically.

More Than 3,500,000 Strowger Automatic Telephones in Service or on Order Throughout the World

Automatic Electric Inc.

Factory and General Offices: 1033 West Van Buren Street, Chicago, U.S.A.

The testing and selection of the hundreds of different kinds of materials that enter into the construction of Strowger Automatic telephone equipment is a never-ending job, requiring the use of the latest testing facilities known to science. Below is shown a transformation point recorder for the testing of iron for use in electro-magnetic devices.



STROWGER AUTOMATIC

The
Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising Committee - - - J. STUART JONES. W. D. SHARP. J. F. STIRLING. W. A. VALENTINE. J. W. WISSENDEN.

Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. XIV. NOVEMBER, 1927. No. 152.

RETIREMENT OF MR. JOHN SCOTT.

THE retirement at the end of last month of Mr. John Scott, who has been Postmaster-Surveyor at Birmingham since July 1, 1919, requires more than a passing mention, for it removes from official circles a man of outstanding personality who has carved for himself a special place in the life of the Post Office and of the Civil Service generally.

Mr. Scott entered the service of the National Telephone Company in 1895 and, within the remarkably short period of ten years, had become District Manager of one of the largest districts, that of Manchester. At the time of the transfer of the National Telephone Company's business to the Post Office, on Jan. 1, 1912, he had been for four years Assistant Provincial Superintendent at Birmingham, and he became, in the Post Office organisation, one of three provincial Superintendents, Mr. Dalzell and Mr. Valentine being his colleagues. In 1915 he was appointed Postmaster-Surveyor of Sheffield, and in 1919, as already stated, he was transferred to the corresponding but higher position at Birmingham. It may, perhaps, be added that, in 1911, when still in the Company's service, Mr. Scott was loaned for some time to the Turkish Telephone Company to take charge of the development study of Constantinople for its first telephone system. So much for the historical facts of Mr. Scott's career.

Mr. Scott belongs essentially to the category of men whose natural sphere is the world of business, where ready and sure judgment, energy, and the power to give immediate effect to a decision command success, and where new fields are always open to the man of high courage. Comparisons between the "business" man and the Civil Servant have been numerous, and generally futile because they start on wrong premises. The man in business for himself can improvise as he goes along and what he decides to-day he can cancel to-morrow. A Government Department obviously cannot carry on the business of the State in that manner, and must of necessity seek a large measure of uniformity and permanence in its procedure and regulations. That Mr. Scott entered the Civil Service by accident and in middle life explains his retention of some characteristics not generally associated with Civil Servants; such differences have probably been useful both to Mr. Scott and the Service. It may be of significance that Mr. Scott is leaving the Service at the earliest date which would not involve the sacrifice of the award for past years of labour, in order that he may seek a field of usefulness and reward outside; if so, it probably means only the obvious truism that at 60 a man has a better chance of success than he would have at 62 or 65.

The fact that Mr. Scott is not a typical Civil Servant is probably, though parodoxically, the secret of his success as a Civil Servant. In his refusal to conform to Civil Service type, in his unconventionality, in his occasional brusqueness and outspoken intolerance of views which appeared to him to be unsound, he has been like a vigorous and bracing Northern wind in sheltered quarters, but these qualities alone would not have steered him to the high position which he won in the Post Office service. The conditions of Post Office work almost certainly irked him, but they never discouraged him, and he used his great abilities and spent his remarkable energies as lavishly and as unselfishly in the service of the State as he would have done in other spheres of labour. No man has fulfilled more conscientiously the apostolic injunction to do the work at hand with all one's might.

As might be expected, Mr. Scott's energies were not confined to his official duties. At Sheffield and later at Birmingham he has taken so active a part in the formation and development of the National Savings movement that he was honoured with appointment to the Order of the British Empire, first, in 1917, as a Member and last year as an Officer. He is an enthusiastic Rotarian and is a past-president of the Birmingham Rotary Club. He was the first president of the West Midlands group of the Institute of Public Administration, and is a trustee of Mansfield College, Oxford. He has played an active part in the civic and social life of Sheffield and of Birmingham, and his retirement has led to a remarkable expression of regret from the Lord Mayor of Birmingham and to a public demonstration of it in a tangible form.

To all his activities, official and extra official, Mr. Scott brings common sense and a strong vein of humour. To those who know him best his loyalty and friendliness are outstanding traits. He has a good deal of the spirit of Peter Pan and brings an air of breeziness and bonhomie into any company of men. His ability to tell a good story, especially if it be one against his own countrymen beyond the Tweed, is well known and appreciated. A big lovable Scotsman and a man of varied interests passes from the ranks of Post Office men and women. He must in the nature of things feel some regret on leaving the Service but his regret can hardly equal that of his friends whom he leaves.

THE SINS OF BUREAUCRACY.

GOETHE says somewhere "There is nothing frightfuller than energetic ignorance."* It is surprising how many of the attacks on "bureaucracy" fall under this head and what little knowledge is held to qualify those who busy themselves on this subject to air their views in the Press. We like to keep a wary eye on these casual and inconsequent criticisms. They are not usually important or instructive, but it is well now and again to challenge the hollowness of their statements. A characteristic example in a daily paper recently read as follows :—

"An Englishman who has returned to New York after a holiday in England has stated publicly that the telephone service in England is the worst in Europe."

We may remark in passing there is no penalty for "stating publicly" an expression of opinion however inaccurate and misinformed, unless it is in the nature of a libel, and that it is therefore no more difficult and no truthfuller to "state publicly" that telephone or railway or other public service is bad than to whisper it darkly in corners, or to write it in sand or on water. The statement in question is simply unproven and untrue.

"Telephones are bureaucratically managed in England," continues the writer, "and are only a luxury for people of more than average means."

We can only say that we have often wished that our gas and electric lighting bills were as moderate as those we pay for a bureaucratically managed telephone service. He continues :

"Large country houses, containing priceless art collections, are allowed to burn down because there is no telephone connexion to call the fire brigade, while people who reside in the country districts have to send for the doctor on foot or on horseback, as in the middle ages."

But our critic forgets that country people are mediæval in other respects besides that of possessing no telephone. They sweep their carpets, wash their clothes, curl their hair, and toast their bread as they did in the middle ages, but he does not blame bureaucracy for that. In a recent inquisition into the home life of 11,232 typical American houses, it was found that 70% had telephones, 60% vacuum cleaners, 29% electric washers, 28% electric curling irons, and 20% electric toasters. It will not be claimed, we think, that a like proportion of those household luxuries (or necessities) will be found in this country. Then again, it is well known that the ratio of motor vehicles to population is even higher than that of telephones in America, and consequently nearly five times as high as in this country. Surely this ought to mean that the motor industry in this country must, by inference, be bureaucratically managed. And yet, though we seem to remember seeing columns and columns of laudatory accounts of the progress of that industry in the Press, it is no more highly developed per head of population than the telephone.

Finally, the "Englishman" remarks that in America the telephone is controlled (as we know) by private companies "with the result that competition ensures a satisfactory service." There are, it is true, numerous companies in America, but there is practically no competition. Competition usually means that one has to pay subscriptions to two telephone companies instead of one, and is therefore repugnant to the good sense of Americans. A comparatively small company co-exists with the "Bell" company in Philadelphia, but we can call to mind no other important place in America in which there is competition. Other causes must be sought for the excellent service given in the United States.

**Es ist nichts schrecklicher als eine thätige Unwissenheit.*

HIC ET UBIQUE.

WE gave some figures in our August issue of the number of telephones at Dec. 31 last in the principal telephone-owning countries of the world. We can now add the figure for Canada which is 1,204,691, or 7.8 inhabitants per telephone. Quebec had 246,138 telephones, Ontario 535,046, Saskatchewan 102,148, and British Columbia 101,915.

The Soviet system in Russia had 241,378 telephones at the same date, of which 49,887 were in Moscow and 38,860 in Leningrad. This gives a ratio of 1 telephone to about 570 inhabitants in the Union of Soviet Republics.

According to the *Lokalanzeiger*, Berlin, wireless telephone trials will shortly be carried out between Berlin and Tokio.—*Central News.*

Reuter's Trade Service reports the following from Stockholm : Economic relations between Sweden and Turkey are being steadily developed, the latest step being the conclusion of an agreement between the Swedish L.M. Ericsson telephone company and the Turkish Government for the construction of a telephone system in Turkey. A Turkish company will be founded with a share capital of 6,000,000 Swiss francs, half of the shares being subscribed for by the L.M. Ericsson Co. and the other half by the Turkish Government ; the capital will later be increased. The company will obtain a 40-year concession for the construction of lines between the most important Turkish towns, Angora-Constantinople, Smyrna-Constantinople, Smyrna-Angora, &c., and local telephone systems in some towns, not including Constantinople, where the concession is held by an Anglo-French combine. Agreements for the construction by the L.M. Ericsson Co. of local systems at Smyrna and Angora have previously been concluded. The material for the work will be supplied by the L.M. Ericsson Co., which will also provide engineers. The agreement is subject to ratification by the Turkish National Assembly, which meets in October.

The British Commercial Secretary at Athens states that the Greek telephone service is still very deficient and the number of sets at present authorised is quite insufficient for the requirements. A concession for the reorganisation of the telephone service was obtained by a Belgian company, which was to have co-operated with a British company for the supply of the material, but the British company subsequently withdrew its support. The Belgian concern has since conceded its rights to a Greek group, which, it is said, is still trying to raise the necessary capital. This concession, which was granted under the Pangalos Government, figures in the list of concessions which are to be examined by the present Government.

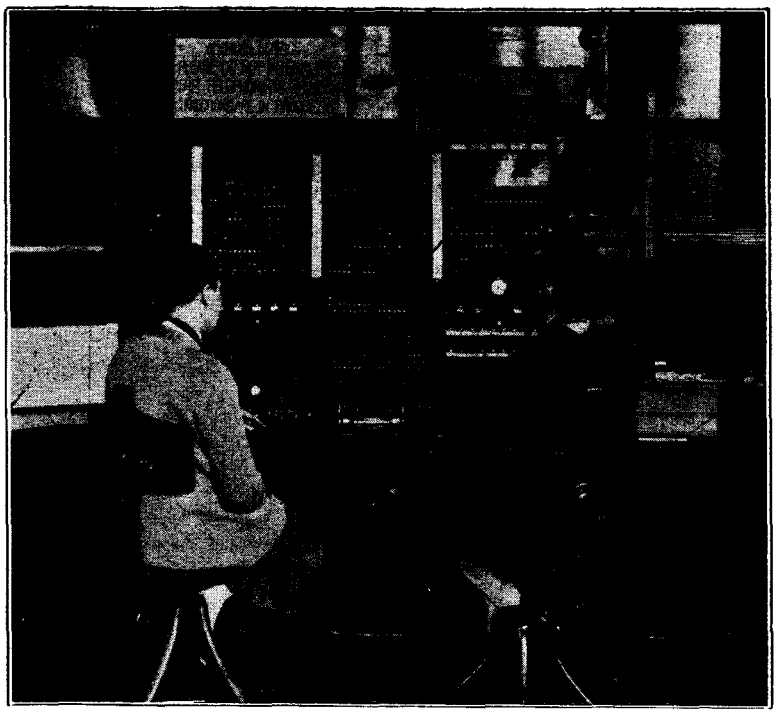
As from Oct. 1 last some 20,000 of the telephones in use in the Brussels area have been turned over to automatic working.

ANGLO-CANADIAN TELEPHONE SERVICE.

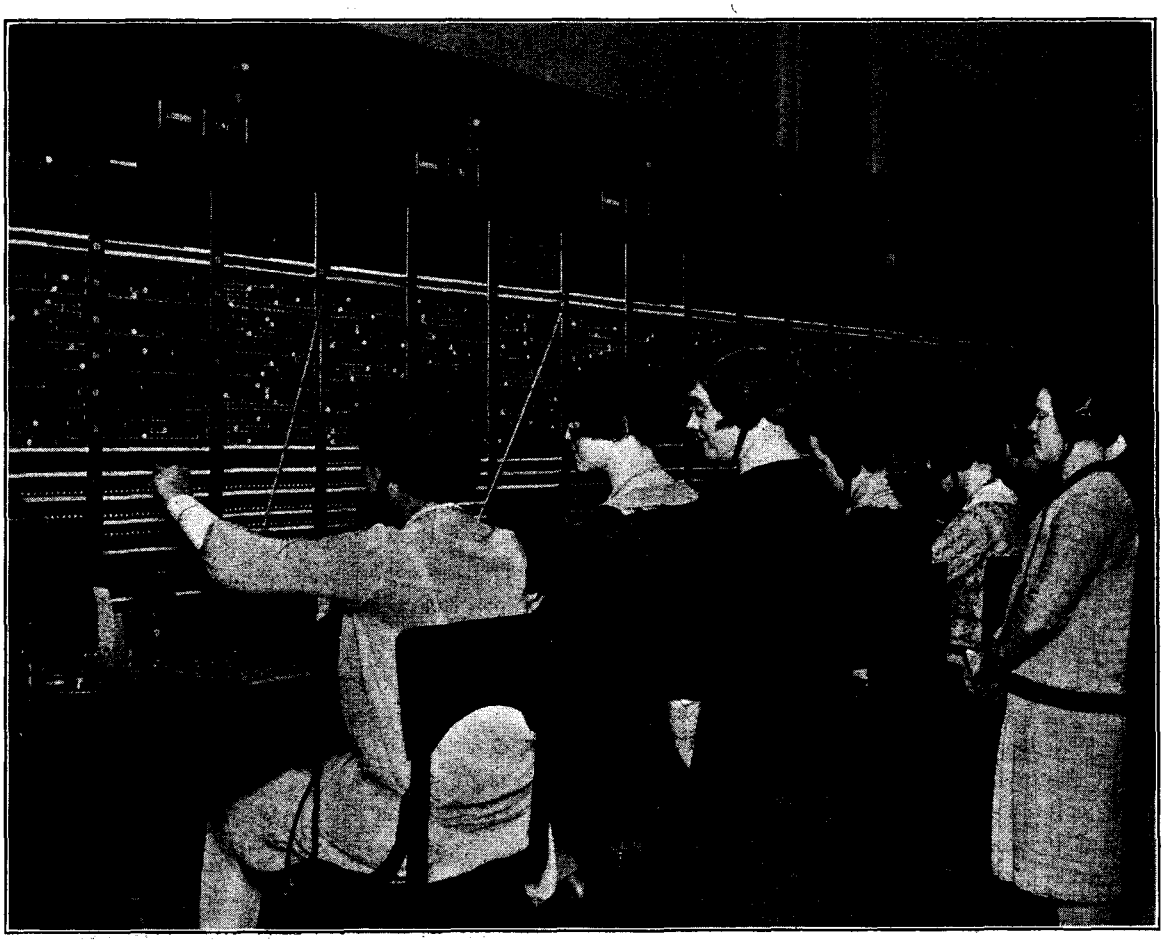
ON Oct. 3, 1927, commercial telephone service was opened between London and the five chief cities of the Canadian province of Ontario—Ottawa, Toronto, Montreal, Quebec, and Hamilton.

Communication is obtained by means of the existing trans-atlantic radio-telephone link—the only one at present capable of transmitting commercial telephone speech—using the Rugby and Rocky Point high-power transmitting stations in England and in Maine, U.S.A., respectively; and the receiving stations at Houlton, Maine, and Cupar, Fifeshire; calls from London to Canada pass over the London-New York circuit and are switched through at New York to their destination over the land lines of the American Telephone & Telegraph Company and the Bell Telephone Company of Canada.

The importance of the occasion as the beginning of a new era in Imperial communications was marked by the inauguration of the service with a conversation between the Prime Minister, speaking from Downing Street, and Mr. MacKenzie King, Prime Minister of Canada, in Ottawa. Mr. Baldwin referred to his recent visit to Canada; and both he and Mr. MacKenzie King expressed their confidence in the utility of the developments in which the new service was the first step. The Canadian Minister of Justice then spoke from Ottawa to the Director of Telegraphs and Telephones in the General Post Office, London; and Mr. Thomas Ahearn, Director of the Bell Telephone Company of Canada, had a conversation with the Controller of the London Telephone Service. Successful commercial calls with some of the other towns in Canada followed on the same afternoon.



The rates charged are the same as those for calls to corresponding places in the United States and the same facilities, e.g., the "search" for a particular person wanted, are provided in the two services. Extensions of the service to more distant Canadian towns will probably follow fairly soon and it is hoped that it will be possible to make the service also available from the provincial centres of Great Britain.



NOTE.

The upper block shows the telephonists operating the trans-atlantic positions at the London Trunk Exchange. Miss Jones (left) and Miss Hughes (right). The lower picture shows the telephonists operating the corresponding positions at the New York Trunk Exchange. Seated, from left to right: Misses Jean Ficaretta, Gertrude Rich, Florence Sullivan, Florence O'Loughlin. Standing: Misses Mary Parker and Helen Merry.

TELEGRAPHIC MEMORABILIA.

AUSTRALIA.—The *Industrial Australian and Mining Standard* states that the Radio Research Board constituted by the Federal Council for Scientific and Industrial Research has mapped out its programme for the ensuing year. It will work in close co-operation with the corresponding body in Britain. Its members are Dr. J. P. Madsen (chairman), professor of electrical engineering at the University of Sydney; Mr. H. P. Brown, director of postal services; Dr. T. H. Laby, professor of physics in the University of Melbourne; and Commander Cresswell, of the Defence Department. Prof. Madsen left Australia in August on a private visit to England, and while in England he will inquire about the work of the British Board, and arrange for collaboration. When necessary the cost of apparatus will be borne by the Council of Scientific and Industrial Research, on which will rest the ultimate responsibility for the scheme.

Speaking in Sydney at the end of September, Mr. Bruce, the Prime Minister, stated that during the past two months only 2% of the messages handed in for transmission by the beam service have been transferred to the cable companies. The amount paid for the transmission of these messages was £3,293.

Reuter's Sydney Trade Service informs us that the plans for New South Wales State broadcasting service have been extended and will probably cost £30,000 instead of the original £23,000. In addition to the Sydney broadcasting station and half-a-dozen relay stations, there will probably be 30 subsidiary stations of low power.

Following complaints from listeners in Victorian country districts that the reception of the programmes broadcast during several days by 3LO (Melbourne) had been practically useless owing to interference from another station, inquiries revealed the fact that JOAK (Japan) was the cause, it having practically the same wavelength as 3LO. Cables were sent to Japan in an endeavour to remedy the trouble, and arrangements have been made for 3LO's wavelength to be reduced by several metres.

To the same agency we are also indebted for the information that the New South Wales Cabinet has approved of the establishment by the State of an "A"-grade broadcasting system. The proposal includes the erection of a central 15-kw. station, in or near Sydney, and six relay, or repeater, stations in the country. The total cost would be about £30,000. The stations will re-broadcast telephony, or Morse, and when not used for Government purposes could be used for re-broadcasting programmes. No land lines will be used for communication between the central station and the others.

It has also been communicated that Mr. E. G. Beard, consulting engineer to the Sydney broadcasting station (2GB), when recently giving evidence before the Wireless Commission, outlined a scheme for allocating Australian wavelengths which, he asserted, would make inter-State reception easy. He suggested that the wave-band of 150 to 550 metres should be divided into six equal parts, one part to be allotted to each State. Two waves, each 30 kilocycles from the centre of the band, should be allotted, one to each "A"-class station. Two waves, of 10 kilocycles from the centre of the band, should be allotted, one to each "A"-station, as relay link waves. The "B" stations should be allotted waves starting with those 20 kilocycles from the nearest "A" station, and 10 kilocycles apart, to the limits of the band.

Of every 30 persons in the Commonwealth, one is the holder of a wireless licence. During the 12 months ended June 30 the number of licences in the Commonwealth increased by 97,079, making the grand total 215,139. The number granted and cancelled in June and the number in force at the end of the month, according to figures made available by the Director of Postal Services (Mr. H. P. Brown), were as follows:—

State.	*New Issues.*	*Cancellations.*	*In force.*	*Per 100 of population.*
New South Wales	3,395	771	59,880	2.55
Victoria	7,106	2,177	118,965	6.95
Queensland ...	1,139	177	33,249	2.63
South Australia ...	930	200	16,791	2.96
Western Australia	123	93	3,903	1.03
Tasmania	112	1	2,351	1.14
Commonwealth totals	11,805	3,359	225,139	3.68

The London *Daily Telegraph*, referring to the above Commission, says that the report recommends that the control of broadcasting stations should remain in the hands of the Postmaster-General, subject to the administration of the Australian Wireless Committee, of which the Director of Postal Services is chairman. The report further recommends co-operation between broadcasting stations to effect interchange and improvement of programmes; further research to determine the relative merits of higher power stations and relay stations; and that in the meantime no further licences be issued for new stations. It also recommends that the location of existing stations be reviewed in consultation with the Defence Department; that the Commonwealth representative at the International Conference should advocate the limitation of the royalty chargeable for broadcasting copyright musical works; the reduction of the Amalgamated Wireless Company's charges and patent royalties; or, failing reduction, that the Commonwealth Government should acquire the company's privately-held shares. It finally recommends that all land coastal stations be re-acquired by the Postmaster-General.

AUSTRIA.—A number of the motor vehicles belonging to the fire brigade authorities of Vienna have lately been equipped with radio receiving and transmitting apparatus, to enable communication to be maintained between the scenes of fires and headquarters.

BELGIUM.—M. Jaspar, the Prime Minister, and M. Anseele, the Minister for Posts and Telegraphs, inaugurated on Oct. 3 the Ruysselede wireless station which has been designed specially for communication with America and the Congo.

The new station lies between Ghent and Bruges. It will use at will both long and short waves. The station covers an area of 358 acres. The aerials are slung between eight pylons each 930 ft. in height.

According to Reuter's Brussels agency the telephone test experiments, by the Belgian Director of Telegraphs and Telephones, on the 6th ult., with New York via London and the Rugby wireless-telephone station were perfectly successful.

BOLIVIA.—The Bolivian Government, says Reuter's La Paz representative, has arranged with a private contractor for the installation of a broadcasting station at La Paz, the first of its kind in Bolivia, with a power of 1,000 watts and a minimum radius of 3,000 km. (The international radio call letters assigned to Bolivia are CPA-CPZ.) The Government reserves the right to install radio-telephonic stations at any time. The La Paz station will be used for broadcasting Government reports, market quotations, official time, Congress proceedings, &c. Five minutes of each hour only may be employed for broadcasting advertising matter. The contract is for five years, and on its expiration the broadcasting station will become State property. The concessionaire, who undertakes to establish a weather bureau, send out meteorological reports and supply a daily service of general news, musical programmes and educational lectures, will retain all subscriptions. An initial registration fee of 5 bolivianos (7*s.* 6*d.*) and an annual licence fee of 46 bolivianos will be charged to users of the broadcasting service.

BRAZIL.—From Rio de Janeiro the information comes that the Brazilian Minister of Communications has approved a concession for an international and national wireless service. The sites of the various stations are left to the discretion of the Government's advisers. The Administration stipulates for a 75% reduction on foreign and 50% on national messages dispatched by the Departments of Public Works and Transportation, Marine and War. All operators are to be of Brazilian birth and the installation must be completed within a year of the official approval of plans. The Government has also authorised the Companhia Telefónica Rio Grandense to operate wireless stations at Sao Paulo, Florianopolis, Puerto Alegre, and Corumba. A station, independent of the new concession, has lately been opened at Manés (State of Amazonas).

The American International Telephone and Telegraph Corporation announces that it has acquired a controlling interest in the Companhia Telefónica Rio Grandense, which does business in the States of Sao Paulo, Parana and Rio Grande do Sul in Brazil, says *T. & T. Age*. The Corporation recently acquired control of the Montevideo Telephone Co. and the Co-operative Telefonica Nacional of Uruguay, which together operate more than 19,000 telephones, and the Chile Telephone Co., the third largest in South America, operating more than 25,000 telephones.

BULGARIA.—A new Act, reports the *Electrical Review*, has lately come into operation in Bulgaria under which wireless telegraphy, telephony and broadcasting are made a State monopoly. Receiving sets may only be used by licence-holders, infringers of the regulations being liable to twelve months' imprisonment, a heavy fine, and the confiscation of their apparatus.

CANADA.—Reuter's Montreal correspondent reports that the purchase of the majority of the shares of the Canadian Marconi Co. is announced by Messrs. Lazard Bros. & Co., of London. The shares are being transferred to a holding company in which Marconi's Wireless Telegraph Co., Ltd., and the Radio Corporation of America have taken substantial participation. The Lazard firm will, it is understood, control the holding company and, in order to ensure the control remaining permanently British, are forming a voting trust for 25 years. This trust holding voting control in the holding company will be vested in three trustees, two of whom are nominated by Lazards and one by the British Marconi Company. The first trustees will be Sir Robert Kindersley, Mr. R. H. Brand, and either Lord Inverforth or Mr. F. G. Kellaway. It is further announced that Sir Joseph Flavelle, chairman of the Canadian Bank of Commerce, has agreed to become chairman of the Canadian Marconi Co.

CHINA.—According to Harbin reports, says the same authority, the Chinese Eastern Railway Co. has decided to install radio receiving sets in the residences of the more important staff members and directors, as well as in the offices of the railway administration. The *Chinese Economic Bulletin* adds the information that altogether 35 sets of the 6-valve type have been ordered, and the installation will be gradually extended to other quarters in the near future.

COLOMBIA.—Reuter's Bogota agent informs us that the Government has concluded a contract with a German firm of electrical engineers for the erection of three wireless stations at Honda, Neiva and Ocana respectively. Plant and apparatus for a fourth high-power station, capable of communicating with both home and foreign stations, are being shipped shortly from Germany. The four installations (which will be supplementary to those at Barranquilla, Pasto, Manizales and Bucaramanga) will be erected under the superintendence of German engineers.

CZECHO-SLOVAKIA.—*Licences.*—The number of registered wireless subscribers in the country totalled 210,000 on July 31 last.

FRANCE.—Having obtained from the French Government the requisite permission to land an additional cable at Le Havre, in order to give direct communication between France and North America, the Western Union Telegraph Company is, says *The Times*, making arrangements to lift one of its existing transatlantic cables now terminating at Penzance (England), and to connect it directly to Le Havre.

GERMANY.—According to *World Radio*, Berlin's relay transmitter on the Magdeburger Platz has closed down for good, and the wavelength thus freed has been taken over by the Augsberg plant in Bavaria.

The number of radio receiving licences in operation in Germany increased from 1,635,728 at the end of March last to 1,713,899 at the end of June, an advance of 78,171 in three months.

GREAT BRITAIN.—The Wireless Organisations' Advisory Committee, which includes representatives of the Radio Society of Great Britain, the Radio Association, the Wireless League, and the Wireless Association of Great Britain, has issued an interim report, in which it is stated that, "in the main, the distribution of programme material, as arranged by the B.B.C., is satisfactory to listeners." Among the suggestions made by the Committee, which either confirmed existing practice or were adopted by the B.B.C., were the following, says *The Times*:—

"The B.B.C. should undertake demonstrations of reception, in order that listeners might be accurately informed on the quality of reproduction they might reasonably expect for the expenditure of stated sums.

"A 'clear the ether' campaign, relative to interference with the reception of broadcast programmes, should be instituted in the autumn."

The following may be accepted, in general terms, as the present position of the B.B.C. *vis-à-vis* the question of Empire broadcasting:—

In pursuance of the policy of developing a practical basis for effective Empire broadcasting as rapidly as possible, an experimental short-wave transmitter is being erected at the Marconi works at Chelmsford, which will make use of the two 480-ft. masts situated there and carry out experiments, working chiefly on a wavelength of 24 metres; arrangements have been made for the collection and analysis of reports of these experiments in various parts of the world. The station, whose call sign is 5SW, will use power up to about 25 kw., and should its performance be unexpectedly successful in the early stages, programmes may be transmitted, but it is not anticipated that this experimental station will undertake a regular service. Satisfactory progress is being made with experiments in reception by the "spaced aerial" method. The success of Empire broadcasting depends mainly upon the possibility of transmission being re-radiated efficiently by local broadcasting stations, and it is therefore essential to devise a method of reception which will minimise the fading effect; signals from two or more aerials spaced at considerable distances apart may be combined and treated in such a way as to produce a more constant and undistorted signal. Taking into account the results of its last series of experiments, the B.B.C. sees no reason to revise its prediction that Empire broadcasting may be undertaken with the guarantee of the elementary conditions pre-requisite to service sometime during 1928. Contact is being maintained and developed with the broadcasting organisations of the Dominions and Colonies, while the chief engineer (now attending the World Wireless Conference at Washington) is evolving a further series of experiments in co-operation with the Radio Corporation of America.

The London Press announce that a radiogoniometric aerial, an ingenious piece of wireless apparatus which enables the exact position of an air liner in flight to be located, is to be erected on the top of the new 50-ft. control tower which has now been completed at Croydon Aerodrome.

All the Handley Page Napier and Silver Wing air liners of Imperial Airways have been fitted with wireless equipment which will transmit a signal to the new radiogoniometer.

Thus the traffic control officer, sitting in his office at Croydon Aerodrome, will be able to tell an air liner pilot who is flying above clouds or fog what his exact position in relation to the aerodrome is, and also on what compass course to fly in order to arrive over the aerodrome, even though he is unable to pick up any landmarks to guide him.

The Union of Post Office Workers has received a letter from the Postmaster-General with reference to the decline in telegraph traffic. The number of inland telegrams was 78,269,000 in 1912, and in 1920 it was 82,500,000. Since then the number has decreased yearly, and in 1926 it was 49,783,000. The Postmaster-General regrets that decreases in telegraph staff, both on the rank and file and on the supervising staff, are likely to be necessary. It will be recalled that recently a committee was set up by the Postmaster-General to examine the possibility of effecting substantial economies in the working by the State of the inland telegraph service. The Union of Post Office Workers is preparing a reply to the Postmaster-General.

The decrease in telegraph traffic, it will be noted, only refers to Inland telegrams, the long-distance telegraph traffic, i.e., Anglo-foreign and colonial, still shows the upward trend.

Wireless Apparatus Confiscated.—The magistrates at Eccles, Lancashire, heard a case in which the manager of a shop selling wireless materials at Swinton was charged with having installed and worked transmitting apparatus without possessing the necessary licence authorising him to do so. Mr. F. Elliott, solicitor, who appeared on behalf of the Postmaster-General to prosecute, said that the authorities took a grave view of the case. The defendant had radiated messages last year under the call sign "5OB," and this year under the call sign "2EZ." Two offences were involved—that of installing apparatus for sending purposes and that of working the apparatus. For each action a licence is required. The defendant admitted both sets of transmissions, and the Bench imposed a fine of £2 2*s.* for each offence, and the defendant's apparatus was confiscated.

Loud Speakers not to be Allowed!—West Ham, one of the most flourishing of London's suburbs, is desirous of adopting the recommendation of its Legal Committee and to bring into force a new bye-law duly sanctioned by the Home Office to deal with the matter of loudspeakers which become a nuisance. The new law, which had not yet been passed by the Council itself when we went to press, imposes a penalty not exceeding £5 on any person who "in any street or public place or in any shop, business premises, or place which adjoins any street or public place, and to which the public are admitted, shall operate a wireless loudspeaker or gramophone in such a manner as to cause annoyance or disturbance."

INDIA.—The conditions under which wireless licences are sanctioned in India differ considerably from the simple simplicity of those obtaining in Blighty!

According to the Indian correspondent of the *Electrical Review*, under the Indian Telegraph Act, the establishment, maintenance, and working of "telegraphs" (which includes wireless telegraphy and wireless telephony) in British India is illegal, except in accordance with a licence issued under that Act, and the Act specifies heavy penalties for the use of apparatus in British India without a licence. There are several kinds of licences: if it is desired only to receive broadcasting, the correct form of licence is the "broadcast receiver licence," which can be obtained by any one from any head post office in British India on the presentation of a completed application form and the licensing fee of Rs. 10. A broadcast receiver licence is valid for 11 months after the month of issue, and a fresh licence is necessary to continue to establish, maintain or work wireless apparatus after that date. A separate licence is required for each station or receiving set.

Licences to use wireless for other purposes, such as transmitting or experimental reception, are issued only after investigation, and application has to be made to the Director-General of Posts and Telegraphs (Wireless Branch), Simla, and from whom the applicant may easily be separated by a thousand and many more miles!

The above licences entitle the licensee to use a wireless set in the manner indicated. They do not entitle the licensee to import wireless apparatus into British India, for which a separate "import licence" is necessary under the Sea Customs Act. Import licences are also issued by the Director-General of Posts and Telegraphs (Wireless Branch), Simla; the fee is Rs. 10 per annum, and the licence is valid until the end of the year in which it is issued.

For the convenience of passengers to India who are bringing a single receiver with them, arrangements have been made by which the Customs officers at the principal ports, viz., Bombay, Calcutta, Madras, Karachi, Rangoon, and Dhanuskhodi, issue "temporary permits" in certain circumstances. A temporary permit will only cover one wireless receiver (or its component parts) accompanying a passenger as personal baggage. Application should be made on a form which can be obtained from the Customs officer. It must be accompanied by a fee of Rs. 10, and, provided the application is accepted by the Customs officer, a formal import licence will be subsequently issued by the Director-General of Posts and Telegraphs without further action by the passenger. The Customs duty assessed by the Customs officer is payable in addition to the import licence fee.

ITALY.—The B.B.C. announces the issue of the following statement: "The Council and different Commissions of the Union Internationale de Radiophonie, which met at Como in September, studied various questions relating to the development of radio-telephony. The Council examined and approved of projects for the development of an international spirit, in particular the broadcasting of national programmes. With a view to a closer collaboration in the future between broadcasting stations, the Council decided to invite programme directors to participate in certain schemes, and also considered the protection of broadcasting interests at the coming conference at Rome. Finally, it confirmed the enrolment of new members: Osakeyhtio Suomen Yleisradio at Helsingfors, la Société Romande de Radiophonie at Lausanne, and la Société Anonyme Turque de Téléphonie sans Fil at Stamboul, as active members; and the Broadcasting Corporation of Japan at Tokio as an associate member.

JAPAN.—A new national organisation has been formed under the name of the "Broadcasting Corporation of Japan," says the *Electrical Review*. It has amalgamated the three previous organisations at Tokio, Osaka and Nagoya. The country is now divided into territorial broadcasting divisions: Kanto (Eastern), Tokai (Central) and Kansai (Western), to which are being added: Kyushu (Southern Island), Chugoku (Central States), Tohoku (North Eastern), and Hokkaido (Northern Island). The old Tokio Broadcasting Bureau has taken the name of Kanto Division, but is still better known as the Tokio central broadcasting station, which explains that in accordance with the five-year plan of the new Corporation a new 10-kw. station is being built in the prefecture of Saitama, about 20 miles north of the city of Tokio, to replace the present 1-kw. station at Atagoyama in the city, which will

be converted into a studio connected with Saitama. It is hoped that the new station will begin transmissions next spring. The total number of licensed listeners in Japan is 370,000, of whom 237,000 belong to the Kanto division.

JUGO-SLAVIA.—*World Radio* reports that a broadcasting station is to be erected shortly at Laibach. It will be ready for operation by next Easter and will be the largest in the country.

NEW ZEALAND.—Reuter's Trade Service announces that to minimise interference from Australian stations and the new high-power station at Wellington, the following new wavelengths have been allocated to New Zealand stations: IYA, 333 metres; 2YA, 420 metres, 3YA, 306 metres; and 4YA, 363 metres.

NORWAY.—A representative meeting of merchants, held at Oslo on Sept. 20, says Reuter's Agency, discussed the increased time required for the transmission of telegrams between Norway and England. It was stated that the average period for sending messages to London was now as high as 108 minutes, compared with 63 minutes previously, and it was suggested the delay took place in England. A resolution was passed urging the Norwegian telegraph administration to seek to remedy the evil.

It is understood from other sources that the figures quoted above do not at all represent the situation, but the matter is receiving the closest attention of the two administrations concerned.

SALVADOR.—The *Electrical Review*, in a recent issue, gives the following satisfactory report on the Telegraphs and Telephones in this Central American Republic, which "possesses efficient services of telephone and telegraph communication. The telephone system comprises more than 2,650 miles of line (of which 85 miles was erected in 1926) and 275 exchanges. The telegraph system embraces 1,000 miles of line and 250 telegraph stations. Twenty-five new offices with combined services were opened during 1926. In the capital, the telephone and telegraph lines are laid underground, and messages are transmitted through a new central telegraph and telephone office. The wireless telegraph station in San Salvador has been renovated recently, and new short-wave equipment installed, which will make it possible to send communications at all hours."

SIERRA LEONE.—Similar in quality is the report for 1926 of the Sierra Leone Railway Administration (which also manages the telegraph system of the country and the Freetown telephone system) shows that the total mileage of lines in operation at the end of the year increased by 25 to 1,269 miles; the total number of circuits on the Freetown telephone exchange increased by 9 to 106, and the number of telegrams dispatched increased by 1,032 to 70,552, the proportion of Government to public traffic being 17,826 to 52,726 telegrams. The number of subscribers (excluding the railway) on the telephone exchange was 55 (36 public and 19 Government). Telephone revenue increased by £693 to £2,133, due to Government subscribers, who previously paid half rates, paying full rates from January, 1926. Telegraph revenue decreased by £333 to £4,932, due to revision of charges.

SOUTH AFRICA.—By arrangement with the B.B.C., the Baldock-Smith boxing match at the Albert Hall on Oct. 6 was broadcast to South Africa by relaying the running commentary on the fight through Phillips Lamps, Ltd.'s Continental broadcasting station (PCJJ) at Eindhoven, Holland.

U.S.A.—A chain of 15 American and Canadian broadcasting stations, forming the second largest radio chain in the world, will be subject to British direction almost immediately as a result of an important scheme ratified in London last month. Contracts, states the *Daily Telegraph*, were signed on Sept. 4 between the American Telephone and Telegraph Co. and the Columbia Gramophone Co., whereby the Columbia Co. will open 15 stations, covering North America from the Atlantic coast to the Rocky Mountains, and broadcast its own musical programmes, in direct competition with the National Broadcasting Co.

I.B. Corporation v. *F.R. Commission*.—Of great interest, also, is the action of the International Broadcast Corporation in withdrawing the suit it had begun against the Federal Radio Commission in the Court of Appeals of the District of Columbia. The suit was brought for two purposes: to obtain for station WGL in New York City a better broadcast channel, and to test the legality of the 1927 Radio Act. *World Radio* says that the suit has been withdrawn, not because the Corporation believed the position it had taken to be a wrong one, but because it felt that whatever difficulties now exist can be adjusted by the co-operation of the broadcasting companies under the supervision of the Commission. It is also pointed out that should the Radio Act be declared unconstitutional at this time, conditions of chaos would be created.

According to the *Telegraph and Telephone Age*, high-powered radio broadcasting reached a new peak on Aug. 4, when a programme of WGY at Schenectady, N.Y., was broadcast at midnight from a new 100-kw. experimental transmitter. This test marked the first time that 100 kw. has been modulated and fed to an antenna for broadcast service. The Federal Radio Commission issued a special licence to operate with 100 kw. for 30 days, and specified the period from midnight to 1 a.m., eastern standard time. Comparison tests were made of transmissions by the 100- and 30-kw. transmitters. By means of this investigation, which is part of an extensive development programme, the radio engineers hope to improve the broadcast service.

In a report emanating from the Electrical Equipment Division of the Department of Commerce, it is estimated that 18,000,000 receiving sets are now in use throughout the world and that 200,000,000 sets would be required to serve all of the people within the constant reception area on a basis of five persons to each set. Fifty-seven countries now maintain broadcasting services.

Cables and Wireless.—The Mackay companies have acquired the wireless system of the Federal Telegraph Company, a Californian concern, the present service of which is limited to point-to-point and ship-to-shore transmission, but it is intended, says *The Times*, so to expand the system as to provide a wireless supplement to the existing cable service. The long-wave arc system will be employed for foreign transmission, while for inland work a short-wave will be used.

In this same connexion the following from the *Electrical Review* is equally interesting:—

"That the cable telegraph companies still have faith in their undertakings despite the development of 'wireless,' is once more demonstrated by the announcement of Mr. Newcomb Carlton, president of the Western Union Telegraph Co., that his Company proposes laying a modern cable between the United States and Japan to provide improved telegraph facilities between America and the Far East, at a cost of three million pounds. 'The need for improved cable communication has been emphasised by recent events in China, which justifies this outlay,' states Mr. Carlton. It is understood that the new cable will be of the 'Permalloy' type, which will permit of the sending of five or six messages simultaneously, and will have a total carrying capacity of 2,500 letters (500 words) per minute. At the time when American and British troops were landing in China, three cable systems were available for the use of the British Government, while only one cable connects China with the United States; of course, a wireless circuit is in operation between San Francisco and Japan, via Honolulu, but it is stated that it works very irregularly. This discrepancy has caused considerable embarrassment to Washington, which is naturally anxious to keep in close touch with the Chinese situation. The present Pacific cable was laid by the Commercial Pacific Cable Co. (one of the Mackay Companies' subsidiaries) in 1902, and runs from San Francisco to Honolulu, thence to Midway Island and Guam, where it branches off to Manila and Yokohama. The Commercial Company's reply to this threatened competition is the purchase of the Federal Radio Telegraph Company, whose circuit it intends to operate between San Francisco and Japan, in addition to its present cable. It is understood that the purchase price was about a million pounds sterling, and that the new wireless circuit will be in operation before the new Western Union cable can be made. The Commercial Company's radio circuit will be operated on the 'beam' system, now operating so successfully between Great Britain and the Dominions, a system which it is understood will also be shortly adopted on the Marconi transatlantic wireless circuit to New York, as well as to Buenos Aires."

The International Radiotelegraph Conference was opened in the Chamber of Commerce Building at Washington, on Oct. 4, by President Coolidge, who cordially welcomed the Conference on behalf of the people of the United States. The *Electrical Review*, London, has a special representative at Washington who will no doubt have an interesting, if very lengthy, report to make to the editor upon his return, which, according to information received as we go to press, is not yet! Some delegates are wondering if they will be in England again by Christmas. Having outlined the importance of the means of communication to civilisation, says the representative in a cablegram, and pointed out that radio could properly fulfil its mission only by the aid of international regulations, he expressed confidence that the Conference, by candid discussion and wise co-operation, would render radio an increased power in the service of humanity. The Conference having vigorously acclaimed the President's address, Mr. W. Kruyt, of the Dutch Telegraph Administration, and doyen of the Conference, expressed thanks for the President's generous welcome, and proposed Mr. Herbert Hoover, Secretary of Commerce and Head of the United States Delegation, as President of the Conference. Mr. Hoover took the chair, and said that the presence there of delegates from over seventy sovereign nations and representatives of over 40 communication companies was the highest proof of the outstanding importance of radio communication. He sketched its amazing growth since the last Convention of 1912, and said that developments necessitated international understanding on the use of the limited number of other channels available if the progress of this great branch of communications was not to be retarded. The allocation among different international services of whole bands of frequencies, from the highest to the lowest practicable, would be one of the major tasks of this Conference. He stressed the fact that the United States had, from the very nature of its constitutional organisation, left the creation, ownership and management of its communication systems to private enterprise, and was glad of the presence at the conference of representatives of the great companies which had so largely contributed to the growth and high efficiency of radio service; it was wholly fitting that they should be heard when policies to which they must conform were being determined. Progress in radio had not ceased, and he looked forward to great advances; while international agreements were necessary to orderly conduct, care was needed that regulation did not hamper progress. The Conference had great responsibility, but, if successful, would aid in spreading that human understanding which was the foundation of peace. The Conference stood in silence during the roll-call of deceased members of the last Conference. Colonel T. F. Purves, head of the British Delegation, expressed the pleasure of the Conference at being assembled in Washington, and gratitude to Mr. Secretary Hoover for presiding.

It is regretted if one or two of the above items appear somewhat belatedly in these columns, and the only excuse the writer has to offer is one well known in telegraph circles, and is yclept " Pressure " !

Not often does the *Observer* trip, but in their issue of Sunday, Sept. 25, their Broadcasting Correspondent permits himself to write " 120 to 150 volts at 20 milliammetres from the mains ' ! A new measure of distance, perhaps ?

And that is how it was done ! The *Westminster Gazette*, in one of its " Miniature Memoirs," relates the following :—

" When Mr. Taft gave his inaugural address as President of the United States a sudden blizzard swept across the country and blew down all the wires. In consequence, the inaugural speech did not appear in the newspapers. President Taft sent for Mr. Theodore Vail, who was then the head of the American Telephone and Telegraph Company, and complained. ' The wires must be put underground,' he said. ' But,' protested Mr. Vail, ' science has not gone so far.' ' Then science must go so far,' replied the President. And so the vast research departments of the Bell enterprise concentrated on the problem and found the solution. Coils and relays were devised and tried and to-day speech is possible across whole continents.

The report for the year ended June 30 last of the Halifax and Bermudas Cable Co., Ltd., states that the net result of working was a profit of £26,949, as compared with £28,322 in 1925-26. To this is added £62,554 brought forward, making £89,503. After deducting the interim dividend and £2,420 for repairs, there is a balance of £84,583. From this a final dividend of 5% free of tax, making 10% tax-free for the year, is to be paid, leaving £82,083 to be carried forward. The annual meeting was held on Sept. 22.

The expenses for the year ended Dec. 31, 1926, of the West India and Panama Telegraph Co., Ltd., exceeded the revenue by £1,383, and after providing for debenture interest, depreciation, &c., the deficit was increased to £10,267. This was added to the accumulated deficit brought forward, bringing the total to £121,338. The first and second preference dividends are paid up to June, 1919, but the ordinary shares have received nothing since 1918, when $\frac{5}{8}$%, free of tax, was distributed.

So the Robot has actually arrived ! According to news from New York, the Westinghouse Electric Manufacturing Company have installed a televocal system of remote control over an " automatic man " at the Washington water supply reservoirs, which (I do not intend to write *who*), in answer to telephonic enquiries from the distant Washington Water Department, replies with a characteristic note repeated six, seven, eight, or as many times as may happen to correspond with the depth of the water in feet in the reservoirs at the moment of the enquiry. An example of this system was exhibited at the Model Engineer Exhibition in London in September, and was mentioned in our last issue.

Major Raymond Phillips, it will be recalled, controlled the movements of a model train by calling out the words " stop," " back," &c., &c.

Since writing the above another claimant to the invention is put forward, in the person of Mr. Samuel Hanmer, an electrician, of Manchester, who claimed, says the *Evening Standard*, in 1924 to have perfected a device which could start or stop an electrical dynamo at the sound of the human voice.

Since that time Mr. Hanmer has improved his device, and he now claims that it can do anything performed by the American " mechanical man," whose invention was announced last week.

" The whole secret of the invention," Mr. Hanmer says, " lies in the attunement of a plate sensitive enough to respond to the vibrations of the human voice. The day is coming when the public will accept as commonplaces ' mechanical men,' which now appear to be marvels."

The Special Wireless Correspondent of the London *Daily Telegraph*, reporting on the London-Sydney short-wave transmission of Oct. 17, says that the relay lasted for about twenty minutes, bad atmospheric interference causing Keston to abandon the relays. Conditions improved for a time, enabling London to hear an announcement from 2FC, Sydney, together with the information that the time in Australia was " nine minutes past four on Monday morning, Oct. 17," and that this constituted the second Empire programme. An impressive part of the programme which followed was a genuine " coo-ee " call, and afterwards Mr. Peter Dawson sang " King Charles." Daventry experimental station, 5GB, relayed this programme as well as 5XX.

Mr. H. H. Young, district surveyor for St. Pancras, London, recently stated, while giving evidence at the St. Pancras Film Factory fire inquiry, that there is " a statutory obligation to give notice to the district surveyor of every hole, however small, to be made in a wall of any building."

Several of us thought of the exits of our " earths " and the inlets of our aerials, and the surveyor was approached on the question and gave the disturbing reply that the obligation applied to the installing of a listening-in set in an ordinary dwelling. Our hearts sank deeply at the decision. Mr. Young, however, appears to have added that he thought that no reasonable surveyor would expect to have notice of such cases, and the two million odd listeners are therefore all relying on the sweet reasonableness of district surveyors. It is fondly hoped that all surveyors will prove kind-hearted !

The *Electrical Review* for Oct. 7 gives a most interesting illustrated description in detail of the Round Island (Scilly Islands) Radio Beacon. This, the first beacon station to be put into regular commission by Trinity House, was designed by the Marconi Company to the specifications of the Trinity Brethren.

The signal for fair-weather periods consists of the call sign GGG in Morse, repeated at the rate of 15 words per minute for 47 seconds, followed by a prolonged dash of 10 seconds duration and terminated by one repetition of the call sign, the whole transmission taking 60 seconds exactly. It is followed by a silent period of three minutes in each case, and is repeated three times, covering a total of nine minutes every half-hour.

In view of these modern aids to navigation it is therefore not surprising to hear that there is a steady flow of orders from shipowners for new direction-finding apparatus. The writer knows of about fifty installations that have been ordered quite recently among, say, half a dozen firms.

A writer in *Nature* gives an account of certain experiments which had been made regarding the extent to which radio waves actually penetrated the earth, and cited those of Mr. Guy Allen of Boulder, who, on Aug. 17 last, in the Caribou Mine, Colorado, used a nine-valve super-heterodyne radio installation with which he had heard Lima, London, Madrid, &c.

At a depth of 220 ft. below the surface, clear of wire, rails and pipes, he readily detected KFEL Denver (248 metres), and the concert was well heard from the loudspeaker by all present. On proceeding to a depth of 550 ft., carrier-waves were detected, yet no clear reception was possible in the morning; but in the evening at 9.20 p.m. the party returned to the 550-ft. level, and at the end of a tortuous passage 80 ft. distant from all wires and pipes, speech, music and song from KOA Denver (326 metres) was heard from the loudspeaker about as clearly as on the surface earlier in the evening. In both cases the reception was by loop, and in both cases maximum intensity was obtained when the loop pointed within a few degrees of Denver, about fifty miles away.

Previous experiments in a tunnel at Montreal, Canada, had shown that 40-metre waves were weak in penetrating power; broadcasting waves were more efficient, while longer waves of 10,000 metres surpassed both.

The previous experiments referred to were probably those mentioned by Messrs. A. S. Eve and D. A. Keys, of the Mines Bureau, Washington. During these latter experiments the above-mentioned officials appear to have reported that broadcasting waves of, say, 400 metres appeared to be better and were detected by means of good amplification in the tunnel with 700 ft. of limestone and igneous rock above them. Longer waves, in the region of 10,000 metres, were detected more readily, but the Bureau of Mines trusts that some wireless enthusiasts may continue these experiments, and adds that accurate measurements of signal intensity would be specially useful.

The financial editor of the *Electrical Review* recently pointed out that on a certain date in October a coincidence happened which had not repeated itself since before 1907 when what is known as the " Eastern Quartette " all stood at the same price level on the Stock Exchange. The quartette is composed of the following telegraph cable stocks: Eastern Ordinary, Easter Extensions, Westerns and Globe Ordinary, and all " regained their composure and their strength," after " what may be called the periodical " Beam " slump in cable companies' stocks and shares had run its usual course."

An interesting feature of *Supervising*, commencing with the number published on Sept 15, is a Biographia for Students of Telegraphs, Telephones and Posts, compiled by Mr. H. G. Sellars of the C.T.O. Cables and Wireless section. The Biographia is alphabetically arranged and so far appears likely to prove an all-embracing compendium, which will no doubt be agreed if only one item be quoted, viz., that of :—

> Argyl, John Douglas Sutherland, Duke of, b. 1845. Moved a resolution at the Mansion House, London, advocating low-priced telegraphic communication within the Empire, 11 December, 1908.

It is with the keenest regret that we have to record the death of Mr. F. Grafton, Superintendent, Inland Telegraphs, C.T.O. Deceased succumbed to a malignant disease at the age of 53 years, and at a point in his career which, humanly speaking, held more than ordinary promise.

Science and the Future.—If the virtues of men keep pace with their growing knowledge, and if they are willing to walk forward in peace, the needs of all will be satisfied, but nothing less than lofty motives will adequately cope with the increasing forces which humanity has to wield.—*The Advocate.*

J. J. T.

PRESENTATION TO MR. BENTON, ABERDEEN.

AN interesting presentation took place at the Second Annual Meeting of the Post Office Telephone Savings Association in Telephone House, Aberdeen, on Oct. 6, 1927, when, at the request of Mr. A. Clow, the Vice-Chairman, the Chairman of the Association, Mr. P. Edmond, District Manager, in a very happy speech asked the Hon. Treasurer of the Association, Mr. A. M. Benton, to accept a smoker's cabinet as a tangible expression of the appreciation of the members for all he so willingly and cheerfully had done for them during the two years the Association had been working. Mr. Benton, in thanking the members for the handsome gift, said that the work had been a real pleasure—indeed, he could truly say it had in reality been a labour of love—and the success which had attended the Association was in itself an ample reward.

This Savings Association, it may be mentioned, has a membership of 77. The total amount deposited was £1,507 3*s.* 6*d.*, and the total number of certificates purchased 1,883, at the end of its second year of working on Sept. 30, 1927.

A BRIEF CHRONOLOGY FOR STUDENTS OF TELEGRAPHS, TELEPHONES AND POSTS.

BY HARRY G. SELLARS.

THE kind reception given to the paper on "Overseas Communication," which appeared in the *Telegraph and Telephone Journal* of January and February, 1927, encouraged the writer to continue and extend his researches with the object of demonstrating the historical progress of the three sister services which are of interest to so many persons in this and all other countries. An attempt has been made to give credit to all those whose work has been of assistance in building up the great worldwide system of communication, but it is realised that the story is incomplete and that many improvements in methods and apparatus have been effected by inventors in all parts of the globe whose names remain unrecorded, but who had the satisfaction of aiding development. Every effort has been made to quote accurate dates, but in many cases the negligence of historians, the gradual development of an idea, the private nature of laboratory experiments, the number of persons engaged in research and experiment, or the tardy publication of results, have sometimes led to uncertainty; and the correctness of dates cannot, therefore, be guaranteed. In cases where an accurate, or approximate, date could not be ascertained the item has been placed in parenthesis, at a point where it is likely to be of interest. Abstruse technical terms have been avoided with a view to rendering each note of interest to the non-technical mind. Foreign readers will comprehend that no disregard is intended to those of their countrymen who have laboured in the great cause, but whose names and achievements have not been recorded in these pages. Allusion has, however, been made to those whose names have emerged from the enormous number of co-workers of other nationalities and have reached this country. Our friends will also realise that, in many items, although not specifically stated, the *British* Post Office is the subject of reference.

B.C.

2634 ... ... Mariner's compass constructed by Hoang-ti, Emperor of China.

1150 ... ... Homer regarded the lodestone as being miraculous.

Travellers used the lodestone to guide them across the immense tracts of land in China, Manchuria, Siberia, and Tartary.

1000 ... ... Greeks, Egyptians, and Romans obtained lodestone from the province of Magnesia, Asia Minor, of which Heraclea was the chief city. It was frequently called Lapis Heracleus.

570 ... ... Thales thought the lodestone possessed reason, and mentioned the attracting properties of rubbed amber.

540 ... ... Pythagoras looked upon the lodestone as something supernatural.

536 ... ... Cyrus established a regular system of couriers and erected post-houses in Persia.

Aztecs and Chinese also had organised establishments of state letter carriers.

460 ... ... Anaxagoras regarded the lodestone as having a "soul."

430 ... ... Hippocrates believed the lodestone to be a purgative.

354 ... ... Aristotle described the electrical power of the torpedo fish.

208 ... ... Philip V of Macedon ordered reports to be made to him at Mount Tisseus, in Thessaly, by means of fire signals.

125 ... ... Various apparatus in use for signalling by means of fire, Polybius called them pyrsiae.

50 ... ... Lucretius observed the movements of iron filings under the influence of a magnet.

32 ... ... Theophrastus mentioned that amber (Gr. Elektron) and tourmaline had the power of attracting dry leaves and straw.

24 ... ... Augustus introduced couriers and post-houses in the Roman Empire.

A.D.

70 ... ... Pliny mentioned the electrical qualities of the lodestone, amber, tourmaline, and the torpedo fish.

382 ... ... First printed newspaper published in China.

415 ... ... Eustathius mentions the case of a man whose body occasionally emitted sparks and flame while dressing or undressing.

800 ... ... Charlemagne introduced couriers and posts into France

1098 ... ... Frode, of Iceland, in his writings, showed that the magnetic needle was used for navigation purposes in the eleventh century. It is recorded that the Chinese were aware that a suspended magnetic body did not point to the true north.

A.D.

1150 ... ... Guizot, of Provins, speaking of navigators, says "they possess a never-failing method by the virtue of the true marinière, an ugly and brown stone to which iron adheres of its own accord." He states that a needle was rubbed on the stone and that the point of the needle then "turns just against the pole-star in dark nights, when neither star nor moon are seen."

1210 ... ... Peter Pellegrinus noticed that the compass needle did not point due north.

1214 ... ... Roger Bacon born.

1250 ... ... Flags used for signalling in the British Navy.

Communication established between Austria and Italy by a connected line of letter posts.

1267 ... ... Polar attraction of the lodestone discovered by Roger Bacon. He was accused of dealing in magic and, being banished from England, took up residence in Paris. Bacon, who was a Franciscan friar, must be regarded as the pioneer of modern scientific research.

1275 ... ... Emperor of China introduced post houses. A fresh courier was provided for each stage which consisted of three miles. The runners wore small bells round the waist to herald their approach, so that no delay occurred in relaying the correspondence.

1294 ... ... Roger Bacon died.

1302 ... ... Flavio Gioja, of Naples, improved the mariner's compass.

1447 ... ... Printed newspapers issued in Germany and Venice. At Venice the news could be seen on payment of a "gazetta."

1455 ... ... Scottish Parliament approved a system of signalling by means of burning faggots, indicating to the Lowlanders the various movements of their English enemies.

1463 ... ... Louis XI established post-houses in France.

1464, May 15 ... Letters first forwarded by post in England.

1481 ... . Edward IV introduced post-horse riders to bring news from Scotland in twenty-mile stages.

1482 ... ... Edward IV organised a system of dispatch riders.

1483 ... ... Richard III improved the system of posts which had been set up in 1481.

1484 ... ... Richard III followed the example of Edward IV and used relays of riders to carry dispatches. A Master of the Posts was appointed.

1492 ... ... Columbus discovered the declination of the compass needle from the geographical meridian.

1516 ... ... Brian Tuke occupied the position of Master of the Posts.

1533 ... ... Tuke explained the condition of the posts to Thomas Cromwell.

1540 ... ... William Gilbert born at Colchester.

1543 ... ... Post-horse arrangements existed in various parts of England.

1555 ... ... Regulations issued in connexion with the Posts on the London-Dover Road.

1568 ... ... British Government established a Post Office for foreign letters.

1576 ... ... Robert Norman discovered that a balanced magnetised needle dipped towards the north. He constructed a dipping needle and found the angle of dip in London to be 71 deg. 50 min.

1580 ... ... Declination of compass needle in London 11 degrees 15 min. E.

1581 ... ... Queen Elizabeth appointed Thomas Randolph first chief postmaster of England.

1588, July 29 ... Defeat of Spanish Armada signalled by beacon fires.

1589, Mar. 28 ... Richard Sackville born.

1591 ... ... Elizabeth issued a Proclamation relative to the carriage of private letters, and ordered that all foreign letters should pass through the Posts.

1594 ... ... Shakespeare may be considered to have foretold telegraphy in a "Midsummer Night's Dream," Act II, Scene I, where Puck addresses Oberon in the following words, "I'll put a girdle round about the earth in forty minutes."

1598 ... ... Posts to Ireland established via Bristol and via Holyhead.

1600, April ... Gilbert expounded theories on terrestrial magnetism and electricity. He discovered that a large number of substances, which he called "electrics," attracted light bodies when rubbed. (Gilbert's name has been adopted as the unit of magneto motive force.)

A.D.

1600, Dec. ... Postal arrangements with East Indies, Cape of Good Hope, Mauritius, etc., in hands of East India Company.

Gilbert devised the earliest electroscope. In the course of experiments he found that iron bars set upright acquired magnetism and that a bar of steel heated and cooled while lying in the magnetic meridian acquired magnetic polarity.

1602 ... ... Jost Bing, of Hesse, invented a measuring compass.

Otto von Guericke born at Magdeburg.

1603 ... ... Post to Berwick, for Scotland, organised, and instructions issued for all the Posts.

Dr. William Gilbert died.

1605 ... ... Bacon used for cryptography the five-unit code afterwards adopted by Whitehouse, Burnett, and Baudot.

1607 ... ... James I appointed Lord Stanhope "Master of the messengers and runners . . . within the King's dominions."

1609 ... ... Posts maintained by the English Crown at a loss of £3,400 per annum. Monopoly in the carriage of letters vested in the State.

1615 ... ... First daily newspaper appeared in Frankfort-on-Main.

1619, Feb. ... James I, of England, established the office of Postmaster for Foreign Parts out of the King's Domains, and appointed to the post two London merchants named de Questers (father and son).

1619, Nov. ... Thomas Witherings made "Postmaster of England for foreign parts."

1620 ... ... Post to Plymouth organised.

1622 ... ... First English newspaper appeared in London.

1631 ... ... William Frizell, appointed foreign postmaster by Charles I, ordered a regular service to be run between London and Edinburgh.

1633, Mar. 16 ... Thomas Witherings again took up the appointment of Postmaster for Foreign Parts, and established a service between England and the Continent.

1635 ... ... Witherings organised the Posts, with a scale of postage rates, according to weight and distance. Rates of postage :—

Under 80 miles	... ...	2 pence.
80 to 140 „	... ...	4 „
Over 140 „	... ...	6 „
Scotland	... ...	8 „

Prideaux, successor of Witherings, paid a rent of £5,000 per annum for the profits from Posts.

Post communications were available between London and most towns in England, Ireland, and Scotland.

1642 ... ... Earl of Warwick held the post of Master of the Posts by assignment from Thomas Witherings.

1642, Dec. 25 ... Isaac Newton born at Woolsthorpe, Lincolnshire.

1643 ... ... A Post Office erected under parliamentary orders in Cloak Lane, near Dowgate Hill, London.

1649 ... ... Net revenue of Post Office, £5,000.

1650 ... ... Otto von Guericke devised the first electrical machine, consisting of a globe of sulphur which was revolved and rubbed with the hand.

Von Guericke first observed that sparks and flashes of light could be obtained from electrified bodies when discharged.

1653 ... ... Prideaux retired. Rent of the Posts raised to £10,000.

1657 ... ... The compass needle in London pointed due north and south.

1657, June 9 ... A Bill "for settling the Postage of England, Scotland, and Ireland" received the consent of the Lord Protector. The Bill provided for the appointment of a "Postmaster-General of England and Comptroller of the Post Office," an office which the Lord Protector might grant in return for a yearly rent.

Post Office endeavoured to control incoming letters from abroad.

Post Office removed to the "Black Swan," Bishopsgate Street, London.

1660 ... ... Post Office granted "in farm" to Henry Bishop for seven years at a rental of £21,500 per annum. John Wildman acted as manager.

"Franking" of postal correspondence granted to Members of Parliament. Minimum rate of postage between London and Manchester reduced to 3d.

Homeward bound ships ordered by Act of Parliament to give up all letters at the port of arrival.

(*To be continued.*)

FIFTY YEARS WITH TELEPHONE PIONEERS.*

BY T. A. PROUT.

SHAKESPEARE has it that "thoughts are but dreams till their effects be tried," and Emerson that "the ancestor of every action is a thought."

Certain it is that pioneers, the men and women "who go before to prepare the way for others," are necessary in all ages and are "the salt of the earth." The derivation of our word *Pioneer* suggests that it means literally a "foot soldier," and it is not surprising if his lot is usually a hard one.

I am attempting a review of a period of 50 years. Well now, is a half-century a long or a short period ? It depends, no doubt, on the point of view. On the one hand it is so *long* as to be the greater part of the Psalmist's tale of "threescore years and ten," and so *long* that it takes us back to the days before the advent of telephone exchanges, electric lighting, or motor-cars.

On the other hand, this half-century is so *short* that when it began some men here were riding their old "penny-farthing" bicycles with a 60-in. wheel in front and one of a few inches diameter following behind—ladies didn't ride bicycles in those far-off days.

The same period is so short, too, that Sir Oliver Lodge, who is still amongst us and in the front row of pioneers, was a married man before our period opens in 1877.

If Sir Oliver Lodge at 76 years of age can evince his enthusiastic interest in such characters as that of the great Faraday, whose figure you have before you in marble, and the pioneers in astronomy such as Galileo, "let us now praise famous men" beginning with *Phillip Reiss*, the German electrician who in 1861 exhibited at Frankfort apparatus which he described as a telephone and which succeeded in transmitting by electrical means musical and other sounds. This was a near approach to a satisfactory telephone, and I believe that Germany is now very intent on trying to establish that Reiss was the first inventor of the telephone.

Other inventors made interesting contributions about this time, and curious to relate, one, Mr. Royal E. House, of Binghampton, N.Y., invented and patented an "electro-phonetic-telegraph" which was capable of operating as a magneto telephone in the same manner as the instrument subsequently and independently invented by *Alexander Graham Bell.* Mr. House appears to have "built better than he knew," as unfortunately for him he did not realise the capabilities of the apparatus he had himself devised, and thus the broad fact must be taken that Bell was the first man to produce and make known publicly the apparatus for the transmission of articulate speech and any other sound to a distance by electrical means, and to carry his discovery to a successful conclusion. Bell was a Scotsman who lived in Edinburgh until he was 24 years of age. He was then—in 1870—mainly for health reasons, taken by his father, Mr. Melville Bell, to Canada.

He was accompanied by his brother, and though well versed in science he was less proficient in business affairs. The story of Bell's life is one of great interest and fascination. At 15 years of age he made a model of a skull of gutta percha and by working a bellows was able to make it say "Papa—Mama." He also had a Skye terrier at this time which he taught to stand on its hind legs and growl while he manipulated its throat and mouth in such a way that certain vowel sounds were produced. The absorbing passion alike of father and son was to bring science to the aid of the deaf. Following upon a lecture by his father at Boston on his system of visible speech for the education of the deaf which he had already introduced into London schools, his son Graham was offered a salary of £100 a year to instruct teachers in his father's visible writing system, and he took up his duties in April, 1871.

He made the acquaintance of a Mr. Thomas Sanders, a leather merchant, whose little boy, then 5 years of age, had been born deaf.

Mr. Sanders got Bell to take the little boy as a private pupil in the Bell system of lip reading, and so marvellously successful was the teacher that Mr. Sanders gratefully sought for some means whereby he could show his appreciation to Bell, who was at the time like some other inventors, feeling after some way of sending more than one message at the same moment over a single telegraph wire.

Mr. Sanders offered Bell the use of an attic in his house for a workshop and to supply him with money for making his experiments. Graham Bell also made the acquaintance of Mr. Gardner Hubbard, a well-known Boston lawyer, whose daughter Mabel had lost her hearing as the result of an attack of scarlet fever. Mr. Hubbard agreed to join Mr. Sanders in helping Bell financially, and later on Miss Mabel Hubbard, who received great benefit from the Bell system of visible speech, became the wife of our famous inventor, the founder of the vast telephone business. When Bell began to talk of the possibility of *speaking* over a telegraph wire, his wise and sympathetic friends were of the opinion that there was not much in *that* idea but if he found that it could be done it would be interesting. In the fullness of time in the afternoon of June 2, 1875, while experimenting with a reed receiver the spring stopped vibrating.

* Paper read before the London Telephone & Telegraph Society.

Bell's assistant at the time, Mr. Thomas A. Watson, whose name in connexion with the invention of the telephone is now almost as widely known as that of Bell, snapped the spring with his finger, on which Bell rushed to where Watson was to find out what had happened. It was thus that Bell, when 28 years of age, first heard the baby cry of the invention destined to revolutionise the then existing slower methods of conducting business and social intercourse the wide world over. Bell not unnaturally resigned his position as a teacher and on Mar. 3, 1875—his 29th birthday—was granted the world famous patent No. 174465 which was soon to become and for years to remain the centre of fast and furious attacks in a long series of about 600 patent law suits.

On Mar. 10, 1876, in Boston, the human voice came clearly over a wire for the first time in the world's history.

Mr. Watson, who heard Bell speak on that memorable occasion, says that it made such a deep impression upon him that he wrote the sentence down in a book which, it is not a matter of wonder to hear, he has always preserved The simple words were :—

" Mr. Watson. Come here. I want you."

When we think of the extraordinary demands we now make of the telephone to transmit speech clearly under the most adverse conditions of stress and noise, even in the midst of the noisy machinery of a tank in motion, as was done on Salisbury Plain this summer, it is curious to read that during this summer of 1877 the proud inventor's statement that " the telephone was now talking so well that one did'nt have to ask the other " man to say it over again more than 3 or 4 times before one could understand " quite well, if the sentences were simple."

In August, 1876, young Bell was contemplating a trial of speech transmission over the 5 miles from his house at Tutela Heights into Brantford, Ontario. He cleaned the town shops out of their stocks of stove-pipe wire to run along his father's fence to the junction at Mount Pleasant Road where he would connect it to the telegraph wire leading into Brantford.

We can picture the scene. There was a family named Brooks living across the road opposite the Bell homestead. The son Thomas Brooks was carting grain from an adjoining field. What could be more natural than for Bell to ask Tom Brooks to give him a hand with the plaguey stove-pipe wire. Brooks asked him to wait till the afternoon when he would finish his job without blocking the lane, and then he and his next-door neighbour, E. McIntyre, would help to string the wire.

The first words the inventor heard on this occasion were spoken from Brantford by his uncle, David Bell, the familiar ones from Hamlet :—

" To be or not to be, . . ."

In 1906, nearly 30 years afterwards, Dr. Bell, on re-visiting his old home at Tutela Heights, was pleased and proud to meet the two men who had thus helped him to put up the first telephone line in Canada.

It is not strange that in Canada, where the telephone is so widely developed as only to be second—and a very good second—to the U.S.A., Brantford is known as the Telephone City. On Oct. 24, 1917, the Duke of Devonshire, when Governor-General of Canada, unveiled a fine monument in honour of Graham Bell's invention.

I am much indebted for the slides shown to-night to a sumptuous volume entitled " Pioneering the Telephone in Canada," privately printed at Montreal in 1926, in commemoration of the 50th anniversary of the Telephone. My possession of this Pioneer's limited edition is due to the courtesy of Mr. Charles Fleetwood Sise, the President of the Bell Telephone Co. of Canada.

In an inspiring dedication of the book to all who with head, heart, and hand contribute to the upbuilding of the great public telephone service, it is truly said that :—

" The leaders in the great army of Telephone workers have been " men in whom zeal for service burned with a steady flame. And in the rank " and file there has been from the first something of the churchman's and " the soldier's devotion to duty."

Dr. Bell passed from this life on Aug. 4, 1922, at his summer residence at Cape Breton. His remains were buried on the following Friday in a grave hewn out of the solid rock, and for the space of one minute during the ceremony of burial all communication was suspended over the vast entire network serving the 17 million telephones in the U.S.A. and Canada, as a tribute to the memory of the man whose beautifully simple invention had brought this mighty business into being.

I must here part from Bell, however reluctantly, as truly there are many others who must even in the short time at my disposal, be mentioned. There is Elisha Gray, who applied in America for a patent for a telephone within an hour or two of Bell having deposited his application, but Gray allowed his apparatus to remain undeveloped, and after some litigation both patents were acquired by one company.

As might be expected Edison, the inventive wizard, quickly entered the telephone arena opened up by Bell, and Edison produced a carbon transmitter. It was no sooner pointed out to Edison that his transmitter would be sterile so long as he could not use the existing receiver, than he characteristically undertook, although in the throes of great discoveries in electric lighting, to produce a receiver entirely different to Bell's to act with his own carbon transmitter, and he was not slow in delivering the goods, as his nephew, C. P. Edison, reached England with Edison's ingenious chalk receiver in March, 1879. I wonder what young Edison thought of our beloved English climate that summer.

Our summer of 1927 was not in it with 1879. It rained day and night almost continuously till Sept. 30 and was followed by a glorious Indian summer in October. May history once more repeat itself! The Edison Telephone Co. was quickly formed in London and an exchange service offered at £12 per annum against the £20 of the Bell Company.

It May 1878 the genial Professor David Hughes, a Londoner who had gone out to America, had given the telephone industry then in its infancy a great fillip by his invention of the microphone, and many of us soon got busy listening for the first time to the noisy footsteps of the common house fly while parading on the microphonic wooden floor. Hughes was the inventor also of the famous printing telegraph which bears his name. Fortunately for the future history of telephony Hughes did not patent the microphone, and from it sprang many types of carbon transmitters. Hughes' action had, however, avoided endless complications attendant on patents litigation.

In 1879-80 Francis Blake followed in the train and produced his famous carbon button transmitter which was a great favourite for the many years before very long trunk circuits became available, when it became less suitable. I spoke from Liverpool to London in 1903 with a Blake transmitter alternately with other transmitters then coming along and considered to be its superior, and the clear articulation of the " Blake " excited comment from the listeners at the London end. It is interesting to find that the dear old " Blake " transmitter was resurrected from the dead as recently as 1922 and placed under trial by the B.B.C. with other types of transmitter, with a view to broadcasting, because of the old reputation of the Blake for faithful articulation.

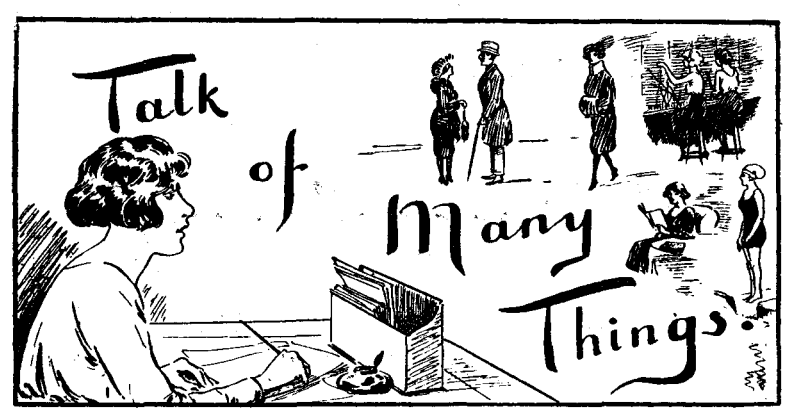
Contemporaneously with Blake's production of his transmitter the Rev. Henry Hunnings, then a curate at Bolton Percy, near York, constructed a highly successful granular carbon transmitter which was an advance on any instrument then known, and he had no difficulty in getting £1,000 for it, and this transmitter was used by the Globe Telephone Co. in their fight for subscribers in London. Mr. Hunnings was aided and advised by his friend Mr. Cox Walker, an astute telegraph engineer who was at the moment running an optical business in York. Mr. Cox Walker, now 85 years of age, was a great figure in the telephone turmoil of the first ten years.

So many present to-night know more than I do of the far more recent great advance in telephony which followed Dr. Michael Pupin's practical application of Mr. Oliver Heaviside's mathematical theories which extended back to 1887, by the invention of the loading coil in 1900 nearly half-way on in the half-century under review. Further advances in the problems of transmission have followed from work done by Mr. Wm. Duddell of oscillograph fame, as well as from the researches carried out by Mr. B. S. Cohen and Mr. J. G. Hill, Post Office Engineers.

Later still the satisfactory transmission of speech over immense distances through underground conductors has been rendered possible by the evolution of the telephonic repeater—the fond dream of telephone men for forty years—by the adaptation of the vacuum oscillating valve invented by Professor Fleming of London University.

(To be continued.)

WE TELEPHONISTS



Some Summer.

AFTER listening to the accounts given by colleagues of their experiences this year on annual leave, and comparing them with my own, it appears that most of us have either weathered the storm or stormed the weather. Not a few of us have done both. The particular clerk of the weather who conceived the notion of measuring rainfall in *millimetres* instead of *inches* will have been able to enjoy his excellent joke to the full this year. I am unable to confirm the rumour that he has died laughing or to hold out any hope that this fate may yet overtake him. In the same spirit of inspired

optimism and gay abandon, however, I will make him a present of an idea which may not have occurred to him—to express sunshine in therms and the velocity of the wind in inches per hour.

"Sunshine," say you, with a bitter laugh. "Yes, sunshine," I said, and I want to say more about it, or rather, about the sun. Personally, I think there's too much fuss made about the sun. He doesn't bother about us, so why should we concern ourselves about him? He shines because he can't help it—shines in a relentless and impersonal sort of way with an entire absence of any emotion of friendliness. It is true that we owe everything to him, but it is only when love prompts the gift that gratitude becomes real. Much the same applies to the moon, but she, being nearer, seems to evince rather more interest in us. She is cold and aloof, however, and her pale light serves only to deepen the shadows and invest them with a mystery.

Now the wind and the rain are different. With them you have personal and intimate contact with Dame Nature. You may be alone, but you can never be lonely in their company. The wind caresses and buffets and teases. Sometimes his persistence bores or his ceaseless chatter irritates. Hide from him and he finds you suddenly and with a great laugh shakes you into humour again. Occasionally he breaks out into an orgy of wildness as though he were sowing oats. Then he reminds you of a vigorous and undisciplined human—uncertain, changeable, but, withal, lovable at heart. Does he not sob and sigh as if in repentance? And the rain, too—soothing and cooling or raging and freezing, lashing your face or laving your brow. He drops from the heaven and seems at once to establish contact with all that is unworldly and pure. He brings with him the conviction that there is that which is above and beyond the petty importances of earth. Even in their wildest and maddest moments the wind and the rain are friendly and much more personal than the impassive and imperturbable sun and moon. They are wild and uncertain, not placid and inevitable. They are the living vivid expression of the nature around you, and they make you realise that you are a part of nature rather than a mere spectator present on sufferance.

But it was a beastly summer, wasn't it?

PERCY FLAGE.

To Mr. Flage.

I thank you for your words of cheer,
Received on Wednesday over here.
Your answer filled us all with glee,
And banished all the double D.
Why blush unseen within your bower?
And hide your head like modest flower?
Perchance we've met in traffic jam,
Or at friend Lipton's buying ham.
Who knows! we may have been detected,
Both choosing eggs marked large "Selected."
And last amidst these rains and fogs
Perhaps we've jostled at the dogs!

D. D.

A Telephone Romance.

(Continued.)

On the second day of the honeymoon the bride "Expressed" a wish to go for a boat trip, so they went down to the "Riverside," where they managed to "Annexe" a boat called "The Frobisher," in which they sailed past "Greenwich" and eventually arrived at "Richmond." The bride (although enjoying the trip) felt rather nervous and would not "Abandon" the "Hatch End" of the boat until assured by the bridegroom that there was no "Prospect" of any danger.

And now a late description of the going-away attire will no doubt be welcomed by my readers.

The bride (who looked a "Howler") was robed in a dress of "Buff cord" trimmed with "Red sleeves" and "Finished" with a "Blue print" collar; she also wore a beautiful "Opal" "Ring" which "Flashed" in the light. The bridegroom wore a "Royal" blue suit (which suited his "Spare" "Figure") and also a "Purley" grey tie. During the trip the bridegroom waxed rather sentimental, and among other endearing "Expressions" he called the bride (whose nickname was "Peg") his little "Pink peg," and enquired anxiously whether she had yet regretted her "First choice"; his "Answer" was the "Glow" in her "Clear" eyes.

They arrived at their hotel that night happy but hungry, and found a meal already prepared consisting of a "Langham," and after a short "Pause" the bride partook of a piece of "Tottenham" cake, the bridegroom contenting himself with a "double."

The next day was spent in packing their "Trunks," and as the bridegroom was due at the "Treasury" at a "Fixed time" they had to use "pressure" to get to the "Junction."

On reaching the station they found that the "Line" was "Blocked," and on "enquiry" of the "Traffic Officer" "on duty" they were told that no "Tickets" would be issued as the "Line was temporarily out of service" due to the fact that an "Express" had become derailed, and no "Traffic" could possibly "Filter" through.

On hearing this, the bridegroom did not "display" any annoyance but immediately arranged that they should return by "Tandem."

This they managed to borrow from the hotel. The bride, who was rather "keyed up," had some difficulty in mounting, and had to "Hop" several times before getting her balance. After pedalling "Automatically" for a "long distance" the bride's skirt suddenly became "In contact" with the "Number plate," which caused them to "Tee over."

D. D.

(For further adventures of the happy couple see our next issue.)

Ten Little Gold Plugs.

Ten little gold plugs, all in a line,
One in the "Busy-Back," then there were nine.
Nine little idle plugs, solemnly did wait,
One up the "Multiple," then there were eight.
Eight little bright plugs, like sunbeams of heaven
One on to "Fault-Desk," then there were seven.
Seven little quiet plugs, one in a fix,
One capped "out of order," then there were six.
Six little gay plugs, as bees in a hive,
Connected one to "T.T.," then there were five.
Five little shining plugs, the quarter of a score,
One in the "Junction Test," and then there were four.
Four little straight plugs, docile as can be,
One through to "Supervisor," then there were three.
Three little coloured plugs, cords green and blue,
One in the "Holding," then there were two.
Two little comrade plugs, sharing all the fun,
One joined the "Break-Jack," then there was one.
One little lonely plug, cord all undone,
Off came his little jacket, then there were none.

V. M. G. C., Paddington.

London Telephonists' Society.

All those who to the meeting went to welcome our new President Miss James) were one and all entranced as into bygone days she glanced. "Notes from My Diary" was the trend; we listened, breathless, to the end. We heard, with pleasure, many names of those who'd gladly served Miss James. There was, it seems, a Mr. Pink (that was the name I heard, I think) who, when he found things going wrong, would hurry forward with a song. And then a certain Mr. France would help still further with a dance. Again, we heard how dear Miss Reekie, when tempers frayed and nerves grew creaky, would soothe and hush and calm and bless, with unremitting tenderness. (O ay, di mi, what charming ways they had in those dear, bygone days!) Much more we heard—then, at the close, numbers of orators arose. Miss James had said, as one inured, muffled transmission could be cured in babies and transmitters too, by patting them, as mothers do. One speaker, Mr. Valentine, said, after praising auld lang syne, *he* did not know, as know he should, that patting babies made them good. (Well, *we've* known many a baby ruffled, but *never* with "Transmission muffled"!) Miss Cox arose directly after and caused great merriment and laughter saying Miss James's old-time drill had caused the wreckage in Cornhill. In speech quite free from platitude Miss Nurse expressed her gratitude, then strove to add to memory's stream, but (gracefully) forgot her theme. All these, and many more, we heard, but from telephonists—no word. Were they a vow of silence keeping? Or (let me whisper) were they sleeping? It was, indeed, a merry night, the speeches good, the paper bright; but how I wish it had been true—becaue it wasn't (*entre nous*, Miss James, in answer to *enquiary* said she had never kept a diary!)

The 4th November is the next event, "Psychology" the text, when Captain Reid, in words profound, his latest theories will propound. With lantern slides his points he'll mark, so means to keep us "in the dark." Please note the place, the time, the date—a Friday night and don't be late.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), London, E.C.1.

LONDON TELEPHONE SERVICE NOTES.

Accounts Branch.

THE retirement on the last day of September of Mr. A. E. Young removes a very well-known personality from Cornwall House. Mr. Young, who celebrated his 60th birthday and the commencement of his 43rd year of service on Sept. 28, started his career as a postman in the Eastern District. In 1889 he was transferred to the indoor staff and appointed an Adult Messenger in the Secretary's Office, and when the Post Office London Telephone Service came into being, Mr. Young was one of its earliest recruits, being transferred on Dec. 31, 1901. In March, 1904, he was promoted to the rank of Assistant Head Messenger, a position he held until his retirement, being in charge of all uniform staff at Headquarters.

Mr. Stirling presided at a little presentation ceremony on Sept. 30 and in a happy speech pointed out that the title of Mr. Young's rank did not at all describe his duties. Mr. Young made what, he said, was his maiden speech in acknowledgment of the cheque for £17 which Mr. Stirling had just handed to him on behalf of all grades of the staff, and stated that the money would be spent on a new table and wardrobe for the cottage at Misterton, in Somerset, where he hopes to spend a happy and busy retirement in the cultivation of an extensive garden. A separate presentation of a book was made by the Registry staff, and at a farewell tea given by Mr. Young to the Boy Messengers, he was the recipient of a silver-mounted Malacca cane.

The Rana Ladies' Swimming Club (Controller's Office) held their annual Gala at St. George's Baths on Oct. 10, when a crowded audience saw a very interesting programme.

Among important events decided on this occasion was the 60 yards Championship for the Liddiard Cup which was retained by last year's winner, Miss B. E. D. Taylor, after a very close contest. The final of the Civil Service Breast Stroke Championship was again won by Miss D. M. House, of Regent Exchange, and a team from that Exchange also won the Invitation Team Race.

The 120 yards men's Team Race for the "Lotus" Shield resulted in the return of that trophy, which had been held several years by the Accounts Branch, to the Traffic Branch.

A number of humorous items kept the audience in constant laughter, not the least amusing being the unrehearsed incidents. A "Greyhound Race" was a topical item, complete with a very realistic hare, and kennels—to say nothing of the barking of the "hounds"—while a "Life Saving" event illustrating the averting of a tragedy in the flooded Thames Valley and including five rescues from a watery grave was one of the most entertaining items of the evening, even though the audience persisted in thinking it farce, and not tragedy at all.

A thrilling water polo match between the City of Westminster and Amateur Club, a clever display of Fancy Swimming, and Floating by ladies of the "Naiad" Club, and an exhibition of diving by members of the Amateur Diving Association, including the high diving champion of all England, completed a programme full of good things.

During an interval Miss J. Liddiard, M.B.E., Lady Superintendent, distributed the prizes which included a special presentation to the Club's instructress, Miss L. F. Varndell, whose excellent tuition was evident throughout the evening. Members were pleased to see the Controller and Deputy Controller present.

* * * *

Contract Branch.

The volume of business done by the Contract Branch during the month of September and the quarter ended Sept. 30 was as follows:—

	Stations.	
	September.	*Quarter ended September.*
New business obtained	7,693	20,877
Ceasements	4,529	11,336
Net gain	3,164	9,541

The net gain for September last year amounted to 3,190, and that for September, 1925, to 3,429, so that this year's figure cannot be regarded as satisfactory. It is stated in some quarters that the trade outlook is improving appreciably, and it is hoped that this will materialise and reveal itself in the figures for next month.

The number of exhibitors at this year's Motor Show was 543, and orders were taken for 398 exhibition lines as compared with 380 last year and 372 in 1925. The fact that only 73% of the exhibitors this year rented lines shows that there is still room for propaganda work on the value of the telephone amongst motor manufacturers.

The practice of enclosing reply post-cards with the quarterly accounts pointing out the advantages of extension telephones has yielded such good results that it is being continued. One was sent out with the last batch of accounts and another is being prepared for the next.

We have heard a great deal lately from the morning papers about the small number of telephones per 1,000 population in this country as compared with the United States and the necessity for intensive propaganda to reduce the disparity. It might be a good thing if some of the newspapers looked into the possibility of making greater use of the telephone in their own businesses as one of the foremost in this campaign has only one-seventh the number of exchange lines and one-third the number of extensions that are provided for a New York newspaper with only a third of its circulation.

* * * *

L.T.S. Football Team.

When the process of building up a football team is entered upon the first games played invariably reveal wide contrasts in ability and style, and it is not easy to find out exactly the best position a player should occupy, and in junior football particularly a player's inclination for a certain position does not always mean that it is the place he will be most useful in. This task of weeding out and changing about occupied several weeks before anything in the nature of the most useful eleven could be seen, and, even now, owing to recent welcome acquisitions to the playing strength from the traffic side, the team is still experimental.

The first match was played on Sept. 24, against a Kingston team known as Beverley, and was lost by 3 goals to 2.

The league tournament opened on Oct. 1, when Nathismus were entertained, and a spirited and fluctuating game resulted in a win for the visitors by 4 goals to 3. Nathismus undoubtedly played the prettier football and deserved to win, but the winners were the first to admit that they were indeed lucky to get away with two points. The L.T.S. quickly registered two good goals and held the lead until nearly half-time, when a long shot was allowed to escape the grasp of the home goalkeeper.

The last and winning goal was the result of a penalty award for hands. As the incident occurred close on time and was the result of the ball rising unexpectedly from the ground rather than any deliberate action on the part of the player it was unfortunate that the first match should be lost under such circumstances.

On the whole the display was satisfactory, and with one or two places strengthened the team is expected to hold its own in the league competition.

* * * *

London Telephonists' Society.

The first meeting of the London Telephonists' Society for the 1927-28 session was held in the City of London Y.M.C.A., Aldersgate Street, on Friday, Oct. 7.

The earlier part of the evening was devoted to music, vocal and pianoforte, which was provided by members of the staffs of Gerrard and Regent Exchanges, to whom thanks are due for their kindness in thus contributing towards the success of the evening.

The chair was taken by Mr. Hinshelwood, and after his introduction of the new President, Miss James proceeded to read the presidential address.

The interest which such a title as "Notes from My Diary" would naturally arouse, increased as Miss James read, and her references to the gaping shutters of magneto working at "Queen Vic.," and the lists of numbers to be memorised, drew reminiscent sighs of sympathy from many of her hearers, while the information that refreshment clubs occasionally refunded all or part of the weekly subscriptions of their members, gave, to those whose service had not embraced such pleasures, a feeling of infinite sadness. Miss James referred to the rigid adherence to Post Office Rules which was expected of every officer, and pointed out how necessary such training is; how desirable as an aid to thoroughness, and as an invaluable means of self-discipline.

The advantages to be derived from the classes which are arranged, in many cases on exchange premises, in all subjects, were mentioned, and a hope expressed that some of the results might, later in the year, be given in the form of competition papers.

At the conclusion of the address great enthusiasm was shown by all, and further reminiscences were added by many.

The meeting was then closed with an expression of appreciation to Miss James for a very pleasant and interesting evening.

* * * *

Victoria Exchange.

On May 31 and June 1 respectively, the staff of Victoria Exchange helped with a Bazaar held in Westminster Hospital in aid of funds for the hospital. The Victoria staff were responsible for the sweets and chocolate stall, and at the conclusion of the Bazaar they very proudly handed over to the hospital authorities the sum of one hundred guineas.

Everyone was delighted with the result, and our efforts were much appreciated by the matron and nursing staff.

We have since been very gratified to learn that Miss Butler, "in recognition of valuable services rendered," has been elected an Honorary Life Governor of the Hospital.

* * * *

L.T.S. Swimming Association.

The results of the Annual Gala held on Oct. 14 will be included in next month's notes.

THE

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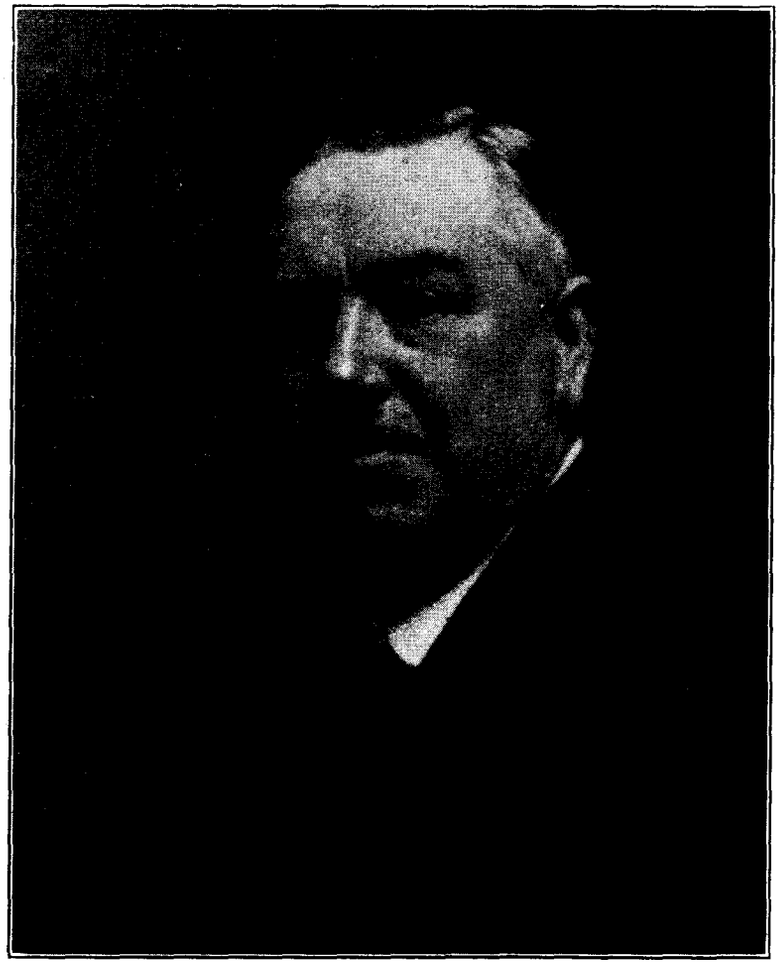
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XLVII.

MR. J. R. M. ELLIOTT.



MR. J. R. M. ELLIOTT, Superintending Engineer for the Northern District of England, was born on Aug. 9, 1869, and, as may be inferred from his name, is of North Country stock. He entered the Post Office Service at Newcastle-on-Tyne as a Telegraphist in May, 1885, and transferred to the Engineering Department as a Relay Clerk in December, 1891. In 1896 he came to the Engineer-in-Chief's Office as an Engineer, Second Class, and he remained in London for nearly thirteen years, rising in the interval to the position of Technical Officer. In April, 1909 he went back to Newcastle-on-Tyne as Assistant Superintending Engineer, and three years later, on the retirement of Mr. Robb, he became the Superintending Engineer of the district.

Although Mr. Elliott left Headquarters over eighteen years ago, he is still remembered there as a telegraph technician of a high order. The Wheatstone system, which he did much to develop, has in the course of time been largely superseded by other systems, but in its day it was the mainstay of British telegraph practice. Mr. Elliott, like most Post Office engineers, has more to do nowadays with the telephone system than with the telegraph system, but the condition of the telephone plant in the Northern District is evidence that Mr. Elliott's technical abilities are by no means confined to the older service.

ROUTINE TESTING—AND WHY WE DO IT.

BY G. PYBUS (*Headquarters Traffic Section*).

INFALLIBILITY, unfortunately, is an attribute only of the gods. In common with all things human, telephone plant and apparatus, no matter how carefully handled and attended to, are liable to failures which sometimes have consequences totally out of proportion to the importance of the piece of apparatus involved. Happily, however, the better the condition in which the apparatus generally is kept, and the more attention that is paid to the detection of incipient faults and weaknesses, in a like degree is the liability of failure reduced. With telephone apparatus it can, perhaps, safely be said that "Prevention is better than cure," and it is mainly with this object in view that systematic routine testing is undertaken in exchanges.

There is, however, another reason for making these tests, which is the compilation of statistics bearing on the fault liability of exchange apparatus and plant. From the exchange and engineering fault reports, summaries are prepared, the substance of which eventually reaches the Engineer-in-Chief's Headquarters staff, and there, by careful scrutiny and comparisons, attention is broadly directed by reason of the high proportion of faults to possible sources of weakness in, say, a type of apparatus. As the knowledge of where the trouble lies is usually half the battle towards its rectification, this information is of the utmost value as by following the clues supplied initially by the routine tests the exact location of the trouble can be determined, and this is followed, in due course, by an improvement in the design of the guilty apparatus, if such is possible.

Faults are bound to occur in even the best regulated exchanges no matter what care and attention is given. It should not be assumed that the finding of a large number of faults during routine tests is evidence of poor exchange maintenance, as such a state of affairs is usually and normally accompanied by few faults being found outside the periods of testing. It will be appreciated that most of the faults which are discovered outside the testing periods are brought to light owing to trouble having been experienced by subscribers and, therefore, the more faults that are found during the routine tests the better it is for all concerned.

As readers of this *Journal* are no doubt aware, routine testing in exchanges is mainly performed by the traffic staff under the guidance—although this may possibly be invisible to the casual observer—of the engineering staff. In the little game of "Telephony" as played under modern rules, the dividing line which separates engineering work from traffic work is sometimes remarkably elusive, and the case of routine testing is perhaps one of the best examples of this.

Recently, the methods of conducting and reporting routine tests have been remodelled and the new system, which came into operation on Oct. 1 last, is now generally in force throughout the country. Under the revised system all tests have been allocated "Test Code Numbers," co-ordination has been achieved between the traffic and engineering branches, and any tendency to the overlapping of work—if such existed—has been eliminated.

Routine tests may now be divided under two main classes, i.e. :—

(1) Those reported on a routine test form which are treated throughout as routine test fault reports ; and

(2) Those reported on other forms which are—although found during a routine test—treated as non-routine or ordinary faults.

Broadly speaking, the motive underlying this classification is to separate those faults which are peculiar to a particular subscriber's or junction circuit from those which are found on what may be termed "common" plant. Discerning readers may hesitate to accept this broad classification, and may possibly instance the fact that calling signals are definitely associated with a certain subscriber but yet are due to be reported on a routine test form. This departure from the general principle is explained by the fact that the apparatus involved in this case, although not "common" is practically similar in exchanges of a like type, and the inclusion of any faults found in the routine test summaries permits of a review of this type of apparatus being obtained. Reasons for other departures will, no doubt, be readily deduced.

Most faults found under class (2) are later entered on the fault cards of the subscriber or junction, and, so far as this brief survey is concerned, cease to interest from this point. Those found under class (1) however, have an effect for a long time afterwards, and although they only interest the exchange until the faults are cleared their influence is ultimately felt throughout the service, owing to the pressure they help to exert through the study of the summaries in which they are included.

As regards the use of Test Code numbers, these, in addition to simplifying the form in which summaries are prepared, assist in reducing the amount of descriptive matter which requires to be passed by an exchange when the results of routine tests are reported elsewhere.

Another little point which—particularly to the traffic staff—may have attracted attention, but may not be clear, is the significance of the last four words of the phrase *Positions or sections tested—or to be tested*, which appear on the routine test form. The form is designed for the joint use of both traffic and engineering staffs, and it is when the form is used by the latter and issued as a guide for certain work to be done that the words referred to are used. The issuing officer in such cases is issuing an instruction for certain defined work to be carried out and the form, in these circumstances, is not a record of work done—until after its completion—as is the case when the form is used by the traffic staff.

As time passes and the exact value of the different routine tests now being made becomes apparent such alterations as are found necessary will be made. Certain tests may possibly be omitted or the periodicity altered to meet changed conditions and so, as with all things telephonic, routine testing will keep abreast of the times.

TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

AT the second meeting of the season on Monday, Nov. 21, at the Institution of Electrical Engineers, Sir Henry Bunbury, K.C.B., the Comptroller and Accountant-General of the Post Office, read to an interested and representative audience a paper on Telegraph and Telephone Finance, a subject on which, of course, he is an authority. The paper gave rise to plenty of discussion, which largely resolved itself into a thirst for further information on the part of his critics. Sir Henry replied to these Rosa Dartles at considerable length, leaving but few queries unanswered.

We hope to reproduce his paper in full in our next issue.

AUTOMATIC TELEPHONY.

BY C. W. BROWN.

VIII.—(*Continued from page* 32.)

It will be appreciated that the selected scheme will be influenced by the size of the junction group between the manual and automatic exchanges. It will obviously reduce the amount of B equipment necessary at the automatic exchange if direct sending is provided at manual exchanges having a large number of junctions to an automatic exchange, but other factors operate also, such as space,

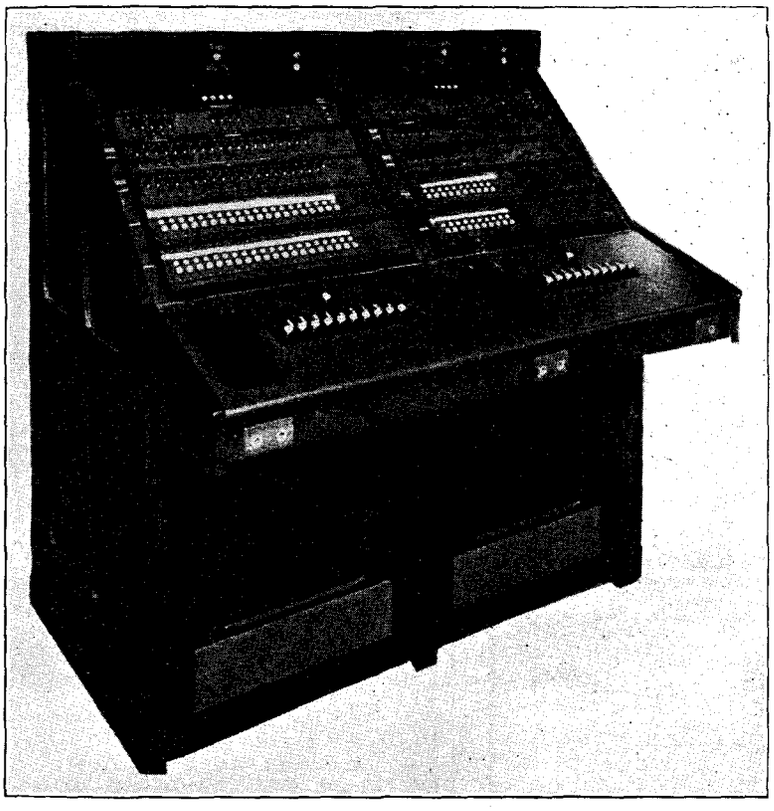


FIG. 8.

the number of automatic exchanges to which large groups of junctions exist, &c., while it must not be overlooked that B positions will always be available at the automatic exchange. Key sending and not dial sending would, of course, be provided at manual exchanges when necessary.

The B positions provided at automatic exchanges are of special type, as will be seen from Figs. 8, 9 and 10.

The absence of a multiple on the positions makes plugs and cords unnecessary. As a result, negative supervision is given. Each junction—there is accommodation for 50—has an assignment key, combined disconnection and order wire emergency key and a junction lamp. The positions each have accommodation for five order wires led through keys for use in conjunction with the junction order wire emergency key, for replacing faulty order wires. The junction lamp glows continuously while a call is in progress, the darkened condition indicating that it is free. Facilities are

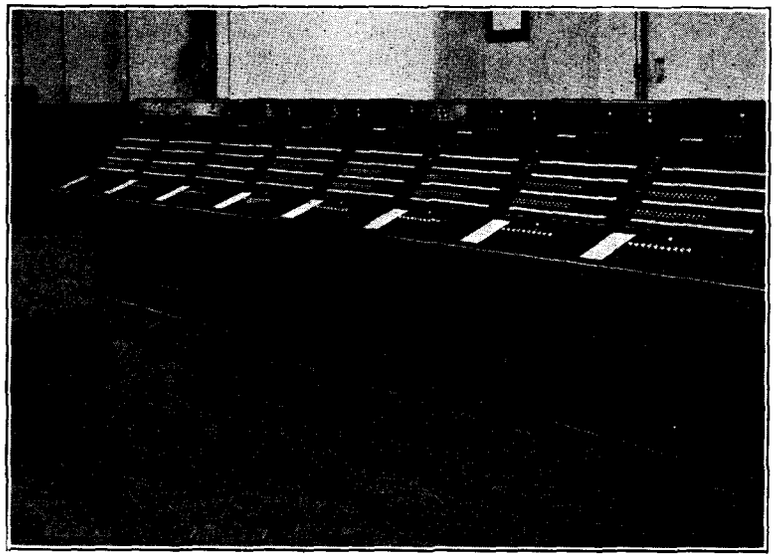


FIG. 9.

provided for cancelling a faulty "set up" by the operator both when it occurs during the setting up or after the last digit has been keyed. Impulses pass out to the associated selector only when the full number of digits has been keyed and the distant A operator has taken the junction concerned. If either of these operations are delayed, the apparatus that has been operated and held is automatically released, a few seconds' grace only being given.

Should an A operator take up a wrong junction, a distinctive "flicker" signal is received on the junction lamp of the circuit taken, thus the B operator is informed of the condition. The flicker signal is also given if the available sending equipment is engaged when an assignment key is depressed. The senders are usually in groups, and a given number of positions have access to the group; each position has simultaneous access to a number of senders, in the case of London, four; when the four channels are engaged, the fact is advised to the operator by means of lamp signals. During keying by the B operator, the position is guarded by means of a tone, so that A operators will not pass requests while the B operator is engaged in keying a call, thereby eliminating the risk of confusion and the possibility of wrong keying.

FIG. 10.

"Cordless B" or "key sending B" working is the expression used in connection with the foregoing method of operating, and Fig. 11 shows the disposition of the main items of equipment.

Tandem switching.

The routing of traffic will fall into two categories: (*a*) that routed over direct junction routes, and (*b*) that routed over indirect junction routes. The former has been substantially described already. The latter is met by the provision of Tandem centres, from which small groups of junctions radiate to the exchanges concerned, junctions being provided between the tandem centres for cross area traffic. In London, at the outset, one tandem centre only is provided having small junction groups to all exchanges in the fee area. The scheme will be seen from Fig. 12, which is a representative diagram of a Director area such as London. The whole of the junctions outgoing from Tandem are located on the banks of selectors, the junctions incoming being connected to selectors. Those selectors that are reached by automatic exchanges are clearly tandem selectors, being situated between code selectors at the originating exchange and numerical selectors at the called exchange. On calls from automatic exchanges and manual exchanges they are situated between code selectors and the call indicator equipment. To cater for manual to automatic traffic, the junctions from the manual exchanges are terminated on selectors, teed into special B positions in a manner similar to the arrangement for manual to automatic direct working. The tandem operator, however, has facilities for sending codes as well as digits, the sender equipment being arranged to function as a translator as well as having "coding" facilities for calls destined for manual exchanges.

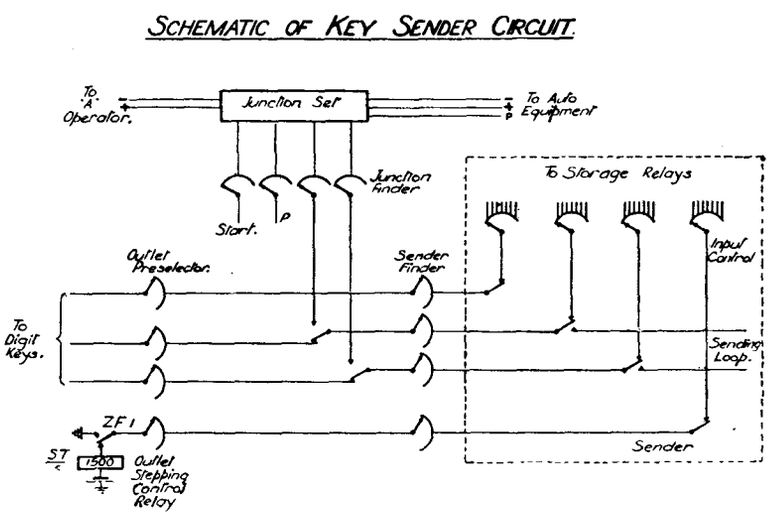


FIG. 11.

The tandem exchange is thus virtually divided, fully automatic traffic being handled mechanically while traffic between manual

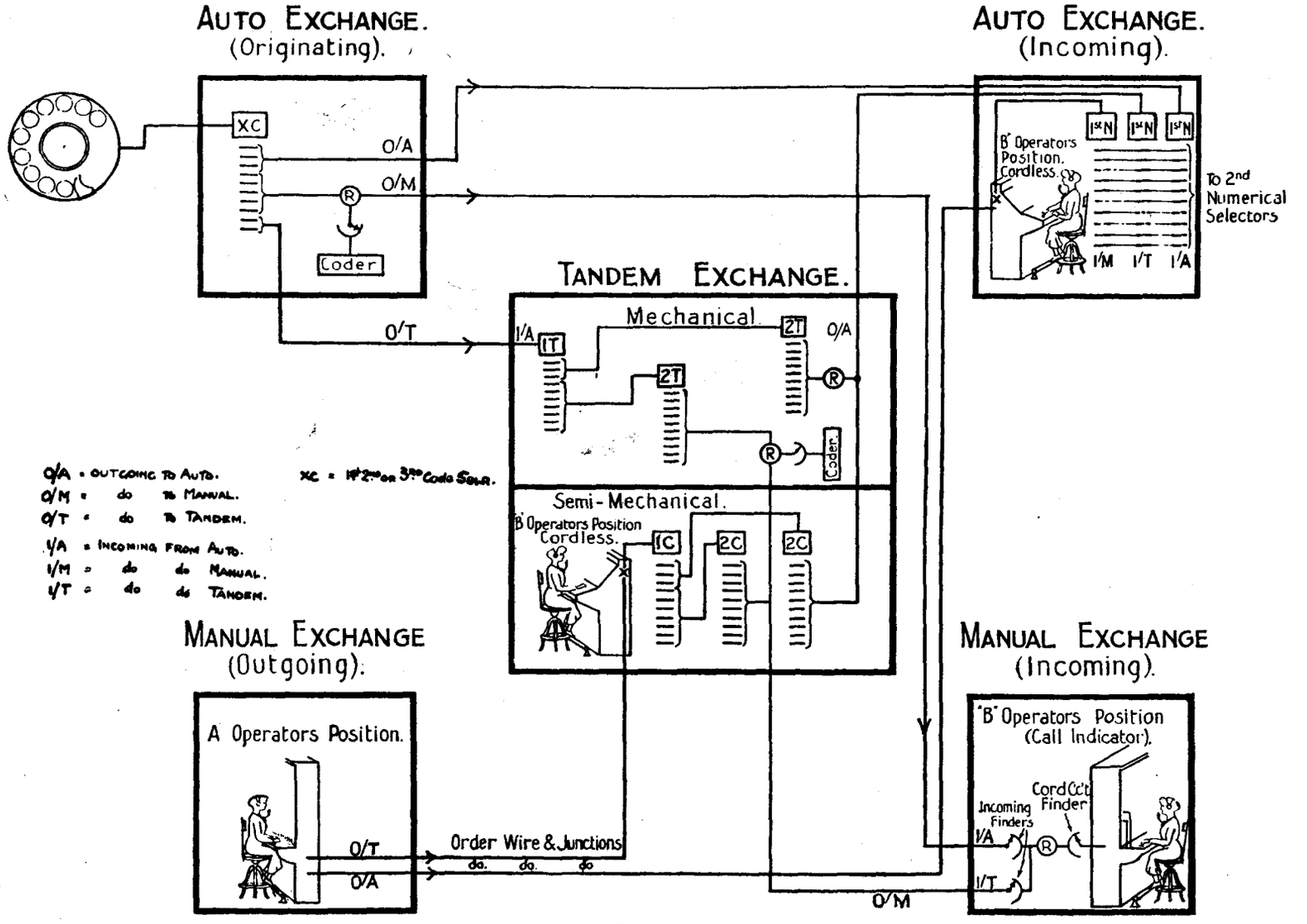


FIG. 12.

and automatic exchanges and between manual exchanges is manually and mechanically handled. The junction groups from the tandem exchange are jointly used for both classes of traffic. The expressions "mechanical tandem" (M.T.) and "semi-mechanical tandem" (S.M.T.) are frequently used to identify the separate portions.

Manual to manual traffic.

A reference to the figure will make clear that this class of traffic, when handled via tandem, is routed to call indicator positions at the incoming manual exchange. It has been stated that this facility will enable the concentration of all traffic to a few positions during slack periods, thus enabling the closing down of direct junction routes, with a consequent economy without loss of efficiency.

It will be appreciated that as the conversion from manual to automatic working progresses, the call indicator equipment will be thrown out of use and the traffic via S.M.T. will gradually reduce as full mechanical tandem working increases.

In concluding these articles on "Automatic Telephony," the writer would point out that many other facilities than those described are provided in a modern automatic telephone system, amongst which are fault testing, dial testing, trunk offering, service observation, fault alarm schemes and routine testing. With the exception of trunking and grading, the main items have been covered, however. To those who wish to delve into the latter phase, many excellent publications exist, notably the professional papers of the Institution of P.O. Electrical Engineers.

(*Conclusion.*)

NOTICE.

In consequence of the great demand for numbers of the *Journal* containing instalments of this article, most of the issues from April last are out of print. The *Editor* will be glad, therefore, if any agents who may hold unsold copies of those issues will return them to him.

REVIEWS.

"*Television for the Home.*" *By Ronald F. Tiltman, F.R.S.A., A.Rad.A., with an introduction by Professor A. M. Low, D.Sc.* (*Hutchinson & Co., Ltd., London.*)

This little book makes no pretence to be a guide to the investigator or even to the technical student. The author states that his aim has been "to give a popular outline of Television for the ordinary man or woman" who may be interested in the subject of the televisor, the telenoctovisor, and last, but not least, in the history and successful struggles of the British inventor, Mr. G. L. Baird.

In these objects Mr. Tiltman has certainly succeeded. Every line of the hundred odd pages, with its excellent illustrations and clear type, is of intense interest, while no Service library is likely to regret the half-crown spent on the purchase of a copy. One must, however, be permitted to suggest that the title chosen for what is really a *history* of Television is hardly the most apt, seeing that only two out of the ten chapters deal with the *home* side of the matter. "Image," on page 68, should evidently read "imagine," and, with other little slips, will no doubt be corrected in any future edition. On page 25 the following phrase appears "so Conservative an office as the Post Office," and is surely not intended to convey the impression of political bias on the part of St. Martin's-le-Grand!

J. J. T.

"*B.B.C. Handbook,* 1928." (*Price 2s. net.*)

We have received an advance copy of this handbook, which deals with the many problems of broadcasting in all its aspects. The genesis of the scheme in this country and its rapid development are described and the probable future lines of growth are forecast. A general description of the proposed regional system is given in some detail with all the pros and cons. The only complaint we have to make about the book is that it is too full of "meat."

"*The Earth and the Stars.*" *By Charles G. Abbot.* (*Published by Chapman & Hall, Ltd., 11, Henrietta Street, W.C.2. 264 pp. Price 15s. net.*)

The present year has witnessed a great increase in popular interest in astronomical matters owing to the bicentenary of the death of Sir Isaac Newton, which occurred in March, the total solar eclipse in June, and the transit of Mercury across the sun's disc last month. The need has accordingly been felt for a good non-technical account of the present position of astronomical science, and this want has been very well met by the volume under review.

The author is an expert in his subject, being the Director of the Smithsonian Astrophysical Observatory, but, unlike so many experts, he has in addition to a deep knowledge of his subject the ability to impart it in a helpful and interesting manner.

In the first chapter a general review is given of the heavenly bodies which are within reach of naked eye observation.

The second chapter is devoted to an account of the famous men who have advanced our knowledge of the Universe, from the time of the Greeks to the present day, and of the instruments which have been and are now employed.

The third chapter deals briefly with modern atomic theory in its applications to astrophysics, and with spectrum analysis.

The fourth chapter deals with the earth, considered as a heavenly body, and with its neighbour the moon. In the next chapter the story of the solar system is continued, embracing the remaining planets, the comets, and meteorites.

The sixth chapter is devoted to the dimensions and composition of the sun, and the seventh to the sunspots and other curious phenomena which appear from time to time on its surface, and to the effect of sunspots on the electrical state of the earth. This chapter concludes with an account of solar eclipses.

The following chapter deals with the energy radiated from the sun, and its relation to life on the surface of the earth.

The next chapter is devoted to those applications of astronomy in our everyday life which concern the keeping of the calendar and navigation.

In the tenth chapter is given a delightful account of the principal constellations, in which the brighter stars have been arranged with the mythological stories connected with them.

The eleventh chapter is devoted to a more serious description of the stellar universe, with an account of the distribution and structure of the stars as revealed by modern research. The following chapter deals with the distances, sizes and motions of the stars, and the next one with new stars, variable stars, star clusters and nebulae. In the final chapter is given an account of the various theories which have been advanced to explain the origin of the Universe.

An appendix contains a note on the total solar eclipse of Jan. 24, 1925, an account of the tides, tables giving data of the solar system and of the principal stars, a list of the constellations, and a useful glossary of astronomical terms.

The book is very fully illustrated, the illustrations including many beautiful photographs of star clusters and nebulae, and we can thoroughly recommend it to all who wish to have a very readable and at the same time authoritative and up-to-date account of the fascinating science with which it deals.

TELEGRAPHIC MEMORABILIA.

ALASKA.—The centre of the earthquake recorded on seismographs on Oct. 24 was, apparently, in the Pacific Ocean, but Alaska suffered a shaking. A telegraph submarine cable was broken in two places—near Wrangell, 50 miles from Petersburg, and between Juneau and Skagway.

AUSTRALIA.—There has been quite an abnormal quantity of happenings of late—in the Australian Press, at any rate—regarding both cables and radio matters, making it a very difficult matter to select the most interesting items without mangling such by condensation or resorting to, perhaps, the lesser evil of omitting information altogether. To take two non-debatable paragraphs first :—

The *Electrical Engineer of Australia and New Zealand*, in commenting on the creation by the Commonwealth Government of a separate branch of the Postmaster-General's Department to deal with wireless activities, shows that up to the present the wireless business of the Department has been controlled, together with the telegraph service, by one branch, under Mr. J. Malone, Chief Manager of Telegraphs and Wireless. Under the new arrangement a new office is being created (that of Chief Inspector, Wireless Branch) with a salary of from £720 to £792 a year, and the wireless staff will be separated from the telegraph branch and placed under the supervision of the new officer.

Australian statistics for the year ended June last show, says the Melbourne correspondent of the *Daily Telegraph*, that the number of words carried in both directions reached the total of 27,670,000, of which the Pacific Cable Board handled 11,960,000 and the Eastern Telegraph Co. 15,710,000 words. Of the international traffic originating and terminating in Australia, the United Kingdom was responsible for 12,000,000 words, the United States for 2,700,000, and other countries for 4,800,000. The figures for New Zealand and the Pacific Islands were 5,900,000, and for messages in transit, mainly from New Zealand through the Eastern Company, 2,300,000. A feature is the fact that the international cable traffic was actually higher than in the previous year, despite three months of "beam" competition. According to the present traffic returns, as quoted by the *Daily Telegraph*, the "beam" system is carrying about 60% of the total United Kingdom business, the proportion being less for full-rate messages and higher for the cheaper classes of traffic. The Commonwealth terminal charges are stated to have amounted to £217,000 last year.

Arrangements have been made by the Associated Radio Company to erect a short-wave broadcasting station as an adjunct to the Melbourne station, 3AR, which will use a wave of 55 metres. The power to be used at the outset will be 250 watts.

According to *World Radio*, the Commission has recommended, *inter alia*, that the control of broadcasting remain in the hands of the Postmaster-General as at present, subject to administration by a committee comprising the Director of Postal Services as chairman, an officer of the Wireless Services (presumably a Government servant) and a "Broadcasting Officer" (presumably appointed from one of the broadcasting stations). Re-allocation of wave-lengths between the present bands and the location of all existing stations to be reviewed, B-class stations (which receive no revenue from the licence fees) to be limited in power; that no fee be charged for the licence of a blind person; that definite wave-bands be allotted to amateurs; that radio traders be compelled to keep a register of the names of all persons who purchase complete receiving sets, to be available for inspection by radio inspectors; that the charges for performing rights on copyright music be reduced to 4*d.* per item (instead of about 1*s.* 10*d.*), of 5% of the gross revenue of the station, no limit being placed upon the number of items broadcast; and that the patent rights charged by Amalgamated Wireless (Australasia), Ltd. (holder of Marconi patents), be reduced from 5*s.* per listener's licence to 2*s.* (this charge is collected from the broadcasting stations at present).

That in States where there are more than one A-class station steps should be taken to ensure that they will not broadcast news matter, including sporting news, simultaneously; A-class stations are also recommended to provide announcers who are proficient in the correct use and pronunciation of the English language. That stations be called upon to include advanced educational matter in their programmes. Further, that the Commonwealth Government re-acquire all land and coastal stations and that an Inter-Departmental Committee should co-ordinate various wireless services from the point of view of defence. The Commission finds that the public has little to complain of in the programmes broadcast; it recommends that the stations in sparsely-populated States like Tasmania and West Australia should receive a subsidy of £5,000 a year each from the revenue of the stations in the States like Victoria and New South Wales.

Reuter's Canberra representative states that in the House of Representatives in connexion with the proposed fresh agreement with Amalgamated Wireless (Australia), Ltd., Mr. S. M. Bruce, Prime Minister, said a problem which might arise in the future was the rival merits of the wireless and cable services; probably the cables were essential to defence, and were necessary as an auxiliary to the wireless services. The co-ordination of these methods of communication might have to be faced, and it might be suggested that co-ordination would be difficult to effect if the success of the "beam" system proved phenomenal; the Commonwealth would not allow such a position to arise. The Company, he announced, had agreed to pay terminal charges from March 28, 1926, the amount due being approximately £25,000. On the basis of nine million words per annum, the Company would pay approximately £45,000. The Commonwealth had agreed to make a contribution of £45,000 a year for the maintenance of coastal stations in exchange for the terminal rates, the Company agreeing to pay the Commonwealth 30% of the revenue from the stations. The average losses of the stations for the five years of Government control had been £34,000.

The third broadcast to the Empire from Australia on Oct. 30 was much more successful than the second, a fortnight previously, which had to be abandoned owing to the bad atmospheric conditions. A special programme was transmitted by 2FC, the Sydney station, on a short wavelength, and was picked up at the B.B.C. listening post at Keston, and re-broadcast from 2LO, 5XX and 5GB, whence it could be heard by listeners throughout the country. As the time, "Four o'clock, Monday morning, at Sydney" (Oct. 31) was being announced, clocks could be heard striking 6 p.m. (Oct. 30, Sunday) in England. Much of the programme was heard with ease.

CANADA.—The *T. & T. Age* states that Mr. W. D. Robb, vice-president of the telegraph service of the Canadian National Railways, and Mr. W. G. Barber, ganeral manager, Canadian National Telegraph Service, visited the Maritime Provinces recently to inspect the telegraph lines along the railway, with a view to the acquisition of those east of Moncton, over which the Western Union Telegraph Co. operates commercial business. In 1924 the Canadian National took over the Western Union Co.'s lines in British Columbia, and the taking over of the lines in the Maritime Provinces has been under consideration since. Western Union Telegraph Co.'s officials from the United States also visited the Maritime Provinces recently in connexion with the matter.

GREAT BRITAIN.—The *Board of Trade Journal* says that a special feature of the London Section of the British Industries Fair, 1928, will be the wireless section, in which upwards of fifty representative manufacturing firms are to present an exhibit larger in size and more representative in scope than the wireless section at any previous British Industries Fair. It will be one of the largest and most comprehensive displays of the British wireless trade which will have been seen in this country. The great strides which the industry has made since 1923, the year of its inception, will be effectively shown. Overseas buyers interested in this section should pay special attention to the exhibits of the latest type of portable wireless set; of special valves adapted to work from alternating current mains; screened grid valves and gramophone pick-ups.

The fourth Manchester Wireless Exhibition, which was held at the end of October, too late to report upon in our last month's issue, was a distinct success. There were over one hundred stands showing the very latest products of the chief radio factories.

Loud-speakers of every conceivable style, most of them of exceptionally artistic design, were well to the fore. The running of radio receivers from the electricity supply was also well in evidence.

The following statement has been issued by the board: "The attention of the Marconi Company has been called to reports to the effect that the company has come to an arrangement with the cable companies or is discussing such an arrangement, and that the opposition to the company's petition for the Court's approval of its capital reduction scheme has been withdrawn. In view of the extent to which these rumours have been circulated, the company thinks it necessary to state that there is no foundation for either of them."

The company's capital reduction scheme petition was down for hearing on Monday, Nov. 7, and the proceedings, after occupying several days, before Mr. Justice Eve's court in the Chancery Division, resulted in a verdict in favour of the company, which is thus authorised to write down the £1 issued ordinary shares to ten shillings.

During the proceedings it was stated by Mr. Nordon a solicitor, that the capital in the Television Company was £600,000, and that that company gave Mr. Baird £150,000 for his patents.

The first programme experimentally broadcast by the B.B.C. from Great Britain to its colonies and dependencies took place from the Royal Albert Hall, London, in connexion with the Armistice Day Remembrance Festival.

The transmission was arranged to take place from 8 to 10 p.m., G.m.t., through 5XX for the British Isles and Europe, and through 5SW (the new experimental short-wave transmitter at Chelmsford) for the Dominions and Colonies overseas, which works on 24 metres with a power of 20 kw. The programme was relayed throughout the broadcasting systems of the Dominions, using 5SW as the inter-Continental link.

According to the *Sunday Express*, the following were a few of the registered and representative results of the broadcast which, considering the immense difficulties to be overcome, cannot be called unsatisfactory :—

Ottawa.—The broadcast of the Albert Hall concert was a great success. Transmission arrangements were so excellent that wireless amateurs with only crystal sets were able to follow the programme clearly.

Montreal.—The Albert Hall programme gave great pleasure to listeners in Montreal and district.

Toronto.—"Lead, Kindly Light" and "Abide With Me" were the best heard parts of the programme.

Cairo.—Thunderstorms interfered somewhat with reception, but many individuals report excellent reception.

Ceylon.—Cheering as the Prince of Wales entered the Albert Hall could be heard plainly, but atmospherics then unfortunately caused interference.

Melbourne.—Listeners were disappointed because the Prince of Wales' speech was inaudible.

Bombay.—Fair to strong signals were re-broadcast by the secretary of the Wireless Club, and speeches could be followed, although fading occurred.

Nairobi (Kenya Colony).—Snatches of the songs were heard and followed eagerly.

The following, however, is a report furnished by the B.B.C. to the *Daily Telegraph* of all three broadcasts :—

"Australia reported a good and clear reception of one of the three broadcasts, namely, the mid-day organ recital, and the message of greeting from the B.B.C. From New Zealand and South Africa there was no definite information, and it may be assumed that reception was unsatisfactory. In Canada there was a very successful re-broadcast of the speech by the Prince of Wales and other items in the evening programme. India did not even hear the carrier wave. Buenos Aires received the Prince's speech clearly, but Lagos reported that speech was received badly and that the music was only passable."

A propos of this subject the Wireless Correspondent of the same journal recently wrote to that newspaper apparently regarding an interview he had obtained with Captain Eckersley on the latter's return from the Radio Conference at Washington, in which the Captain explained that during his visit to America he had been in close touch with Dr. A. N. Goldsmith, of the Radio Corporation of America. He, Captain Eckersley, found that the B.B.C.'s view that radio engineers could not at present give a minimum guarantee of efficiency for an Empire service was entirely supported by Dr. Goldsmith. He had arranged that the B.B.C. should continue the experiments which had been carried on for the past four years with America in transatlantic reception. The Chief Engineer of the B.B.C. also told the *Telegraph* correspondent that he could visualise "the time when a giant station somewhere in the heart of England would direct beam transmissions to South Africa, Canada, India, and Australia. Spaced aerial systems, covering perhaps miles of territory, would pick up these beam broadcasts in all parts of the Dominions for relaying to listeners through the local stations. The beam, he told me, had shown how to a great extent atmospherics could be conquered. Fading, the other great trouble with long-distance reception, was being tackled by the spaced aerial system—a number of receiving stations spread over a given area taking the same broadcast and combining the result."

HOLLAND.—It is reported by *World Radio* that at the annual meeting of the Netherlands Union for Radio Dealers it was stated that in 1923 the total value of wireless sets of all kinds imported into Holland was 250,000 guilders, or about £20,000. The increase in the last few years has been so great that in the first nine months of 1927 the value of the imports was just over six million guilders (£500,000).

It is reported, says *The Electrical Review*, that the new transmitting station at Huizen, which has been built by the Protestant and Catholic Radio Group, was to be inaugurated on Oct. 22. It will use a wavelength of 1,840 metres. It would be interesting to know if they have yet been heard "on the air."

The Philips Co.'s short-wave experimental transmitting station, PCJJ, is being removed from Eindhoven to Hilversum, and, in consequence, the transmissions will be interrupted for about six weeks whilst the transmitter is dismantled and reinstalled at the new station. The last transmission from Eindhoven was to have taken place on Oct. 18. Later advices, however, state that: "Owing to unforeseen circumstances the transference of the Edinhoven short-wave transmitter (PCJJ) to Hilversum has been delayed," but judging from the terms of the communication the transfer should become effective before the end of the present year.

INDIA.—An interesting illustration of the value of wired-wireless in countries where telegraph lines have to pass over rough and exposed country and are liable to develop faults through exposure to strong winds and storms, comes from India and is reported upon by the *Times of India*. The Central Telegraph Office is at Bombay, as our readers are aware, and the "beam" wireless transmitting station at Kirkee, Poona, signals between the two stations being conveyed over the telegraph lines by means of wired-wireless. On Sept. 14, according to the newspaper just mentioned, there was a "very bad breakdown of the trunk telephone between Bombay and Poona, which was not put right till the following morning. While the wires could not be of any service for telephone communication after the breakdown, the 'beam' wireless service, which is also using the Government trunk lines for transmitting messages to Kirkee, experienced no difficulty in putting through hundred of words over the same incapacitated wires. While speech uttered into the telephone mouthpiece could not pass beyond the spot where the break had occurred, *the 'beam' signals jumped over the breach, a very clever adaptation of the latest advances of wireless science to land-line signalling.*"

While there is no doubt that the beam signals could in the circumstances pass over a gap in the broken wires, justice rather demands that the carrier-wave should have the full credit of forming the bridge between the broken ends. May one hasten to add, for the comfort of the sister service, that it was no fault of the telephone signals, as such, that they were unable to get across. For these latter the "bridge" was not available as they had not taken the precaution to travel by that route!

Indian Engineering says that a 250-watt transmitting plant is being erected by the Burma Radio Syndicate which hopes to commence broadcasting before very long.

NEW ZEALAND.—From Wellington Reuter's agency reported that during the 36 hours tests of the English 24-metre station (5SW) reception in New Zealand, at Wellington, was heard from 11.50 p.m. on the Saturday until 2.30 a.m. on Sunday. Until 1 a.m. reception was only on headphones, but afterwards there was fair loud-speaker strength. The broadcast was also clearly heard at Auckland from 4 p.m. (summer time) onwards on Sunday. The gramophone music, organ solo, and announcer's statement regarding the experiments were picked up on 3-valve sets, and came through with remarkable clarity on the loud-speaker, though there was frequently slight fading.

The Church of England authorities in Auckland, alive to the possibilities of broadcasting as a means of disseminating religious teaching, says the London *Daily Mail*, are to establish a station of their own at a heavy cost.

POLAND.—There has recently been held at Warsaw a broadcasting conference, says *World Radio*, with the main object of studying the problem of exchange by landline of the broadcast programmes between the Central European countries, i.e., Poland, Germany, Austria and Czecho-Slovakia. The Conference, which took place in the offices of the Ministry of Posts and lasted three days, was attended by the duly authorised delegates of the respective countries.

The Cracow station's wavelength of 422 metres, it is understood, will be allotted to the new station in Katowitze, and since Oct. 25 it has worked on 500 metres. Katowitze, being a station of 10 kw., had to adopt an exclusive wavelength, while the former could do with a common wave.

According to the Ministry of Posts and Telegraphs, the total number of the listeners registered throughout the country at the end of August was 95,274. A little over 3,000 applications were registered during August, the small number being due to holidays.

The Central Board of Statistics, according to the *Electrical Review*, indicates that "the Polish market consumes 30,000 valves, and about 60,000 lb. of wireless parts per month—all of foreign make. The value of the imported wireless materials amounted this year to nearly £150,000. Two-thirds of this amount covers goods imported from Germany. The above figures, if added to those representing home manufacture, point to their being about 300,000 radio listeners in the country, of whom, so far, only one-third have registered." There is likely to be some hard thinking in the Polish Post Office as a result, is the involuntary comment. Who would deny the value of statistics after this little revelation?

The system will shortly be amplified by the addition of two new transmitters—one in Katowitze, Polish Upper Silesia, and another in Wilno, North-East Poland. The power of the Katowitze station will be 10 kw., and that of Wilno about 5 kw. Thus there will be, says the last-mentioned source of information, five stations, namely, Warsaw, 10 kw.; Cracow, 1.5 kw.; Posen, 1.5 kw.; Katowitze, 10 kw.; and Wilno, about 5 kw. A sixth will be erected in Lvov, South-East Poland, but the chain will not be complete until either the erection of a seventh transmitter somewhere at the Polish sea coast is completed, such as at Gydnia (Polish Baltic port west of Danzig), or by the increase of Posen's 1.5 kw. to 15 kw.

PORTO RICO.—A new direct radio service between the United States and Porto Rico was opened on Oct. 10 by the Radio Corporation of America. The transmitting apparatus at San Juan, P.R., is of the modern short-wave vacuum-valve type, says the *T. & T. Age*, with an average power of 20 kw.

SOUTH AFRICA.—Reuter's Durban correspondent states that Mr. Beardsley, a radio amateur, picked up transmissions during the night of Nov. 1-2 from the new British short-wave station at Chelmsford, 5SW, with which the British Broadcasting Corporation is carrying out experiments, and which will serve as a guide to its future policy with regard to Empire broadcasting. Reception was very clear indeed.

The following items of special interest to readers of these columns are culled from the Annual Financial and Statistical Report on the South African Post Office for the year ending March 31, 1927 :—

The general profit and loss account for the Department as a whole shows that on the revenue side cash receipts amounted to £3,495,519, which, with the value for services rendered to the Imperial Government, and Union and Provincial Government Departments, made up a total revenue of £3,661,454. Expenditure amounted to £2,844,538 for cash payments, interest liability on capital £344,758, interest on value of Government buildings £65,197, liability on Pension Funds £207,970, services rendered by other Departments £126,594, and miscellaneous and depreciation £71,771. There was thus a balance of profit of £626. Last year the balance of profit was £303,097, and the reduction to £626 is due principally to the sacrifice of revenue caused by the reversion to inland penny post.

The cash revenue for the year was: Postal, £1,717,588; telegraphs, £474,210; and telephones, £1,183,114, which, with receipts from Government telegraphs and telephones of £120,607, made a total of £3,495,519. The cash expenditure totalled £2,907,671, the chief items being: Salaries, wages and allowances, £1,957,738; conveyance of mails, £474,779; and maintenance

of telegraphs and telephones, £340,422. These cash figures compare with revenue £1,471,782 and expenditure £1,491,204 in 1911-12 and £3,495,519 and £2,907,671 in 1926-27.

The total number of telegrams was 6,055,679, including 233,326 press telegrams of 30,332,380 words, an increase of 155,000 on the year previous. Cablegrams via the Post Office numbered 263,368, as against 243,150 in 1925-26.

In the Union's Education Departments Technical Examination there were 15 successful candidates for the Preliminary Technical Certificate, out of 53 entries.

For the City and Guild's Examinations 8 passed out of 10 entries for Telephony I, and 14 (one candidate gaining the Silver Medal) out of 21 for Telegraphy, Grade I.

The "teletype" telegraph instrument has been extended during the year to work between Johannesburg and Pietermaritzburg, Johannesburg and Union Buildings, Port Elizabeth and Grahamstown, and Port Elizabeth and Queenstown. The Eastern Telegraph Co. introduced a new apparatus known as a "regenerator," by means of which transmission time between England and South Africa is considerably reduced.

The "carrier current" system is being installed between Johannesburg and Durban, whereby several circuits will be obtained from one pair of wires.

The Service journal of the South African Post, Telegraphs and Telephones gives a very appreciative notice of the British Post Office Secretary's book on "The Post Office" in Great Britain and wonders how with a quarter of a million men and women to look after, Sir Evelyn could manage to find time to compile so huge a mass of material.

SPAIN.—The Spanish Government has annulled by Royal Order the concessions granted to the Radio Iberica Company and Vicente Goyeneche, the owner of "Radio Madrileña," on Oct. 31, 1924, and July 22, 1925, respectively, for broadcasting purposes, on the ground that neither station has broadcast a regular programme since April last, and they have failed, therefore, to comply with the concession. The stations were EAJ6 and EAJ12, and broadcast on 272- and 297-metre wavelengths, says *World Radio*. Thus Madrid is left with only "Union Radio," EAJ7, on 375 metres, and "Radio España" on 400 metres. Radio Iberica will be remembered as the first Spanish broadcasting station.

SWITZERLAND.—Reuter's Berne Agency recently reported that: "In view of the need felt by the League of Nations for the possession of further communication facilities, it is announced that the Board of the Swiss Marconi Company has decided to install a new high-speed radio-telegraph transmitter with an anode power of 50 kilowatts. The range of the installation will be over 3,000 kilometres and the station will be capable, in normal weather, of linking up the headquarters of the League at any moment with any spot in Europe, the Far East, and North Africa. The present transmitters will be reinforced, so that the League will by next summer have at its disposal four high-power transmitting sets, and it will be possible to receive simultaneously from twelve foreign stations. At the same time, the Swiss Marconi Company will have an office permanently open at Geneva from which it will be possible to transmit news directly by wireless telegraphy. The estimated cost of the scheme is 650,000 Swiss francs, which will raise the total expenditure on the Swiss Marconi Company's installations to over 3,000,000 Swiss francs.

U.S.A.—Variations of the transmitter frequency of station WCGU at Sea Gate, Coney Island, U.S.A., are due to the rise and fall of the tides, according to Mr. Richard W. Daniels, chief engineer of the station. Tests with a laboratory oscillator showed, says the *T. & T. Age*, that during ebb tide the wavelength decreased to 210 and a fraction metres and that midway between this and flood tide it decreased from two to four half-kilocycles, thus increasing the wavelength to 214.6 metres, which is more than the wavelength prescribed for the station by the Federal Radio Commission. The aerials of WCGU are 75 ft. from the breakers, which, combined with the fact that the sand, when wet, becomes an excellent conductor of high-frequency current, according to Engineer Daniels, adds capacity to the antenna while reducing its effective height. The operators are obliged constantly to check the wavelength of the station because of this peculiar condition.

Mr. S. W. Goulden, of the Radio Corporation of America, states that a new type of microphone has been tested by WJZ in New York, WGY in Schenectady, and KDKA in Pittsburgh, and proved successful. It is a condenser microphone and is reported to reduce the effect of extraneous noises caused by mechanical vibration at the point where the programme originates.

The gross income for this same Corporation, it may be mentioned, for the quarter ended Sept. 30 was $16,773,091, and the surplus profit was $3,588,989, making the surplus for the first nine months of the year $4,141,355.

The Federal Trade Commission, says the Exchange Agency, will resume its investigation into the alleged monopoly of the principal electric companies and the American Telephone and Telegraph Company and others in New York on Nov. 1.

The companies are charged with the exchange of patents and the results of research and experiments with a view to perpetuating the control of wireless and broadcasting.

The following appears to be one of the side-lines of the American Telephone & Telegraph and the Western Electric Companies of America, who, between them, according to the *Daily Mail*, have installed an artificial larynx which enables him to speak with ease in the throat of Mr. T. Coleman Du Pont, Senator for Delaware, U.S.A. Recently he had an operation involving the removal of his vocal chords, the larynx and part of the tongue and windpipe, but by a device perfected three years ago in the laboratories of the companies mentioned he is still able to talk.

A new system of electrical control has also been demonstrated in New York, by which it is possible for a telephone to turn on electrical machinery at a distance. By this method a housewife, by telephoning her home and using the correct signal, can turn on the electric stove and cook her dinner while she is out shopping.

No telegraphist is likely to envy the lot of a telephonist with this latter contraption as a possible super-position in view. It needs no far flight of imagination to visualise the awful possibilities of a "wrong number" and its sequel, a "wrong dinner" started at a "wrong time"!

The Mackay system, which includes the Postal Telegraph-Commercial Cable Companies, following the decision of the United States Circuit Court of Appeals on Oct. 6, that Dr. Lee De Forest was the original inventor of the radio feed-back circuit and oscillating audion, is to establish short-wave wireless systems across the Pacific Ocean and throughout the United States in about six months; the starting of the land system only awaits the approval of the Federal Radio Commission. The Court of Appeal's decision and the contract held with the Federal Telegraph Co., of California, are accepted by the Mackay Companies as placing them in a position to begin wireless operation without fear of litigation. They will begin the installation of short-wave wireless stations across the Pacific Ocean that will at a "nominal expense," says an American authority, double the capacity of the service to the Orient now provided by cable connecting San Francisco, Honolulu, Midway Islands, Guam, Manila and Shanghai. Radio stations will be erected at all those places and will provide service to Manila by automatic relay; if static interferes with communication between stations in the chain, messages will be relayed by cable. The wireless system will be used to carry deferred, or cheaper, messages, and to supplement the cable at times of heavy traffic.

The Chicago Federation of Labour, which has been experimenting with station WCFL for the past two years, plans a chain of co-operative farmer-labour owned and operated broadcasting stations, says *World Radio*. A representative of WCFL is asking State federations of labour to assess themselves $1 a year per member so that entrance may be made to the radio field on an extensive scale. WCFL is now about to expand and unite with the Iowa Farmers' Union in the erection of a station near Elgin, Ill. The WCFL plant in Chicago cost £40,000, and is now, after a laborious fight, established.

Washington Conference.—The technical sub-committee of the International Radio and Telegraph Conference voted by 10 to 7 to exclude broadcasting from a band between 1,050 and 1,550 metres. Germany, France, Norway, Sweden, Austria, Czecho-Slovakia and the Netherlands strongly opposed the motion, and a subsequent message announced that the sub-committee has reached a compromise whereby all European nations will be permitted for one year to broadcast on wavelengths between 1,550 and 1,340 metres. The sub-committee also adopted an agreement that, notwithstanding the adoption of wavelength band restriction, certain services of each nation shall be privileged to use any wavelength for any purpose so long as such use does not interfere with another service authorised by the allocation agreed upon.

According to the *Daily Telegraph*, it adopted an agreement allocating adopted wavelengths applicable in the future, but does not propose prohibiting or abolishing existing stations. Each nation is to conform to the new allocations as soon as practicable. Great Britain, desiring to keep her bands free for aviation services, voted with the United States, but favoured reservations for European broadcasting on a 1-550- to 1,875-metre band. The delegates of the principal nations at the Conference have agreed to frame the proposed Radio Convention in two sections, one to be signed by nations like the United States, with private communication systems, and the other by nations with Governmental communications. Thus, says the Exchange Telegraph Company, the United States private wireless companies escape international regulation, a point upon which there has been controversy since the Conference opened. The general regulations to which the United States adhere include rules for preventing interference, allocating frequencies and promoting uniformity in mobile services, both for ships and aircraft.

What is described at Washington as an American victory was the recommendation of the Mobile Service Sub-Committee of the Conference that spark radio sets be eliminated from use in ships by 1940. Mr. White, an American delegate, discussing the number of votes to be allowed to each country, advocated one vote for each independent governing nation. This proposal, it was stated, would include the Irish Free State, Canada, Australia, New Zealand, and probably South Africa among the independent nations, but would exclude British India and the Philippines. The proposal, if ratified, would eliminate the suggestion of a British delegate that the vote be "by administration," which it was estimated would give no fewer than 60 votes to the British Empire. Another proposal by a Chinese delegate was

that the vote be according to the volume of traffic, but that was opposed by the Americans on the ground that its enforcement would involve too much technical research.

Later: Reuter states that satisfactory progress was reported in the discussion on the allocation of short wavelengths to various radio services.

An understanding is also reported to have been reached on the allocation of votes to various nations. It is understood that the United States, France, Italy, Japan and Germany would have six votes each and Great Britain eight. This understanding is expected to arouse opposition from some of the smaller Powers, particularly those in South America, which would be allowed only one vote each, despite the fact that they sought larger influence in voting, on the ground of the size of their territories.

It is worthy of note that the interests of the amateur—that very useful individual who has proved so helpful to the development of the use of short-waves—were represented at Washington by Mr. Hiram Maxim. Mr. Maxim is a relation of the famous gun inventor, adds the wireless correspondent of the *Daily Telegraph*, and goes on to say that the opinion in certain quarters at the time of going to press was that a band between 0 and 20 metres might be allotted to the amateurs of the world as there is "much to be investigated in the ultra-short wave region. Mr. Gerald Marcuse, of 2NM, Caterham, whose name has become famous in radio circles, is not, therefore, likely to be compelled to "go out of business."

The American delegation to the Conference set a precedent on Nov. 11 by agreeing at a plenary meeting of the Convention Committee to the inclusion of an unconditional and compulsory arbitration clause in an international treaty binding upon the United States. The delegation voted for compulsory arbitration for the settlement of any international dispute arising from the Convention.

As these lines go off to the impatient "Comp.," we hear by wireless and otherwise that most, if not all, of the various British delegates are homeward-bound.

A meeting of the Institute of Wireless Technology was held at the Engineer's Club, London, on the 8th ult., when Messrs. W. B. Medlam, B.Sc., A.M.I.E.E., and U. A. Oschwald, B.A., presented a paper entitled "A Note on the Performance of Valve Detectors."

The directors of the National Telewriter Co., Ltd., have decided to pay a dividend of 1% on the Preferred ordinary shares.

The City Editor of the *Electrical Review* continues to remark on the "mysterious rise in Great Northern Telegraphs," which apparently "is still the outstanding feature amongst cable stocks and shares. . . ." He comments that Copenhagen professes to be as much in the dark as is London, and cannot account for the movement, and that hints abound as to the buying being for purposes of control.

On the other hand, the same commentator remarks that the Eastern Telegraph group is a heavy holder of this stock, being "manifestly uneasy at the possibilities of wireless competition."

In the cable manufacturing industry in Germany this same note of uncertainty may be heard here and there. For example, Herr G. Zapf, writing in a Cologne newspaper, states that while the home market is at present very well occupied, in the case of submarine cable manufacture, this branch is at present in a state of stagnation owing to the paralysis of the German marine cable policy caused by the war *and* through the conflict of opinion as between cables and radio-telegraphy.

The issue of Nov. 11 of the *Electrical Review* contained an excellent photograph of Lt.-Colonel A. G. Lee, O.B.E., M.C., &c., &c, the distinguished Staff-Engineer-in-Charge of the Radio Section of the G.P.O. Engineering Department.

The *Review* reminds us that the original of the photograph entered the Engineering Department in 1901, serving during the war with the Signal Section of the Royal Engineers, being mentioned in despatches and gaining the M.C. He is at present Lieut.-Colonel, Royal Corps of Signals (Supplementary Reserve). Lt.-Col. Lee received the O.B.E. in June, 1927, for work in connexion with transatlantic telephony. He received the Duddell Premium, 1924-5, for joint authorship of a paper on the Leafield coupled arc. He was British delegate to the Inter-Allied Radio Conference in Paris in 1921. His other activities include membership of various committees of B.E.S.A., B.E.A.I.R.A., and the Radio Research Board. Of the "Atmospherics" Committee of the last-named he is chairman.

The occasion of this biography was the announcement of the delivery of his address before the I. of E.E., the Wireless Section of which he is chairman. The *Electrical Review* has since published a lengthy *résumé* of the address on "Radio Atmospherics" in their issue of Nov. 25.

It is satisfactory to know that the Chloride Electrical Storage Co., Ltd., are taking very special steps to deal with the matter of lead poisoning in connexion with accumulator manufacture the dangers of which are, perhaps, not fully realised by the outside public. The company in question have appointed Dr. R. E. Lane, M.R.C.P., to make a complete study of the disease. The doctor is to devote the whole of his time to the matter.

It is gathered from the terms of the announcement that the results of Dr. Lane's investigations will be made known to the whole of the industry.

I may perhaps be permitted to strike a personal note in expressing my intense satisfaction that the Engineering Department of the G.P.O. has caused a Cook governor (designed by Mr. F. Cook, Overseer, Cable Room, C.T.O) to be made at the Holloway factory, and also to learn that one has been issued for use on a Baudot set working between London and the Continent. The writer was favoured by the inventor with a first sight of this simplified form some twelve months and more ago, and I should be surprised, indeed, if the further prolonged trials did not materialise with a unanimous verdict in its favour. Mr. Cook first worked out his invention mathematically and then made his model accordingly—"with odd bits from his motor-bike," was the comment of his friends—nevertheless, even this first rough effort was successfully proved out.

Writing of inventions, I hear now and again privately of the progress made by the Karolus Siemens apparatus for the transmission of photographs, and the conviction is apparently gaining ground in Germany that there is a widening field for its exploitation in the Radio services.

From the same source the opinion is also expressed that there is much to be done in the way of improving the printing telegraph apparatus for line telegraphy and that this form of apparatus is likely to be standard for a long time to come.

It is with sincerest regret that the death is recorded of Mr. H. W. S. Rentell, A.M.I.E.E., F.Z.S., for over thirty years editor and manager of *Electricity* and managing director of S. Rentell & Co., Ltd., London.

The following promotions in the C.T.O.: to Asst. Superintendent, Messrs. W. G. Godden and E. F. Bing; and to Overseer, Messrs. H. Potter and C. H. Allaway; were duly announced as from an early date in October, and due congratulations are tendered accordingly.

Mr. William Davis, in the Oct. 15 issue of *Supervising*, has written an appreciation of Mr. Charles H. Garland—who has just retired from the Civil Service—with which no one is likely to quarrel, certainly not the esteemed subject of that appreciation. The career of C. H. G., commencing as a C.T.O. telegraphist and terminating his Government service as chief of a Department of the Ministry of Health at Darlington, being decorated in 1926 with the I.S.O., is certainly as unique a record as was his work for the P.O. Sanatorium and that as chairman of the National Sanatorium Association.

Parliament—On Nov. 8, Sir F. Wise asked the Postmaster-General if he would state the number of wireless telephony calls between England and the United States and *vice versa*.

Sir W. MITCHELL-THOMSON said that the figures up to Nov. 6 were as follows: Calls from Great Britain 830, calls from United States 991.

Post Office Relief Fund.—At the October meeting of the C.T.O. Branch the Committee considered reports on scholars benefitting under the Fund. The Committee noted the success of one of the girls who had passed the Matriculation Examination with Honours, obtaining five distinctions and special credit in Oral French. In the Clerical Examination she took the 97th place out of 150 successful candidates and 504 qualified candidates, and has since taken up duty in the Savings Bank Department. Such successes are particularly gratifying to the Committee, and afford striking evidence of the valuable work achieved through the agency of the Fund.

An Abuse of Science.—The invention of a microphone which can be hidden in a vase of flowers and will make lovers' whispers audible outside the conservatory or in the next room is an abuse of science!—The *Frankfurter Zeitung*.

J. J. T.

THE TELEPHONE AND ILLITERATES.

WHEN reporting upon postal and telegraph communication on the Gold Coast, Mr. Ormsby-Gore, Parliamentary Under-Secretary for the Colonies, drew special attention to the fact that one of the advantages of the telephone was that it could be used by illiterates, and on the Gold Coast, where so much wealth is in the hands of illiterate cocoa farmers, its use naturally appeals to them. He was told that in certain cases they had even been willing to guarantee sums up to £120 per annum to cover the usual rental fees in order to get the service. This factor is worthy of the most careful consideration by those firms that are desirous of endeavouring to foster trade abroad.

THE BIRTH OF HOLBORN AUTOMATIC EXCHANGE.

How often has imagination been fired by the story of some sweet, demure maiden sitting in a daisy-decked dell pulling apart the petals of the most perfect specimen she can find, reciting to herself the while with tremulous lips—"He loves me—he loves me not—he loves me!" In like fashion many a romancer of the telephone service was murmuring in hushed tones in the early days of November, "Holborn opens—Holborn opens not—Holborn opens!" The wheel of chance having been skilfully adapted and controlled to operate as a dial granted the magic message: "011,121,2," which, being automatically translated by a director, read, "Holborn opens in the eleventh month at twelve on the twelfth." So far, so good. It was a happy chance that housed London's first automatic exchange in the same building as "Tandem," which, had its naming had the skilful attention lavished on some other exchanges, would surely have been known as "Autolycus"—"the snapper up of unconsidered trifles," for if one ignores the suggestion of the last two syllables it answers well the description of an "Auto-Toll" snapping up and correctly routing the trifles of traffic which do not justify direct circuits. This by way of digression.

Surely Nov. 12 was a veritably inspired date. Had not the octave begun with the pyrotechnic display of the 5th, to be followed by the pageantry of the 9th, succeeded in turn by the solemnity of the 11th and the gaiety of the 12th, whilst the very hour of midnight had a singular appropriateness, for was it not the time at which, under a ruling of the Portland Club, the "valued call" ceased to operate, and "majority calling" was restored to its pride of place—truly prophetic and fully realised on Monday the 14th.

For one very closely interested in the "birth of London's first automatic exchange," it must be reckoned a trifle disconcerting to reach the exchange in a taxi, the dial of which records one sum in order to obtain another. On the other hand, what could be more heartening than to reach the goal quickly and correctly via SEVENDIALS—a happy omen and one which to those who are superstitious (and who is not) would fully justify the new system for London.

Arriving at the building itself one was immediately struck with the atmosphere of complete orderliness and repose as in a house prepared for some very special occasion. The floor of the apparatus room shone as brightly as the faces of the baby's parents—the A.T.M. staff and the P.O. Engineers—whilst the expectant nurses—the Traffic staff—stood ready to minister to the child's wants when its cries became audible. It might have been a "royal" infant, so numerous were the courtiers and press representatives gathered to greet its arrival; and with what intense satisfaction did the news circulate just prior to midnight—"It lives; 'tis a bonny baby," whilst the quoter of apt sayings reminded us that "Saturday's child works hard for its living." There is always a pessimist present on such occasions, and one was heard to repeat Lord North's comment, "They are ringing the bells now; they'll be wringing their hands soon,"—but his remarks were drowned in the showers of congratulations from the general body.

"Let us test our first choices," sounded almost as a chorus in the early hours of the morning, but, possibly owing to the fact that a delegation from Liverpool was staying at an hotel near by, "first choices" came to be confused with "First Avenues."

The child is certainly beautiful to behold and has already developed individuality of its own. It slept peacefully enough all through Sunday, was a little restless on Monday and Tuesday, when rather too many folk were anxious to test its reaction to stimuli, a process that can be overdone, but by Wednesday it was reproducing with really remarkable accuracy long sequences of letters and figures when these were communicated to it slowly and deliberately, as is the proper way when addressing young children. An only child, we are told, lacks much and pines for the company of other children. It is the same with this baby, and there is no doubt that it will go from strength to strength as it gets the benefits of association with its cousins—Bishopsgate, Sloane, Western, and the other members of an ever-growing family.

H. D.

THE WASHINGTON CONFERENCE (II).

THE Washington Radiotelegraph Conference is making as rapid progress as could reasonably be expected of a body representing practically all the countries of the world and comprising more than 400 delegates. It divided itself up into a number of committees: each committee set up sub-committees. Only by this process of diminishing the number of members could conclusions be reached. Unfortunately, however, each decision has to trickle back through a sub-committee, full committee, and a drafting committee before it is finally approved by the full Conference. Hence, while there is much activity and much clanking of official machinery, the final output per day or even per week is somewhat meagre.

There have been few exciting moments. One occurred when the President, Mr. Hoover, asked whether the Conference would be willing, as an act of international friendship, to allow Germany to exercise six votes, although, having lost all her colonies, the number to which she was entitled should have been reduced from six to one. It was made clear that the concession would be limited to the present Conference, and that if any delegation objected the proposal would fall. After a tense silence of about a minute's duration Mr. Hoover declared the motion carried.

One of the committees had to consider the conditions under which amateurs should be allowed to operate experimental transmitting stations and what kind of messages they should be allowed to exchange with amateurs in other countries. There are some 17,000 amateur stations in the United States; and a representative of this powerful body made a long statement from which one gathered that the wireless amateur is the salt of the earth, that he alone is responsible for all the progress made in the wireless art and that his activities are more important than those of the League of Nations in fostering international friendship and binding nation to nation. After a good deal of discussion regulations were made which appeared to be satisfactory to all parties.

Proposals had been made that the question of the counting of code words which had been left over by the Paris Conference, should be dealt with at Washington; but it was decided that a Radiotelegraph Conference would not be competent to deal with this question and could not properly set up a special Telegraph Conference at Washington to deal with it. The present rules of counting will accordingly remain unchanged.

Many alterations have been made in the radiotelegraph regulations; and important decisions have been taken in regard to the allocation of wavelengths to broadcasting and other classes of wireless services.

F. W. P.

DOUBLE X.

THE Foreman passed a "service call" from a public telephone to his Inspector on the question of the use of certain poles. These are described as "lights," "mediums" and "stouts," without the use of the word pole.

Foreman: "There are two double Xs. on them, and 3 Stouts with 3 Xs, and we want the stouts."

Voice of Lady interrupting: "You said this was an official call and you are talking about beer all the time."

REDUCED TELEPHONE CHARGES FOR ANGLO-CONTINENTAL CALLS.

ON Dec. 1 considerable reductions were made in the charges for calls between Great Britain and the Netherlands, Germany, Danzig, Sweden, Norway, and Denmark. As examples we give the day charges between London and—

	New.	Old.		New.	Old.
Amsterdam ...	8/-	10/-	Gothenburg ...	17/3	21/6
Berlin	12/-	16/-	The Hague ...	8/-	10/-
Breslau	14/-	18/-	Hamburg ...	11/3	15/-
Cologne	9/9	13/6	Königsberg ...	15/3	20/-
Copenhagen ...	14/9	18/6	Leipzig	12/-	16/-
Danzig	14/6	19/-	Munich	12/6	16/6
Dresden	12/6	16/6	Oslo	18/6	22/6
Düsseldorf ...	9/3	12/6	Rotterdam ...	8/-	10/-
Frankfort-on-Main	10/6	14/-	Stockholm ...	17/3	21/6

The night charges are roughly three-fifths of the above. On the same date the Anglo-Swedish service was extended to cover the whole of Sweden, and the London—Oslo (Norway) and the London and Copenhagen (Denmark) services extended to cover the whole of Great Britain.

A day call from London to Gellivare (2,300 miles distant) in the Arctic circle costs £1.

THE G.P.O. PLAYERS DRAMATIC SOCIETY IN "R.U.R."

THE G.P.O. Players Dramatic Society are nothing if not enterprising, and are decidedly catholic in their taste. On Oct. 28 and 29, at King George's Hall, they gave their supporters an opportunity of seeing Karel Capek's much-talked-of "Robot" play. This drama, which has the distinction of having added a new word to the language, deals with a solution of the labour problem by a method fraught with tragic consequences. The R.U.R. (or at least its General Manager, played by Mr. Jack Scott) cherishes at one time high ideals. Drudgery is to be abolished, the cost of production of every kind of commodity is to be reduced, and a golden future for humanity is anticipated. But the demands of shareholders for dividends leads to the production of robots in countless quantities. They are much sought after as soldiers by "patriotic" war ministers, and soon the earth is plagued by vast, efficient and unfeeling masses of instruments of slaughter. In all this there is an allegory which is not difficult to read. Ultimately, as the methods of manufacture improve, the robots are endowed with feeling, and soon learn to turn upon the human beings who exploit them, until, as a result, humanity ceases to exist. Mr. Jack Scott, who sustained the heavy part of the General Manager of the company, came off with flying colours in this exacting rôle. Mr. John Cahill (Clerk of Works), the only human being left alive after the revolt, found a part well suited to his finished technique. The staff of the R.U.R. were a triumph of stagecraft. Dr. Gall (Mr. Alfred Doust), Dr. Helman (Mr. Gerald Storr), Fabry (Mr. Eric Hudson) and Berman (Mr. Cyril Leigh), each looked and acted their rôles to the life. Miss Kathleen Emery, as Helena, moving in an atmosphere at first uncanny and afterwards tragic, played this sympathetic character with great effect. Miss Cowan, as the maid, brought a welcome touch of comedy into a play depicting little of the lighter side of life. All the Robots were good, Miss Joan Barrett and Mr. Pilkington successfully enacting a scene indicating the dawn of love and the promise of the perpetuation of race of Robots by the process of nature, which might easily have raised a titter if unskilfully handled. The play was produced by Mr. H. Hodgson Bentley with the care and competence which we have come to expect of him. He received quite an ovation at the end.

W. H. G.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations in the Post Office system at Sept. 30, 1927, was 1,566,960. The new stations added during September numbered 17,713, and the cessations 8,142, resulting in a net increase of 9,571 stations.

The following table shows the number of stations working at Sept. 30 last in London, England and Wales (excluding London), Scotland, and Northern Ireland :—

	No. of Stations at Sept. 30, 1927.
London	553,264
England and Wales (excluding London) ...	849,745
Scotland	144,037
Northern Ireland	19,914

The growth for the month is summarised below :—

	London.	Provinces.
Telephone Stations—		
Total at Sept. 30	553,264	1,013,696
Net increase for month	3,482	6,089
Residence Rate Subscribers—		
Total	122,765	198,954
Net increase	1,285	2,067
Call Office Stations—		
Total	4,956	18,004
Net Increase	25	124
Kiosks —		
Total	653	3,118
Net increase	30	83
Rural Party Line Stations—		
Total	—	10,088
Net increase	—	36
Rural Railway Stations connected with Exchange System—		
Total	—	817
Net increase	—	11

The number of inland trunk calls dealt with during August (the latest statistics available) was 8,518,656—an increase of 1,023,560, or 13.7% compared with August of last year.

Calls made to the Continent during August numbered 24,503, and from the Continent 26,574, representing increases of 16.5% and 12.8% respectively over August, 1926.

Further progress was made during the month of October with the development of the local exchange system. New exchanges opened included the following :—

PROVINCES—Fforestfach, Wakefield, and Sandal (Wakefield) (all automatics),

and among the more important exchanges extended were :—

LONDON—Chiswick, Ealing, Ilford, Ravensbourne (Bromley), and Sydenham.

PROVINCES—Altrincham, Beeston, Berwick-on-Tweed, Brighouse, Brentwood, Castleford, Crosby, Eccles, King's Norton, Minehead, Newport (I. of Wight), Northwich, and Workington.

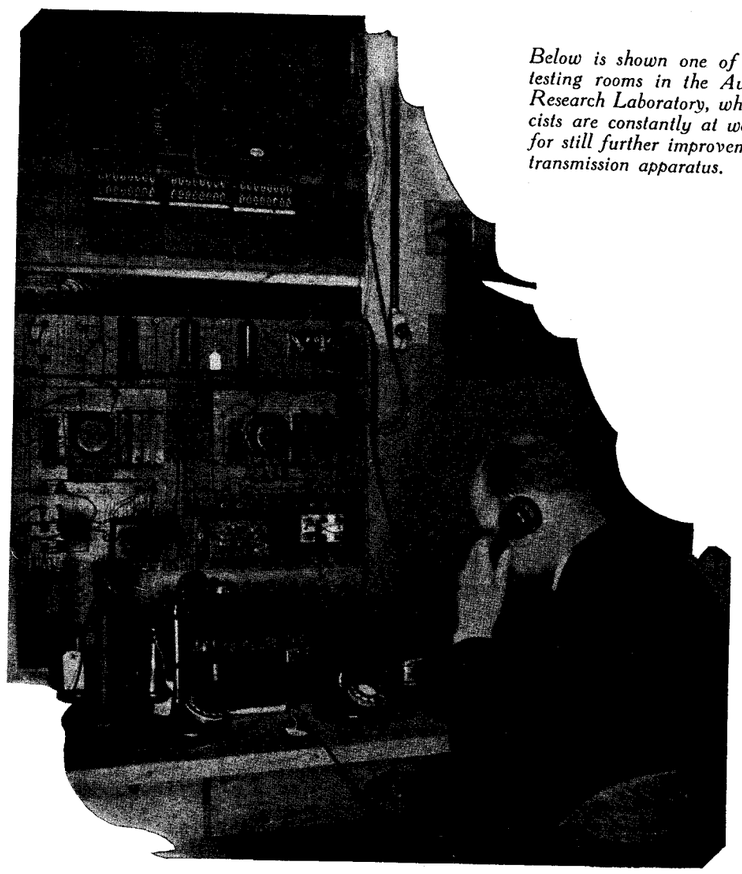
During the month the following additions to the main underground system were completed and brought into use :—

Newbridge—Hengoed.
Risca—Newbridge.
Newport—Cross-Keys,

while 70 new overhead trunk circuits were completed, and 94 additional circuits were provided by means of spare wires in underground cables.

Where Strowger Automatic Leadership Begins—

The Transmission Laboratory.



Below is shown one of the transmission testing rooms in the Automatic Electric Research Laboratory, where expert physicists are constantly at work in the effort for still further improvement in Strowger transmission apparatus.

IN the development of Strowger Automatic Telephone Equipment, the importance of efficient voice transmission has been kept continually in mind. Changes in switching methods that might adversely affect transmission have never been permitted to enter into Strowger Automatic design. The result is that the whole Strowger Automatic transmission circuit in use to-day is remarkable for its simplicity and effectiveness.

The development of transmission equipment to work in harmony with automatic switches, and yet be free of all switching equipment and unnecessary "bridges" once a connection is established, has required years of painstaking experimentation and research.

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STROWGER AUTOMATIC

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Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.1. The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. XIV. DECEMBER, 1927. No. 153.

"AUTOMATICS."

WITH the opening for public service of the Holborn automatic exchange, the first step in the conversion of the London telephone system to automatic working is definitely surmounted. We are glad that an automatic exchange is actually working in London, if only for one reason. It will convince the man in the street and the more casual kind of journalist that the administration has really embarked on the introduction of "automatic" working into this country. Like Berlin, like New York, like several other capital cities, London is in process of conversion to that system of telephony, and like them is in the early stages of the process, though not so far advanced as the American city. Few if any of the largest urban telephone systems in the world are yet wholly converted to automatic working, although in some of the great provincial towns both here and on the Continent and in America, the change over is complete.

The traveller returning from abroad, having found an automatic service working in Nice, or Orleans, or Munich, or Zurich, or some place in Australia or New Zealand, forthwith writes to the papers saying "They have the automatic telephone in France (or Germany, or Jerusalem). I used it myself in Bopfingen (or Fontenay-aux-Roses, or Wagga-Wagga, as the case may be). Why does England lag behind? What are the authorities doing?" He is seemingly not aware that there are important and flourishing automatic systems working in Edinburgh, Leeds, Sheffield, Portsmouth, Southampton, Blackburn, Stockport, Dundee, Paisley, the Hartlepools, Grimsby, Darlington, York, Oxford, Ipswich, Coventry, Gloucester, Halifax, and in fact in upwards of 60 towns and cities, some of whose exchange systems were converted to automatic working before the War. He seems to think that they "have automatic telephones" in France, if they have them in Orleans, but that we cannot be said to "have automatics" unless we have them in London. And yet this Administration, like all others, gave the automatic system its first trials on small and then on fair-sized provincial exchange systems, before proceeding to the conversion of its capital city. The period of trial is long past, and the gigantic work of converting London's vast and complicated network which will take 15 years to complete is pushing steadily forward.

HIC ET UBIQUE.

As we go to press we learn that the Anglo-Austrian telephone service will be opened for communication between London and Vienna on Dec. 1. The charge for a three-minutes' call by day will be 14*s*. 9*d*. This is the eighth Overseas service to be opened during the year. The extension of the Swedish service to all parts of Sweden and Great Britain, and the considerable reductions in the charges for calls to Germany, Holland and Scandinavia, we deal with in another column.

How quickly did Chappés optical telegraph operate? According to *Telegraphen-Praxis* of Lubeck, this question is answered by Ennemon Gonon in his description of optical day and night telegraphs as follows: "Look at the *Moniteur* of 1841, there you will find that a telegram of 43 words left Calais on Aug. 30 and only reached Paris on the 31st. (The mail coach went twice as fast.) On July 17 a telegram of 36 words was sent from Bayonne and only reached Paris on the 18th in the evening. A telegram of Dec. 27 from Toulon was received in Paris on Jan. 2; it comprised only 57 words. In the year 1843 51 telegrams out of 99 required 2, 3, 4, and even 6 days for their journey.

On Sept. 29 telephone service was inaugurated between the United States and Mexico. The trunk line between Washington and Mexico City via Harrisburg, Pittsburg, Cleveland, Toledo, Chicago, St. Louis, Dallas, and Laredo (Texas) is 3,357 miles long, 2,348 miles from New York to Laredo, and 786 from the latter point to Mexico City. The charge for a call from New York to Mexico (3,134 miles) is $13.55—about £2 16*s*. The charge for a call for London to Stockholm (1,547 miles, or nearly half the distance between New York and Mexico) is 17*s*. 3*d*., whilst between London and Königsberg (about 1,230 miles) the charge is 15*s*. 3*d*.

As the result of a circular from the Mid-German Broadcasting Company, says *Telegraphen Praxis*, asking listeners-in to vote for a programme of music for a "By-desire" night, the following items came first in order of popularity: (1) Selections from Tannhäuser; (2) Blue Danube waltz; (3) Overture to "Poet and Peasant"; (4) Selection from "Tales of Hoffmann"; (5) from "Fledermaus"; (6) from "Carmen"; (7) from "Mignon,"; (8) Wienerwald waltz; (9) Selection from Weber's "Freischütz"; (10) "Peer Gynt" suite; (11) Selection from "Cavalleria

Rusticana"; (12) Schubert's "Unfinished." This interesting result would seem to indicate that popular taste is similar in all countries. All the foregoing pieces might be heard on a good seaside band.

A correspondent sends us a cutting from a Manchester newspaper which seems to give tidings of an "Automobile 'Phone Scheme." He wondered at first whether the paragraph was prophetic of the days when motorists would have wireless telephone equipment in their cars and be independent of the services of the exchange; but further study of the paragraph showed that only an ordinary automatic scheme was referred to.

The report of the Postmaster-General of New Zealand for 1926-7 contains the information that an inter-island telephone cable was laid during 1926 affording communication between Wellington in the North Island and Nelson, Blenheim, and other places in South Island. When the repeater equipment is completed it is expected that not only Wellington but places as far north as Napier and Auckland will be able to communicate with Christchurch in South Island.

The number of telephones in New Zealand increased from 130,186 on Mar. 31, 1926, to 137,307 in Mar., 1927. Of these 45,364 are working automatic.

A writer in the *Daily Sketch* says: "It sounds comical to hear this week of Londoners learning to dial. In Nice I rang up friends and business offices by dialling in the winter of 1923-4." That was really very clever of him; but (if he was born at the time) he could have rung up subscribers by dialling at Epsom in 1912, not to mention that there were automatic exchanges in Darlington in 1914, Portsmouth in 1916, Leeds in 1918, Dundee early in 1924, and in fact some 20 British towns by the date he mentions.

The United River Plate Telephone Company had, in 1926, 310 exchanges, 136,044 subscribers and 719,700 kilometres of lines. Indicative of the further demand of Buenos Aires and the Argentine provinces for additional telephone communications is the estimate of the Company that £20,000,000 will be required to be invested in the Company's plant during the next 10 years in order properly to cater for development. Long distance lines have been installed during the past two years to Santa Fe (481 kilometres) Tres Arroyos (507 kilometres) and Cordoba (750 kilometres) and the inauguration is expected shortly of the Buenos Aires—Bahia Blanca line, which will establish the record for long distance telephony in South America, namely, 1,600 kilometres. The automatic system is successfully installed in Cordoba and Rosario, while in Buenos Aires five automatic exchanges are already equipped and a further seven will shortly be opened.

We have received a very useful booklet, published by the Society of Motor Manufacturers & Traders, containing a mass of statistics invaluable to motorists. There is one feature about motoring statistics which always interests us and that is the comparison offered by the growth of motor vehicles and the growth of telephone stations. The total number of the former in 1926 was 1,694,000 and of the latter 1,511,000. Two years ago the numbers of each were approximately equal.

The Annual Report of the Postal & Telegraph Department of the Straits Settlements shows that the number of telegrams dealt with increased by 103,684, from 1,008,882 in 1925 to 1,112,566 in 1926. There were in the latter year 1,504 telephones working in Malacca and 683 in Penang. 3,131 wireless messages were despatched and received by the Penaga and Payu Lebar Wireless Stations.

We learn from the Annual Report of the South African Post Office that during the year telephone trunk communication was established between Cape Town and the Cape Peninsular and Kimberley, Johannesburg and Reef, Pretoria and Bloemfontein, there being an average of 89 long-distance calls per week since the opening of the service. During the busiest week 197 calls were originated.

According to Reuter, a telephone service between Berlin and Moscow, via Warsaw, will be opened to the public shortly. Three minutes' conversation will cost 11 marks (about 11*s*.).

An agreement has been signed, says Reuter, between the Post and Telegraph Departments of Poland and Russia with regard to the establishment of telephone communication between the two countries. For the moment four lines only will be opened, namely, Warsaw-Moscow, Warsaw-Minsk, Moscow-Baranowitche and Baranowitche-Minsk. Further lines will be established as required, and those projected will be reserved for local conversations on the same terms as international conversations, between the hours of 10 a.m. and noon and 14 and 15 o'clock; at the other times, international conversations will enjoy priority in accordance with the International Telegraph Regulations. The fees for an ordinary conversation of three minutes between Warsaw and Moscow will be 9.60 gold francs. The agreement provides for communication between Berlin and Moscow via Poland.

We wish all our readers both at home and abroad a Happy Christmas and a Very Prosperous New Year.

DEATH OF MR. SIDNEY RENTELL.

WE deeply regret to record the death of the Editor of *Electricity*, Mr. Henry William Sidney Rentell. Born in 1864, he was educated at the Philological School, Marylebone, and at Neuenheim College, Heidelberg. On his return to England he completed his studies at the Finsbury Technical College. He joined the staff of Woodhouse & Rawson in 1885, and worked there until 1894. In 1894 he acquired control of *Electricity*, which he so successfully conducted for a period of over 30 years, and published various technical books, many of which have become official standards for class teachers and students of electrical engineering. Another publication he founded is the *Practical Electrician's Pocket Book and Diary*, which he started in 1899 and which has proved a very useful annual. His loss will be much felt by the electrical industry.

FIFTY YEARS WITH TELEPHONE PIONEERS.*

BY T. A. PROUT

(*Continued from p.* 45.)

I WISH now to speak of a quintet of telephone executants, two of whom are still with us and resident in London. I ought to have included Col. C. B. Clay and Mr. Alfred Coleman, whom I am glad to see present to-night, and have thus formed a septet. In 1892 a comet appeared suddenly in the British telephone constellation. I was at Bristol at the time, and the comet was in the shape of Mr. W. E. L. Gaine, a solicitor acting as Town Clerk of Blackburn. His name was unknown to the bevy of stars then twinkling in the telephone heavens, but our astonishment at his assumption of the post of General Manager of the National Telephone Company was increased by the fact that no one pretended that Mr. Gaine was an electrician, an engineer or even a financier, but he was a brilliant genius and quickly enthroned as the telephone king of this country who never tasted defeat during the 15 years of his reign up to his untimely death in June, 1907.

Innumerable delicious stories centre round this fine man whenever old National staff foregather. He had a kind heart and was too big a man to do anything small and mean.

On the walls of rooms occupied by many ex National men there still hangs a copy of a painting of this inspiring telephone leader at work, by Mr. Audley Gunston, the brother of the indefatigable Editor of the *Telegraph and Telephone Journal*.

I think, by the way, that our Journal has something to complain of, in that it is not sufficiently supported by telegraph and telephone men and women. I take it still, and hope to maintain my subscription as long as I am able, as I would not willingly miss its contents from month to month.

Acting with Mr. Gaine in so many great enterprises was Mr. Frank Gill, the ever-popular Engineer-in-Chief of the National Telephone Co., during eight momentous years—1903-1911. If his occupancy of that position is not sufficient warrant for inclusion in the quintet there is his present great position of European Chief Engineer of the International Standard Electric Corporation of Connaught House, Aldwych, with its world-wide ramifications of electrical communication work.

A few minutes later we shall have the opportunity of seeing a set of slides illustrating a really fine romantic piece of pioneer telephone work, just carried out by Mr. Gill in Spain.

No excuse is needed for including the late Sir Andrew Ogilvie with telephone pioneers. I saw enough during the 15 years I was in the telephone branch of the Secretary's Office to know how diligently and thoroughly he prepared affairs and himself for the great merge which took place in January, 1912. He created the numerous Telegraph and Telephone Advisory Committees and in many different ways carried the good-will of the public with the Post Office in the many and necessarily difficult changes of rates and forms of administration incident to the full State control of telephones. Sir Andrew was singularly attractive to those who came into contact with him, of whatever grade, and were without his large experience of organisation and economics. During the war he worked like a Trojan, and the premature decease of this most courtly gentleman in 1924 was mourned by telephone men and women who had had the privilege of knowing him irrespective of whether they were "pre-transfer staff" or not.

I was glad to read in the August issue of the *T. and T. Journal* a contribution, under the well-known initials 'F. H. S. G.," containing a frank acknowledgment of the great experience in the telephone business of my old chief, Mr. R. A. Dalzell, the Director of Telegraphs and Telephones, and speaking of the rapidity and soundness of his decisions given without any parade of the unique knowledge he possessed which enabled him to move with such impressive ease amidst the intricate details of telephone administration. We wish Mr. Dalzell now a complete restoration to health, when his fruitful mind will not cease to ponder over telephone problems.

No one who has spent many years in the telephone business can fail to be familiar with the name of Sir Wm. Preece. He went over to the United States in the eventful year of 1877, and on his return he reported favourably on the newly invented telephone and paid a visit to the first English telephone exchange in Coleman Street in 1879, when there were only 52 subscribers in this great City. Many telephone men were nurtured on his Manuals of Telephony and looked forward to his frequent addresses to the Engineering and Technical Societies of the time.

* Paper read before the London Telephone and Telegraph Society.

Assembled in London, we ought to take a glance at the Metropolitan area, with its 550,000 telephones, which represent 7.5 telephones per hundred of the population. As London telephone users originate 10,000,000 calls per week this is no small business. Blucher, on coming to London, exclaimed "What a city to sack!" We may well say "What a city to telephone!"

London, with its 600 street kiosks, of which many are of highly attractive design and illuminated by night, is in this respect in advance of even the United States and Canada, where such kiosks giving continuous service are still unknown.

If, Mr. Chairman, America presses us too hardly on the poor share they suggest that we make in the proportion of telephones to the human population, I suggest we might reply that we can in London claim one telephone per horse. Can they approach us on the equine unit? And we are moving faster than ever before with development generally.

The administration of the vast London telephone system now being gradually put on the director automatic system is under the charge of our friend, Mr. W. A. Valentine, who is a general favourite with everyone he meets, and the interests of the L.T.S. are safe in his hands we know very well.

Time being limited, I will divide my 50 years into five decades and look on the progress made in these periods. During the first ten years from 1877-1886, we put in telephones at an average rate of 3,500 per annum. In the next ten years, 1887-1896, in the course of which the Post Office persuaded the Company to sell them their Trunks on an undertaking by the then Postmaster-General that there should be no general competition with the Company but co-operation with it, the net additions made went up to 9,000 per annum. The following ten years, 1897-1906, included a period of fierce opposition to the National Company by Mr. Hanbury, the Financial Secretary to the Treasury and the first municipal competition in Glasgow, but the rate of growth was increased to 35,000 a year and during the next ten years, 1907-16, notwithstanding two years of war, the average growth was over 32,000 a year. In the last ten-year period—1917-1926—although a further two years of war are included, the number of telephones added was increased to over 60,000 per annum, and the present increase is at the rate of 120,000 stations a year. Although prophecy is dangerous, I have no hesitation in forecasting three million telephones in ten years and nine millions by 1977, the telephone centenary year. My imagination boggles somewhat thereafter as we shall have reached the stage of far more telephones than there are people who are likely to be liable to pay income tax in our tight little island homeland.

Now we must face up to the uncomfortable fact that the development of the telephone in Great Britain lags seriously behind America, Canada and several Continental countries on the basis of telephones to population. What is the explanation of this? Is it the innate conservatism of the British people that makes them slow to adopt telephones? Is it climatic and temperamental differences? The fact remains that telephones for the reception of the wireless broadcast services have been installed in 2½ million homes in four years, whereas exchange telephones have been available for over 45 years and the service has only been installed in a third of a million private houses. I realise the wide difference between the small initial cost of a crystal wireless set and the 10*s.* annual cost of a licence and the cost of the telephone, but the wide gulf between 2½ millions and one-third of a million houses needs bridging as early as possible. The introduction of quarterly payments a few years ago did a great deal, and the more recent introduction of the amount of the deposit to 20*s.* was a step in the right direction.

The conditions in England and America are not in every respect identical, I know, but the fact that the system of monthly payments for the telephone service in the States has been so successful should, I think, present a strong case for a reconsideration of its availability in our own country. With the influx of a great body of new private house subscribers and the further growth of the telephone habit, a still more rapid general extension of the exchange service should result to the benefit of the community.

I am constrained to-night to use the word "psychology," in loving memory of our friend, John Lee, lately Controller of the Central Telegraph Office.

Seriously, I am interested in the psychology or philosophy of advertising and I enjoy seeing the vast improvement of the poster art. I also scan daily the flood of literature which reaches me through the post and ponder on what would be the effect of a like deluge of clever telephone publicity in securing larger increases of subscribers' lines, and—not less important financially—an increase in the use of the service by existing subscribers? It is said that an additional call per line per day would produce £250,000 increase in revenue.

I observe that in modern advertising the method is indirect rather than direct. By post a night or two ago I got a booklet advertising electric lamps, but it is mainly an interesting article on sun-worship with a homily by Sir Arbuthnot Lane on the benefits of artificial light. The next night another firm of electric lamp manufacturers comes along with their brochure in the shape of an equally interesting "Story of Light" from the time of the theft by Prometheus of fire from heaven to the invention of the carbon

filament lamp by Edison and Swan. Incidentally the prices of lamps were identical. Which firm's lamps shall I buy ?

At present, I am a non-smoker; but I am presumably a potential consumer of cigarettes—what Contract Officers call "a prospect"—and am now possibly hesitating on the brink of deciding which particular cigarette I shall favour, Gold Flake, Black Cat, De Reszke, Woodbines or Navy Cut, when I notice a statement in the tobacconist's shop window that £5,000,000 per annum is being spent on advertising cigarettes and is undoubtedly being paid by you smokers! Advertisements can certainly be made interesting and there is clearly room for so unquestionably useful a service as the telephone to chip in as the railway and steamship companies have done to promote travel.

The advertising literature of the Telephone Development Association is already familiar to us and they have favoured me with a few slides of some of their recent efforts, such as, "51 years and not on the telephone! You are behind the times" and "It pays to advertise."

Marvellous as the progress made by the telephone during the past 50 years has been, I have no hesitation in predicting that in the next half-century—and in our own country especially, the current 10 years—will witness still more wonderful technical triumphs in the art and a far more rapid growth in the number of users than in any similar periods. For both of these forecasts the British Post Office staff, its organisation and plant are now well prepared.

If pathos be one of the missing ingredients of this address its omission may be remedied by the contemplation of a man who would have been proud to have been a telephone pioneer, but who after nearly 50 years of happy striving has but developed into a boy scout and in that capacity thanks you for listening to "the old, old story" as he has tried to tell it.

In the ensuing discussion, Mr. H. E. POWELL-JONES (Telephone Development Association) said:—

Mr. Prout asked us why those appalling figures have to be put on the screen to show the backwardness of this country in telephone development. I think the answer is comparatively easy. We are never going to get the telephone habit in this country until we use the same methods to get that habit as the cigarette manufacturers adopt. The cigarette habit is easy because you are given opportunities of indulging that habit every few yards in every street, village and town in this country. If you could indulge your liking for the telephone to the same extent, you would have more of the habit. In the same way, I think, the holiday habit, which is certainly a feature of modern life, owes its existence very largely to the publicity which is issued by railway companies and others interested. Anybody who has anything to do with transport is doing clever work and creating the travel habit. I think, if you compare the relative publicity which is being given nowadays to transportation and communication, which, after all are twin services, you get a very good measure of the lack of publicity in communications.

The Post Office have an extraordinarily good case, but I am afraid it very often goes by default. You find a constant flow of criticism in the papers, which is entirely unfair and not altogether deserved, but you know what happens when a new boy goes to school. If he is of a timid, shrinking, apologetic type who will not stand up for himself he generally gets a bad time, and it seems to me that it is the Post Office's own fault that you get such a bad time at the hands of the Press. If you go back to 1912 and realise the difficulties with which you were faced, and the extraordinarily able way in which they have been overcome, it is a very fine case, and I think you can safely rely on that instinctive sense of justice of the British people if you state your case more frequently. Advertise yourselves and you will find the whole sympathy of the British people is with you instead of very largely, I think, against you.

On this question of advertising I do not want to be misunderstood: I do not suggest that the Post Office should do its own advertising—still less that it should hand over that advertising to any one expert, but I think there is a very good case for the handling of advertising of the Telephone Service by a Committee on the lines of the Empire Marketing Board. You must not be afraid of tradition; I know there is an old tradition that the Post Office does not advertise. But the State has now realised since the war how much they owe to advertising.

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Mr. Baldwin said recently: "On the selling side, we must modernise our methods and make use of the great development which has taken place recently in the art of advertising."

A couple of days later, Mr. Amery said: "Advertising is essential to promote efficiency." And then Mr. Ormsby-Gore said that advertising to-day is recognised by every responsible person in the country as being a necessary factor in prosperity. Sir Alfred Mond said it had always seemed to him a fallacy to imagine goods could be sold by waiting for someone to come along and buy them.

It seems to me extraordinarily illogical that you should have one Government spokesman after another speaking fervently of the benefits of advertising and yet the Post Office telephones—one of the greatest businesses in this country, and a profitable business—are not allowed to advertise.

In certain directions you can advertise without spending much money. For instance, the public have very little idea of what the large drums to be seen in the streets are. Why should you not put up a notice saying: "We are putting down telephone cables to serve the district of so-and-so; now is your chance to get a telephone."

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Col. C. B. CLAY described his early efforts at telephone advertising in the North of England Telephone Co., and related some anecdotes of the early rivalry of telephone companies.

Mr. DAY said he did not think Mr. Powell-Jones was at all happy in his selection of the examples of the beneficial results of advertising. He would have been more impressed with an example of public advertising in connexion with a great public utility. For instance, the cigarette trade was not to be compared with an organisation like the telephone.

Passing on to the Press, he could not see that the Post Office telephone administration received much unfair criticism. There was very little criticism indeed appearing in the Press, and he believed the people of this country were well satisfied with their telephone service, coupled with the difficulty that the Administration had to overcome. He thought personally that the Treasury could quite easily make out a very good case against a Government Department embarking on advertising in the way referred to by Mr. Jones. What that defence would be he had not the time to outline, but it did assume that the public ownership of a great utility was in itself desirable.

He submitted that the final test of any administration, Government or private enterprise, could be simplified in two ways. One was: Were the discoveries of the scientists and the inventors embodied in the system as quickly and as rapidly as they were brought to the notice of the administrator; and secondly: Was the administration, from top to bottom, such that the greatest number of people obtained the maximum benefit? It seemed to him that these were two acid tests, and as time went on they would be able to say that a Government Department in Great Britain could command the services of men able to deliver the goods and give the utmost benefit of the inventor.

Mr. DIVE said that, speaking from his own personal experience, he never had been ashamed of the fact that he was in the Post Office and in the telephone service, and he took courage to say that he had defended both on many occasions and driven the war into the enemy's camp when he had had the pleasure of meeting the heads of great commercial houses who were anxious to teach the Post Office their business.

Speaking of advertisement, only that morning, he saw an advertisement to the effect that a big business house gave the pictures of 12 ladies who had been chosen by the staff as the 12 most beautiful girls on their staff, and they were put in mannequin parades so that the public could give a vote. He studied their faces very intently and he was bound to confess that there was not one of them that could not have been matched in the telephone service of London.

Mr. MUIRHEAD paid tribute to Mr. Prout's personality and to the great part he had played in telephone development. He thought that advertising led to heightened production all round and benefited the whole community.

A BRIEF CHRONOLOGY FOR STUDENTS OF TELEGRAPHS, TELEPHONES AND POSTS.

BY HARRY G. SELLARS.

(*Continued from page* 44.)

A.D.			
1663	...	...	Lease of Post Office transferred from Henry Bishop to Daniel O'Neale.
			Profits of the Post Office (and wine licences), worth £21,000 per annum, settled on the Duke of York.
			Marquis of Worcester suggested a system of telegraphy.
1664, Oct.		...	Daniel O'Neale died and his widow, Katherine, Countess of Chesterfield, held the lease. Colonel Phillip Frowde was manager during O'Neale's holding.
1665	...	...	Sir William Penn drew up a code of flag signals. M'Arthur and Lord Richard Howe, in later years, improved the arrangement.
1666	...	...	General Post Office removed to the "Two Black Pillars" in Brydges Street, Covent Garden, London, owing to the destruction by fire of the "Black Swan," Bishopsgate.

1667, Oct. ... Lord Arlington and Lord Berkeley became joint lessees of the Post Office for ten years at an annual rental of £25,000. Sir John Bennett and Andrew Ellis acted as deputies for Arlington and Berkeley, respectively.

Robert Hooke described how sound could be transmitted by means of a tightly stretched wire.

1668 ... ... Bond observed the variation of the compass.

1672, June ... Sir John Bennett left the Post Office and Andrew Ellis took over sole management. Ellis died in less than a month and his widow transferred her interest to Colonel Roger Whitley. On July 29 Whitley was appointed Deputy Postmaster-General.

1675 ... ... Boyle experimented with a view to ascertaining the origin of electricity, using a resinous cake.

Newton and Boyle used glass in construction of electrical machines.

1675, Aug. 10 ... Greenwich Observatory founded.

1676, Jan. 13 ... Sir Isaac Newton exhibited to the Royal Society a glass electrical machine in which a brush of hog's bristles was used to rub the glass.

Boyle published an account of his electrical experiments. Von Bose added a "prime conductor" to von Guericke's electrical machine.

1677 ... ... Revenue of Post Office settled on Duke of York, on whose behalf Whitley remained as "manager" for a few months. The Earl of Rochester was then appointed Postmaster-General and Philip Frowde, junior, managed the office under the title of "Governor."

1678 ... ... Swammerdam demonstrated to the Grand Duke of Tuscany that the muscle of a frog's leg contracted when brought into contact with silver and copper.

1680 ... ... Dockwra, a merchant, organised a private penny post for London, and introduced postmarks. Letters and parcels carried.

1681 ... ... Another Penny Post introduced in London by Robert Murray, upholsterer.

1683 ... ... Robert Murray assigned Penny Post to Dockwra.

Halley published his theory of magnetic variations.

1684 ... ... Dr. Hooke suggested a system of telegraphy.

1685 ... ... Revenue of the Post Office, estimated at £65,000, reverted to the Crown (James, Duke of York, became King James II).

1686 ... ... Otto von Guericke died.

Pension of £4,700 per annum granted to Barbara Villiers, Duchess of Cleveland, and to her successors the Dukes of Grafton, out of Post Office revenue.

1686, Dec. ... Earl of Rochester granted a pension of £5,000 per annum to be charged to Post Office account.

1688 ... ... Mail packet service established between Falmouth and Corunna, and shortly afterwards between Falmouth and Lisbon, North America and West Indies.

1689, April 12 ... Major John Wildman appointed to take possession of the Post Office and to exercise the powers contained in various Acts of Parliament.

1690 ... ... General Post Office removed to Sir Robert Viner's mansion in Lombard Street, London.

1691, Feb. ... Wildman dismissed from the Post Office and Sir Robert Cotton and Sir Thomas Frankland became joint Postmasters-General. The office was held by two persons until 1823.

1694, June 20 ... Creation of a Secretaryship to the Post Office authorised. Mr. Wilboyl appointed.

Pensions charged on Post Office revenue amounted to £20,000 per annum.

1695 ... ... Scottish Parliament set up a separate Post Office and Postmaster-General for Scotland.

1699 ... ... Net revenue of Post Office £77,384.

1700 ... ... One penny paid to Private Shipmasters for each letter handed to the Post Office in this country or the Colonies.

1701, Jan. 21 ... Postmaster-General authorised to appoint a Deputy Postmaster-General for Scotland. Mr. G. Maine appointed at Edinburgh.

1702 ... ... Act of Parliament sanctioned the customary payment of one penny made to Ship Masters for each letter handed to the Post Office, and granted to the Postmaster-General the monopoly of conveying letters in the United Kingdom and Colonies.

1704 ... ... First American newspaper (*Boston News Letter*) appeared.

1705 ... ... Francis Hawksbee observed the resemblance between the electric spark and lightning.

Postage for letters *to* the West Indies 1*s.* 3*d.* a sheet, *from* the West Indies 1*s.* 6*d.* a sheet.

1706, Jan. 17 ... Benjamin Franklin born in Boston, Massachusetts.

Stephen Gray experimented in electrical attraction, conduction, and excitation.

1708 ... ... Charles Povey established a halfpenny foot post in the London district.

1709 ... ... Mails for certain places abroad dispatched on Mondays, Tuesdays, Thursdays and Fridays; to Ireland on Tuesdays and Saturdays; to Wales on Tuesdays and Saturdays; to Scotland on Tuesdays, Thursdays and Saturdays; to places in England every day. Letters reached London from all parts of England and Scotland Mondays, Wednesdays and Fridays; from Wales, Mondays and Fridays; from Kent and the Downs every day; "but beyond sea uncertain." Postage 2*d.* a sheet up to 80 miles, packets 8*d.* an ounce. Over 80 miles, 3*d.* a sheet, packets 12*d.* an ounce. Letters to Dublin, 6*d.* a sheet, packets 1*s.* 6*d.* an ounce.

Hawksbee improved the electrical machine.

1709, Nov. 29 ... Notice published in the *London Gazette* abolishing Povey's Halfpenny Post, and fixing fines for setting up and continuing the business.

1710 ... ... English and Scottish Post Offices re-united under one Postmaster-General. Postage calculated according to distance. Revenue divided between the public exchequer and the Crown.

1710, Oct. 2 ... Richard Dyot, J.P. for Middlesex and Commissioner of the Stamp Office, arrested for counterfeiting stamps.

Gross revenue of Post Office £111,461, cost of management £44,639, net revenue £66,822.

1711 ... ... General Post Office set up for the "three kingdoms and the Colonies," the Postmaster-General having to pay £700 "into the Exchequer upon Tuesday in every week."

1711, June 23 ... Act of Parliament put into force abolishing the Penny Post and assimilating all postage rates to those of the General Post Office.

1713 ... ... Stamp duty imposed on newspapers.

1716 ... ... £17,000 lost to Post Office through "franking."

1719 ... ... Ralph Allen, Postmaster of Bath, offered to take the bye and cross-posts on lease at a rent of £6,000 per annum.

1720 ... ... Angle of magnetic "dip" in London reached maximum of 74 deg. 42 min.

Stephen Gray and Wheeler "discovered" electric induction.

1721 ... ... Gross revenue of Post Office £168,968, cost of management £69,184, net revenue £99,784.

1722 ... ... Marcel observed that a bar of iron became temporarily magnetic if placed in certain positions.

1724 ... ... Graham found that the compass needle undergoes daily directional variations.

1727, Mar. 20 ... Sir Isaac Newton died at Kensington, London, and was buried in Westminster Abbey.

1727, Oct. 17 ... John Wilkes born in London.

1728, Nov. 27 ... Maintenon born.

1729 ... ... Stephen Gray, a pensioner of the Charterhouse, discovered that some bodies conduct electricity more freely than others. He found that a cork in the end of a rubbed glass tube attracted light bodies.

1730 ... ... Du Fay, of Paris, sent a charge of electricity through 1256 feet of moistened thread.

1731 ... ... Prof. Boze, of Wittenburg, added a "prime conductor" to Sir Isaac Newton's electrical machine.

Symmer propounded the "two-fluid" theory of electricity. He also observed that similarly electrified bodies repelled each other and that bodies having unlike charges attracted each other.

Du Fay, working independently, reached conclusions in connexion with positively and negatively charged bodies similar to those of Symmer. He named the two dissimilar kinds of electricity "vitreous" and "resinous."

£38,000 lost to Post Office through "franking."

1736, June 25 ... John Horne Tooke born in Westminster.

1736, Aug. 23 ... Charles Augustin de Coulomb born at Angouleme.

1737, Sept. 9 ... Luigi Galvani born at Bologna.

1739 ... ... Emerton patented a wood preserving compound.

1740 ... ... Bernoulli calculated the lifting power of a magnet.

1741 ... ... Winckler, of Leipzig, devised a cushion for the rubber of an electrical machine.

1742 ... ... Desaguliers classified bodies as "electrics" or "non-electrics."

Gordon, of Erfurt, replaced the glass globe in von Guericke's machine by a glass cylinder.

1744, Jan. 2 ... Joseph Milner born at Leeds.

1745, Feb. 19 ... Alessandro Volta born at Como.

1746 ... ... Leyden Jar principle discovered by Von Kleist (Bishop of Pomerania), Muschenbroek, or his pupil, Cuneus. Uncertainty exists as to whom the credit is due.

Winckler constructed a Leyden battery.

1746, April ... Abbé Nollet discharged a Leyden jar through a number of Carthusian monks joined together by iron wires and forming a circle 5,400 feet in circumference, the simultaneous contortions of the monks proving the presence and speed of the current.

Fontana noticed that the internal volume of a Leyden jar increased when it was charged.

Artificial magnets made by Dr. Gowan Knight.

(Scoresby suggested laminated magnets.)

1747 ... ... Benjamin Franklin announced his theory of a single electric fluid.

Louis XV, of France, caused a charge from a battery of Leyden jars to be passed through 700 Carthusian monks joined hand in hand.

Sir W. Watson suggested the "plus" and "minus" theory of electricity.

1747, Aug. 5 ... Dr. Watson proved that electric current could be transmitted through a wire using the earth to complete the circuit.

1749 ... ... Franklin, by means of a kite, proved the identity of electricity and lightning and invented lightning conductors. Franklin introduced the terms "negative" and "positive" in connexion with electricity. He also supposed that the Aurora Borealis was due to electric discharges in the upper air, and devised a plate condenser or "fulminating pane."

1749, Mar. 23 ... Pierre Simon Laplace born at Beaumont-en-Auge.

Net revenue of Post Office £97,398.

1751 ... ... John Canton introduced an amalgam for the rubber of electrical machines.

1752 ... ... Sulzer drew attention to the "taste" produced by laying two dissimilar metals upon the tongue.

Lemonnier observed that electricity was usually present in the atmosphere.

Franklin invented the "electric chimes" to warn him of the presence of atmospheric electricity drawn from the air by pointed iron rods.

Dalibard, of Marly-la-ville, acting on Franklin's proposal, erected an iron rod 40 feet high and drew sparks from a cloud.

1753, Jan. ... Richmann, of St. Petersburg, experimenting in atmospheric electricity, was killed by a discharge.

Romas, repeating the kite experiment of Franklin, obtained sparks nine feet long.

1753, Feb. 17 ... Charles Morrison, writing in the "Scots Magazine," suggested using an insulated wire for each letter of the alphabet, and passing a charge along the wires to spell words.

John Canton "discovered" electric induction.

1758 ... ... Beccaria published his researches on atmospheric electricity.

(Mascart, in Paris, demonstrated variations in atmospheric electricity, at various times of the day. Guy Lussac showed variations in atmospheric electricity at various heights.)

Beccaria noticed that electrified liquids evaporated more quickly than those which were not electrified.

1759 ... ... Franz Maria Ulrich Theodor Æpinus and Wilke devised the first condenser with a stratum of air between two brass discs.

Æpinus also constructed a condenser with a dielectric consisting of air space and a plate of glass.

(Fizeau constructed a plate condenser.)

1760 ... ... De la Fond, Planta, Ramsden and Cuthbertson constructed electrical machines with glass plates.

Hereditary revenues from the Post Office surrendered to the State, a Civil List being granted by Parliament for support of the Royal Household, &c.

1764 ... ... An Act of Parliament allowed Members of Parliament to "frank" correspondence.

Postmaster-General obtained permission to set up in provincial towns a penny post similar to that which had been in force in London since 1680.

Profits on bye and cross-posts amounted to £20,000 per annum.

Ralph Allen, who had organised cross-road posts all over the country, died.

1765 ... ... Postage reduced on short-distance letters.

1767 ... ... Dr. Priestley suggested formation of an Electrical Society.

Lane produced a discharging electrometer.

1768 ... ... Geuns, of Venlo, suggested the construction of compound magneto. A. L. Lavoisier conducted experiments in electricity.

1771 ... ... Cavendish showed that the attraction between two small electrically-charged bodies is inversely proportional to the square of the distance between them.

1772 ... ... Henley produced a discharging electrometer, and a "Universal" discharger for discharging Leyden jars, or condensers.

1773 ... ... Ingenhousz and Cavendish investigated the electrical state of certain fishes.

1774 ... ... Lesarges tried a telegraph system at Geneva similar to that proposed by Morrison in 1753.

Court of King's Bench ruled that within the limits of a post town—to be defined by the Postmaster-General—delivery of letters should be free.

Richard Lovell Edgeworth invented the shuttle telegraph for distant visual signalling.

1775, June 10 ... André Marie Ampére born at Lyons.

1775, July 5 ... William Crotch born at Norwich.

Cavendish discovered that the capacity of a condenser depended upon the inductive power of the dielectric.

Count Alessandro Volta, of Como, invented electrophorus.

(Phillips made the electrophorus more efficient by pasting strips of tinfoil across the surface of the lower disc.)

Biot proved that an electric charge resides on the surface of a charged body. He also showed variations in atmospheric electricity at various heights.

1776, Aug. 16 ... William Hyde Wollaston born at East Dereham, Norfolk.

1777, April 30 ... Johann Karl Friedrich Gauss born at Brunswick.

Hans Christian Oersted born at Rudkjobing, Denmark.

Lichtenberg produced his electrical figures and investigated the distribution of electricity over the surface of conductors.

George III complained of the bad state of the Packet Boats, and ordered representations to be made to the Post Office.

1778 ... ... Brugmans, of Leyden, observed repulsion between bismuth and both ends of a magnetic needle.

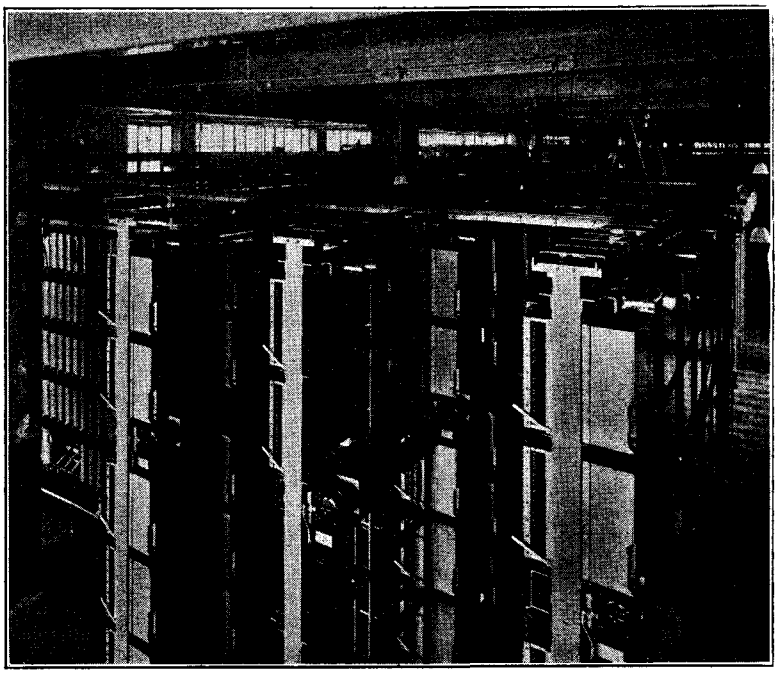
1779 ... ... Coulomb invented the torsion balance for measuring electrical attraction. (Coulomb = Unit of electrical quantity.)

(To be continued.)

HOLBORN AUTOMATIC EXCHANGE.

THE second stage in the automatic telephoning of Greater London was completed at midnight on Saturday, Nov. 12, when, quite unobtrusively, with no particular flourish of trumpets, automatic working became a reality to nearly ten thousand of London's half-million telephone subscribers.

The development of the "Director" register controller, a clever combination of "Strowger" mechanisms, with almost human characteristics, has hastened the solution of the London telephone traffic problem, and the new 10,000-line automatic telephone exchange at Holborn is the first tangible result.



HOLBORN AUTOMATIC EXCHANGE.—GENERAL VIEW, SHOWING "DIRECTOR" REGISTER CONTROLLER IN FOREGROUND.

The equipment is housed in the same building as the mechanical Tandem equipment, recently put into service and with which it will be so intimately associated during the necessarily prolonged transition period, when the "old" and the "new" systems have perforce to work side by side and in unison, until such time as the whole of the Greater London telephone area has been equipped for automatic working.

In many respects the new main automatic equipment at Holborn resembles that of other comparably equipped exchanges of high capacity, but in addition to the usual complement of lineswitch units, trunk selector boards, group and final selectors, familiar to all who have studied the principles of "Strowger" automatic telephone equipment, it possesses outstanding characteristics in its "Director" register controllers, in effect the brains of the exchange.

To serve the 9,400 subscribers for which Holborn is at present equpped, there are 222 of these "Director" register controllers, or roughly one to every 42 subscribers connected. Traffic records go to show that this proportion will suffice, having regard to the fact that, having performed its function of "routing" the call from the area of origin to that in which the wanted subscriber is situate, the "Director" register controller is immediately available for further use, and is not "tied up" for the duration of the call which it has assisted in maturing.

Holborn telephone subscribers, and eventually all telephone subscribers in the Greater London area, as and when their respective exchanges are equipped with "Strowger" mechanism, will "dial" seven digits comprising three letters, representing the initial letters of the exchange to which the wanted number is connected, followed by four numerals representing the actual number in that exchange.

The "Director" register controller performs three main functions, namely :—

(1) Receives and stores the call.

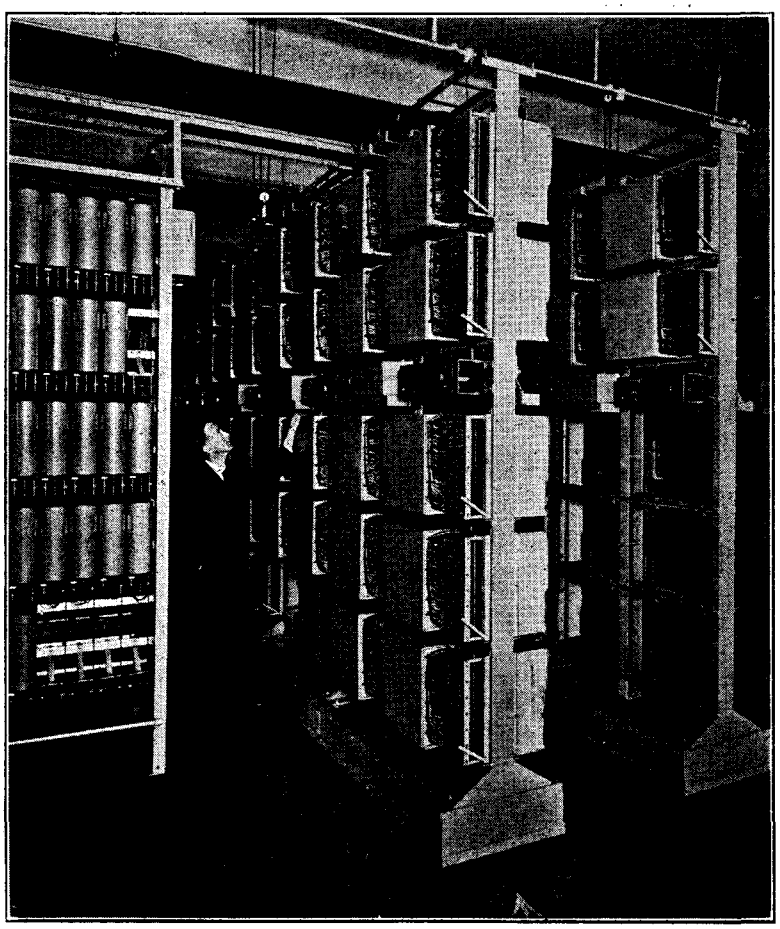
(2) Translates the three code (letter) impulses, in order that the call may be directed over the best available route.

(3) Transmits, firstly, the translated code impulses and secondly, the four numeral impulses.

It will therefore be realised that the routing of calls is not directly effected by the trains of impulses corresponding to the three letters as dialled The "Director" register controller translates these first trains of impulses into a particular form, which depends upon the number of selectors, and the various levels of the same, over which the call has to be "routed." The translated trains of impulses, as transmitted by the "Director" register controller may be, and in fact are, entirely different to the impulses corresponding to the code letters. Thus, the dialled impulses 236 for CEN (CENtral) may become another series altogether, up to six digits, as sent out by the "Director" register controller to actuate the routing selectors which serve to extend the connexion to the desired exchange.

To explain exactly how this is accomplished is outside the scope of any journal save those specially devoted to telephone technology, suffice it that dialling the first letter operates a selector known as the "A digit switch"; this switch seeks an idle "Director" register controller in a particular group, depending upon the dialled impulses. The chosen "Director" register controller then receives on its "B C switch" the second and third letters as dialled. As a result of the "B C switch" being set to a particular position, the impulses sent out are translated in accordance with a predetermined plan. The control and sending of the new train of impulses are a function of the "Director" register controller. The numerical part of the call is retransmitted in the same form as received.

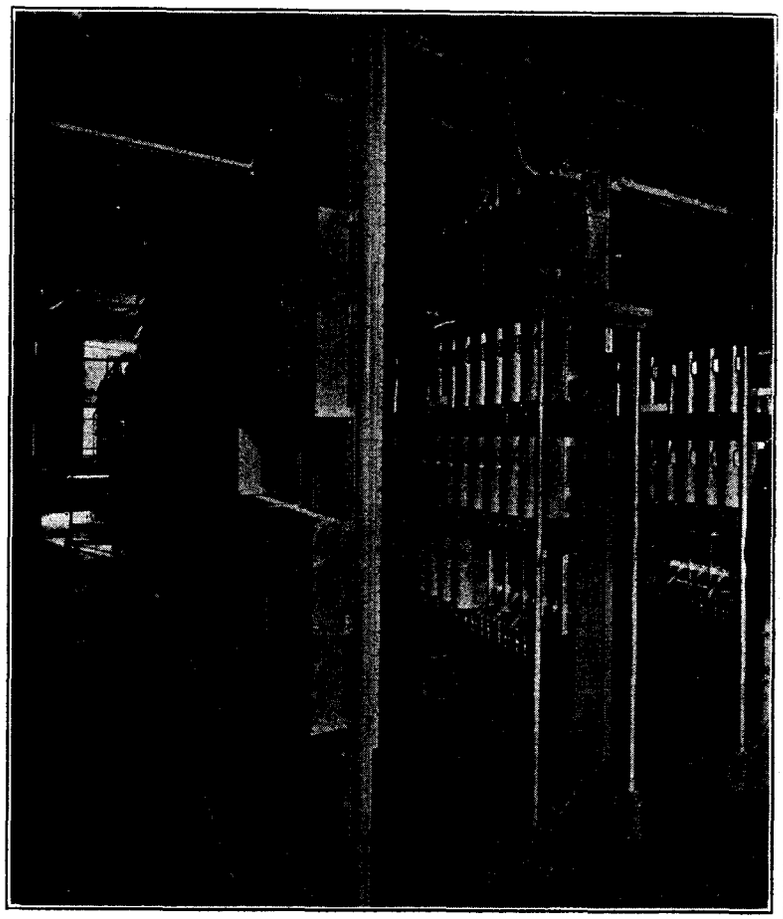
As soon as the last numerical digit has been dialled and its train of impulses has passed through this sequence of switches constituting the "Director" register controller, the latter, as a complete unit, immediately becomes available for another call, and is selected in its turn by the next subscriber requiring its temporary services.



"DIRECTOR" REGISTER CONTROLLERS.

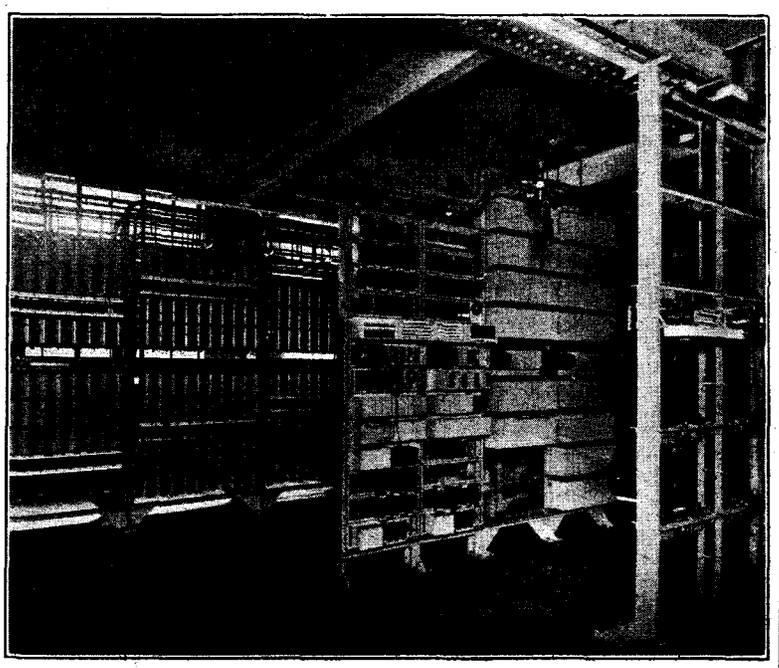
To ensure constant supervision of the exchange equipment with the minimum of human endeavour, there is incorporated in the "Strowger" equipment at the Holborn exchange an automatic testing installation, termed Routiner equipment, so named by virtue of its functions, which constitute the automatic routine testing of all "Director" register controllers. In action, this Routiner equipment systematically, and of its own volition, subjects each "Directors" register controller in turn to an exhaustive series of tests, representing more drastic conditions than obtain in normal service. Any abnormal condition in an individual unit is thereby detected at an early stage, before it has time to affect prejudicially service, and automatically indicated to the maintenance staff on duty who are thereby enabled to rectify it.

This Routiner equipment, which is set in action by the simple closing of a switch, effects obvious economies in maintenance personnel. Any "Director" register controllers found to require attention can be temporarily



SUBSCRIBERS' METER RACK.

cut out of service, or "busied" by throwing over an individual switch, without affecting the traffic passing at the time. The necessary adjustments having been effected, the switch is reversed and the "Director" register controller again takes up its normal share of the total traffic load.



STROWGER "ROUTINER" EQUIPMENT.

Another feature of Holborn automatic exchange are the Coders, 80 in all, whose function it is to convert the dialled trains of impulses, received from Holborn automatic subscribers, into appropriate codes of impulses to operate the Coder call indicators at the outlying manual exchanges, where the connexion is completed by the local telephonist. The Coders are analogous to the "Senders" described in connexion with Mechanical Tandem, and comprises groups of relays and rotary lineswitches. As previously described in connexion with Mechanical Tandem, the equipment at these outlying exchanges, which are still manually operated, comprises Coder call indicator positions on the manual board.

A system of lamps disposed below numerical stencils under a ground glass screen let into the keyboard, is controlled by code impulses reacting on a group of relays in such manner that the number dialled by the Holborn automatic subscriber appears on the screen in front of the local telephonist, who picks up a disengaged plug and completes the connexion by plugging in the multiple at her position.

Conversely, for handling manual exchange traffic, incoming from outlying areas to Holborn automatic subscribers, 31 cordless, or semi-"B" positions, are provided. These closely resemble the semi-"B" positions in Mechanical Tandem exchange, and are, in fact, located on the same floor. They are squat cordless switchboard sections, arranged in suites, each telephonist's position being equipped with a row of ten keys numbered 0 to 9, and resembling those of a typewriter. The keys are also lettered similarly to the dials on the London automatic telephones, the numbered keys being each associated with groups of letters. With the aid of these keys the telephonists complete the connexions incoming from outlying manual exchanges for Holborn automatic subscribers.

In addition there is at Holborn a manual switchboard consisting of specially equpped "A" positions. Telephonists at these positions will handle calls from telephone boxes; give information or answer enquiries; investigate complaints concerning the service, and divert official calls into their proper channels.

THE ST. JOHN AMBULANCE ASSOCIATION: LONDON POST OFFICE CENTRE (POST OFFICE AMBULANCE CORPS).

THE Annual First Aid Competition for the London Postal Ambulance Challenge Shield (holders, Inland Section, Mount Pleasant), open to all male officers in any department of the London Post Office, and the Women's Trophy (holders, Savings Bank Department), open to members of the Women's Branches of the P.O.A.C., will be held on Monday, Nov. 14, 1927, at 7.30 p.m., in the King George Hall, Caroline Street, Great Russell Street, W.C.1. Admission by programme, 3*d*. A limited number of tickets for seats will be reserved at 1*s*. each. Members of the staff can assist the funds of the Corps by purchasing a programme from any member of the Corps.

As the P.O.A.C. performs a very important work, and renders first aid to a large number of cases every year in the various departments, it is hoped that as many as possible will attend. Particulars of the competition can be obtained from Miss E. K. M. Meeser, Controller's Office, L.T.S., Cornwall House, Waterloo Road, S.E.1, or Mr. J. E. G. Rogers, Inland Section, Mount Pleasant, E.C.1 (Competition Secretaries).

OLD TIMERS.

THOSE of us—and I think we are few—who have been fortunate enough to embrace a period of actual manipulative experience in the transoceanic cable services within our career, will remember the day when morse key and sounder played a very active part in dealing with traffic from the London stations; and, of course, the Wheatstone system also contributed its functions.

With the passing of the punching "sticks"—superseded by the "gell"—and the practically universal use of typewriters at morse circuits, the beautiful rhythm of an expert puncher's movements, and the artistic, but copperplate, writing of receiving telegraphists, have gone the way of all things—so far as cables are concerned—to make room for progress in the shape of Morkrums, Creeds, automatics and Baudots.

I think I must have had the pleasure of being acquainted with the fastest stick puncher in the British Isles. His hands, grasping the small rubber-tipped pieces of iron, skimmed over the studs in a light fantastic manner at an astounding speed. For hours this man would maintain this standard of rapidity, and to watch him, in a spirit of appreciation, was an entertainment in itself. To the company's loss, he subsequently resigned and departed, I think, for Honolulu. But, the world is very small, for exactly ten years later this wizard of the "sticks" confronted me in the rôle of sergeant-major at a military depot not a hundred miles from London.

It is no exaggeration to say that, on a day when the temperature was quite normal, beads of perspiration stood out on the brow of a telegraphist whose powers of endurance had been sorely tried by the reception of a continuous and uninterrupted flow of messages for a consecutive number of hours; and practically every one of those messages were couched in the language of cabling commerce—ten-letter code.

At that period the Syphon Recorder system terminated at a retransmitting station situate in Ireland, and here the staff were very proficient in morse dictation from the undulating symbols as they appeared on the recorder slip. One particular member distinguished himself every afternoon, from three p.m. till six, by transmitting Stock Exchange traffic in this manner, at a speed, and with formation, that was not very far removed from that produced by slow-running Wheatstone slip.

Now, in the same company, the typewriter has replaced the pencil and the Syphon recorder system is extended to London, but I understand that, although, of course, vast improvements have been made, the Wheatstone system is still favoured to a great extent, and automatics, &c., are taboo.

A recent introduction to duties connected with the "Beam" assisted to remind me of those days, but rapid though the service was, it could not—and I doubt if it does now—defeat the speed at which our latest system of overseas communication is capable of working—that is, in a given space of time.

W. T. L.
(*Central Telegraph Office.*)

CORRESPONDENCE.

A JAPANESE APPRECIATION OF MR. LEE.

TO THE EDITOR OF "THE TELEGRAPH AND TELEPHONE JOURNAL."

Sir,—As the controller of the greatest telegraph office in the world, and also as a worldwide authority on telegraph communication, the name of Mr. John Lee is well known even in this far eastern country.

It was at the beauty spot of Cortina d'Ampezzo, Italy, that I had the great delight and honour of making acquaintance with him, last summer, on the fortunate occasion of the Committee Conference on Code Languages for the International Telegraphs, to which I was sent to attend by the Japanese Government.

The bright, fascinating scenery of the surroundings, combined with the genial climate, was certainly a great help to efficient progress in the solution of the rather toilsome but very important problems of the subject, but that Mr. Lee's dauntless exertions and adept skill played the greatest part in creating a friendly atmosphere, there was not the least doubt. His natural humour and wide and deep knowledge acquired by long experience in practical participation in the telegraph service were fully displayed when discussions among delegates were keen and the situation seemed to be difficult.

Cortina and its vicinity were certainly one of the most lovely parts in the southern Alps, and displayed their utmost beauty when, by the courtesy of the Italian delegation, an excursion party composed of the whole delegates and their ladies drove in autocars along the zigzag paths, by the beautiful lakes and under beetling precipices. On this occasion Mr. Lee and I had a memorial photo taken together on the shore of lake Alleghe. By these contacts with him, I was able to divine the noble character which played a very influential rôle in his long and eminent career. He is a man of human warmth as well as a strict reasoner, and a highly cultivated person.

On visiting later the Central Telegraph Office of the G.P.O., London, *en route* round the world, after the close of the Cortina Conference, I had again the pleasure of seeing him, this time in his very headquarters. After being cordially received, I was accorded many facilities for observing the excellent system of the London telegraph service. The amount of knowledge and experience I was given by him and his office was very valuable, for which my gratitude to him was boundless, and ever since I have been an admirer of him.

To my great surprise, the recently received *Telegraph and Telephone Journal* brought the unexpected news of his resignation, and I cannot help feeling a genuine regret not only for the British but also for the International Telegraph Service, which sustains a great loss by the retirement of such a distinguished leader. My mind is full of emotion to find, on the page containing the report, the very picture taken on lake Alleghe which spontaneously recalls those memorable and happy days in Italy and England.

The great services he has rendered to the development and completion of the telegraph communication in great Britain as well as in the world are fully appreciated and recognized by the public and I shall have no need to repeat them here.

Now he has retired amidst heartfelt praises, leaving that which he built to the care of his good successor. My sincere wish as one of his reverent juniors is that he may be spared to enjoy a happy leisure and a long and healthy life and that he will, when he feels like it, impart his valuable experiences to others.

The Central Telegraph Office,
Osaka, Japan.

S. HIROSHIMA.

THE RETIREMENT OF MR. J. E. A. SORRELL.

THE coastal Telegraph Repeater officers may be classed among those modest flowers which prefer to bloom unseen. Mr. Sorrell was typical of his class. He has now passed out of active service upon reaching the age-limit, a service which he has adorned since Jan. 1, 1884, when he commenced his career as a telegraphist in the C.T.O., transferring to the Repeater class as Relay clerk ten years later. As a telegraphist he was a front ranker in efficiency, as a relay clerk his standard was equally high, but as Officer-in-Charge, J. E. A. S. surely touched the high-water mark of Repeater Office supervision.

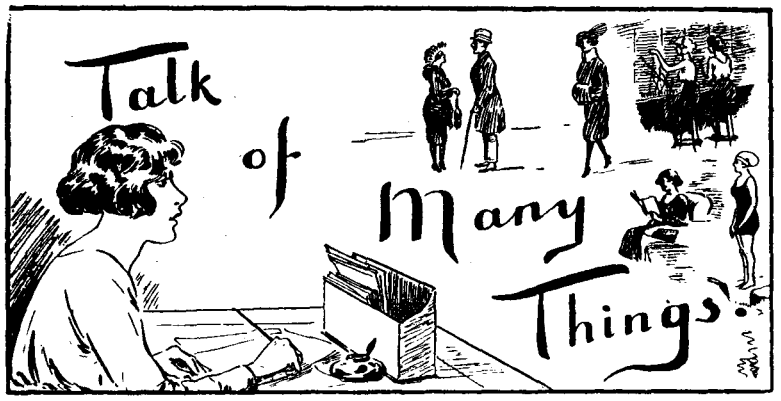
There was very seldom, if ever, need for reports to "higher quarters" with Sorrell, for he had a wonderful understanding of human nature, and as a result rendered A1 service to the State while maintaining an atmosphere of good fellowship with all those around him.

This is not to say that he was slack in real discipline, for no delinquent could ever get ahead of Sorrell's high-speed lectures, nevertheless, no staff ever had better counsel for their defence.

Mr. Sorrell represented the British Post Office repeater office interests in 1910 as a member of the Anglo-German Telegraph Commission, which spent one month in Germany and one in the British Isles in examining several technical difficulties. During the war he was in charge of the Lowestoft Cable Repeater Office, which at that time was situated on the beach just below one of the "scores." The humour (?) of the situation did not miss our now retired colleague who directed a friend's attention to the fact that although the cable office was boarded up, surrounded by corrugated iron sheeting and protected by a military guard, only the latter were provided with a dug-out during raids, it being presumed that the civilian telegraph staff would carry on—which they did. The experience of six nights spent in that "ark on the sands" with a Zeppelin raid each night and the desolate view of an uninhabited seafront of broken windows each morning will be remembered by all those of us who formed the emergency staff during a week of complete breakdown of the East Coast land lines. Outstanding, however, beyond all these transient inconveniences, is the recollection of J. E. S., cheerful, unperturbed, unselfish, considerate of others through it all, though he had already had months and was yet to have many months more of this anxious chargeship.

Such eulogia some may say should be left unuttered for the present, but why, may I ask, should we always wait till the funeral day to tender our floral offerings?

WE TELEPHONISTS



The Birthright.

THIS article was very nearly not printed because of a slight misunderstanding with my typist. At one stage in the proceedings matters were so critical that I had visions of being compelled to write the article by hand. That, of course, would have been exceedingly awkward because, some time ago, the printer gave me to understand "once and for all, that" —well, anyway, he was extremely rude about my caligraphy. So, you see, I am rather dependent upon the typist to interpret the signs and wonders which somehow wander across my notepaper and resemble the footprints of bees after, say, the Bees' Wedding. Sometimes, clever as she is, her brows furrow deeply, and then I dictate, and that's how it was this month. No sooner had I uttered the title, however, than she closed her note-book with a snap, and blushed. Really, if I was going to dictate matter on that subject, she said, I must engage another amanuensis. Things about population were not so bad, but—and then she dabbed one eye with a tiny handkerchief. "But, but," I said, "I say, you know—really—what I mean to say is—tut, tut—what's the matter with birthright?" "Everything," she said, decisively. And then a great light dawned upon me. "I said birthraight, not birthrate," I said. "Yes," she said, "I know—I'm not deaf." "But"—well, blow it all. I said soothingly, "birthraight—you know, the mess of pottage business." "Oh!" she said, "Yes, of course; I was forgetting your Oxford accent. *So* sorry." And so here we are, rather less hot and bothered than formerly, thank you.

I'm concerned about our birthright because in this year 1927 I feel that we are being cheated thereof. Fifty-two Sundays, one Good Friday, and one Christmas Day: that's what we've always been used to: it was good enough for our fathers and mothers, and that's what we want. And what have we got this year? Fifty-two Sundays, one Good Friday but *no* Christmas Day because, forsooth, Christmas Day falls on a Sunday! Is this the thin edge of the economy wedge? If so, it won't be long before Good Friday will fall mysteriously on a Sunday and then where shall we be? Or else there's something wrong with the calendar. I said at the time that is was a mistake not to let Messrs. Whittaker & Letts look after the calendar instead of allowing the Julians and the Gregorys to butt in. If it's not due to economy or calendars it must be due to Summer time. They've monkeyed about so much with the clocks that, despite their cunning, someone has blundered and we, who labour by day and by night and on Sunday, Good Friday and Christmas Day, are the losers.

And who cares? Nobody. Those thousands and thousands of the great British Public who will sit round the groaning board on Dec. 25, 1927, eating their way through seasonable fare: those who, later, will be blaming the mistletoe or attaining their end via Postman's Knock—will they give us a pitying thought? Not a tear, not a sob. No! when we crawl home feebly after duty our lot will be a bony carcase, a few pudding crumbs, and some empty mince-pie lids. And—the mistletoe queue will be full. Alas!

Meantime the problems of Automatics, C.C.I. and Tandem routes have receded into the background. The great and insoluble question of the moment is, "Shall duty performed on Dec. 25, 1927, be regarded as Sunday duty or Christmas Day duty, and if not both why either or which of the two?"

However, may you all have as happy a Christmas as the circumstances will permit.

PERCY FLAGE.

Sydenham Exchange.

The first dance of the Winter Season was held on Oct. 25, 1927, at the Dartmouth Hall, Forest Hill.

The Committee was fortunate is securing the services of Mr. Townsend, who was an excellent M.C., and distributed the prizes to the following Tennis and Swimming Club prizewinners:—

Tennis Tournament: Experienced Players.—
1st prize.—Miss E. Songhurst.
2nd „ Miss B. Lewis.

Tennis Learners.—
1st prize.—Miss R. Wireman.
2nd „ Miss M. Callen.

Swimming Club.—
1st prize.—Most Enterprising Member: Miss M. Whorewell.
2nd „ First Learner to Swim: Miss Franklin.

A pleasing feature of the evening was the presentation of a bouquet from the staff to Miss Bowley in appreciation of the keen interest she always takes in the social work of the Exchange. The Secretaries of both clubs were also the recipients of beautiful flowers presented to them by the members.

A special work of thanks is due to Miss Arnott, who gave much of her time to the preparation of refreshments, and to whose organising abilities the committee is greatly indebted.

The dance was a social and financial success, and we hope to welcome our many friends again at the Social to be held on Tuesday, Jan. 3, 1928, at the Hamilton Hall, Forest Hill. Our library needs extending to allow scope for educational purposes, and we hope that the Social will enable us financially to fulfil the scheme we have in mind.

May I—with the permission of the Editress—inform colleagues at other exchanges that we should be pleased if they would join us for Winter Tennis. Cobb's hard courts at Silverdale, Sydenham, have been engaged and the fee for the season is extremely moderate.

G. M. T.

A Telephone Romance.

(Continued.)

After the "breakdown" it only took them five seconds to "pick up" all their belongings, including the "Tandem" which the bridegroom carefully "tested" for "faults," and after close "observation" found the "lamp cap" to be bent. This "minor irregularity" was soon adjusted, but upon closer "observation" he found one of the saddles to be in a "dropped position," so after rescuing his goggles, which his bride laughingly called his "face equipment," they "abandoned" the Tandem and set out to walk.

Before starting, the bride "arranged" her hair with the aid of her sister "Addis combe" and refreshed herself with some "Mitcham" lavender water. After proceeding for some distance they found themselves in the wrong "Area," so the bridegroom "rang the bell" at a neighbouring cottage, and when a "quick answer" was received remarked "I am sorry that you have been disturbed," but I fear that we are on the "wrong route," and added "We came via Tandem" but had to "abandon" it owing to an accident, which caused "repeated faults." They were soon advised of another route, and instructed *re* their "correct procedure," so turning "East" and a little later to the "North," their villa soon appeared in view. As they approached, it looked very "effective" with its windows "glowing with lights," its "flimsy" curtains, and its wallpaper patterned with "green rings."

After they had rested for a short time, the bride suggested that she would like to change her attire, and appeared later in a "multi" coloured dress which "emphasised" her "curves" and was "finished" at the waist with a "double-ended cord."

A "circulating message" must have been sent of their arrival for several visitors arrived to tea, including the bridegroom's old army friend, "Major Irregularity" (with whom he played in the same team at "Fulham") and several connexions of both families. With the "tee over" and the "American Service" "restored" to its place, several speeches were made, and among other things it was agreed that they were "coupled correctly" and that their "establishment" at "Mount View" should be a happy one.

The bridegroom thanked them in a few well-chosen words and ended by saying that they both viewed the future through a "fixed" "red glow" with no "bar" to their happiness.

After this someone suggested a song, and the bride rendered The Holy "City" in a low but "audible tone," and after "repeated demand" the bridegroom "obliged" with The Lass o' "Richmond" hill, which he sang in "ringing tones" with a good, rising inflexion.

For their further adventures see our next issue.

D. D.

At the Board.

(With apologies to Thomas Hood.)

Pick it up tenderly
Treat it with care,
Fashioned so slenderly
Fragile and rare.

Hold the plug gingerly,
Don't touch the cord,
It frays so easily,
Spoiling the board.

Push the plug gently
Swift but unflurried;
Exercise common-sense,
Careful though hurried.

After the call ends
Guide to the socket,
Should it lie idly there
Someone may knock it.

When the day's over
Swiftly its hurled,
Anywhere, anywhere,
Out of the world.

D. D.

London Telephonists' Society.

The paper read by Captain Reid last month was very good indeed. "Psychology," the title read, which covered most of what he said. He told us, to our stupefaction, why we make such and such an action. He spoke of our response to touch, to sight and hearing; stressing much that the important thing to do is "Find the *other's* point of view." And flights of airman next were seen, in simple graph form, on the screen. Their "standards" varied quite a lot—some peaks were high, and some were not. The high deserved some obloquy, the low showed rare efficiency. We liked it all—the only rift was that it seemed too short, too swift. Then Mr. Pounds bestowed a mead of well-earned praise on Captain Reid. To which the members said "Hear, hear; we hope you'll come again next year."

December 2nd next, please note (the title is too long to quote) when, though its cold, or dark, or damp, let's all come out for Mr. Camp.

Remember, too, within your reach, that guinea for the finest speech!

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North) London E.C.1.

LONDON TELEPHONE SERVICE NOTES.

London Telephonists' Society.

THE second meeting of the London Telephonists' Society for the current session was held on Friday, Nov. 4, at the City of London Y.M.C.A., Aldersgate Street, E.C.1.

A concert, arranged by Mr. Hugh Williams, was given by members of the Accounts Branch. The music, both pianoforte and vocal, was delightful, and was received with enthusiasm by an appreciative audience. At the conclusion of the concert a very hearty vote of thanks was given to the artistes.

The title of the lecture, "Psychology, and its Effect on Human Efficiency," had stimulated great interest, and there was a large number of members present. It immediately became apparent that Capt. Reid was a lecturer who was a master of his subject; his simple and lucid delivery giving to his hearers the full value of his address.

In Capt. Reid's definition of "rythm" as the ability to appreciate a coming stimulus, we recognised a condition very necessary to the individual as a means of producing truly effective work, while the control, which he states is so necessary to the physical and mental well-being of humanity, is a need fostered by the requirements, if not by the conditions, of modern life.

Slides were shown on the screen, and it was demonstrated, by means of the ubiquitous curve, the reactions of the individual to a variety of influences, and it was most interesting to note how a similar set of circumstances affected persons who differed temperamentally.

After the lecture points were raised by members of the audience, and a discussion followed. In answering, Capt. Reid mentioned that although involved controversies raged round scientific subjects, the basis of all scientific discovery is observation.

In conclusion, the thanks of all were conveyed to Capt. Reid for giving the Society the benefit of his vast experience as a student of industrial psychology.

* * * *

Contract Branch.

The volume of business done by the Contract Branch during the month of October showed a remarkable increase as indicated by the following figures:—

	Stations.
New business obtained	10,395
Ceasements	4,195
Net gain ...	6,200

The net gain is the highest on record and shows an increase of 1,016 stations on the figure for September and, what is still more gratifying, an increase of 528 on the previous record figure which was obtained in January, 1926. The figures for this month were as follows:—

	Stations.
New business obtained	9,747
Ceasement	4,075
Net gain ...	5,672

A number of amusing letters are addressed to the Controller from time to time, some of which illustrate the foreigner's difficulty with our language. The following is an example of this nature:—

"Dear Mister,

"I am veri sorry to have not participated a month before because I have known just now that I am obliged to change addres on Nov. 10, 1927. I pray you to procure to execute the removal in the shortest time possible.

I tank you feignedly,
Your faithfully,

The retirement of Mr. C. J. S. Livemore, First Class Contract Officer, has removed from the South-East Contract Office, an officer of considerable experience.

Mr. Livemore entered the Service of the National Telephone Co. as Wayleave Officer in 1904, became a Chief Contract Officer in 1910, and First-Class Contract Officer in 1912.

His unfailing good nature and genial disposition will be missed by his colleagues, who presented him with a cheque as a token of their esteem and goodwill.

* * * *

Football.

The game with the Treasury provided us with a runaway victory, the final score being 10 to none. The most pleasing feature about the result was the improvement in the play of the defence, and it must have been encouraging to the forwards, who have not been remiss in goal scoring, to retire from a game with a clean sheet. These runaway victories do not, as a rule, furnish the best games, and a far better contest was witnessed when the Colonial Office who, by the way, are the present leaders of the League, were entertained at Raynes Park. The result was a draw of 5 goals each, but when it is considered that at one period the L.T.S. lead by 3 goals to nil and later on in the game were leading by 5 to 3, it must be confessed that the final result was rather disappointing to the L.T.S. supporters. The Colonial Office recovered splendidly from the early reverses and came near to winning towards the end, when they showed the best football of the match. They are a fine team and should have a good season. It cannot be said, however, that our players are free from blame in permitting the visitors to snatch a point. The defence was weak under pressure and was guilty of bad tactics when holding a winning lead. These defects should, with a little more experience and understanding, disappear.

Two of our players, Messrs. Cowdray and Wilson, were selected to play in the League trial game, and hopes are entertained that further honours will be awarded the club.

Here is a list of fixtures to the end of the year:—

Nov. 19	... War Office	Home.
„ 26	... Board of Education	Away.
Dec. 3	... „ „ „	Home.
„ 10	... Ministry of Health	Away.
„ 31	... War Office	Away.

For the benefit of Members of the L.T.S. Staff wishing to visit Raynes Park, it is pointed out that Teas are provided in the Pavilion of the Club's headquarters.

Swimming Association Gala.

The ninth annual gala was held at the Pitfield Street Baths on Oct. 14. The interest in this event increases each year and on this occasion the attendance numbered 1,300. To the spectator it seemed that there were as many competitors as onlookers and, indeed, the entries for some of the events were remarkable. For the 33 yards handicap there were 138 competitors, and the team race for the Pounds Cup attracted an entry of 22 teams or 88 swimmers.

Apart from the competitive events the gala was notable on account of the demonstration given by Mr. E. H. Temme, the successful Channel swimmer, on how it was done. He was assisted by his trainer, Mr. T. Storey, and with the aid of a boat the method of feeding the swimmer was shown. The stroke demonstrated by Mr. Temme, who, by the way, is brother to the popular and energetic Secretary of the L.T.S. Swimming Association, was a powerful trudgeon at a rate of about 28 to the minute. Needless to say Mr. Temme received a great ovation from the audience.

Then there was the usual display of fancy and trick high diving by a team of A.D.A. divers.

Another event which was instructive and amusing was a display of life-saving by swimmers from Avenue Exchange.

Perhaps the most exciting event was the invitation team race in which a representative side from the London Banks, after a neck-and-neck struggle, beat an Insurance Office team by a touch.

A very good polo match between the Civil Service and Insurance Offices was won by the latter, 4 goals to 2.

Other results were :—

Learners' Race—"Agnes Cox Cup."

Miss Stevens (Park)	1
Miss Norden (London Wall)	2
Miss Dover (City)	3

L.T.S. Men's Team (Prossor Cup).

Automatic Section (Messrs. Gregory, Vincent, Porter and Bishop).

"Pounds Cup" Team Championship.

Regent (Misses House, Williams, Palmer, and Broomsgrove)	1
Victoria (Misses Amos, Bailey, Davis, and Drinkwater)	2
Gerrard (Misses Burt, Fairey, Hayter, and Wilson)	3

This was a very close race, and the noise created by the cheers of the supporters of the different teams beggars description.

The sealed handicap in connection with this race was won by Hampstead (Misses Martin, Turner, Hammond, and Payne), Lee Green being second and Primrose Hill third.

33 *Yards Handicap.*

Miss Watford (Park)	1
Miss Durling (Gerrard)	2
Miss Bennett (Paddington)	3
Miss Sumner (Museum)	4

Supervisors' Championship.

Miss L. K. Davies (Trunks)	1
Miss J. Davies („)	2
Miss Lloyd (Bishopsgate)	3

Diving Championship.

Miss McBirney (Trunks)	1
Miss D. Curnow (Holborn)	2
Miss H. Davis (Gerrard)	3

The Dance and Prize Distribution was held at Australia House on Nov. 18. During a jolly evening Miss Agnes Cox, who was presented with a fine bouquet by Miss Stevens, the winner of her cup, distributed the prizes. She commented on the fact that exchanges who had not previously competed were amongst the prizewinners this year, and she congratulated Regent on their fourth victory in the contest for the "Pounds Cup."

Mr. Pounds, the President and originator of the Association, referred to the large number of the staff who have learned to swim under the influence of the Association and he gave the number as 700.

SECRETARY'S OFFICE CRICKET CLUB.

A VERY successful Bohemian concert was held on Friday, Oct. 21 last, at which the "Leech" Cricket Shield was presented to the B. & S.B. and E.B. team, the winners of the Inter-branch Competition.

The members and their lady friends very much appreciated the talented efforts of their colleagues. Mr. W. J. Bale (Overseas Telegraph Branch (sang "The Toreador's Song" from Carmen and "Onaway Awake, Beloved," from the "Song of Hiawatha." His efforts were awarded by a hearty encore.

The Type duty provided a pleasing soprano in Miss Kelly and a rich contralto in Miss Vance.

Mr. T. Hanson, of the winning team, gave us a tasteful rendering of those well-known songs, "Take a Pair of Sparkling Eyes" and portions of the "Indian Love Lyrics." Mr. A. C. Jones, of the Traffic Section, excelled with skilfully played violin solos. The solo efforts of Messrs. John Whiffen and Arthur Hemsley, of the Traffic Section, were much appreciated, and their duet, "The Battle Eve," absolutely "brought down the house."

The humorous items by Mr. W. H. Oxlee, of the Staff Branch, provided that element of "gay abandon" which is expected on such an occasion. The eleventh hour presentation of a burlesque of "Julius Caesar" by the G.P.O. Players, some of whom are interested in the Mails Branch side of the Cricket Club, was a huge success, and the way certain incidents in the competition were brought in was admirable.

The concert ended all too soon, and those who were present gave expression to the sentiment that they had enjoyed a jolly good evening.

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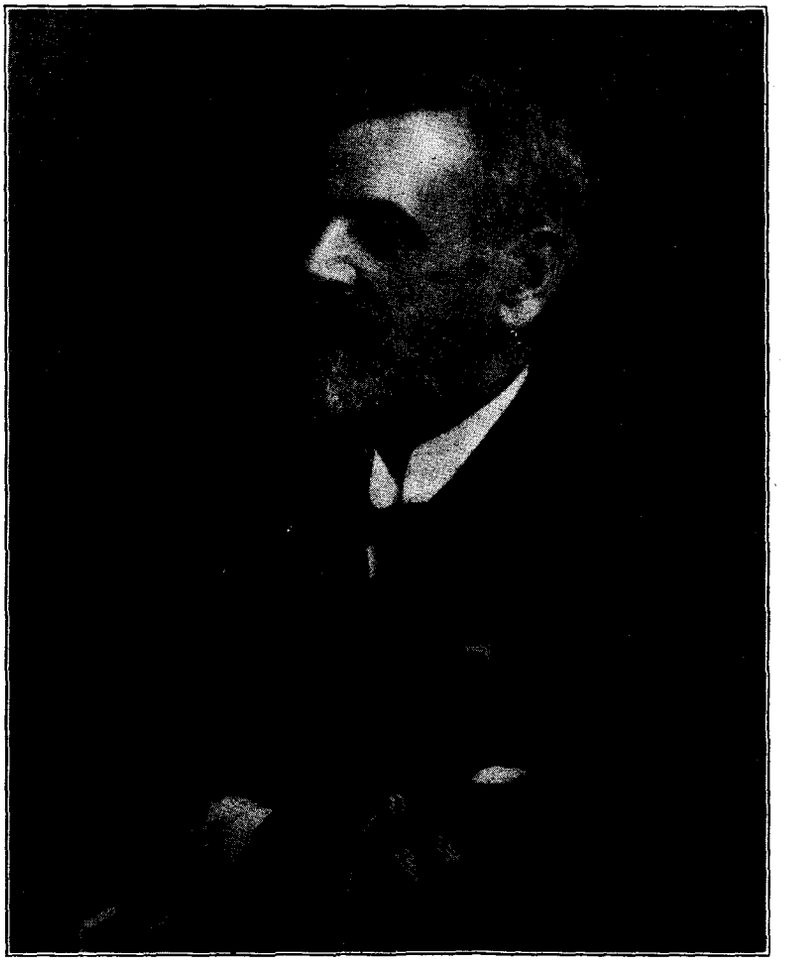
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XLVIII.

CAPTAIN H. F. BOURDEAUX.



[*Photograph by Lafayette.*

CAPTAIN BOURDEAUX, the subject of our sketch, is well known in telegraph and telephone circles as the Submarine Superintendent of the Post Office. He entered the service as 3rd Navigation Officer of the cable-ship *Monarch* in 1894, became Chief Navigation Officer of the *Alert* in 1903, Assistant Submarine Superintendent in 1912, and was promoted to his present post in 1922.

His father who was transferred from the Submarine Telegraph Company in 1889, became Submarine Superintendent. Captain Bourdeaux is therefore in the line of succession, and succeeded his brother in the post he now holds.

Captain Bourdeaux was in charge of various cable ships working under difficult and dangerous conditions during the whole period of the war, and during this time carried out important operations, details of which have never, and probably never will, be made known in a public journal.

He was awarded the O.B.E. and obtained special commendation from the Secretary and the Engineer-in-Chief for his exceptionally valuable work.

In 1919 he was delegated to select routes for submarine cables in the West Indies and subsequently accompanied the Cable Ship *Faraday* in the laying of cables between Barbados, Demerara, Trinidad and Turks Island. Needless to say Capt. Bourdeaux plays no small part in connexion with those Anglo - Continental telephone services which are now attaining such great importance. Moreover, the cable ships under his charge are always busy in one or other of the British seas, repairing the numerous telegraph and telephone cables which connect the mainland not only with neighbouring islands great and small, but also with the Continent.

TELEVISION.

THE Bell System Technical Journal for October, 1927, contains a series of five technical papers on various aspects of the experimental demonstration of television over wire and wireless channels of the Bell system. The papers were presented originally as technical essays at the Summer Convention of the American Institute of Electrical Engineers, Detroit, Mich., on June 20-24, 1927; and they treat in considerable detail with the various difficulties which were met and overcome.

As the articles occupy over 100 pages of print, it is not practical to reproduce verbatim any description of the interesting research work; but our readers would no doubt be glad to learn something of the American developments in this intriguing side issue of the electrical communication services, i.e., the reproduction at a distance of moving pictures.

Television and its possibilities depend entirely on the retentive faculties of the living eye, and in order to present a single image from a series of telegraphic signals the lag between one signal and the next for each part of a moving picture must not be more than one-sixteenth of a second; and the problem therefore resolves itself into the possibility of accurately telegraphing the whole of the moving picture in that brief interval of time.

The photo-electric cell is the medium used for turning light and shade into electric signals. It is extremely sensitive to light, but as it must respond, for this purpose, to light reflected from the image it is necessary for the part of the latter which is being transmitted to be highly illuminated. Any general system of lighting with that object is impracticable in consequence of its harmful or disconcerting effects on a living being; and this difficulty has been overcome by the Bell Company by means of an ingenious method of spot lighting through fifty pin-hole apertures arranged spirally on a disc which is rotating at the rate of at least 16 times a second. Allowing for the interval between each hole, the spot light can only be on one part of the image for the short space of less than a two-thousandth part of a second, a speed which is not perceptible to the human eye, and therefore causes no inconvenience to the person under illumination. The reflection of this travelling light on the object causes variations in three large photo-electric cells mounted in front of the disc, one at each side and one at the top, and thus the light and shades of the object are converted into fifty lines of telegraphic signals. These three cells are claimed to be the largest photo-electric cells that have ever been made, each of them presenting an aperture of 120 square inches to collect the reflected light. So much for the transmitting apparatus.

The receiving apparatus is provided with a similar perforated disc which rotates in exact synchronism with the one at the transmitting station. The reproduced spots of light are viewed through a frame so arranged that only one of the pinhole apertures can pass behind it at one time, the lights and shades for each of the parallel lines being provided by the variations of a neon lamp at the back of the disc. The received picture is therefore a series of parallel lines with varying light travelling over the frame so rapidly that the human eye sees only a complete picture formed by the whole 50 lines at one time. Special arrangements are necessary for increasing the size of the picture so that it may be suitable for public exhibition in a hall. During the experiments transmission of living images was syschronised with speech, for which purpose the use of three transmitters was necessary, one of 50 kw., employed to transmit the speech of the person talking, one of 5 kw. for the transmission of the picture, and a third of 1 kw. to provide for synchronising the picture with the speech and the receiver with the transmitter.

In the case of transmission over wires the output was cut down to a low level so as to avoid causing interference and noise on adjacent wires in the telephone cable, the received signals being amplified in order to actuate the receiving apparatus. In the case of transmission by wireless, most elaborate arrangements were deemed necessary to secure freedom from interference and consequent distortion. The aerial tuning and coupling apparatus was housed in small buildings placed under the centre of each aerial, i.e., one for the picture and the other for the voice, the structure containing the picture aerial being provided with a copper roof connected with the earth system. The station building was not situated directly under either aerial, but a special shielded studio was constructed in one of the rooms of the station, and the walls, ceiling and floor of the studio were completely covered with sheet copper lapped over one inch and soldered. The windows were covered with copper gauze and the doors with sheet copper having a firm wiping contact with the door frame. Acoustic conditions were restored to the studio by fixing wall-board over the copper and covering the floor. The arc was mounted in a metal cabinet outside the room and all possible parts of the apparatus were shielded. The shielding and apparatus, where practicable, were earthed.

Those who have read the Press notices about other systems of Television will realise that the device for spot lighting is one of the main distinguishing features of the Bell system. That device may, in practice, prove only to be applicable to small objects reasonably near the transmitting apparatus, and its application to sporting events, such as horse races, boxing matches, &c., may present insurmountable difficulties. But whether that be so or not, the experiments form a substantial stage in the investigation of the problem of illumination for television purposes. It will be remembered that in at least one other system the same problem has been attacked with the aid of infra red rays.

J. W. W.

TELEPHONE DEVELOPMENT OF THE WORLD AT 31ST DEC. 1926.

BY W. H. GUNSTON.

THE following tables show the telephone development of the world during 1926 and of the principal countries and their largest cities. Compared with 1925, the total number of telephones increased by 1,549,000, of which increase 878,000 took place in North America, and 518,000 in Europe.

This total is distributed over the six continents thus:—

	Dec. 31, 1925. (Thousands.)	Dec. 31, 1926. (Thousands.)
Europe	7,475	7,993
Asia	912.5	963.5
Africa	165.5	188.5
North America	18,240	19,118
South America	402	432.5
Australasia	530	578.5
	27,725	29,274

The figures for 1925 have been adjusted slightly (*vide* article on last year's development in the *Journal* for Jan. 1927) in the light of later information.

Europe increased by only 518,000, as against 610,000 in the previous year, a falling off due to the fact that Germany's total increased only by 100,000 in 1926, as against 200,000 in 1925. Nevertheless, Europe increased at the rate of 7% as against North America's 5%.

The figures in the annexed tables are those for the latest date (Dec. 31, 1926) to which it is possible to obtain information from the numerous administrations and other sources from which they are collected. In all essentials the figures are official, estimates being resorted to in an inconsiderable number of cases only. They are official for all the chief telephone-using States (Great Britain, the United States, Canada, Germany, France, Holland, Belgium, Scandinavia, Switzerland, Austria, Russia, Poland, Czecho-Slovakia, Australia, New Zealand, South Africa, India, Japan) and for numerous smaller States. For Mexico and South America, as also for some of the smaller countries, the figures are based on the previous year's official statistics. In a few cases, viz., China, Finland and the West Indies, the estimates are based on older figures.

The following table shows the number of telephone stations per 100 inhabitants of the chief telephone using countries at Dec. 31, 1926 :—

United States	15.6
Canada	12.7
New Zealand	10.0
Denmark	9.8
Australia	7.5
Sweden	7.4
Norway	6.9
Switzerland	5.3
Germany	4.3
Great Britain	3.4
Netherlands	3.2
Austria	2.4
Belgium	2.3
France	2.1
Argentina	2.0
Japan	1.7
Poland	1 0
Czecho-Slovakia	0.9
Spain	0.6
Italy	0.5
Brazil	0.3
Russia	0.2

This list contains all States possessing 100,000 telephones, with the exception of China, to whose 450 millions a total of 117,000 telephones stands in a negligible ratio.

EUROPE.

The annexed table (I) shows that there is one telephone to every sixty inhabitants of Europe. This figure, however, does not convey a fair impression of the development of Northern and Western Europe. In an area comprising Scandinavia, Germany, Austria, Switzerland, Holland, Belgium, France, Great Britain and Ireland, there are about 184 million people and about 6,756,000 telephones, a ratio of 27 to 1.

The principal increases in growth are to be found in Great Britain, 120,429 (8.7%) ; Germany, 100,479 (nearly 4%) ; France, 61,880 (11%) ; Russia, 34,583 (17%) ; Belgium, 17,374 (nearly 11%) ; Czecho-Slovakia, 16,468 (nearly 15%) ; Sweden, 16,052 (nearly 4%) ; Netherlands, 11,024 (over 5%).

The trunk line systems are in the hands of the State in practically all European countries except Spain. The local systems are operated by the State in almost all countries except Denmark (but in South Jutland there is a State system), Italy, Spain and Turkey. In Poland and Portugal the systems in the chief cities are worked by private companies. In Norway and Finland both the State and Private companies are in the field. In the Netherlands, the Amsterdam, Rotterdam and Hague systems are operated by the municipalities, and in the British Isles the Hull, Jersey and Guernsey systems are worked by the local authorities.

I.—EUROPE.

Country.	Population (thousands).	No. of Telephones.	Inhabitants per Telephone
Austria (152,757) ...	6,535	158,078	41
Belgium (156,307) ...	7,577	173,681	43
Bulgaria (8,531) ...	4,861	9,440	517
Czecho-Slovakia (113,767)	13,588	130,235	104
Danzig (17,707)	356	17,157	20
Denmark (311,570) ...	3,283	315,984	10.4
Esthonia	1,250	12,000*	104
Finland	3,402	87,000*	39
France (740,990) ...	39,209	822,870	47.5
Germany (2,588,016) ...	62,568	2,688,495	23.2
Great Britain (1,391,156)	44,173	1,511,585	29.2
Greece	6,800	5,500	1,236
Hungary (78,451) ...	7,482	80,183	93
Iceland	94	3,555	26
Irish Free State (23,112)	23,139	25,528	123
Italy	38,500	210,000*	183
Latvia 31/3/27 (18,411) ...	2,000	24,192	83
Lithuania (6,400) ...	2,000	6,818	294
Luxemburg (7,957) ...	263.8	8,350	32
Netherlands (215,928) ...	7,029	226,952	31
Norway (173,000) ...	2,649	174,500	15
Poland	13,000	135,347	96
Portugal (21,344) ...	6,399	21,850	293
Russia (206,795) ...	138,419	241,378	574
Rumania (41,675) ...	17,000	47,692	356
Serbs, Croats and Slovenes (26,778)	11,600	27,979	410
Spain (120,279)	21,658	134,860	160
Sweden (434,594) ...	6,036	450,646	13.4
Switzerland (200,211) ...	3,888	210,486	18.4
Saargebiet (17,688) ...	—	19,000*	—
Turkey (10,325) ...	2,000	10,907	183
	476,000	7,993,000	60

* Estimated.

The figures in brackets denote the number of stations at 31st December, 1925.

II.—ASIA.

	Telephones.
Ceylon	7,086
China	117,000*
Dutch East Indies (41,392) ...	43,329
French Indo-China	4,269
Federated Malay States	5,048
India (42,170)	47,624
Iraq (731)	825
Japan proper	636,727
Chosen (30,442)	65,000*
Formosa (12,637)	
Quantung (16,627)	
Saghalien 3,040	
Palestine (2,227)	2,695
Persia	3,547
Philippine Islands (16,966) ...	18,000*
Siam	2,000*
Straits Settlements (7,192)—	
Penang, 1,691	8,213
Malacca, 483	
Singapore, 6,039	
Turkey in Asia (est.)	2,000*
	963,500

Population 1,013,000,000 or 1 telephone per 1,051 inhabitants.

* Estimated.

The total for China is based on an American estimate.

The telephone systems of Asia are, generally speaking, in the hands of the State. In India and the Dutch East Indies there are both State and private companies in the field. The systems of Persia, Turkey in Asia, Singapore, Shanghai and Hong Kong are operated by private companies.

III.—AFRICA.

	Telephones.
Algeria (23,000)	24,060
Belgian Congo	400*
French Colonies	1,000*
Egypt (34,950)	36,778
Kenya and Uganda	1,782
Mauritius	1,098
Madagascar (1,254)	1,300*
Morocco (6,597)	7,000*
Nigeria	1,846
S. Rhodesia (1,981)	2,391
South Africa (78,571)	81,584
S.W. Africa	1,047
Tunis	8,167
	188,500

* Estimated.

Population 143,000,000 or 1 telephone to each 881 inhabitants.

These are all State systems, except that Durban (South Africa) has a municipal system, and Mauritius is operated by a private company.

IV.—NORTH AMERICA.

	Telephones.	Population (thousands).	Inhabitants per telephone.
U.S.A. (16,935,918) ...	17,746,152	114,430	6.4
Canada (1,144,095) ...	1,204,691	9,500	7.9
Mexico	58,000*	16,000	275
Cuba (62,114)	70,000*	2,900	41
Porto Rico (12,760) ...	13,000*	1,300	100
Other West Indies ...	4,000	3,500	—
Central America (20,014) ...	22,000*	6,000	273
	19,118,000	153,700	8

* Based on American official figures for 1925.

United States.—The total is made up of :—

American Telephone and Telegraph ("Bell") Company and Associated Companies ...	12,816,252
Independent companies in connexion with above system	4,758,000
Entirely independent	171,900
	17,746,152

The increase in stations over 1925 was 810,224 (or 4.8%).

The telephone service in North America is in the hands of private companies, except in Saskatchewan, Alberta and Manitoba (Canada) where the Provincial Governments operate the principal systems. There are also some small Government systems in Mexico, Central America and the West Indies.

Canada.—The total number of telephones was thus distributed amongst provinces :—

	Telephones.
Ontario	535,046
Quebec	246,138
Saskatchewan	102,148
British Columbia	101,915
Manitoba	71,369
Alberta	71,160
Nova Scotia	40,650
New Brunswick	30,294

The increase over 1925 was 60,596 stations or 5.3%.

V.—SOUTH AMERICA.

	Telephones.	Population (thousands).	Inhabitants per telephone.
Argentine (189,036) ...	205,000	10,087	49
Bolivia (1,824) ...	2,000	—	—
Brazil (102,984) ...	106,000	35,805	338
Chile (35,164)	40,000	4,655	116
Colombia (17,342) ...	19,000	—	—
Ecuador (4,518) ...	4,500	—	—
Paraguay (461) ...	500	—	—
Peru (11,000)	12,500	—	—
Uruguay (26,051) ...	27,500	1,678	61
Venezuela (12,035) ...	1,300	—	—
Other places (2,642) ...	2,500	—	—
	432,500	76,374	177

The figures in brackets are official figures for 1925 (from an American source). The figures for 1926 are estimated from them. The telephone in South America is almost entirely operated by private companies of which, except in Brazil, the principal are British.

VI.—AUSTRALASIA.

	Telephones.	Population (thousands).	Inhabitants per telephone.
Australia (384,563) ...	424,442	5,633	13
New Zealand (125,372)	132,089	1,320	10
Hawaii (18,804) ...	19,000	256	13
Other islands	3,000	700	—
	578,500	8,000	14

Australia.—The telephones are thus distributed amongst the States :—

	Telephones.
New South Wales	160,424
Victoria	133,218
Queensland	51,512
South Australia	45,391
Western Australia	21,981
Tasmania	11,916

The increase over 1925 is 39,879 or over 10%.

In New Zealand the increase (6,637) is over 5%.

The telephone service is operated by the State in Australia and New Zealand.

THE DEVELOPMENT OF THE LARGE CITIES.

Cities with 100,000 telephones and upwards :—

	No. of Telephones.	Population per Telephone.
1. New York	1,502,376	4
2. Chicago	848,017	3.7
3. London Telephone area ...	519,969	14
3*a* (*London Adm. County*	401,902)	11
4. Berlin (Greater)	427,070	9.4
5. *Boston	405,599	4.3
6. Philadelphia	382,000	5.4
7. *Los Angeles	307,471	3.8
8. Paris	288,471	10.4
8*a* (*Paris and suburbs*	360,000)	17
9. *Detroit	272,562	5.7
10. San Francisco	229,935	3.1
11. *Cleveland	197,652	5.7
12. *Pittsburgh	191,697	4.9
13. *St. Louis	189,929	5.6
14. Toronto	163,744	3.9
15. *Montreal	150,681	5.6

		No. of Telephones.	Population per Telephones.
16.	*Cincinnati	145,707	4.6
17.	Hamburg—Altona	142,979	9.7
18.	Washington	139,032	3.6
19.	*Kansas City	132,246	4.7
20.	*Copenhagen	130,675	6.2
21.	*Milwaukee	129,151	4.9
22.	Baltimore	122,197	6.5
23.	*Tokyo*	121,856	18
24.	Minneapolis	119,666	3.9
25.	Stockholm	111,487	3.5
26.	*Buffalo	111,348	5.4
27.	*Oakland	109,348	4.7
28.	Buenos Aires	104,281	22
29.	Seattle	103,595	3.8
30.	Vienna	101,410	18

* Including suburbs.

CITIES WITH 10,000 TELEPHONES AND UPWARDS.

Of these 278 cities, 166 are in North America, 84 in Europe, 10 in Asia, 8 in Australasia, and 4 each in Africa and South America. (41 are in the British Empire).

United States :—(The principal cities are mentioned in the foregoing list)	152
Germany :—(Berlin 427,070, Hamburg 142,979, Munich 63,306, Leipzig 58,928, Cologne 58,626, Dresden 52,505, Frankfurt (Main) 51,681, Breslau 37,649, Düsseldorf 38,157, Stuttgart 36,172, Hanover 31,641, Nuremberg 31,513, Bremen, Essen, Chemnitz, Mannheim, over 20,000; Duisburg, Dortmund, Magdeburg, Königsberg, Stettin, Elberfeld, over 15,000; Barmen, Kiel, Halle, Kassel, Aachen, Karlsruhe, Crefeld, München-Gladbach and Wiesbaden, over 10,000)	31
Great Britain :—(London 519,969, Manchester 50,254, Glasgow 47,649, Liverpool 48,349, Birmingham 39,642, Edinburgh 22,321, Leeds, Newcastle-on-Tyne, Bradford, Sheffield, Hull, over 15,000; Bristol, Cardiff, Belfast, Nottingham and Leicester over 10,000)	16
Canada :—(Toronto 163,744, Montreal 150,681, Ottawa 34,949, and Vancouver, Winnipeg, Quebec, Hamilton, London, Victoria (B.C.), Halifax, Edmonton and Windsor between 10,000 and 30,000)	12
France :—(Paris 288,471, Marseilles 18,990, Lyons 19,750, Bordeaux 13,074, Lille 10,811, Strasbourg 10,676)	6
Japan :—(Tokyo 121,856, Osaka 76,856, Kyoto 24,856, Kobe 24,642, Nagoya 21,629, Yokohama 13,456)	6
Australia :—(Sydney 94,812, Melbourne 80,301, Adelaide 27,385, Brisbane 20,122, Perth 12,575)	5
Switzerland (Zurich 28,451, Geneva 16,374 Basle 15,859 Berne 14 001)	4
Netherlands :—(Amsterdam 39,804, Rotterdam 33,833, The Hague 31,036)	3
Belgium :—(Brussels 60,324, Antwerp 25,485, Liege 12,064) ...	3
Sweden :—(Stockholm 111,487, Gothenburg 29,913, Malmo 15,416)...	3
New Zealand :—(Wellington 15,997, Auckland 15,957, Christchurch 10,290)	3
Russia :—(Moscow 54,936, Leningrad 47,150)	2
Spain :—(Barcelona 18,500, Madrid 17,800)	2
Italy :—(Milan 18,000, Rome 14,000)	2
India :—(Calcutta 12,377, Bombay 10,096)	2
Egypt :—(Cairo 14,813, Alexandria 10,348)	2
South Africa :—(Johannesburg 22,754, Cape Town 14,036) ...	2
China :—(Peking 41,000, Shanghai 24,000)	2
Argentina :—(Buenos Aires 104,281)	1
Austria :—(Vienna 101,410)	1
Brazil :—(Rio de Janeiro 35,871)	1
Chile :—(Santiago 10,568)	1
Czecho-Slovakia :—(Prague 30,345)	1
Cuba :—(Havana 42,860)	1
Danzig :—(Danzig 10,493)	1
Denmark :—(Copenhagen 130,675)	1
Hungary :—(Budapest 32,993)	1
Ireland, Free State :—(Dublin 14,005)	1
Latvia :—(Riga 11,215)	1
Mexico :—(Mexico City 30,700)	1
Norway :—(Oslo 40,872)	1
Poland :—(Warsaw 33,797)	1
Portugal :—(Lisbon 17,726)	1
Roumania :—(Bucharest 12,532)	1
Turkey :—(Constantinople 10,907)	1
Uruguay :—(Monte Video 15,589)	1
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TELEGRAPHIC MEMORABILIA.

A HAPPY NEW YEAR.

AUSTRALIA.—The question of Beam *v.* Cables was still vexing the public mind up to the time—slightly earlier than usual—that the *Journal* went to press. The skein is a tangled one, and better cannot be done for our readers than to place before them the published facts and points of view so far as they have come into our hands by the medium of the usual agencies, &c. Thus, the Canberra agency of Reuter's cables that "Mr. S. M. Bruce, Australian Commonwealth Prime Minister, has stated that he approved of the suggestion from London that the countries financially interested in the Pacific Cable Board should confer in view of the growing competition of wireless-telegraphy. The Ministry, Mr. Bruce added, considered that the competition between the 'beam' and cable services was not economical; the 'beam' system had taken 45% of the Pacific Cable Board's traffic."

On the 5th ult. the Canberra correspondent of the *Daily Telegraph*, London, cabled as follows:—

"Replying to a question in the House of Representatives in the matter of the position of the cable services in respect of the development of beam wireless, the Right Hon. S. M. Bruce, the Commonwealth Prime Minister said:

"The position of the cable services since the development of beam wireless is becoming acute and serious, and will be more serious if the beam system advances during the next twelve months at the same rate as it has during the last two months. The cables are vitally necessary for defence purposes as an adjunct of communication. As the matter is so serious it is proposed to appoint a committee of representatives of all the Governments concerned to meet in Great Britain and to examine the whole question. The representatives will make recommendations to their respective Governments. The appointments have not yet been made."

The new wireless agreement Bill submitted by Mr. S. M. Bruce, Prime Minister, to the House of Representatives, says Reuter, provides for the continuance of Commonwealth control over commercial wireless conducted by the Amalgamated Wireless Co., all charges being subject to the approval of the Commonwealth. The Company's patent rights are to be available for five years free of charge to wireless traders and broadcasting agencies; fees for listeners are to be reduced by 3*s.* 6*d.* to 24*s.* The Company has agreed to grant a licence free of royalty to every newspaper broadcasting station in the Commonwealth for the purpose of receiving official news from the British Government.

The Company is apparently waiving its present charges to broadcasters and listeners and receiving instead 3*d.* per month from the Government in respect of every listener's licence. The Company is to test the validity of its patent rights.

Reuter's Melbourne Trade Service states that: "Country listeners have often complained of the difficulties they experience in selecting sets suitable for the locality they are in, and 3LO is now considering equipping a special railway train to tour the country for the benefit of listeners. The train would carry a large variety of wireless sets and accessories, and be accompanied by experts, whose advice would be of great benefit owing to the distance from the cities."

New Short-wave Station.—On Nov. 21 the Melbourne station (3LO) commenced to conduct a regular Empire transmission for two hours every Monday afternoon from 4.30 Melbourne time (6.30 a.m. London time), using a wavelength of 36 metres.

At the end of June 1927, states the *Electrical Review*, some 2,797 persons were licensed as radio dealers, of whom 916 were in New South Wales, 1,024 in Victoria, 344 in Queensland, 335 in South Australia, 49 in Western Australia, and 129 in Tasmania, says the Royal Commission in its report, and evidence before it suggests that a number have no knowledge of the technical side of radio, and in at least some instances have sold sets of inferior quality. Under the present regulations, each dealer's representative who demonstrates a set for sale is bound to have a licence, for which the annual sum of £5 must be paid. The Commission is of opinion that when the employer himself holds a dealer's listening licence, he should be entitled to obtain further licences for his employees at reduced fees.

CHINA.—*World Radio* relates that in the spring of 1924 the Kellogg Switchboard & Supply Coy, of Shanghai, started to broadcast a daily regular programme and has continued to do so. It goes on to show how that although broadcasting and receiving in Chinese territories are not permitted on account of Government restrictions, the Kellogg Company's station was nevertheless instrumental in saving the lives of many missionaries and others during the recent outbreak of civil war. The number of radio users in Shanghai is estimated to be 10,000; the number of radio importers is placed at 15 and that of dealers at 25. Radio sets are either imported ready made, or are made locally of parts imported; prices range from 8*s.* to £150. Shanghai

has three broadcasting stations, owned by the Kellogg Switchboard & Supply Co., the Kobe Electric Works, and the Shanghai Mainichi Shimbunsha, and each station claims to have a wavelength of 342 metres and power of 250 watts.

COCOS ISLANDS.—The British Chamber of Shipping has been notified that the radio-telegraph station on the island, which was closed on Nov. 30, 1926, has been reopened for the receipt and dispatch of private messages and distress calls.

FRANCE.—The *Financial News* says that the laying of the first section of the new Franco-American submarine telegraph cable, which is to cost Fr. 100,000,000 (about £800,000) was commenced at Le Havre, France, on Dec. 8, and completed Christmas Day. The first section will terminate at Newfoundland, whence a second section will follow on to New York. The French shore end was sunk by the cable-layer "Druge," but the "Colonia" will lay the deep-sea sections.

Broadcasting in France.—M. Bokanowski, Minister of Commerce, has laid demands for credit for development before the Finance Committee of the Chamber. The Minister proposes to create three "national," or main and 18 "district," or subsidiary, broadcasting stations. One of the national stations is to be at the existing school of telegraphy and telephony, whose transmitter will be developed accordingly. The other two national stations and the district stations are to be built with Government assistance and worked by private syndicates. The whole scheme is intended to be in working order within two or three years. The necessary funds will be obtained by raising the present tax of Fr. 1 on each receiving set, which is not levied effectively, and of which many listeners are not even aware, to Fr. 10 and by stiffening up the machinery for collection, says *The Times*. The Finance Committee has expressed the view that the national stations should be set up as soon as possible, and should be used to broadcast not only entertainment, but information useful to the rural population and weather reports. It is probable that existing private stations will eventually be acquired by the State.

GERMANY.—On the first of last month a public service for the telegraphing of pictures, documents, &c., was inaugurated between Berlin and Vienna at a minimum cost of eight marks. The special correspondent of the *Daily Telegraph* gives the following authentic particulars, &c. :—

Eight marks is the price of the transmission of a photograph of the dimensions of 3¾ in. by 1½ in. Every addition to the length adds a further two marks to the price. From nine in the evening until eight in the morning the charge is reduced by 20%. The maximum dimensions of telegraphable pictures are 7¼ in. by 3¾ in.

It is made known that, in addition to pictures in the ordinary sense, the service provides for the transmission in facsimile of drawings, plans, and written and printed matter of all kinds. The public is advised not to attempt to transmit yellow, blue or lilac, or to expect that a "picture telegram" delivered at the other end will show any other colours than black and white.

The *Electrical Review* says that the reported installation of a communal receiver at Frankfurt-on-Main extends the system of private relays which has already been widely adopted in Germany, with the approval (given experimentally) of the Reichspost, and in Darmstadt, plant capable of supplying many thousands of subscribers was initiated a short time ago. The method is to install central receiving apparatus and lay suitable lines to subscribers, who pay a monthly subscription fee of 4 marks, two of which (the ordinary broadcast licence fee) go to the Reichspost. The system is particularly well suited to new tenement buildings and settlements, adds *World Radio*, and many of the larger hospitals in Germany have adopted the system.

The British Department for Overseas Trade, in an interesting report on the Economic and Financial situation in Germany, in dealing with telegraph and telephone matters in that country, states that the number of telephones (main and subsidiary connexions) increased from 2,540,000 in 1925 to 2,640,000 in 1926; and the number of automatic exchanges was 221, with 143,000 subscribers. The telegraph is said to be increasingly superseded by the telephone so that the telegraph department shows an annual deficit of 40,000,000 marks. Two important cables were laid during the year. One was between Germany and Denmark, and the other between Germany and the Azores. The chief wireless connexions are with the United States, Argentina, China, Japan, the Dutch East Indies, Brazil and Egypt. The number of subscribers to the broadcasting system was 1,500,000 on Feb. 1, 1927, or an increase of 261,000 over April, 1926. At present 22 broadcasting installations are being carried on by ten companies. The transmitting apparatus at Koenigswusterhausen is to be replaced next year by one of five times greater capacity.

GREAT BRITAIN.—The results of the year's operations to Mar. 31, 1927. of the Pacific Cable are in brief as hereafter recorded and indicate that the receipts (£478,302) exceeded the ordinary working expenses by £178,284. After taking account of the annuity of £77,544 payable to the National Debt Commissioners in respect of interest and repayment of capital, a surplus of £100,739 has been devoted to the reserve and renewal fund in compliance with the provisions of the Pacific Cable Act, 1927. The *traffic* receipts (£467,063) exceeded those of the previous year by £13,467, due in part to the greater volume of traffic, but mainly accounted for by the circumstances that, owing to a carry-over from the previous year, payments received during the year under review from one of the connecting administrations in adjustment of traffic exchanges covered 13 months. The expenditure (excluding the contribution to the reserve and renewal fund) was higher by £21,030 than that of the preceding year. The expenditure from this fund during the year in connexion with the duplication of the cables between Vancouver Island and Fiji amounted to £2,131,308. The cable between Norfolk Island and Auckland was interrupted from Mar. 1 to 13, 1927, but did not involve any inconvenience to traffic. The duplication of the Board's cable system was completed during November, 1926. More than 12,000,000 words of international traffic (i.e., other than local messages between Australia, New Zealand, and the Pacific Islands) were transmitted across the Board's system, approximately 120,000 words above the total of the previous year, and established a further record. Ordinary, or full rate, international traffic fell off approximately 100,000 words, the loss being attributed to the attraction of the cheaper services. Week-end telegrams were less by approximately 130,000 words, the decrease being due to the reintroduction by the rival route of this service, which had for many years past been available only by the Board's route. There was an increase of approximately 40,000 words in Government traffic, 230,000 words in deferred ordinary, 60,000 words in Press, and 50,000 words in deferred Press, while the daily letter telegrams showed a reduction of approximately 40,000 words. In addition, approximately 3,700,000 paying words were carried between Australia and New Zealand and between those Dominions and the Pacific Islands, approximately 250,000 words in excess of the number handled during the previous year. On Feb. 1 the Board reduced its tariffs for telegrams exchanged between the British Isles and Australia and New Zealand, and corresponding reductions were made for traffic between Canada and Australia or New Zealand, as a corollary to the duplication of the system. The reductions were estimated to represent a sacrifice of approximately £27,600 per annum on the volume of traffic which was being handled at the time they were brought into force.

The *Daily Telegraph* adds that "in recording the completion of the duplication of the cable system the Board remark: The speed at which the new cables are capable of working surpasses all original anticipations. The capacity guaranteed by the contractors was 600 letters per minute, but the actual speed obtained during the tests was more than twice that figure, and it is anticipated that this could be increased should growth of traffic demand."

In the House of Commons.—On Dec. 5 last the following questions were asked and replied to as hereunder:—

Mr. A. M. Samuel, Financial Secretary to the Treasury, informed Sir Walter de Frece that the revenue of the Pacific Cable Board had undoubtedly suffered during the past year owing to the competition of the "beam" service and the lower rate charged. The Board was taking steps to effect economies in administrative expenditure, and experts were continuously engaged in improving the methods of working. The new cable was one of the most efficient in the world, having a capacity of about 1,200 letters a minute as against a maximum of about 260 on the old cable.

Mr. A M. Samuel informed Mr. O. Nicholson that the duplication of the Pacific cable was carried out between 1923 and 1926 at a cost of £2,641,000, which was met out of reserve funds. The Board made a working profit of £178,284 during the year ended last March, and, after paying £77,545 for interest and repayment of capital, devoted £100,739 to its reserve and renewal fund.

Sir W. Mitchell-Thomson, Postmaster-General, informed Mr. O. Nicholson that the total capital cost up to Mar. 31 last of the Rugby wireless station, including site, buildings and telegraph and telephone plant, was approximately £490,000. He estimated the present annual expenditure, including interest, depreciation and amortisation of capital, at about £123,000 and the annual revenue at about £57,000.

Viscount Sandon asked the Under-Secretary for the Colonies what were the communications as to wireless, cable and mails of the Falkland Islands; whether any steps were being taken towards their improvement; whether the installation of direct wireless communication with Great Britain or some part of the Empire could be undertaken; and what would the cost of this be?

Mr. Ormsby-Gore said that there was no cable communication with the Falkland Islands. Mails were transmitted in either direction by vessels of the Pacific Steam Navigation Co. and such other opportunities as occurred from time to time. As regards wireless communication, messages from the Government station at Stanley were relayed usually via the station at Cerritos in Uruguay. The Governor had recently submitted proposals for the establishment of a station capable of direct short-wave communication with the United Kingdom, at a cost which he estimated roughly at £3,000. Those proposals were being examined from the technical and the financial points of view.

The British Post Office Wireless Station, at Grimsby, known as Humber Radio, which is provided for communication with ships at sea, was transferred to Mablethorpe, Lincolnshire, on Dec. 6, and a continuous service day and night is now afforded. The name remains unaltered.

Commencing last month, time signals controlled by the standard clock in Greenwich Observatory are now to be broadcast from the Government's high-power radio-telegraph station at Rugby on a wavelength of 18,000 metres, concluding at 10 a.m. and 6 p.m.

The B.B.C., which celebrated its fifth birthday on Nov. 15, inaugurated its short-wave station (5SW) at Chelmsford on Nov. 11. The aerial power will be between 15 and 20 kw., with a wavelength of 24 metres, and elaborate precautions have been taken to maintain constancy of frequency. The aerial is of the same type as the Marconi "beam" pattern, but has no screen wires behind it and so is non-directive. The oscillatory system is the standard Marconi one, but the modulator has been built up experimentally. It is explained by *World Radio* that the plant has been primarily installed to facilitate "two-way" experiments between England and America in conjunction with new reception methods and the Radio Corporation of America.

The 5SW programme was re-broadcast all over the U.S.A. and Eastern Canada, but in New Zealand and Australia attempts to relay it were not so successful owing to fading.

The Chelmsford Empire transmitter (5SW) commenced on Dec. 12 to transmit daily from 12.30 to 1.30 p.m. and from 7 p.m. until midnight, except on Saturdays and Sundays, on a wavelength of 24 metres. The National Broadcasting Co. of America, as well as organisations in the Dominions, will possibly relay some of the transmissions, which may last for some months. Chelmsford will relay the programmes of Daventry (5XX). (See also under U.S.A.).

It became known a week or two ago that a mobile transmitter with two masts and an aerial was touring the country in search of suitable sites for stations to be erected under the regional scheme under which the present 2LO station will be moved to a site north of London. The B.B.C.'s regional stations will serve: London and the South-East; the North of England; Scotland; Western England and Wales; and Northern Ireland. The mobile transmitter, it is understood, has already carried out tests in the Pennines and country just north of London, while engineers have made a rough survey of Wales.

The new aerial promised when "Daventry Junior" started work in August is now up, and engineers are testing the signal strength, but the new aerial will not be put into regular use at once as it has been found to suffer from screening in the direction of Birmingham. Recently 5GB's power was increased by 6 kilowatts to a total of about 24 kilowatts.

The British Government Radio Research Board's laboratory, test room, apparatus and a 200-ft. high lattice aerial mast at Ditton Park, near Slough, Buckinghamshire, England, were destroyed by fire on Dec. 1.

The number of radio broadcast receiving licences in force in Great Britain and Northern Ireland on Nov. 30 was 2,356,000, compared with 2,130,000 on the same date last year, an increase of 226,000. The number of free licences issued to blind listeners since the service was started at the beginning of the year is approximately 11,000.

The old system of illumination by incandescent gas burners in the lighthouses at Burnham-on-Sea, Somerset, England, has been successfully superseded by an electric and automatic one, the first installation of its kind. Trinity House made the change-over on Nov. 23 last.

"A night watchman employed on street works at Newton Abbot, Devon, fixes an aerial between the chimney of the road engine and the roof of his hut and listens to English and foreign stations."

The above paragraph has been very well advertised in the London and Provincial Press of the country, and the ingenuity of this *road-minder* deserves all the publicity it has received. It is hoped, however, that this lowly genius has duly made the necessary arrangement with the Licence Department of the G.P.O. Otherwise he may discover the drawbacks of publicity!

Figures published by the *Wireless Trader* show that the total value of exports of radio apparatus from this country during September was £95,892, including valves valued at £16,914. Japan was by far the most important customer, her share amounting to £30,047 (valves £7,697). Australia took second place with £12,880 (valves £3,437), and the Netherlands was third with £7,448 (valves £50). Other important customers were: India and Burma £7,795, France £5,261, and Italy £3,776.

GREECE.—The Government has decided to establish a broadcasting station in Athens, and relay plant at Corfu and Salonica is projected. Government regulations permit of the use of frame aerials only for reception.

HOLLAND.—Reuter's Amsterdam agent records that a new long-wave wireless station for European traffic was opened at Kootwjk on Nov. 21.

On Dec. 1 the Dutch Telegraph Administration completed its 75th year of Government Telegraph Service. The event was celebrated by the Administration and Supervision by the issue of a *Jubileumnummer* of the *Tydschrift voor Posteryen en Telegrafie*. This number is the 11th monthly issue of its 44th year and contains well over 60 pages of interesting matter, on the past, present and future of telegraphy, and is well illustrated throughout. There is an interesting symposium on "The future of Telegraphy," which includes many well-known names, each expressing his views in his own tongue, thus Monsieur Montoriol for France, Mr. Creed, Mr. Murray and last, but not least, Mr. Archibald, for Great Britain. Dr. Lüschen writes for Germany, while R. De Boer for the Dutch gives both the pessimistic and optimistic views of the by-and-bye and seems to come down heavily, as one would have expected, on the latter side.

Un chanson au Baudot is reproduced *in extenso* from the *Cable Room Chronicle*, London, a compliment which will be much appreciated by the Cable-ites.

The Dutch Postmaster-General has issued a *communiqué* in which he says he has obtained excellent results with short-wave radio-telephony between Holland and the Dutch East Indies, and that, if results can be maintained, regular telephone communication between the Netherlands and its Colonies will be assured.

HUNGARY.—On the 6th ult. Reuter, wiring from Budapest, stated that the Budapest Prefecture of Police has decided to install at headquarters transmitting and receiving apparatus for the despatch and recording of pictures sent by wire. Smaller sets will be provided for the various district stations.

INDIA.—Experimental short-wave transmission is to be undertaken *in order, if successful, to enable the two existing stations' transmissions to* be duplicated on both short and long waves, says *World Radio*, so as to give listeners who live beyond the normal range of the present 3-kw. transmitters a chance of using smaller and cheaper receivers than is at present possible. Such development may increase revenue sufficiently to permit of the erection of further normal-wave stations.

As the special correspondent of *The Times Engineering Supplement* stated when cabling from Calcutta at the early part of last month: "Broadcasting is making slow progress, and will reach its full development only when 'Empire broadcasting' becomes something more than a newspaper headline. Consequently the demand for wireless instruments remains on a limited scale, British suppliers commanding most of the trade. The main trouble of the Indian broadcasting company, which at present has stations only at Bombay and Calcutta, is the smallness of the area in this vast country which is open to reception on small and cheap sets.

"Plans, however," the company announce, "are proceeding for development on original lines, and should these prove practicable, there appears no reason why all India and countries beyond as well should not be able to receive one or other of the stations, and a large part of it both stations, on comparatively small, simple and cheap sets.'"

IRISH FREE STATE.—When members of the wireless trade dined together in Dublin recently, the speakers urged the removal of the duty on imported components and materials of the trade, the contention being that, as there was no industry to protect at home, the imposition of the tax was for revenue purposes only.

It is understood by the *Electrical Review* that it is contemplated to discontinue the direct telegraph line from London to Waterford, and that in future cross-Channel messages will be relayed via Limerick, Cork or Dublin. It is also understood to be a question of the upkeep of the cable between Rosslare (Wexford) and Fishguard (Wales); the direct line will only continue henceforth to and from Waterford up to 4 o'clock in the afternoon, and messages between London and Waterford after that hour will be sent by the longer indirect route.

NORWAY.—It is reported that the Bergen station will commence duplicating its transmission shortly, if it has not already done so by the time these lines are in print, on 30 metres, in addition to its normal wavelength of 370.4 metres.

In an endeavour to improve cable telegraph communication between Norway and London, says Reuter's Oslo agent, the Norwegian Government has decided to exchange with Great Britain two telegraph officials for a month, with a view to the mutual study of conditions in the two countries.

PHILIPPINE ISLANDS.—Day and week-end radio letter telegram services, via Marconi, were recently inaugurated to the Sandwich and Philippine Islands.

POLAND.—The new transmitting plant at Kattowitz, which has been recently tested nightly on 422 metres, should by this month be in full operation.

As a result of the development of communication by telephone, the use of the telegraph service is declining in Poland as in other countries. The Ministry of Posts and Telegraphs is consequently laying this year only an insignificant number of new telegraph lines; they will reinforce the present telegraph systems between Warsaw and Gdynia, Warsaw and Posnan (Posen) and Posnan and Cracow, via Katowice.

SOUTH AFRICA.—When the African Broadcasting Co. took over the services there were 11,000 licensed listeners. To-day the total is more than 14,000; "piracy," however, continues, and another attempt is shortly to be made to deal with it. Now that the African Co. is broadcasting throughout the whole of the Union, developments may be expected, says *World Radio*. A new station is to be erected in Johannesburg, and it will contain a 20-k.w. set, against the ½-kw. set now doing duty, and should be in operation about Mar. 6, 1928.

SPAIN.—A return relating to the activities of the Spanish Telegraph Department during 1925, which has lately been issued, shows that the number of telegraph offices in the country declined from 3,394 in 1924 to 2,944, and the length of the telegraph line in use from 35,272 to 31,780 miles. Although the number of messages dealt with increased from 14,608,369 to 15,737,479,

there was a falling off in the receipts from 25,127,557 pesetas in 1924 to 19,507,087 pesetas in 1925. The service is apparently run at a loss, the return showing that the cost of operation and maintenance amounted to 44,493,324 pesetas, as against 48,833,512 pesetas in the earlier year.

SWITZERLAND.—The correspondent of the *Daily Telegraph* reported from Geneva that at one of the public meetings of the Council held last month a considerable time was occupied with the report on the Conference of Press Experts held in Geneva last August. On the report of the Cuban representative, the Council decided to draw the attention of the Governments to the resolutions of the Conference which called for official action. A letter from the International Association of Journalists accredited to the League of Nations was presented by the Secretary-General to the members of the Council regarding the question of direct telegraphic communications between Geneva and London, which for a long time have been under consideration and have recently become particularly acute, as communication between Geneva and London has been found distinctly inadequate, resulting frequently in delays of as much as six hours. It is pointed out how communications between London and Geneva are of widespread importance, London being not only a receiving point for information concerning the League, but also the retransmission station for the British Dominions, the Far East, and North and South America. The Association of Journalists asked whether it might not be possible for the Council to arrange that the organisation for communications and transit should study this problem and bring about a meeting of experts belonging to Switzerland, France and Great Britain. Sir A Chamberlain informed the Council that immediately he returned to London he would consult the Postmaster-General and, so far as Great Britain was concerned, they would do their utmost to bring about an improvement in communications, the necessity of which was endorsed by all the members of the Council.

It is also reported that the wireless apparatus required for a new wireless station is now being manufactured in the Marconi works at Chelmsford, and the masts and accessories are under construction in Switzerland. The Swiss Marconi Company will be in a position to open the new station near Geneva for traffic in the spring of 1928.

It is with the deepest regret that we learnt through Reuter's Berne agency on the 16th ult. of the unexpected death of Henri Etienne, director of the International Bureau of the Telegraphic Union. This most respected officer of the Union, whose signature is probably known in telegraphic circles all over the world, was returning to Europe from the International Radio Conference in Washington and actually died on board ship from *angina pectoris*.

U.S.A.—At least 22 American stations have installed short-wave transmitters (using different call signs to those of their parent stations) for the purpose of relaying programmes.

The value of exported radio apparatus from the United States during 1926 amounted to £1,758,890, according to the Department of Commerce. Over 50% was for North and South American countries. The total export value dropped £220,000, or 11%, in 1926, due largely to the decrease of exports to Canada. North America took 20% less in 1926 than in 1925, South America increased its purchases 21% in 1926 over 1925 and 39% in 1925 over the preceding year.

The National Broadcasting Company of America has notified the Federal Radio Commission that it intends to endeavour to establish systematic international broadcasting at the earliest possible date. The first interchange of programmes is planned between the United States and Great Britain, and in the United States it is intended to operate between the hours of 7 and 11 in the evening, e.s.t., throughout the year. Experience has shown that two short wavelengths at least will be required to enable British reception of American programmes. The transmitter will deliver approximately 20 kw. of power, modulated telephonically, and will be installed at Bound Brook, N.J., in the same building as the present broadcast transmitter of W.J.Z. The programmes will not be broadcast to the public, but addressed to the British Broadcasting Corporation's corresponding receiving station in England, and regarded as a point-to-point service. It is possible that commercial arrangements relative thereto will be worked out and, in any case, the programme will not be available for rebroadcasting purposes, except by those to whom it is addressed. According to *World Radio*, the purpose of this restriction is to make certain that rebroadcasting shall be conducted by responsible agents capable of giving good service to the public abroad, and in such efficient manner that a fair idea of the nature and quality of American programmes can be gained by the public in foreign countries. The two wavelengths desired for the purpose are 27.207 metres (11,020 kilocycles) and 18,715 metres (16,020 kilocycles). The first is within a band already assigned for relay broadcasting, and the second within a point-to-point service band. (See also under GREAT BRITAIN, *re* 5SW.)

The following items regarding the late Radio Conference held at Washington, are condensed from communications cabled by Reuter's special agency in that city:—

The International Radio Conference at Washington adjourned on Nov. 25 after ratifying the new Wireless Convention, which will come into force on Jan. 1, 1929, and will remain in force for a period of five years. The convention was signed by 79 nations and territories.

Some time must elapse before the recommendations of the Conference are published. The matters of chief interest have proved to be the allocation of waves to the various services and the regulations for the gradual supersession of spark sets at sea. As regards the former, we understand that the principal changes from the band for long-range c.w. work will extend from 1,875 to 3,000 metres, the part between 2,000 and 2,400 being reserved for the use of stations which work with ships. As regards the latter, we understand that i.c.w. sets are to be substituted for spark sets in ships as opportunity occurs, and that it is stipulated that no spark sets must be in commission by 1940. The policy already entered upon in this country of having auto-alarm receiving apparatus in ships as a substitute for watchers has been agreed to in general by the Conference.

The regulations laid down by the last International Conference, which was held as far back as 1912, are, of course, quite inadequate for present conditions, so that the Conference has had to deal with an enormous amount of work in framing up-to-date regulations. Various arrangements have, however, grown up internationally by mutual consent during the last few years, and it will be found that, in the main, the arrangements already in use have been made the basis of the new regulations. Point-to-point working, which was not dealt with by the 1912 Conference, has been catered for in accordance with present practice, the longer waves allocated for this service being from 2,725 to 30,000 metres. Broadcasting requirements are, of course, also new; 1,340 to 1,550 metres will be available in Europe only for the longer-wave broadcasting stations, but they will be able to use also a band between 1,550 and 1,875. Both bands will also be available for other services. The shorter broadcast band will, we understand, be 200 to 545 metres, which is larger than that at present available in this country, but it includes the band of 200-330 metres which will be used for communication between small ships in place of the 300-metre wave of the 1912 Convention.

A distress call for use in radio-telephony, which will be the exact equivalent of the S.O.S. in telegraphy, has been adopted by the Conference and incorporated in the new International Wireless Convention. The new code is "Mayday," to be spoken through the broadcasting apparatus, and followed immediately by details. "Mayday" is the phonetic spelling of the French "M'aider" (help me).

The Conference has fallen into line with the British Air Force, which some time ago officially adopted the words "May Day" as a signal to be given by aircraft in distress.

The Belgian delegate stated that his Government had expressed its willingness to hold the Telegraph Conference in Brussels next year instead of in 1930.

With regard to short-wave developments, the *Electrical Review* has a lengthy and very interesting paragraph in their issue of the 16th ult. regarding the G.E.C. of America, thus: "In its pursuit of knowledge of short waves, the General Electric Co. of America has developed a 5-metre transmitter wherewith propagation tests will be conducted. Apparently the signal follows a straight unobstructed line: a receiver on a hill will pick up a strong signal, but the same receiver, when placed on the other side of the hill, so that it is not within the 'line of vision' from the transmitter, will get a barely audible signal. Natural static was absent from the tests made, but man-made static, such as that from the ignition systems of automobiles, was very noticeable; thus far the transmitter has been tested only thirty miles away. Extremely high frequencies are involved, a five-metre wave representing approximately 60,000,000 cycles per second, and the 1-kilowatt transmitter is constructed so that it can be elevated and swung from one of the 300-ft. masts at the transmitter laboratory at South Schenectady. Two new-type, four-element, air-cooled valves are used in the special oscillator circuit; the antenna is about 8 ft. long, and consists of a half-wave radiator, voltage fed, connected directly to the oscillator. A meter in the middle of the antenna is used for measuring the antenna current, which is read by means of a surveyor's transit on the ground. Tuning the transmitter is made possible by a rope drive connected with a 'vernier' control; wires for supplying power and control are run to the transmitter from the ground. The portable five-metre receiver used consists of a regenerative detector and one audio amplifier; the grid tuning coil consists of five turns of wire 0.5 in. in diameter; the 'tickler' coil is 0.25 in. long and 0.25 in. in diameter, and it is inside of the grid coil. Very small condensers located close together are used for tuning and regeneration control, and special low-capacity valves are used. Generally, it is unnecessary to use any antenna, the telephone cords picking up sufficient energy; an antenna may, however, be used.

WEST INDIES.—The report of the Pacific Cable Board for the financial year ended Mar. 31, 1927, on the working of the submarine cable system and radio-telegraph stations in the West Indian Islands and British Guiana shows that the receipts amounted to £50,412. The Board reports that the business of the telegraph system showed a consistent growth throughout the year under review. The number of words handled during the year totalled 1,379,769 (including 57,310 words in telegrams exchanged with ships at sea), as compared with 1,085,178 (47,206 words in ships' telegrams) during the preceding year; traffic receipts (£49,914) exceeded those of the

previous year by £11,545. The net expenditure (£33,581) was £418 in excess of that of the preceding year, which was accounted for mainly by contributions to the staff provident fund which was instituted during the year under review. The surplus of receipts over net expenditure amounted to £16,831, as compared with £6,010 during the previous year; £10,831 was available towards meeting the annuity of £23,922 payable to the National Debt Commissioners in respect of interest on, and repayment of, advances of capital for laying the cables, installing the wireless stations and equipping the system; the deficiency to be made good by the contributing Governments was therefore £13,090. No interruptions occurred, with the exception of St. Vincent, where transmission was suspended from June 23 to 27 owing to a breakdown of plant.

As these lines are penned the year of 1927 is drawing fast to its close and the outstanding feature of the telegraph world is pre-eminently Beam *v.* Cable. As I write with the latest weekly review of cable and wireless stocks and shares before me this is what I read: "It cannot be said that the cable group is particularly happy, although the severity of the slump has been stayed, and there was a little bargain-hunting on the part of speculative investors. The Eastern Company, pressed to make a statement on the subject of cable and wireless, replied that it would be improper to do so in view of official assurance that the Post Office would be in a position to deal, before the end of the year, with the situation placed in front of them. Eastern ordinary stock is normally unchanged at the extremely wide price of 145-155 but has changed hands down to 143. Eastern Extensions have dropped 15*s.* to 14¾*s.*, Globes 10*s.* to 15*s.*, and the preference 7*s.* 6*d.* to 10½, while Westerns at 14 xd. are about the same as they were. Anglo-Americans are flat at 96 for the preferred and 24 for the deferred. Indo-Europeans maintain their position at 40, but Great Northerns weakened to 37¼. Marconis continue to be a firm market at 31*s.* 3*d.*; the price has been up to 32*s.* 6*d.* A boomlet occurred in Canadian Marconis, the price being run up to 11*s.* 3*d.* (comparing with 6*s.* 6*d.* at one time last month) before reaction lowered the quotation to 8*s.* 9*d.* on a statement from the chairman, at Toronto, that 'there is no prospect in sight warranting the trading in the shares.'"

Perusal of reports from many administrations abroad also tells a tale of reduced telegraph receipts against telephone competition, which might shake one's faith in the future of telegraphy altogether if it were not for the long view on such a subject. The day for very short-distance telegraphy has no doubt gone, but the longer distances should find the telegraph still well to the fore, despite the telephone, high-speed motors or aeronautics!

The French news, above, shows that there are still experts who have faith in cables, while the following abridged report of the Western Telegraph Co., Ltd., emphasises once again the feature of secrecy which is claimed for underground and submarine cables. One thing is certain, the last move on the chess-board of telegraphy is a long way off yet.

The annual meeting was held on Nov. 24. Sir John Denison-Pender, G.B.E. (chairman) presided, and in presenting the report said that there was a decrease of £208,422 in the revenue. The actual decrease of message receipts, the main source of revenue, however, was slightly more than that figure, namely, £216,669, but there was an increase in respect of sundry other items. On the other hand, there was a reduction of £11,377 in working expenses, and they looked forward to further reduction in expenses when the effects of a new system of working made themselves fully felt. In the circumstances the result of the year's working could not be considered unsatisfactory, as they had been able to maintain the dividend. They had purchased a site for new offices at Rio de Janeiro; the value of property in the capital of Brazil was now not far short of that in London.

They were half-owners with the Eastern Telegraph Co. of a subsidiary company, the working of which they both found could be more economically carried out by its being absorbed, and as that company lay in the Eastern Company's sphere, it took over the working. They divided the greater part of the liquid reserves, and the company's share was £206,500. The decrease in revenue was due to competition, depression in trade, and the fall in Brazilian exchange. Every opportunity had always been taken by the company to improve plant and the carrying capacity of cables, and this year had seen perhaps the most important advancement of recent years, the installation of the latest invention for rapid and accurate transmission at all the main line stations. By means of this new apparatus, not only was direct transmission from point to point achieved, but speed was accelerated, and accuracy was further assured. They now worked directly between all the principal centres such as London and Buenos Aires, London and Rio de Janeiro, and, in conjunction with the Western Union Telegraph Co., between New York and those South American cities. Last year he had made it clear that with the number of telegraph companies competing in South America, in bad times there might not be sufficient traffic to go round and give satisfactory returns to the shareholders of those companies not fortunate enough to have financial Government support. In addition to the cable companies they had as competitors two comparatively recently started wireless companies, the Transradio of Argentina and the Brazilian Company. Since the introduction of the beam system between England and the remote portions of the Empire a great deal had been written concerning the effect it might have upon the cable companies.

But there had been no sign of doubt as to the security of transmission given by cables. It was by means of tariffs that the radio became a competitor of cables. Since Aug. 1 last the rates had been the same for both means of communication. Three months had passed since their international traffic had been carried at the reduced rates, and there had been a marked improvement in words carried, and, so far, the tendency was for it to increase. The cash receipts at the lower rates now in operation could only be made up by increased activity in commerce. His opinion remained confirmed that the cables gave the most accurate, secret and speediest means of communication, and were absolutely essential in certain circumstances, but he had no hesitation in saying that the co-operation of the two means of communication should be brought about in the interests of the Governments, the public, and the communication companies themselves.

A quarterly dividend of 5*s.* per share, free of tax, has been declared in respect of the current year.

The eighteenth annual exhibition of Electrical, Optical and other Physical Apparatus is to be held by the above Societies on Jan. 10, 11 and 12, 1928, at the Imperial College of Science and Technology, South Kensington.

From the Post Office to the Bar!—During the hearing of a case at the Old Bailey Sessions the Recorder congratulated Mr. A. E. McCloskey, the prosecuting counsel, on the masterly way in which he had marshalled the facts of the case in his address. Before going to the Bar Mr. McCloskey was an electrical engineer for thirty years on the staff of the G.P.O., London, and his services were loaned by the P.M.G. to the Governments of India, Ceylon and the Irish Free State.

At an informal meeting of the I.E.E. on Monday, Nov. 21, with Mr. J. R. Bedford in the chair, Mr. W. Day opened a discussion on "Automatic Telephony." He said that the manual telephone was definitely limited by the bulk of its multiples, the increase in the number of exchanges with the consequent slowing down of working, less reliability, and dearer plant. Another difficulty was the recruiting of the right type of operator to meet the intensified conditions. He then briefly reviewed the alternative systems, and explained with charts and lantern slides the route and apparatus of the "director" or step-by-step system recently put into commission at the Holborn exchange. He said that the difficulties of the subscribers in this area would rapidly vanish, and that familiarity with the apparatus would ensure successful functioning.

Mr. Gerald Marcuse, the British amateur, whose station 2NM anticipated Chelmsford in Empire broadcasting, expressed qualified approval when the *Daily Telegraph* wireless correspondent read to him Washington's list of amateur wavelengths. Unless a special concession could be obtained from the British Post Office, he pointed out, it meant that the wave he had most successfully used for broadcasting to Australia (32.5 metres) would have to be relinquished. Another difficulty which he foresaw lay in the possible use of crude methods of transmission by some Continental amateurs. Two or three might conceivably blot out the whole of a narrow band in the coveted short-wave region.

It is announced that Messrs. Isaac Pitman & Co., Ltd., are publishing immediately the survey of "The Cable and Wireless Communications of the World," which has been written by Mr. F. J. Brown, C.B., C.B.E., late Asst. Secretary, G.P.O.

Broadcasting has, to some folk, already become an ancient recreation, and by such is possibly even ranked with the commonplace.

One wonders whether the statement made by Miss Mildred Cable, missionary, the author of "Through Jude Gate to Central Asia," before a gathering of the School of Oriental Studies, would give these same folk just one new thrill of this now every-day marvel! Said Miss Cable, who herself has crossed the Gobi desert by a Central Asia route never trodden by a white woman before: "The Kazaks, the wild Tartan people of to-day, informed me of the details of our coal strike and quoted the names and politics of our political leaders, having gained this knowledge by means of wireless, which now connects their remote land with the greater world."

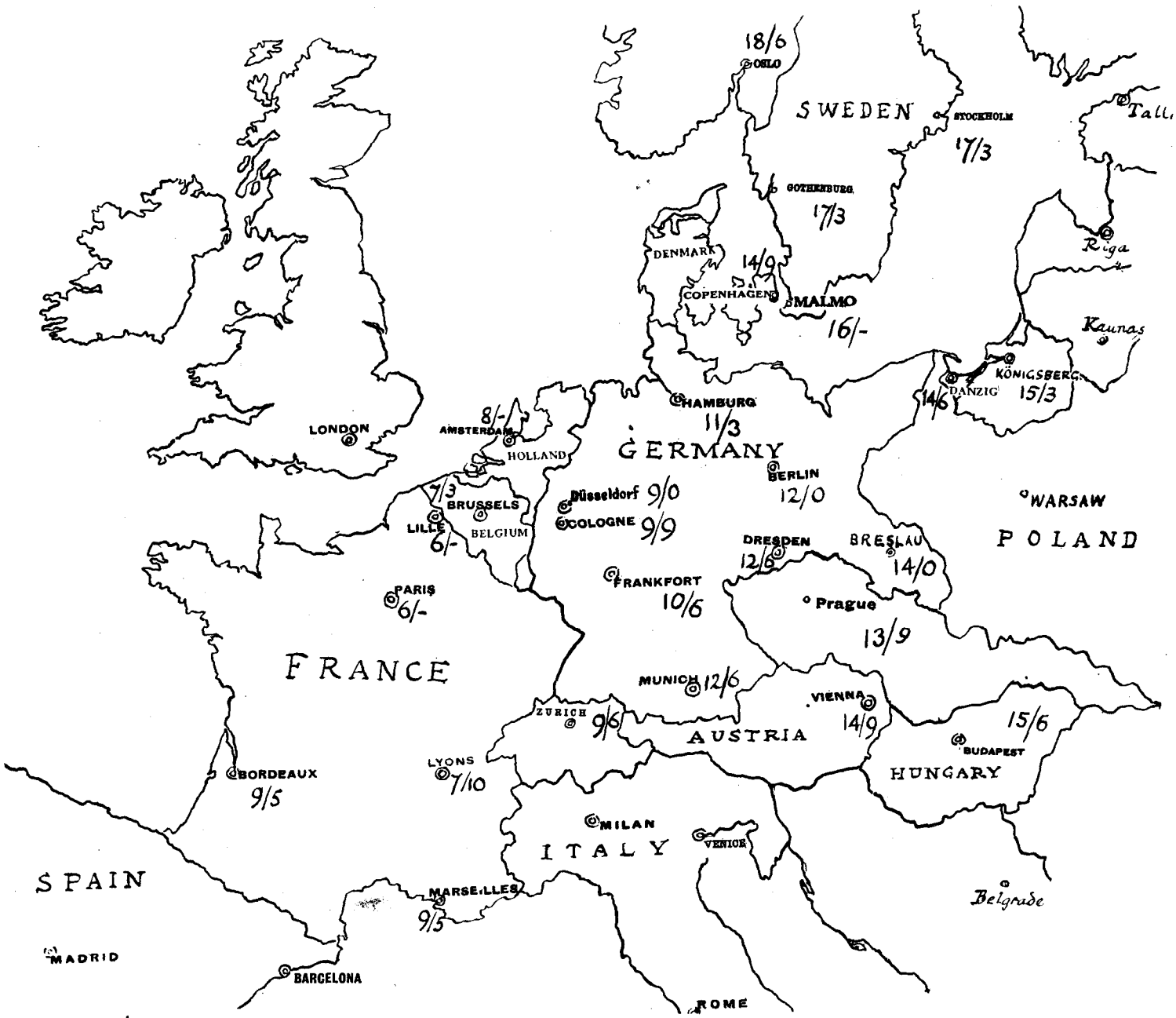
In a letter from a relation resident in Montreal there appears these few words: "We listened in to your Armistice Concert at the Albert Hall and got it splendidly. The Prince's speech, too, was as clear as it was when we heard him here in Montreal." It is perhaps the personal touch that affects one in a case like this, but nevertheless the wonder of it seems to grow upon one. Shall I be believed if I say that the thrill of being in instant touch with the humanity at the other end of an ordinary telegraph circuit is still not entirely quenched—after, in round figures, four decades?

Congratulations to Mr. Cobley, Asst. Supt., Cable Room, who retired on Nov. 26 last, upon reaching the age-limit. "George" was always a popular supervisor and his geniality will no doubt be missed by many. With his many activities and interests in life our old colleague is not likely to suffer from ennui. That his retirement may be a long and happy one is the wish that surely follows him.

Hearty congratulations also to Messrs. B. F. Ward and Wall upon their promotion to the vacancy and sequent vacancy respectively.

Leisure.—The advantage of leisure is mainly that we may have the power of choosing our own work, not, certainly, that it confers any privilege of idleness.—"The Value of Time," Lubbock.

J. J. T.



ANGLO-CONTINENTAL TELEPHONE SERVICES.

Map shewing the principal European countries which are in telephonic communication with Great Britain and the charges for a day call of 3 minutes from London to the principal towns in such countries. Those countries in which no figures are inserted are not yet in telephonic communication with any place in Great Britain.

PROGRESS OF OVERSEAS TELEPHONE SERVICES IN 1927.

Jan. 7 ... Transatlantic telephone service inaugurated between London telephone area and New York and its suburban area.

„ 15 ... Transatlantic service extended to whole of New York State.

„ 29 ... By this date transatlantic service had been extended to cover communication between any place in England and Wales and the States of New York, Maine, New Hampshire, Massachusetts, Vermont, Rhode Island, Connecticut, New Jersey, Pennsylvania, Maryland, Delaware and District of Columbia (1st American zone).

Feb. 15 ... Transatlantic service had been extended by this date to whole of Gt. Britain, and to Ohio, Indiana, Michigan, Illinois, Wisconsin, Virginia, West Virginia, Kentucky, Tennessee, North and South Carolina and Georgia (2nd American zone).

„ 19 ... Transatlantic service extended to Missouri, Kansas, Arkansas, Oklahoma, Louisiana, Mississippi, Alabama, Florida, Iowa, Nebraska, North and South Dakota and Minnesota (3rd American zone).

„ 21 ... Transatlantic service extended to Montana, Wyoming, Idaho, Colorado, Utah, New Mexico and Texas (4th American zone).

„ 26 ... Transatlantic service extended to Washington, Oregon, California, Nevada and Arizona (5th American zone).

Mar. 11	...	Transatlantic service extended to Cuba.
May 5	...	Direct London—Geneva circuit formed, providing first through circuit to Switzerland. Converted to a London—Zurich circuit, May 25.
„ 7	...	New Anglo-Belgian submarine telephone cable brought into use and 5th Brussels circuit provided. 4th Antwerp circuit provided on May 18.
„ 15	...	Anglo-Belgian charges reduced and night rates and British zone system applied to this service.
June 22	...	Anglo-Swedish service from 3 p.m. to 8 a.m. inaugurated (confined to communication between London and Stockholm).
„ 24	...	Anglo-Swedish service made continuous.
„ 29	...	Service between London and Provinces and Free City of Danzig inaugurated.
July 15	...	Anglo-Danish service (confined to London and Copenhagen) inaugurated.
Aug. 10	...	Anglo-Swedish service extended to the Provinces in this country and to Gothenburg.
Sept. 5	...	London—Geneva circuit provided. Converted to a London—Basle circuit on Oct. 5, forming the 2nd Anglo-Swiss circuit.
Oct. 1	...	Anglo-Norwegian service (confined to London and Oslo) established.
„ 3	...	Transatlantic service extended to Dominion of Canada. Service confined to communication between London and Ottawa, Quebec, Montreal, Toronto and Hamilton.
„ 12	...	Anglo-Swedish service extended to various places near Stockholm and Gothenburg and also to Malmö and Helsingborg.
„ 27	...	Anglo-Swiss service extended to all principal towns both in this country and Switzerland.
Dec. 1	...	Anglo-Austrian service opened between London and Vienna.
		Anglo-Swedish service extended to whole of Sweden.
		Service to Denmark and Norway extended to the Provinces in this country.
		Anglo-Continental rates to Germany, Holland, Sweden, Norway, Denmark and Danzig reduced by about 20%-25%.

During December also arrangements were completed for opening an Anglo-Czecho-Slovakian service to Prague, and an Anglo-Hungarian service to Buda-Pest on Jan. 1, 1928.

REVIEWS.

"Wireless Direction Finding and Directional Reception." By R. Keen, B.Eng., A.M.I.E. (Second and enlarged edition. Published by Iliffe & Sons, Ltd., Dorset House, Tudor Street, E.C.4. 490 pp. Price 21s. net.)

The subject of wireless directional reception has in recent years become one of the most important sections of the practical application of Hertzian waves. Directional reception is used to enable unwanted electrical oscillations, emanating from another transmitting station or generated by natural means, to be prevented from interfering with the signals which it is desired to receive. It is also employed, and this is probably its more important use, to ascertain the direction in which a transmitting station, from which signals are being received, lies from the receiving station. This latter application of the subject has nowadays become practically indispensable to navigation, especially in narrow and crowded waters such as those round the British Isles. The first edition of the book under review, which appeared five years ago, was welcomed as supplying greatly needed information on this subject, but the developments which have taken place in the art since that time have caused much of the earlier edition to be out of date, and consequently a new and revised edition has become necessary.

Following a short historical survey of the subject, chapters are given on the directional properties of aerial systems; frame aerial reception; rotating frame D.F. installations and the Bellini-Tosi system. Many other important aspects of the subject are dealt with, such as suitable installations for work on shore, on ship, and in the air; night effect and other freak phenomena; fault clearing and maintenance; and notes on field and nautical astronomy.

The book is written in a very clear and interesting manner and is fully illustrated with diagrams, drawings and photographic reproductions. It should form part of the library of everyone interested in wireless communication.

"The Principles of Radio Communication." By John H. Morecroft, assisted by A. Pinto and W. A. Curry. Published by Chapman & Hall, 11, Henrietta Street, W.C.2. Second Edition, 1,001 pp. Price 37s. 6d. net.)

The first edition of this book was published in 1921, and at that time was the most up-to-date and authoritative work on the subject. During the last six years, however, the developments in radio communication have been so great that much of the matter in this edition has become obsolete, and a large amount of new matter which should be incorporated in a standard text book has accumulated. In the edition now under review the necessary modifications to meet these circumstances have been made. Certain portions which were out of date have been omitted, and a large amount of new material added. Among this new material may be specially mentioned field strength measurements, short-wave propagation with the phenomena of reflection, absorption and fading, voice analysis for radiotelephony, loud speakers, crystal control of frequency, and the various new arrangements for amplification.

For readers who are already familiar with the earlier edition it will only be necessary to say that the new edition takes the same rank in radio literature to-day as was occupied by the first edition when it appeared. For those, however, who may not have been acquainted with the earlier edition we give below a summary of the ground which is covered by the new one.

The first two chapters contain a résumé of general electrical theory, and the next deals with the phenomena in oscillatory circuits. The following chapter gives a general view of the methods of communication in which electromagnetic waves are employed.

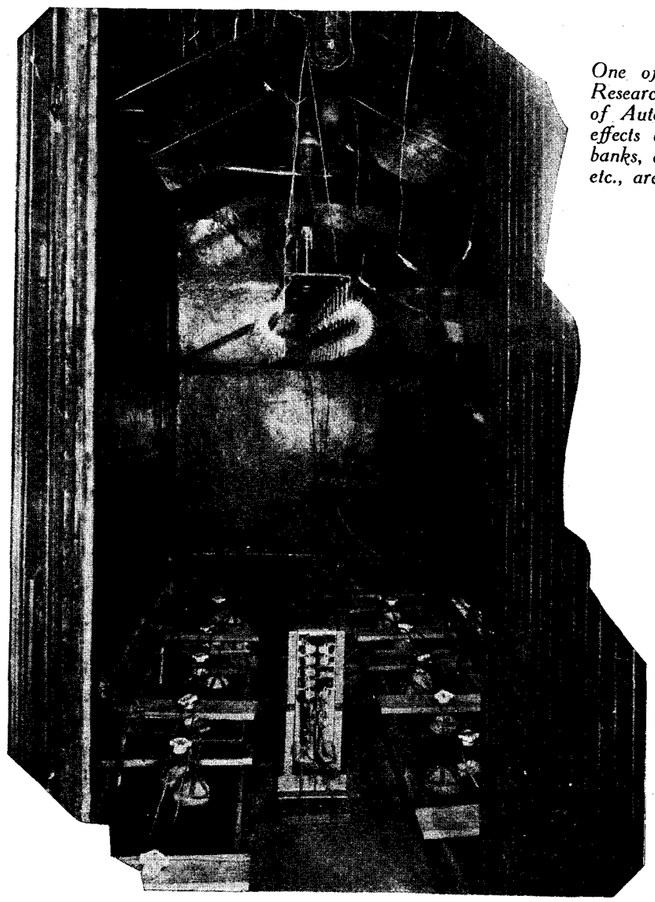
Then follow chapters on spark telegraphy, the theory of electronic valves and their application to wireless telegraphy, continuous wave telegraphy, wireless telephony, the various types of aerials with the phenomena associated with them, and amplifiers.

The book concludes with a very full index.

The subject matter is dealt with in the same clear manner which distinguished the first edition and the general get-up of the book is excellent. It should be on the shelves of everyone interested in any way with the technical side of wireless telegraphy.

Where Strowger Automatic Leadership Begins—

The Climatic Test.



One of the humidity rooms in the Research and Development Department of Automatic Electric Inc. Here the effects of moisture on cables, switch banks, condensers, switch mechanisms, etc., are determined.

WHEN Strowger Automatic equipment is shipped to such rigorous climates as Manchuria or Canada, or to warm, moist places, such as Hawaii and the Philippines, it is with the certain knowledge that its operation after installation will be just as reliable as it is in the country of its origin.

The ability of Strowger equipment to function correctly even under the most adverse climatic conditions is determined long in advance of installation, both by actual experience and by the most thorough tests that science can devise.

The testing laboratories of Automatic Electric Inc. are equipped with facilities for reproducing various atmospheric conditions, to determine the effects of heat, cold, humidity and dryness on the operating characteristics of the various elements of the complete exchange. These tests insure reliability and durability for Strowger Automatic operation the world over.

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STROWGER AUTOMATIC

The
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NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. XIV. JANUARY, 1928. No. 154.

AN EVENTFUL YEAR.

THE year 1927 has been a remarkable one in the annals of the telegraph and telephone services of this country. The inauguration of transatlantic telephony, the extension of the " beam " telegraph services to Australia, South Africa, and India, the spread of automatic telephony at home, and the far-reaching development of the Anglo-Continental telephone services have all combined to leave their mark on the past year. Besides the establishment, by the aid of radio-telephony, of communication with the telephone exchange systems of the United States, Canada, and Cuba, telephone service has been extended within the last twelve months to Sweden, Norway, Denmark, Austria, and the Free City of Danzig, and during the same period much-needed direct circuits have been provided between Great Britain and Switzerland, affording an efficient service to all places in both countries. These developments are referred to in more detail elsewhere.

We have remarked before in these columns that although the Anglo-French service was opened as long ago as 1891, in 1921, thirty years later, the Anglo-Continental service was little used except between London and Paris, Lille, Brussels, and Antwerp. The important extensions of the service to Holland in 1922 and to Germany in 1926 brought the number of States with which communication could be obtained to five (including Switzerland, to which a service via Paris was opened in 1913). This year has seen them increased to ten, and preparations completed for an early extension to two more. With the telephone at his elbow, the London subscriber (in most cases, the British subscriber) can speak from his home not only across the Atlantic, not only to capital cities of the European countries mentioned, to commercial centres such as Lyons, Zurich, Antwerp, Cologne, Frankfurt, Hamburg, Leipzig, Gothenburg, &c., to Swiss mountain resorts and Belgian and German Spas, but also with Prussian towns on the Lithuanian border, and Swedish towns in the Arctic circle.

The development of the inland telephone system has brought the number of telephones in use up to about 1,635,000, as nearly as can be estimated at the time of writing. Of these about 1,600,000 are connected with the Post Office system, an increase of 124,000 for the year. There is now a ratio of about 27 inhabitants to every telephone in the country. The latest returns indicate that the number of exchanges in existence at Dec. 31 should be 4,270, an increase of 150 for the year.

An event of the year was the opening of the first public automatic exchange in London, viz., Holborn. During the year the manual systems of Halifax, Harrogate, Llandudno, Colwyn Bay, Gloucester, Brighton, Hove, &c., Sheffield and suburbs, the Potteries towns, Burnley, Southport and suburbs, Wakefield, and Exeter were converted to automatic working. The total number of Post Office telephone stations working on this principle is now upwards of 171,000.

Turning to radio-telegraphy, it may be recorded that the total number of wireless licenses at the end of October last was 2,338,078, representing an increase in twelve months of 240,760. There was a further gain of 18,000 in the month of November.

Perhaps the most significant event in telegraphy during the year was the inauguration of the beam services. The Canadian service was opened in 1926; but 1927 saw the opening of the Australian service in April, the South African service in July, and the Indian service in September, and each of the three services offered to the public rates that are lower than the present cable rates, and substantially lower than the cable-rates previously in force. The experience of any one of these Beam services proved to be no safe guide in making plans for the others; the South African service is very largely immune from fading, but each of the other services has its fading periods, which vary partly with the time of year and partly in a manner quite unpredictable. No one would be rash enough to claim that all these problems have yet been solved; but the Central Telegraph Office and the engineering staff are greatly to be congratulated on the progress that has been made to their solution, with the willing co-operation of the wireless companies at the other end of the circuits. There can be no doubt that the Beam has already proved more successful than even the greatest optimist among us would have dared to prophesy.

THE TELEPHONES OF THE WORLD.

THE annual review of the development of the telephone systems of the world which we are again able to present to our readers, shows that development is proceeding on its usual lines, without surprises and without disappointments—except, indeed, the slight disappointment that Europe's total increased only by 518,000 as against 610,000 during the year 1925. As usual, rather more than one-and-a-half million telephones were added to the sum of those in operation in the world—which means that by the time they can be collected the total obtained is always one-and-a-half million behind the total of the moment; as usual, America's preponderance is well maintained; and, as usual, the best-developed States show the largest actual increases and generally the lowest percentage increase in stations. Europe is increasing, judged by 1926, at the rate of 7% and America by 5%. It is reasonable to assume that the former figure will be maintained for some years to come; it is equally reasonable to suppose that the latter figure will decrease, for the telephone in a continent with one station to every 8 inhabitants (including blacks) cannot increase indefinitely at the rate of 5%, whilst Europe, with several great civilised countries in a backward state of telephone development could well increase her rate of growth under favouring circumstances. Nevertheless, even with this assumption, Europe will be hard put to it to reach in 1935 one-half the total number of telephones America will possess in that year.

We fully expect, however, to find that Europe has increased by over 600,000 during the past year. Great Britain's growth goes forward each year; in 1925 it was 115,000; in 1926, 120,000; in 1927 (as nearly as we can estimate), 124,000. Germany, whose development was below the normal last year, will, we hope, have regained her former rate of increase. France's rate of increase has been steadily upward, and also has that of Belgium. These, with the countries hitherto backward in development but which are now showing marked signs of activity, such as Russia, Italy and Spain, will, we imagine, show figures for the year just closed which will result in a considerable improvement in the telephonic position of Europe.

At the time of writing there are probably 30,775,000 telephones in the world—a truly remarkable figure to be attained in forty-eight years!

HIC ET UBIQUE.

TELEPHONE service between this country and Czecho-Slovakia and Hungary was opened on Jan. 1, confined for the present to communication with Prague and Buda-Pest. The charge for a 3 minutes' day call is 13*s*. 9*d*. to Prague and 15*s*. 6*d*. to Buda-Pest.

The Press informs us that a regular wireless telephone service from Angora to London is expected to commence on Jan. 1 1928! As nothing is known of the matter in the Telephone Branch of the Post Office, we conclude that the Press conjurors have produced this particular Angora rabbit out of their own hats.

"The right of a telephone subscriber on a rural party line to talk German, even if it *does* deprive all the listeners-in of knowing what he is saying, drew the attention of the Kansas Public Service Commission recently." So *Telephony* reports, and informs us that the Commission ruled that he could speak German. He had been annoyed by neighbours who insisted that all his telephone conversations should be in English. The complaints were not made by those he was talking to, but by others!

The case throws a curious sidelight on the habits of the American rural telephone-subscriber. The objection to the subscribers' speaking German was not and could not be based on any "defence-of-the-realm" theories, but simply that other party line subscribers could not gratify their curiosity by overhearing their neighbour's conversation, or at least understanding what they heard.

The transatlantic telephone was last month brought into the service of a buyer in Philadelphia anxious to secure two of the gems from the late Lieutenant-Colonel Sir George Holford's library, which is now being dispersed by Messrs. Sotheby. The sale was due to begin at one o'clock. At five minutes to the hour (7.55 a.m. New York time) the telephone in Messrs. Sotheby's office rang, and Dr. Rosenbach, still in bed, was giving his agent, Mr. H. C. Rham, instructions to bid for lots 221 and 248. He secured the first lot, Columna's "Hypnerotomachia Poliphili," printed on vellum at the Aldine Press, 1499, at £3,000, but failed to obtain the second lot, Dante's "La Divina Commedia," 1481. This went to Mr. Dring, of Quaritch's, for £3,950.

According to the *Electrical Review*, plans for the conversion of the whole of the Commonwealth's city telephones from the manual to the automatic exchange system, and for an extension of trunk-line services in all States, have been completed. Within the next five years 53 new automatic exchanges, serving 111,782 subscribers, would be opened in the Commonwealth; most of them would be conversions of manual exchanges, but a few would be additional to the number of exchanges already in existence.

The transatlantic service carried a "record" traffic on Christmas day. There were 16 outward and 28 inward calls, or 44 in all. They were principally in the nature of Christmas greetings from family gathering to family gathering, and were by no means confined to London and New York. From a village in Gloucestershire to San Francisco is a far cry; but in addition seasonable messages were exchanged between places as far apart as Melton Mowbray, Cheltenham, and Oxford on the one side and Philadelphia, Washington, Baltimore and Boston on the other.

We have received the following Christmas card from Jerusalem:—

To the Telephonists of Great Britain
(via *T. & T. Journal*):

KIND REMEMBRANCES AND ALL GOOD WISHES FOR A MERRY CHRISTMAS
AND A HAPPY NEW YEAR.

We hope to talk to you soon!

Xmas 1927. SUPERVISORS AND STAFF,
JERUSALEM EXCHANGE.

On our own behalf and that of the Telephonists of Great Britain we cordially reciprocate the good wishes.

TELEGRAPH AND TELEPHONE FINANCE.*

BY SIR HENRY N. BUNBURY, K.C.B.

THERE are several ways of approaching this subject. They range from the study of the "infinitely great" to the study of the "infinitely small." We can, for instance, look at the movement of revenue, working expenses, and above all capital in the aggregate, and observe what are the characteristics and tendencies of these factors at the present time: what is happening to the services as organic undertakings. Alternatively we can put them under the financial microscope, analyse their costs, and so observe the characteristics and tendencies of the numerous small expenses which go to make up a unit of telegraph or telephone service. Some three years ago Mr. Waldegrave and I presented a paper in which the average cost of an inland telegram was analysed into its components and the results exhibited for the Society's information. It would be interesting to do the same for telephone service; for the costs which were prepared for the Telephone Rates Committee of 1920 were not published in any detail and are in any case now somewhat out of date.

On this occasion I propose to approach the subject on the broader lines. In passing we will consider some resemblances between the current problems of the Telegraph and Telephone Services and those of other public utility services. It will be necessary from time to time to quote figures showing the movement of the various financial factors such as cost, revenue and capital expenditure; but I will try not to introduce more figures than are necessary for the purpose in hand.

Now it is important to remember that just as the telegraph and telephone services are to a large extent from the point of view of the public alternative methods of rapid communication and are therefore in some degree competitive, so from our own point of view they are closely interwoven both in their engineering, operating and financial aspects. For instance, one of the reasons why telephone development in rural districts in this country is relatively backward is that this country has long had the finest rural telegraph service in the world. To that extent the telegraph service is bearing some small part (but it is a very small part) of the financial burden which in a country with a less efficient telegraph service would fall on the telephones. Again, the use of telephony in telegraph operation is steadily increasing, especially in the Phonogram service; and there is no doubt that over long distances the development of the telephone has enabled a telegraph service to be provided, at telegraph rates, which is vastly better than anything which the general public could have expected 15 or 20 years ago. In the opposite direction, some countries use telegraphic operation in the preparation of long-distance trunk calls, on the ground that it is cheaper to do the preparatory work telegraphically than to occupy a costly trunk telephone circuit for this purpose: though whether things really work out in this way seems to be open to doubt. Again, the fact that the telegraph and telephone circuits are usually carried on the same poles or in the same underground cables not only gives rise to some troublesome accounting problems but materially affects the cost of providing plant for the two services. Sixteen years ago the Engineering Accounts Committee asked themselves the question whether it was not desirable or necessary to finance all new engineering works from a common fund and to throw the whole capital expenditure on engineering plant into a common capital account which should lease circuits to the telegraph and telephone services on a suitable rental basis. The Committee came to the conclusion that owing to the impending transfer to the Post Office of the National Telephone Company's system, the time was not opportune; but they clearly felt that sooner or later a common capital account and a common capital fund would be the logical and most convenient solution of the problem.

All these considerations show that telegraph and telephone finance are, to put it at its lowest, closely interdependent. It might, indeed, be argued that telegraph and telephone service should be regarded as elements of a single service of electrical communication, largely interchangeable, their interchangeability to be governed mainly by considerations of finance. Development is certainly in this direction. It is in this light that we have to regard the financial facts which will be put before you. We all know that telephone business is increasing and telegraph business, at any rate inland, is diminishing; and most of us know that telephone business is increasing faster than telegraph business is diminishing; that is to say that there is a net increase, by whatever standard you like to measure it, in the volume of business of the two services taken together. It is interesting also to observe that the rate of falling off in inland telegraph business is not diminishing, but rather, so far as can be judged over a comparatively short period, increasing; while, on the other hand, the steady growth of telephone business seems scarcely to have been affected by the industrial depression through which we have been passing. Curiously enough this has not appeared to be the case in Germany, where during the recent period of marked depression telephone business has actually fallen off. The explanation probably is that this country is so far undeveloped telephonically that any fluctuations due to the condition of industry are masked by the steady progress which is being made in overtaking arrears. It may be observed that although telephonic expansion in the United States is still proceeding, and there is no evidence that the saturation point has yet been reached, our rate of expansion is higher. The addition to capital equipment in the Bell System of America is, expressed in money value, about 10% or 11% per annum; in this country it is about 13% per annum.

Let us now look at the salient characteristics of the services separately over a period; and I will take as that period the last five years. By beginning with 1922-23 we eliminate the disturbances caused by the post-war boom, the disorganised condition of the manufacturing industry and the abnormal conditions which were due to the fact that until that year the service had not fully recovered from the dislocation created by the war. The period we are taking is a period in which trade has been on the whole severely depressed, prices have been falling, and the pressure to secure improvements in efficiency and consequently cheaper working has been very great. All industry, and all public services, have been going through one of those phases of economic depression which are invariably, and necessarily, accompanied by a continuous effort to improve efficiency, to eliminate waste and to reduce costs.

The period which we are taking is a post-war period: and I should like here to say a word about the use of a pre-war year as a standard of comparison, especially as I do not propose to quote any pre-war figures. The advantages of taking pre-war experience as a standard or measuring rod by which to judge post-war performance is that it represented a state of affairs in which conditions of relative stability existed and in which economic forces had, or were thought to have, full play. For instance, if we want to estimate the ultimate stabilised relation of retail to wholesale prices we go back to a pre-war period and observe what that relation was then. Similarly, if we want to estimate the future price of a commodity which at the moment seems, for temporary reasons, to be out of parity with other commodities we see how its price was related to the price of other commodities before the war. Economists are, however, coming more and more to believe that the idea of a pre-war normality or, in the terms of the American slogan, "Back to normalcy!" is fallacious. The economic world made in 1919 a fresh start. Many of the pre-war economic conditions will never be restored. We have to build on foundations which are to an important extent new, and the problem of reconstruction is coming to be regarded not as a problem of getting back to pre-war conditions but as a problem of attaining an ever increasing degree of productive and commercial efficiency under the conditions of the post-war world. Just as during the war the cry changed from "Business as usual!" to "Win the War!" so men are no longer saying "Back to pre-War!" but "Let us strive to win the Peace."

It is rather in this spirit that I want to consider our subject of this evening.

We will begin with the Telephone Service. Here are the figures:—

I.—*Telephone Service.*

	1922-23.	1923-24.	1924-25.	1925-26.	1926-27.
Average Cost of Living index	93	77½	77½	77½	75
	£	£	£	£	£
Expenditure ...	12,791,000	12,866,000	14,154,000	15,607,000	17,204,000
Revenue ...	14,035,000	14,584,000	15,006,000	16,163,000	17,488,000
Surplus ...	1,244,000	1,718,000	852,000	556,000	284,000

["Sutton" payments excluded.]

The most noticeable thing about this table is the diminishing surplus; and in order not to alarm you unnecessarily, let me say at once that the diminution is due entirely to the large reductions of rates which were made in July 1922, July 1923, and July 1924. You may be interested to know what the surpluses would have been had those reductions not been made, and assuming that there would have been the same amount of business at the higher rates as in fact there has been at the reduced rates. The surplus would have been—

In 1922-23	£1,800,000,	instead of	£1,244,000
In 1923-24	£3,400,000,	„ „	£1,718,000
In 1924-25	£4,100,000,	„ „	£852,000

In point of fact, however, it is as certain as anything can be that if the old rates had been maintained the traffic would have been less; but even so, the most tenable view is that there would have been at any rate no reduction in the surplus if the reductions in rates had not been made.

The next question which the figures suggest is a more difficult one. You will observe that the surplus in 1926-27 was the smallest surplus in the whole period, and was indeed so small as to be almost insignificant, representing as it does only about ¼% on the capital of the telephone service. Can we assume that we have now touched bottom, and that there is no reason to fear a deficit in the coming years if the present rates of charge are maintained and the price level is stabilised at about its present figure? For you will realise that the price level exercises an important effect on the working expenses and therefore on the surplus. A rise or fall of five points in the average bonus figure for the year means, at present, an increase or decrease of about £190,000 in the working expenses of the telephone service.

This is one of the most important problems which can confront a telephone service. Every public utility, whether conducted by the State or by a private undertaking, depends largely for its success on the good will of the public (which is not quite the same thing as the Press). And increases of charges are a very good way of getting rid of some at any rate of that good will. All telephone managements seem to be engaged in a sort of race between the natural tendency of telephone costs to rise as the density of the system grows, and the natural tendency of human ingenuity to do things more efficiently and more cheaply as science makes progress and experience

* Paper read to the Post Office Telephone and Telegraph Society of London.

increases. If we in Great Britain can hold our present position I am inclined to think that in the course of a few years we shall no longer have the reputation of providing one of the most expensive telephone services in the world. Comparisons are difficult to make exactly because of the great variety in the form of the tariffs of different countries; but I am inclined to think that the gap between our charges and those of the countries which, like Scandinavia, have the reputation of providing a very cheap as well as efficient telephone service has already narrowed a good deal and will continue to narrow still more; while, on the other hand the telephone service in the United States, which is now, I think, distinctly more expensive than ours, seems likely to increase in cost rather than to diminish. The problem is, can we hold our present position?

It is not possible to give a positive answer to this question. So far as the immediate future is concerned, it seems likely that with industry and trade slowly improving, we have touched bottom for the moment and the surplus may even show a tendency to increase, if business activity makes progress and people have more money to spend on one of the minor irritations of modern civilisation. If, however, we take the longer view, the situation is more complex and perhaps not quite so reassuring. For the factor which more than any other governs the cost of telephone service is the fixed plant charges—the annual charges for depreciation, interest and (though this is less important) maintenance of the telephone plant. As you know, something like three quarters or more of the cost of giving telephone service is represented by plant and accommodation charges. And here we are faced with a problem which confronts all public utility services which make use of large quantities of fixed plant acquired at pre-war prices, and renewable at some time or other at post-war prices. What will happen to the tariff when a return has to be earned on a capital which no longer consists of pre-war values because the pre-war plant has all been scrapped and replaced?

It would seem natural to say that the benefit of the pre-war plant should accrue to existing consumers as long as it lasts, and that when that benefit is exhausted the public must be prepared to pay more (that is to say to pay on a post-war price level) for service. The public must be prepared for a rise in charges. This is what has been happening in America and, so far as I can judge, is likely to happen in countries such as Denmark, Sweden, and any other country which became highly developed telephonically before the great rise in prices took place. Unfortunately, however, the public, while it is willing to accept without comment, and certainly without gratitude, a service which has been cheapened by the possession of pre-war plant, offers the strongest resistance when the stocking is empty and the time comes to charge what the service is really costing. And because we are a State service and not a service conducted by private enterprise, we are peculiarly vulnerable to resistance of this kind.

This way of dealing with the problem is, however, not sound economics. The temporary advantage which is given by the possession of pre-war assets in a period of depreciated currency arises entirely from that depreciation. If the depreciation were to become permanent and stabilised the benefit of the advantage could be given at any convenient time, or better still, could be distributed over the whole period during which the advantage lasts. But we cannot safely assume that the depreciation will be stabilised or permanent, and if that is so, there is a serious danger in giving the benefit to consumers at a time when the depreciation is severe and having to terminate it at a time when the currency has appreciated and the public are naturally looking not for increased charges but for reductions. It is like selling cigars at 6*d*. each in a period of high prices when money is plentiful, so long as the stock lasts, and then having to raise the price to 9*d*. at a time when prices generally are lower, money is less plentiful, and more is expected of it. The theoretical economic solution of the problem of pre-war assets, therefore, would be to regulate the charges in accordance with the movement of the general price level in such a way that when their life is exhausted, it will be possible to replace them at the prices then current, while at the same time keeping the percentage increase of charges at a point somewhat below the percentage increase in general prices.

The question is by no means an academic one. In the United States, for instance, it is being fought out in the Courts between the Railway Companies and the Federal Commission which regulates the railways. The issue turns on the valuation of the railway systems on which they are by law entitled to a certain percentage return before any question of rate reduction or surrender of surplus to the State Treasury arises. The Commission maintains that they are only entitled to that return on the capital (mainly pre-war) actually spent in providing the systems: the Companies that it should be on the "reproduction value" at current prices. Of those systems I would suggest, for the consideration of those interested in such problems, that the Companies are more nearly right than the Commission, subject to one essential condition, viz., that the additional income which they would obtain under their contention should, in the main, not be distributed or divided but used to reduce the cost of renewing at post-war prices, pre-war plant. By such use it would serve as a buffer to take the shock which such renewals would otherwise cause to the financial structure of the system, and which would otherwise have to be absorbed by an increase of rates.

These considerations have led public utility services wherever they can to build up reserves against what we call the excess cost of renewal; and, of course, such reserves can only be provided by one means, that is to say by charging the consumer more than it would actually cost to provide him with service at the time. We ourselves in 1920 made a mild effort in this direction, until two years later the wisdom of Parliament pronounced that it was unnecessary, and the £200,000 a year which we were setting aside against the excess cost of renewals was, at the instance of the Select Committee of that year, discontinued. We may live to regret it.

Can we get any light from the accounts as to the course which events are likely to take in this matter? If you will look at the following table you will observe a tendency which is rather disquieting:—

II.—*Telephone Service.*

	1922-23.	1923-24.	1924-25.	1925-26.	1926-27.
	£	£	£	£	£
Revenue ...	14,035,000	14,584,000	15,006,000	16,163,000	17,488,000
Fixed Plant Charges, Interest and Depreciation	4,725,000	5,128,000	5,879,000	6,886,000	7,914,000
Do. as a percentage of	%	%	%	%	%
Revenue ...	33.7	35.2	39.2	42.6	45.3

The figures represent the movement of fixed plant charges (I exclude maintenance because it does not in fact move in the same way) in relation to revenue. You will notice that it is going up all the time: and, so far as this factor is concerned, it will continue to go up, other things remaining equal, until somewhere about 1936 when the amount of pre-war plant carrying pre-war depreciation and interest charges will probably have become insignificant. It should be mentioned that the increase of the percentage in the first two years of the series is, of course, also due, in part, to the reductions of rates.

We have, therefore, a very small margin of revenue, and fixed plant charges whose growth represents each year a new charge on the revenue, or round about 3%. Clearly, we can only hope to escape financial embarrassment in one or other of four ways:—

(*a*) By a fall in the cost of living.
(*b*) By a fall in the cost of plant.
(*c*) By savings in operating cost due to the substitution of automatic for manual equipment—a factor which probably is already, to some small extent, causing the disproportionate growth of fixed plant charges.
(*d*) By accelerated growth of revenue in relation to capital.

(*To be continued.*)

PRESS TELEGRAM WORK.

IT was good to see the veteran ex-Controller of the C.T.O. at the reading desk of the I.E.E. on the 12th ult., when Mr. John Newlands, C.B.E., C.I.E., I.S.O., read an interesting paper with the above title.

Despite the close proximity of the date to Christmastide there was a good attendance, and had it not been for the length of the paper the debate which followed would no doubt have lacked nothing in vivacity.

Much of the paper was historic, but interestingly so, and was livened by the humorous extempore remarks which will probably not appear on the printed page.

Then came a comparison of the conditions of the last century with those of the present day, with certain criticisms regarding the policies of the past and how they have hampered the policy of the present and the future, which is simply saying that what has happened in the smaller sphere of the Post Office Telegraphs has not infrequently occurred in the much wider areas of national history and that the nemesis of the economic and political sins of our sires and grandsires does visit the third and fourth generation.

Stage three of the lecture was especially interesting, giving an account of the inception and successful "Development of the Joint Wire System for News Associations," as organised by Mr. Newlands on behalf of the Press Association, and perhaps it may be added, the hearty co-operation of the Post Office with its excellent underground system of wires, its prompt removal of faults, its immediate replacement of faulty lengths, and its ability to provide extensions for special events to any remote part of the county when needed.

The final half-hour of the meeting was well filled by the Chairman, Mr. L. Simon, Sir Henry Bunbury, Messrs. Sellars and Upcott, and Mr. Newlands, who replied to all the criticisms and questions—except one, and that was a query posed by Sir Henry, and was quite naturally of a financial nature. Had a pin been dropped it would surely have been heard while we waited for the vital answer, but the canny Sphinx would not! We therefore wended our way homeward, if not sadder, certainly not wiser on the £ *s. d.* situation as regards this particular private enterprise. The P.A. has a loyal servant, and the audience appreciated the reticence.

THE WASHINGTON CONFERENCE.

III.

THE Washington Radiotelegraph Conference which met on Oct. 4 came to an end on Nov. 25. It was declared to be the largest International Treaty Conference ever held; but it does not follow that the value of its work was proportionate to its size. Its output of minutes and reports was enormous: sometimes the printed and typed documents distributed reached a total of 70,000 sheets a day, and the grand total throughout the Conference amounted to $1\frac{3}{4}$ million sheets. But the only thing that really matters—the actual Convention and Regulations which emerged from this welter of documents—is a modest little booklet containing about 80 articles.

The Conference made no very startling changes. Its two main tasks were to bring the detailed regulations of the radiotelegraph service up-to-date and to allocate wavelengths. It decided that wavelengths could not be allocated internationally to individual countries or to individual stations, but only to classes of services. It succeeded after a prolonged struggle in parcelling out the whole of the wave-bands from 5 to 30,000 metres among the various classes of services. It made a move—though not a violent one—in the direction of reducing spark working for ship and shore traffic. The Technical Committee (a very learned body of eminent professors and technicians) decided that to continue to talk about wavelengths expressed in metres was making things too simple and that we ought to talk about "frequencies in kilocycles per second."

The Conference introduced into the Convention a provision for compulsory arbitration of disputes concerning the interpretation or execution of the regulations. The only question which it tackled and failed to settle was that of votes. Delegations went to Washington with votes and came away without them. The new Convention contains no voting clause; and this thorny problem has been left over for the next Conference to settle.

The Washington Conference established a precedent by permitting the Press to attend. Newspaper men used to wander from one Committee room to another trying to pick up some crumbs of interesting information among masses of dry matter. It was, however, very difficult for them to understand what was going on: indeed, many of the delegates themselves had only the haziest impression of what was really happening. It is not surprising, therefore, that the Press reports which appeared from time to time showed more imagination than accuracy.

The total cost of the Conference, if account be taken of delegates' salaries, allowances and travelling expenses, must have reached an enormous figure. A mathematical delegate calculated that every time a speaker paused or coughed—bang went £1. This was a terrifying thought, more alarming even than the Transatlantic Telephone Service, the cost of which is reported to have cured several Scotchmen of stammering. The Radiotelegraph Service cannot afford the luxury of frequent meetings on the scale of the Washington Conference; and a proposal to reduce the interval between Conferences from five to four years was opposed by the British Delegation and defeated.

The choice of the meeting place for the next Conference presented unusual difficulty as Madrid, The Hague and Cairo were all offered. The prospect of writing Radiotelegraph Regulations under the shadow of the Pyramids was alluring; but delegates resisted the temptation, and a vote by ballot resulted in favour of Madrid, where the next Conference will accordingly be held in 1932.

F. W. P.

SHEFFIELD POLICE BOXES.

THE illustration shows one of the police boxes now being provided in the streets of Sheffield.

About 150 boxes will be installed in various parts of the city and these will be in 4 groups, the boxes in each group being connected telephonically with a divisional police-station.

The telephone is so arranged that it may be used from the outside by the public for making police, fire and ambulance calls and from the inside

by the police officer, and duplicate indicators on the police-station switchboard will show whether a call is being made by the public or by the police.

A blue lamp is fitted over the roof of the box, which can be operated from the police station, and by its means the attention of the constable on the beat can be called when he is near the box.

Each box, which measures 5 ft. square, is provided with a water supply and wash-hand basin, electric light, an electric radiator (where possible) which is automatically switched off when the officer vacates the box, and the necessary furniture.

A complete set of first-aid appliances, packed in a small portable case, is kept in a locked cupboard which opens from the outside and is accessible to the public by breaking the glass to obtain the key.

It is believed that Sheffield is the first city in this country to install a system of this sort on so extensive a scale.

PROGRESS OF THE TELEPHONE SYSTEM.

The total number of telephone stations working at Oct. 31, 1927, was 1,575,760. New stations added during October numbered 23,378 and ceased stations 14,578, resulting in a net increase of 8,800 on the total at the end of September.

The growth for the month is summarised below :—

Telephone Stations—	London.	Provinces.
Total at Oct. 31	556,707	1,019,053
Net increase for month	3,443	5,357
Residence Rate Subscribers—		
Total	124,413	200,885
Net increase	1,648	1,931
Call Office Stations—		
Total	5,007	18,147
Net increase	51	143
Kiosks—		
Total	698	3,228
Net increase	45	110
Rural Party Line Stations—		
Total	—	10,090
Net increase	—	2
Rural Railway Stations connected with Exchange System—		
Total	—	831
Net increase	—	14

The number of inland trunk calls dealt with during September—the latest statistics available—was 8,589,586, an average of 330,369 calls per day. During the six months ended Sept. 30, 50,980,883 calls were dealt with, representing an increase of 3,200,513 or 6.7% over the corresponding period of 1926.

Calls made to the Continent during September numbered 26,620 and from the Continent 28,852. For the six months ended September, the totals were—outgoing calls 154,668 and incoming calls 165,534, representing increases of 17.6% and 11.4% respectively over the half-year ended September, 1926.

Further progress was made during the month of November with the development of the local exchange system. New exchanges opened included the following :—

LONDON—Holborn (automatic).

PROVINCES—Brighton (automatic) Hove, Portslade, Preston, Rottingdean, Hanley (automatic), Burslem, Stoke-on-Trent, Chesterton, Longton, Newcastle (Staffs), Trentham, Exeter (automatic),

and among the more important exchanges extended were :—

LONDON—Lee Green, Putney, Seven Kings, Sutton.

PROVINCES—Bury, Lincoln, Linthorpe, Morecambe, Roundhay (automatic), Sale, Upton, Westbury-on-Tyne.

During the month the following additions to the main underground system were completed and brought into use :—

Newbridge—Aberbeeg.

London—Purley—Redhill—Reigate.

Newcastle-on-Tyne—Sunderland.

while 78 new overhead trunk circuits were completed, and 101 additional circuits were provided by means of spare wires in underground cables.

PRESS TELEGRAM WORK.*

BY J. NEWLANDS, C.B.E., C.I.E.

INTRODUCTION.

IT is somewhat difficult to realise that over fourteen momentous years have elapsed since I last had the opportunity and the privilege of delivering an address before the members of the Post Office Telephone and Telegraph Society, London. On that occasion, Nov. 24, 1913, the subject was "The Telegraph Service : Methods and Results." In that particular paper the principal methods of dealing with ordinary public messages under the Postal Telegraph System were faithfully recorded, covering a period of nearly 44 years' actual experiences. Much useful information was compiled indicating the progress which had been made and, at the same time, the carrying capacity of practically all the various telegraph instruments, old and new, was clearly demonstrated. The rapid growth of traffic in the telegraphic system under State control was indicated by statistics prepared in periods of five years. This showed that while the total number of telegrams dealt with during 1869—which was the last year of the old Telegraph Companies amounted to less than seven millions, the number had risen during the first year after the transfer of the telegraphs to the State, on Feb. 5, 1870, to 9,850,177. By 1910-11 the yearly total had reached 89,200,000. The high-water mark, however, had already been attained in 1899, when the number was 90,415,123. Since that date there has unfortunately been a steady and even marked decline which has apparently not even yet spent its force. This declension may be attributed in large measure to the rapid development of the telephone system and to some extent to the neglect to develop the telegraphs along somewhat similar lines after the "peak load" period.

During the period which has elapsed since 1913 many sessions of this Society have been held, and it may be safely conjectured that those who have carefully prepared and read papers before you have been in the main practical officers of the Department who were thoroughly imbued with a desire not only to trace out, marshal, and chronicle essential facts for your information but also to submit in their respective papers their quota of suggestions for the good of the Service generally. I begin this address by wondering whether or not the Post Office authorities have made any full or adequate use of the valuable material thus contributed during the past 14 or 15 years. My reason for asking this particular question is due to the fact that both while I was within the Department and also since retiring from the Postal Telegraph Service I have heard of the appointment of one Committee after another, each and all of them engaged upon the work of scrupulously probing into matters of daily routine and practice, all of which ought long ere now to have been well within the knowledge of those responsible for the supreme control or management of the Telegraph Department and also within their capacity to deal with if they had desired to make any real practical use of such information.

The foregoing, however, is merely stated as a preliminary to the address for this evening.

The subject for treatment to-night is "Press Telegram Work."

It will be useful if all of us can have in mind a clear definition of what is meant by the words "Press work."

The messages in all cases must contain only news to be used solely for publication in the newspapers to which they are addressed.

When one passes from such a complicated subject as "The Telegraph Service : Methods and Results,"—which appears to embrace practically every conceivable item within the service—and when one drops down to the single subject of the treatment of Press work it would seem at first sight as if it might be a very simple job indeed, but, as a matter of fact, it has been and still is one of the thorniest and most difficult subjects which the Postal Telegraph Department has ever had to cope with. It may well be asked by anyone here present, "Why has Press work been such a thorny and difficult matter ?"

In order to obtain an effective answer to this query we must go back a bit and trace out the history of the matter under the first stages.

Prior to the transfer of the telegraphs to the State in 1870 the transmission of news was in the hands of an "Intelligence Department," worked by the Electric and International Telegraph Company under an agreement with the Magnetic Telegraph Company and the United Kingdom Telegraph Company. This Intelligence Department had its own reporters, one was in the House of Lords and one in the House of Commons, while others were employed elsewhere. They collected and edited their own news supply including stocks, shipping and markets, with a very brief summary of Parliament. Only speeches by prominent politicians were undertaken.

The average length of the Parliamentary reports on Monday, Tuesday, Thursday and Friday ranged from one-and-a-half to two columns, say from 2,700 to 3,600 words (both Houses included), according to the importance of the debates. On Wednesday—which was evidently an "off" day—only a quarter to one-third of a column of news was supplied. In order

* Before the Post Office Telephone and Telegraph Society of London.

to equalise matters over the different systems all the three companies undertook the distribution of a proportion of the "News" messages.

In addition to the above services certain short Sporting items giving "the results of great races" were furnished during the day, while arrangements were made for supplying special and more detailed racing reports at an additional annual charge to certain subscribing newspapers in London, Birmingham, Leeds, Liverpool, Manchester, Newcastle and Sheffield. *At 10 p.m.* reports giving details of the day's racing were transmitted to newspapers in the above-mentioned cities and the average quantity was estimated at one-eighth of a column for each paper.

Before leaving the subject of Racing one interesting item may be chronicled for your information and amusement. During Goodwood races 40 carrier pigeons were employed by the Intelligence Department to convey the "Results" from Goodwood Racecourse to Chichester because the Duke of Richmond would not allow telegraph posts to be erected in his park. Good old Duke! It should be understood that the Telegraph Companies' staff in the Intelligence Department were the judges of what kind and quantity of news should be telegraphed to the newspapers, and they sent on to provincial papers regular "expresses" or services each containing not more than 200 words per message at an annual charge which ranged from £150 to £250, the average being about £200.

Only those newspapers which entered into a definite contract for a complete year received these specified services at the reduced or Press rate of 30 words for 1*s.* up to 7 p.m., or 40 words for 1*s.* after 7 p.m., and a "copy" rate at 25%.

Messages to all other provincial papers must be prepaid at the ordinary or public rate of 20 words for 1*s.* with no "copy" rate.

There was a general understanding that the daily supply to those who had yearly contracts would be about 4,000 words, but it varied according to circumstances, being increased in volume to some extent when Parliament was in session. These charges, on an average, work out to a word rate of about 4*d.* per hundred. The newspapers have claimed that out of this 4*d.* 1½*d.* was spent in collecting and editing each 100 words, while 2½*d.* was spent in telegraphing the same 100 words. It is to be feared they lost sight altogether of the cost incurred in effecting delivery, which amounted to 1*d.* per message. Such a claim would not bear even a cursory examination.

According to the evidence given in 1868 before the Select Committee on the Telegraph Bill it was made perfectly evident that the newspapers generally *were by no means satisfied* with the regular daily "Expresses," and whenever there was anything really important "on" if it fell outside the scope of the news contracted for, then, whether it was a political speech of great importance or a report of some other highly interesting event, they had to pay a fee for reporting and extra charges for all such "specials" at the full Press rates. The amount of "special" news so taken was absolutely insignificant. Moreover, the quality of the news supplied under the contract system was frequently found to be unsuitable for publication in many of the papers. It was not what they wanted.

The general Press rates before the transfer were as follows:—

30 words, between 7 a.m. and 7 p.m.	1*s.* up to 100 miles. 1*s* 6*d.* up to 200 miles. 2*s.* above 200 miles.
40 words, between 7 p.m. and 7 a.m.	3*s.* to 6*s.* between Great Britain and Ireland.

For each additional newspaper *in the same town* a "copy" rate was charged of one-fourth of these rates, with a minimum of 1*s.* to each newspaper.

It will be observed that the Press "day rate" extended up to 7 p.m., and that the still cheaper "night rate" only commenced at 7 p.m., while the "copy" rate for each additional address after the first was only applicable to any other newspapers *within the same town*. Of course, in these early days there were but few places comparatively where there was more than one "morning" newspaper published daily. They would only be found in the larger cities. Nevertheless, it is obvious that the Telegraph Companies, when operating through their Intelligence Department, were cute enough to frame a thoroughly businesslike tariff, both for contract news and also for a suitable "copy" rate for any additional addresses *within the same town*.

Further, they provided "special wires" for *eight hours* in the night at an annual charge of £750. These circuits, seven in all, were appropriated to newspapers from 7 p.m. to 3 a.m. in Scotland and from 8 p.m. to 4 a.m. in the case of Ireland. The papers concerned were as under:—

Scotsman	Edinburgh.
Courant	"
Review	"
Herald	Glasgow.
N.B. Daily Mail	"
Irish Times	Dublin.
Freeman's Journal and *Saunder's News Letter*	Jointly at a rental of £937 10*s.* "

Of the above, only two had their special wires led direct into rooms within their own publishing offices. These were the *Scotsman*, Edinburgh, and the *Herald*, Glasgow. All the others terminated in the Telegraph Company's offices and delivery of "copy" was effected by means of messengers.

It is noteworthy that private telegraph companies were not in any way bound to observe "code time" when dealing with either fully-paid public telegrams or with news messages. Their Intelligence Department accordingly gave special priority over all ordinary public telegrams to the noon and closing quotations from the London Stock Exchange at 12.15 and 3.15 p.m. This was a great advantage to newspapers.

Any messages containing sporting prophecies, or having the appearance of an advertisement, or containing any matter not intended for publication must be charged at *ordinary* public rates, that is, 20 words for 1*s.* If any message exceeded the 200 words limit it ceased to be considered as entitled to the reduced Press rate and ordinary public rates had to be charged *for the whole quantity*.

On the *Times* Press Pass Book the following words were printed, viz.: "The Companies will not be responsible for errors, omissions or delays." A very wise precaution.

The high rates which were charged to each subscribing newspaper for special reports were practically prohibitive, and in all probability the only speech reported verbatim and telegraphed to the provincial daily press was the Queen's Speech at the opening of Parliament. In order to give this important speech the promptest possible dispatch it was telegraphed, so far as the Electric & International Telegraph Company was concerned, by means of their double needle apparatus. A very rapid signaller was placed at the sending end, while two men undertook the receiving at the different offices in circuit. One read out what was signalled while the other acted as a fast writer. It had to be passed on through several re-transmissions in order to reach all the newspapers entitled to receive it. The same procedure was adopted whenever lengthy "specials" were being transmitted.

Up to 1870 there were very few "evening" newspapers, only three or four, it is believed. In addition there were eight fly sheets containing a few brief telegrams. Moreover, the great bulk of the Press traffic was keyed or signalled by hand on simplex circuits. There was no duplex in these early days. . . . The so-called fast speed Wheatstone automatic apparatus was just coming slowly into use at from 60 to 80 words a minute. It was in use from London to Newcastle, Manchester, Glasgow and Edinburgh. Those were the days of low wages and high results. The work was always in arrears, congestion was rife everywhere, consequently the telegraph clerks of those days were at all times working against time. There were then practically no minor circuits because it was the rule only to cater for the larger towns where it would pay to open up telegraph communications. On the other hand there were omnibus circuits carrying as many as 20 separate railway or small town offices. Mr. Weaver, when asked by the Select Committee (Q 2778) about the desirability of opening new offices, said: "Of course, it would be very desirable to open one for the public good, but it would not be desirable for us, because it simply would not pay." A moment later he said (Q. 2794): "We always look first to profits, and then to the public interest."

You may possibly arrive at the conclusion that somehow or other the current had become reversed as soon as the Government got possession of the telegraphs, but the outlook towards the public was then, and necessarily, taken from quite a different angle. The general public interests had to be considered as a matter of course.

Q. 2802. He (Mr. Weaver) said: "I am a company's officer entirely."

Q. 2803 reads as follows: "And you give your evidence with reference to the company's interest?—Yes, I give my evidence with reference to the company's interest and with reference to paying a dividend, that is my business." Q. 2804. "And as large a dividend as possible?—Quite so.

It is worthy of being specially mentioned concerning the Electric Company's system, Mr. Weaver stated that taking the gross receipts of his company, 76% was received at 18 stations, these being offices in the largest cities in the United Kingdom. At 81 other offices the receipts were 15%, thus leaving only 9% at all their remaining offices. Clearly telegraphy was quite imperfectly developed.

The highest wages paid in London up to the transfer were 35*s.* per week for men and 18*s.* for women. These figures give an impressive idea of the advances made to the staff during the last 57 years. Of course, the times have altered to an enormous extent.

The premier company, the Electric and International, was incorporated in 1846. That company originally used Cook and Wheatstone's double needle instrument, then the single needle, and later on the printing system of Bain, which merged into that of the Morse and Wheatstone systems. Bain was an Edinburgh clockmaker.

The principal towns were connected by means of wires led along the route of a main line of railway.

Prior to 1870 many important towns had no direct communication with London, consequently transmissions and retransmissions led to excessive delay and telegrams for many large places had perforce to be passed from one company to another in order to reach their destination.

In 1866 the time occupied in sending a telegram between London and Bournemouth was two hours, and, worse still, between Manchester and Bolton, only a few miles away, the time occupied was two hours and a quarter.

The Telegraph Companies had added very little to their respective systems for five years before the transfer to the State. Moreover, their systems were incomplete because, for financial reasons, they restricted their operations as far as possible to the principal cities, avoiding the smaller towns villages and remote country districts. In the majority of towns provided with telegraphic communications, the office was situated at the railway station, whilst, in the larger cities, each company had an office at the business centre

of the town, the outlying suburbs being almost entirely neglected. Nevertheless, they had succeeded in making telegraphy a paying concern. Mr. Frank Ives Scudamore, who was then one of the Assistant Secretaries of the Post Office, stated as part of his 125 pages of evidence before the Select Committee on the Electric Telegraphs Bill, that: "With regard to the land Companies, I think that the total paid-up capital is somewhere about two-and-a-half millions." Further: "The highest dividend paid by the largest company is 10%, and that is on all their shares. The second company has paid 8% on all its shares." Mr. Rodwell also said that the telegraph poles and all the plant were maintained out of revenue every year before the 10% dividend was declared.

Mr. Scudamore selected Mr. R. W. Johnston to be his assistant in arranging for the transfer of the telegraphs. Mr. Johnston had been a telegraph clerk in the Electric Telegraph Co.'s service in Edinburgh, but on passing a Civil Service Examination he had been appointed to the Secretary's Office, G.P.O., London. He was utilised to form a Corps of Instructors in Telegraphy and also to organise the "Special Staff" which moved about the United Kingdom attending race meetings, political demonstrations, &c., and this staff dealt on the spot with the large volume of Press traffic incidental to such gatherings.

It was clearly proved to the Select Committee that the trade of the Telegraph Companies was increasing at a rate of more than 10% per annum.

It was shown that the Electric and International Telegraph Company had a very large and gradually increasing reserve fund and this made the dividend payable by that company as secure as if it were a Government stock.

It should be understood that the telegraph system up to 1870 was almost entirely used by the commercial community and the daily newspapers. Therefore it is not to be wondered at that the demand for the State purchase of the telegraphs should have been organised and pressed forward by them. Practically all the Chambers of Commerce throughout the United Kingdom had petitioned in favour of State purchase with cheaper telegrams and they finally secured that great boon. Of course, as usual, all the petitioners emphasised the fact that the public generally would be the gainers, and, as the result proved, they were greatly benefited, but their gain was bought at a price and the taxpayers have had to foot the bill and cover the inevitable loss which ensued. The Select Committee finally agreed with the principal telegraph companies that the price to be paid for their respective undertakings should be on the basis of 20 years purchase of their present profits for the year ending on June 30, 1868, subject, of course, to the approval of Parliament. The Telegraph Act of 1868 was finally passed on July 31, 1868.

It had already been agreed between the Post Office and the representatives of the newspaper press that the postal telegraph system would act only as the transmitter of news and not in any sense as collectors of it. The newspapers undertook to form an association of their own in London for the collection and editing of all the services they would require and their "copy" would be handed over to the Post Office Telegraph Department for transmission.

Reuters was established in 1865.

The Press Association was established in 1868.

The Central News was established in 1870.

The Exchange Telegraph Co. was established in 1872.

Mr. Scudamore had prepared two estimates, one a minimum and the other a maximum forecast. On the mean of those two estimates he thought he should get a net revenue of £280,000 per annum, after paying all working expenses. With that sum the Government could, at 3½%, raise eight millions of money.

It was repeatedly urged, and confidently believed by the Post Office, and Treasury representatives, that the total cost of buying out the telegraph companies would be less than £6,000,000, but, as a matter of fact, it ultimately cost about £11,000,000, or nearly double the estimate. That fact alone was enough to imperil all the ordinary chances of making the scheme the huge success it might otherwise have been.

There is one other interesting point which it seems desirable to comment upon. The Select Committee sat on 9 days in July, 1868. They examined in all 21 witnesses. Only three of these witnesses were directly connected with the telegraph companies, and their entire evidence covers only 24 pages out of a total of 253.

The examination was very thorough, but one cannot help feeling that a good deal of useful and most beneficial information might well have been elicited from the three telegraph experts, who were Mr. R. S. Culley (Engineer-in-Chief of the Electric Co.), Mr. Henry Weaver (Secretary of the Electric Co.) and Mr. E. B. Bright (Secretary of the British and Irish Magnetic Co.). These trained and experienced men should have been well able to forecast the future under the projected Bill and to express a reliable opinion concerning the proposed "copy" rate of 2*d.* for newspapers all over the United Kingdom, but as they belonged to the Telegraph Companies who were selling out no doubt the Select Committee knew best precisely what kind of information they wanted to obtain from them.

(*To be continued.*)

A BRIEF CHRONOLOGY FOR STUDENTS OF TELEGRAPHS, TELEPHONES AND POSTS.

By HARRY G. SELLARS.

(*Continued from page* 65.)

1779 ... ... Coulomb established the fact that the intensity of an electric charge varied with the surface over which it was distributed, and proved that the force exerted between two electrified bodies varies inversely as the square of the distance between them.

John Palmer, of Bath, started an agitation for the use of coaches to carry the mails.

1780 ... ... George Adams, in an essay on electricity, showed the influence which a disturbance in the electrical condition of a given body produces on other bodies in the vicinity.

1781 ... ... d'Elhujar discovered tungsten.

1782 ... ... Volta devised a condenser.

1783 ... ... Dr. Milner invented an electrometer.

William Sturgeon born.

Net Post Office revenue, £160,000.

1784, July 16 ... Irish and British Post Offices separated. James, Viscount Clifden, and William Brabazon Ponsonby appointed joint Postmasters-General.

1784, Aug. 2 ... First mail coach ran from Bristol to London.

Postage raised on certain letters, in place of a tax on coal.

1785 ... ... Van Marum, of Haarlem, constructed a powerful electrical machine, and carried out experiments in heating wire by means of electrical discharges.

1786 ... ... Luigi Galvani, of Bologna, accidentally discovered electric currents when experimenting with two dissimilar metals and a frog's leg. He was unaware of Swammerdam's experiment in 1678.

Volta, of Pavia, obtained electricity from a "pile" made up of layers of copper and zinc discs separated by flannel moistened with brine. He also devised a "Couronne de Tasses," or "Crown of Cups," consisting of a number of vessels filled with brine, each containing a strip of zinc and copper, the copper of one cup being joined to the zinc of the next, and so on.

Saussure conducted experiments in electricity.

1787, Mar. 16 ... Georg Simon Ohm born at Erlangen.

Betancourt devised a telegraph system.

Mr. Lomond, of Paris, devised a telegraph system in which the letters of the alphabet were indicated by the movements of a pithball connected with the line, which was brought into contact with a charged conductor at the distant end.

1788 ... ... Commissioners of Fees and Gratuities found that Secretary to the Post Office had received about £50,000 privately, in 17 years, from the Packet Service. Persons employed in the Post Office prohibited from being concerned, directly or indirectly, in the Packets, or as agents for the owners.

1789 ... ... A. Bennet produced a battery made up of iron and zinc in caustic soda. He also invented the Gold Leaf electroscope with two leaves, and the "Doubler," a continuous electrophorous.

Nicholson introduced a revolving "Doubler."

Galvani made various electrical experiments. Galvanism is named after him.

1790, Mar. 12 ... John Frederick Daniell born.

1790, April 17 ... Benjamin Franklin died.

Net Post Office revenue, £330,000.

Chappè invented the semaphore, or optico-mechanical telegraph. He also devised a system of communication consisting of two clocks regulated so that the hands moved in unison and pointed to figures marked on the dials. The figure to be read was indicated by a signal sent by discharging a Leyden jar.

1791 ... ... Gosnell, accountant, of London, proposed two schemes for transferring money through the Post by order. After taking legal advice, the Post Office decided against its adoption.

1791, April 27 ... Samuel Finley Breese Morse born in Charlestown, Massachusetts.

1791, Sept. 22 ... Michael Faraday born at Newington Butts, London.

1792 ... ... Claude Chappè designed the first signalling system to function regularly and called it the "tachygraphe."

1792, Oct. 1 ... With capital provided by the "Clerks of the Roads," a "Money Letter" (Money Order) system came into operation. Limit of an Order, £5 5*s*., and commission 6*d*. in the £ (payee paid half). Advices "franked" by the Post Office.

Fabroni suggested that the prime cause of difference of potential was chemical action. (This view was supported by Faraday, Wollaston, and Davy.)

1793, Jan. 1 ... Commission on Money Orders reduced to 4*d*. for London orders, but remained at 6*d*. for orders between country towns. Whole commission paid by remitter.

A suggestion made to raise the limit to £20 was not adopted.

1793, Dec. 2 ... "Atalanta" (French flag) attacked the Packet Boat "Antelope," but was beaten and captured. Pensions allowed to certain members of the crew.

1794 ... ... Communication opened between Paris and Lille by means of Chappè's apparatus.

1795 ... ... Semaphore with three pairs of movable arms adopted by the British Government.

Cavallo suggested cloth and pitch as insulating materials.

Don Francisco Salva, at the Academy of Sciences in Barcelona, suggested communicating by means of six or eight wires each charged by a Leyden jar, and the combinations of which could be arranged to indicate the various letters of the alphabet. He proposed that the wires should be separately insulated and rolled into a single cable, and described experiments in which the wires were covered with pitch-coated paper and tied together, the whole being bound round with paper.

Salva also suggested that such cables could be laid in tubes underground or beneath the sea.

Cavallo, in London, transmitted signals through wires by means of discharges from Leyden jars.

Commission on Money Orders raised to 8*d*. in the £.

1796, April 20 ... B. R. Gleig born.

Aldini, on passing electrical currents through dead animals, noticed contraction of the muscles.

Zanotti, on sending a current through a dead grasshopper, caused it to chirp.

1797, Dec. 17 ... Joseph Henry born in U.S.A.

Rates of postage increased.

1798, April 1 ... French Minister of War ordered the apparatus of Chappè to be called the "télégraphe."

1798, April 5 ... "Clerks of the Roads," having lost over £300, gave up the Money Order scheme. Messrs. Barnes (Senior Clerk of the Roads), Daniel Stow (Superintending President of the Inland Office), and Slater, continued the Money Order Office as a private speculation, and other partners joined from time to time.

Mr. Bourne, Assistant Inspector of Dead Letters, suggested establishment of a Ship Letter Office.

1798, Dec. 4 ... Luigi Galvani died.

1799, Sept. 10 ... Ship Letter Office established.

Profits of the Bye-Letter Office reached £200,000 per annum.

Net revenue of Post Office, £720,982.

1800 ... ... Fabroni originated the chemical theory of voltaic electricity.

Volta constructed first absolute electrometer and a condensing electroscope, and introduced the electric battery. (Volt = Unit of electric-motive force.)

He measured the difference of potential between two metals and was of opinion that difference of potential originated from the contact of two dissimilar metals. This theory was supported by Ritter, Pfaff, Ohm, Biot and others.

Carlisle and Nicholson discovered that an electric current passed through water decomposed the liquid into its constituent gases.

Marie and Davy devised a battery with zinc in water and carbon in bisulphate of mercury.

Laplace stated that the electric tension at a given point is proportional to the square of the electric density.

1800, May 14 ... Don Francisco Salva, before the Barcelona Academy of Sciences, described experiments which indicated that voltaic currents could be used for transmitting signals.

Humphry Davy observed that an electric flame and a brilliant light were produced if two pieces of wood charcoal joined to the terminals of a battery were brought into contact and then drawn apart for a short distance.

Number of Money Orders issued in London—11,880.

Post Office Directory commenced publication.

1801 ... ... Wollaston discovered that, if a piece of silver connected with a more positive metal were immersed in a solution of copper, the silver became coated with a thin layer of copper. He proposed diminishing the resistance in batteries by doubling the size of the copper plate and bending it round the zinc.

Gautherot noticed that silver, platinum and gold, placed in acidulated water, could return a secondary current after a connecting battery had been removed.

Postmaster-General authorised to collect and convey letters from places, other than "post towns," and to make arrangements with the inhabitants as regards fees. As the fifth clause of the authorising Act gave this permission, the posts instituted were called "fifth clause posts."

Renè Just Hauy found that certain crystals, when pressed, became electrical.

London penny post changed to a twopenny post. Penny posts continued in provincial towns.

1802 ... ... Ramagnosi, of Trente, found that a voltaic pile adjacent to a magnetic needle caused it to be deflected.

1802, Feb. ... Charles Wheatstone born at Gloucester.
Hatchett discovered tantalum.

1803, June 28 ... Collision in the Atlantic between H.M. Packet "Lady Hobart" and an iceberg.

Ritter devised a secondary battery in which the electrodes were made of platinum. He discovered that certain flowers closed when electrified.

Cruikshank observed that, when a current was passed through solutions of lead, copper, or silver, deposits of the metals appeared at the wire connected to the zinc end of the battery. He also suggested making up batteries in trough form.

1804, Oct. 24 ... Wilhelm Eduard Weber born.

Richard Lovell Edgeworth set up telegraphs between Dublin and Galway.

1805 ... ... Brugnatelli, pursuing Wollaston's discovery, gilded two silver medals by attaching them to the negative pole of a battery and suspending them in a solution of salt of gold.

Admiral Sir Home Riggs Popham introduced a system of flag signalling, consisting of 26 flags and pennants, which formed the foundation of the present international code.

Grotthuss put forward a molecular theory to explain the transfer of electricity and matter through the liquid of a volta cell.

Don Francisco Salva used a voltaic pile for sending signals, their presence being indicated at the receiving end by the liberation of bubbles of gas in water.

Rates of postage increased.

1806 ... ... William Fothergill Cooke born at Hastings.

Eduard Friedrich Weber, brother of W. E. Weber, born.

1806, Aug. 23 ... Charles Augustin de Coulomb died.

1807, Feb. 19 ... Mr. Whitbread, in the House of Commons, proposed the establishment of a "national institution in the nature of a bank, for the use and advantage of the labouring classes alone." The suggestion was not pursued.

1808 ... ... Soemmering, at Petersburg, using submerged conductors, exploded gunpowder by means of electric current.

Sir Humphry Davy produced a primitive electric arc.

Postmaster-General decided that penny posts should be granted to villages.

1809 ... ... Post Office admitted it could not prevent the collection and dispatch of letters to places abroad by private agencies.

Soemmering described to the Munich Academy of Sciences a telegraph apparatus in which, at the receiving end, 27 lines, each allotted to a letter or symbol, terminated

in a receptacle containing water. At the sending station a key, which brought a battery into circuit, was connected as required to each of the line wires. The passage of a current caused chemical decomposition of the water and the message was read by observing at which of the terminals the bubbles of gas appeared.

Zamboni constructed a dry battery composed of paper discs coated with zinc foil on one side and with binoxide of manganese on the other.

1810, Feb. 24 ... Henry Cavendish died.

Morse graduated at Yale University.

Schilling produced a telegraph apparatus.

Singer improved Bennet's electrometer.

1811, Mar. 31 ... Robert Wilhelm Bunsen born.

1812 ... ... Postage ranged from 4*d.* to 13*d.* according to mileage.

1813 ... ... Morse exhibited his first picture at the Royal Academy.

Firm of Reid Brothers, who constructed most of the early telegraphic apparatus, founded.

1814 ... ... Morichini demonstrated the magnetic effects of violet rays of light.

(Elster and Geitel also carried out experiments in connexion with the effect of ultra violet rays.

Bichat, Hoor and Blondict studied the effect of daylight and sun on metals.)

1814, May 1 ... Action between H.M. Packet "Hinchinbrook" and the American privateer "Grand Turk."

(To be continued.)

CHIEF OF THE CANADIAN PACIFIC TELEGRAPH SYSTEM.

STORY OF MR. MCMILLAN'S CAREER.

HARD work, blended with the characteristic Scottish ambition, is the secret of Mr. McMillan's success. Entering the service of the Canadian Pacific on June 6, 1883, he constructed the first permanent telegraph line between Winnepeg and Fort William. Transferring from the section east of Fort William to Medicine Hat, following the laying of the steel line from Medicine Hat to the summit of the Rocky Mountains, now known as Stephen Station, he continued in charge of the Telegraph Construction Department until early in 1885, when he was placed in charge of building the Dominion Government telegraph line from Dunmore to Medicine Hat, Lothbridge, and Fort McLeod. In those days there was not a single building in Lethbridge above the river bank, and only a few along the river bottom where coal mines were being developed.

Mr. McMillan connected the first instrument in the Government service at Lethbridge and Fort McLeod; and has many stirring stories to tell of his experiences at that time. The second Riel rebellion had broken out, and one day, when the line was nearing Lethbridge, a detachment of the Royal North-west Mounted Police stopped to enquire if any despatches from the scene of fighting had been received. The instruments were connected and the operator enquired if any information was available. Shortly afterwards the reply came: "General Middleton completely annihilated." The instrument then stopped working. The Mounted Police officers were thunderstruck, but their consternation was turned to joy when the message was completed: "General Middleton completely annihilated the rebels." The only cloud to their rejoicing was the knowledge that some of their splendid men had made the supreme sacrifice.

Mr. McMillan was in charge of construction of the Government telegraph line from Moose Jaw to Wood Mountain under Mr. F. N. Gisborne, General Superintendent in charge of Dominion Government Telegraphs, and later, his son, Mr. Hartley Gisborne To Mr. F. N. Gisborne belongs the honour of having laid the first deep-sea cable on the Canadian side of the Atlantic. The first section of the deep-sea cable was laid between Prince Edward Island and the coast of New Brunswick, and Mr. McMillan looks back with a great deal of pleasure to having been associated with a man of outstanding ability and a man who, in his time, added greatly to the record of British achievement.

Mr. McMillan continued in the Government service till after the execution of Riel, returning to the Canadian Pacific service, in 1886, in charge of the maintenance of lines on the British Columbia division. When the first through train made the journey from ocean to ocean during the earlier years of railway operation through the Canadian Rockies, there was much to contend with. Some of the seasons were extremely trying, and much of the heavy timbered section of the Rockies was exposed to very serious fires. These, in the earlier years, were followed by periods of extreme high water, and great difficulty was experienced in maintaining railway and telegraph operations.

After four years of service in the construction and maintenance of lines, Mr. McMillan was placed on special electrical work, followed by an assignment to the operation of lines. In this capacity he worked as operator, repeater chief, and inspector till 1905, when he was appointed Assistant Superintendent at Winnipeg. Twelve months later he removed to Calgary as Superintendent, and, in 1912, was promoted to the position of Superintendent at Winnipeg, and during the succeeding year, of General Superintendent at Winnipeg in charge of lines west of Fort William. In 1915 he was appointed General Manager of Telegraphs, with headquarters at Montreal, in executive control of a system which embraces over 120,000 miles of telegraph line and which is a potent link in the Empire chain of communication.

It is a great story, a story of success gained by hard work and all-round efficiency. Mr. McMillan has worked in every single capacity—from the first service in the building of telegraph lines to the equipment, supervision, operation, and general supervision of every department in the Canadian Pacific telegraph service. He knows all about the Canadian West, and the strenuous life of the early pioneer, and is an enthusiast in his belief of the future of the great Dominion.

He has one theory of service—"Work in the job you are on. Make the best of that."

KEITH MORRIS.

RETIREMENT OF MR. ALLAN MACLEAN.

MR. ALLAN MACLEAN, District Manager of the Post Office telephones in Northern Ireland, with headquarters at Queen's Buildings, Royal Avenue, who is retiring on superannuation at the end of the present year, has had a lengthened, varied, and intimate experience of telephony dating back for almost forty-five years. His duties in Ulster began in April, 1918, when he was transferred, several months before the Armistice, on promotion from Canterbury, in which important area he had, from 1916, a very busy and arduous experience, particularly during the intensive air raids period.

It was in May, 1883, that Mr. Maclean—who is a native of the Western Highlands, though his accent would scarce disclose the fact, commenced at Glasgow his connexion with the telephone service when in its infancy in Great Britain, for it was only in 1880 that the United Telephone Co., Ltd., was constituted, as the result of the amalgamation of the Bell and Edison Companies.

Following Glasgow, Mr. Maclean served, in connexion with the progressing telephonic system, in such important commercial and industrial centres as Edinburgh, Dundee, and Manchester, and in 1891 he was appointed local manager in Bolton. In Lancashire, as elsewhere, he made many friends amongst the business community, as well as socially.

An important stage in the career of Mr. Maclean was marked by his appointment in 1895 to be assistant district manager of the telephone service in Liverpool, which was at that time—as in the case of practically all the principal towns in the United Kingdom, including Belfast—under the jurisdiction of the National Telephone Co., the transfer of the system to the Post Office taking place on Jan. 1, 1912. It is an interesting coincidence that Mr. Maclean's friend, Mr. John Lee, C.B.E., who was Postmaster of Belfast 1917-19, was at this period engaged in the Post Office service at Liverpool headquarters, and became superintendent of the Birkenhead G.P.O. until his transfer to London in 1908. On a separate district being formed on the Cheshire side of the Mersey in 1898, Mr. Maclean was appointed District Manager, with headquarters at Birkenhead.

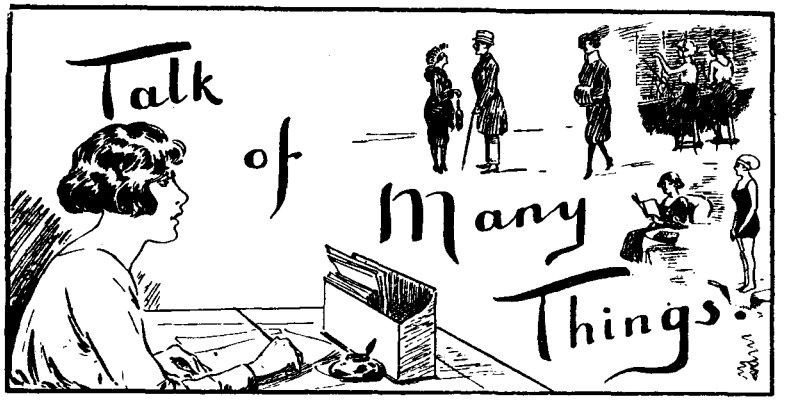
From Birkenhead he was transferred in 1909 to be District Manager of the Thames Valley area, with headquarters at Reading; and there he remained until shortly before the outbreak of the Great War in 1914, when he was appointed to the control of the Plymouth district.

During 1916, in consequence of the special war conditions prevailing, Mr. Maclean was placed in charge of the Canterbury district, where he was located during the greater part of the intensive air raids period until about six months before the Armistice, when he was, in April, 1918, promoted to be District Manager Post Office telephones for Northern Ireland, the area including Donegal until the establishment of the Parliament for the Six Counties. It is well within the recollection of the public of Ulster the tremendous difficulties under which the telephonic system was carried on during the troubled times of 1921 and 1922, when an organised system of dislocation was continuously being carried on by enemies of the Crown, with widespread risk to life and property. The efficient manner in which breakdowns were traced to their source and the necessary repairs—often on a very extensive scale and in remote parts, difficult, and indeed dangerous of access—and the practically normal conditions under which the telephone service generally was carried on, evidenced the skilled organisation directed by Mr. Maclean and the splendid co-operation of the staffs in the different branches in all emergencies.

Mr. Maclean will, in all certainty, carry with him in his well-earned retirement from the public service, the best wishes and gratitude of all who have had the privilege of being associated with him whether officially or in private life. He will also be greatly missed by the large staff of which he was so long the genial, courteous, and ever-thoughtful chief. It is his intention to take up residence in Edinburgh early in the New Year.

(Abridged from *Belfast Telegraph.*)

WE TELEPHONISTS



A Worm's-Eye View.

THE other morning I went out into the garden early—well, if you must know, it was 9 o'clock, and if you don't think that's early for a Sunday morning you clearly don't know much about me—don't interrupt with foolish remarks—and as I sauntered in a leisurely manner to and fro over the length and breadth of my demesne—or domain, as you please, but do be quiet—I heard a voice. It was a low voice, by which I mean that it was low down, by which I mean that it came from near the off-side toe of my carpet slipper—lord! what a lot of precise information you want: yes, yes, the left-hand foot. It said: "Hi! are you the fellow who feeds the birds in this garden every morning?" I stooped down and beheld that it was a worm who addressed me. "Yes," I said, "I am; what about it?" "You needn't shout," he said, "I may be only a worm, but I've got my feelings, same as you." "Ah," I said, as sympathetically as possible, and I sat me down upon the garden roller. "It's a dog's life being a worm," he continued, "Heaven knows I work hard enough turning over the mould in your blessed garden, and me with the rheumatism so bad owing to the wet weather that I can't turn, let alone make ends meet. If I try a simple S the lumbago gets me and it's positive agony to make an 8." "Tut, tut," I murmured. "Ah," he said, "I know how much to value your sympathy; you and your bird-feeding. Luckily you're not much of a hand with that roller. Your neighbour next door is a perfect terror. That's why I moved into your garden—but bless you, if it's not one thing it's another. Life's just a long-drawn-out wriggle. Things were not always so," he went on, with a sigh; "I come of an ancient lineage—quite a long line, in fact, and," he added, drawing himself up proudly, "we've had books written about us." "Ah," I said again, for to tell the truth I was not quite at my ease and the roller was hard, cold and wet. "Why don't you keep a cat," resumed his wormship, "I like cats—gentle, harmless creatures." "Why?" I said, "I don't keep a cat because I prefer to have the birds." "Huh, what a strange outlook on life," said the worm. "Just like you humans, a most inconsiderate and irrational lot—cruel, too. A week ago come Tuesday, you ran a spade through Uncle George. Last Saturday you sliced Sister Alice with your lawn-mower and she's still in a state about the loss of her head—calls it her better half: sheer vanity on her part, of course. Yesterday your neighbour flattened Brother Bill with a roller, and then on the top of all these affiictions you must feed the birds!" "Well," I said, "what about that?" "Why," he said, "can't you see—I don't like birds, the spiteful, vicious things, because they like me." "Oh, ah, um," I said, reflectively. "And another thing," the worm went on—and I never saw a worm in such a passion or looking so cross—"I suppose you believe in cremation."

But just then a thrush intervened, so I never really knew the purport of the worm's last remark. I suspect, however, that the thrush knew, for I swear he cocked his head at me and winked one eye as he flew off with his beak full. Of a truth it is the early worm that getteth the bird.

PERCY FLAGE.

A Telephone Romance.

(Continued.)

The next day they settled down to "Routine," which was a "Test" of the bride's affection, but she felt no "depression."

Most of the "Day time" she spent in the garden and in the evening she would walk across "Bushey Heath" to "meter" husband, where he would often "finder" half way. When unable to do this she listened to the "Traffic return."

On Saturday, as soon as he was "off duty," the bridegroom changed into a pair of "frayed cord" breeches and a "check" cap and with "hand set" to the plough he commenced to "Harrow." He soon removed the first "covering" of "earth" and then set some "miscellaneous plant," later they began to "exchange plant" with the neighbours who turned out to be a "rural party" and seemed very friendly.

As they both continued to "concentrate," the garden soon looked "effective," one corner was reserved for "pink routes" and a "Victoria" plum tree stood in an "end position" near the sun "dial." In the "extension" stood a row of "current" bushes and in an "adjacent position" a little "Redhill" of geraniums. From "local observations" they found that the next-door creeper was "over-lapping" the "dividing line" causing "congestion" among their "plants"; this they "adjusted," and later the bridegroom noticed a hint in the "green book" which he promptly "brought into use," namely, to fit "wire cages" over the "plants" to prevent the cats from "breaking in." The bride who left her head "uncovered," had recently had her hair "cut off" but now wore the "coils" connected into a "switch"; this suited her "outstanding features."

She would often call to the bridegroom in her "bell-like tone," but although he answered her in a "busy tone," there was always a "guarding tone" in his voice. On reaching the "City" on Monday morning tho bridegroom endeavoured to purchase a certain "plant" and was "advised" "unobtainable," but when this was "disputed" it was "obtained" via another source. During the morning a "noisy" buzzer alighted on a "plant," causing the bride to feel "faint," but she soon "recovered" when it was in "safe custody."

Every "plant" was marked with a "designation label," but as there was a "Hayes" over the garden, these were difficult to see.

D. D.

[For further and last adventures, see our next issue.]

Gerrard.

The festal season at Gerrard began on Friday, Dec. 9, with a Christmas Party arranged by the Swimming Club, which proved a greater success than ever. Fancy costumes were the vogue of the evening, and from a visitor's point of view required a larger hall than the Dining Room to display the costumes to their full effect.

The first prize was awarded to "Mr. Wu," impersonated by Miss Greggain, whose mannerisms were so perfect one wondered if she had relatives in Chinatown.

The second prize went to "Aloma," represented by Miss Latimer, whose creation of poppies and beads immediately recalled "Nuitani" of the South Sea Isles.

The third prize was awarded to "Carmen" as impersonated by Miss Carmen, this creation being perfect even to the name.

Our old friend Mr. Keatley, at the piano, assisted by a saxophonist and jazz drummer, enticed many to their feet to enjoy the latest waltzes and fox-trots.

We were pleased to welcome so many old friends and colleagues from other exchanges.

E. L. E. S.

The Central Social.

And once again has Central helped,
The cause of charity;
For on the 6th we gave a dance,
To aid the children's tea.

The band composed of engineers,
Had just one hour's delay:
So many faults on C.C.I.
They could not get away.

The Misses Smith and Morris played,
Until the band could come,
Duets and many lively tunes,
And "T. A. B." the drum.

Miss Longman's comic numbers both
Caused merriment and stir.
We all enjoyed "The Movies,"
And doubled at "Oo'er."

Then everyone besieged Miss Brown,
Who told, with manner thrilling,
In mystic tones and hollow groans,
Our fortunes for a shilling.

Refreshments all the evening,
Were served by maidens sweet;
Who nimbly took your money,
And gave you lots to eat.

Then there was great excitement,
And everyone grew hot;
Miss Fordham held the lucky card,
And Miss Blake won the spot.

And all the other artistes
In merry song and skit,
Made us all hope for encores—
Which time did not permit.

We thank Miss Buckwell and her staff,
And all those who attended.
And our best thanks to "T.A.B.,"
Who as M.C. was splendid.

D. D.

London Telephonists' Society.

Since last we wrote within this space, two more events have taken place.

The Whist Drive, held at Tothill Street, whereto we turned with eager feet; and Mr. Camp's, with graphs so rare, an "International" affair. Each one afforded joy, in parts, for some liked cards and some liked charts. *We* went to both—enjoyed them too, as many others seemed to do. We won no prize, nor have we yet, and who succeeded, we forget; excepting two, forget who could! Miss James and Mr. Hinshelwood.

With modest mien each winner took a prize, and then with terror shook. Loud cries of joy assailed their ears, and hardly anyone shed tears.

Held at the dear old Bishopsgate on January twenty eight, the Annual Dance we next will hymn, where we may glide on supple limb, and dance just anything we choose—the yale, a jazz, or latest blues. And all who for this column care we hope to meet and welcome there.

We wish you all a glad New Year and trust new writers will appear. May each one feel Good Luck's caress—your very grateful Editress.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), London, E.C.1.

LONDON TELEPHONE SERVICE NOTES.

Contract Branch.

THE amount of business done by the Contract Branch during the month of November, whilst not maintaining the high level reached in the previous month, showed an increase of over 500 stations as compared with the figures in the corresponding month of last year. The figures for November were :—

	Stations.
New business obtained	8,408
Ceasements	3,389
Net gain ...	5,019

The telephone habit is growing, and it is quite the fashion now for celebrities to have their photographs taken for publicity purposes whilst apparently earnestly talking into a telephone transmitter, with, however, no doubt in order to prevent complications, their finger negligently holding down the switch-hook. It is all to the good that these misshapen monstrosities of the newspaper artist, which were supposed to be telephones, seem to have disappeared in favour of more correctly drawn, and certainly more easily recognisable, instruments which do not require the letterpress underneath, as of old, to enable one to guess what they are intended to represent.

It is gratifying to learn that at a recent meeting of the Finsbury Borough Council a Labour Member, speaking in support of permission being granted for the erection of a public telephone kiosk in Rosebery Avenue, declared that the kiosks beautified the streets. A somewhat different view, however, is taken in another case in which it was found that a kiosk had not been erected exactly in the position agreed, resulting in the lighting being defective. On this being pointed out to the owner of the property, she wrote as follows: "My late husband arranged for the present position of the kiosk. In the circumstances, the kiosk to me stands there as long as you wish as a memorial." Whilst this is the first suggestion that has come under notice of kiosks being so used, the idea seems capable of expansion. Many owners of private property might like a telephone kiosk erected in their front gardens as a memorial to departed friends, and with this object in view some eminent architect might be requested to design a suitable memorial kiosk. The idea, of course, might be carried still further, and kiosks designed to commemorate some joyful event, although presumably the present standard colouring is bright enough for any joyous occasion.

In these days, when journalists attempt to sharpen their wit at the expense of the Telephone Service, it is refreshing to receive unsolicited such a letter as the following :—

"In reply to your favour of the 16th instant, for which I thank you, I desire to express my appreciation of the efficient manner in which I have been connected with the telephone service, of the expeditious way in which the necessary work has been done, and of the refreshing courtesy with which I have been treated from start to finish.

"For more years than I care to contemplate I have had very frequent occasion to use the 'phone in all parts of the country, and I cannot recall a single instance in which I have had any cause to complain. I certainly think the responsible officials have every reason to be proud of the service, which appears to be an ever improving one, and I congratulate you on its efficiency."

* * * *

Football.

Since the last notes appeared under this heading, four league games have been played, three of which have been won, and two of the victories were gained on our opponents' grounds. Thus, 6 points have been collected out of a possible 8, and 12 goals scored against 8.

The progress of the club so far has on the whole been satisfactory, the record since the beginning of the season being :—

Played.	Won.	Lost.	Drawn.	Goals. For.	Goals. Against.	Points.
8	4	2	2	33	20	10

Recent games have included a home and away fixture with the Board of Education, and in the first match played at Chiswick we had to fight very hard to win by the odd goal in three. We met them again the following Saturday in the return match, at Raynes Park, and suffered our second defeat of the season by 3 goals to 2. It was naturally a disappointing result after the splendid win of the previous week, but there is no doubt the Board of Education adapted themselves to the wretched ground conditions far better than our people, who seemed unable to realise that it is impossible on a waterlogged pitch to make much headway by keeping the ball close and attempting to play a tip-tap game in mud and water. As this was only the first defeat since the opening game of the season, it perhaps seems unkind to criticise the result too severely, but there have been matches when a defeat would not have been altogether unexpected; but this was not one of them.

The War Office were comfortably defeated by 5 goals to 2, but it was rather late in the second half before our superiority was reflected in the scoring of goals. The game with the Ministry of Health at Chiswick was a hectic affair, and the result, a win of 3-2, was perhaps the team's finest achievement of the season. It was a hard battle, and one was glad to see the close of the contest with all the players on the field.

In the Challenge Shield Competition we secured a bye on the 1st round, and meet Taxes 1st eleven in the 2nd round, at Raynes Park on Jan. 7, 1928.

The following is a list of other games during January :—

Jan. 14	...	Colonial Office	Home.
„ 21	...	Ministry of Health	„
„ 28	...	Dollis Hill	Away.

* * * *

London Telephonists' Society.

On Friday, Dec. 2, the London Telephonists' Society held the third meeting of the session, at the City of London Y.M.C.A., Aldersgate Street, E.C.4.

Preceding the lecture, a concert was given by members of the Avenue Exchange. Sincere thanks are due to the ladies who gave so generously of their time, and the pleasure of a very appreciative audience was cordially expressed.

Mr. Camp's lecture on International Telephone Services was of great value.

We were able to survey the development of Anglo-Continental telephony during the last 36 years. During the first 12 years of this service, communication was limited to London-Paris. In 1903 cables between London and Brussels were brought into use. The following year the Anglo-French system was extended, and certain provincial towns in England and France were able to obtain communication one with another. In 1913 a service to Switzerland was inaugurated, but communication was obtained via Paris, and a direct route was not available until 1924.

The war was responsible for an increase of circuits between London and Paris, and as the result of experiences gained by the engineers during that period, a great deal was done to perfect transmission, and so to open out the possibilities of long-distance telephony. Development since the war has proceeded at a greater pace, and communication can now be obtained with practically all the important cities of Europe.

Mr. Camp spoke of the method of charging which obtains; and explained that a proportion of the fees were allocated to each country concerned. The operating procedure was then dealt with, and in mentioning the high standard by which telephonists with language qualifications are judged, Mr. Camp compared the staff of the Foreign Section very favourably with other branches of the Civil Service where foreign languages are required.

The meeting concluded with a very hearty vote of thanks to Mr. Camp for his interesting lecture.

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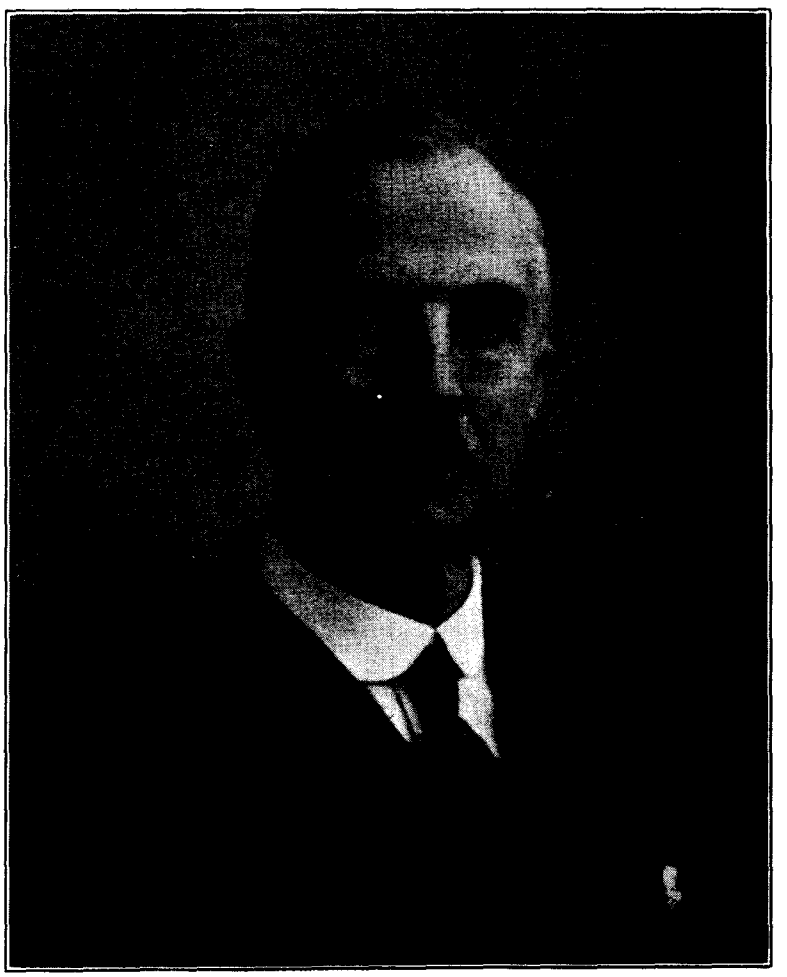
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XLIX.

MR. P. F. CURRALL.



MR. P. F. CURRALL, whose portrait we offer to our readers, was born in 1870, and entered the service of one of the companies amalgamated with the National Telephone Company in 1886. At the time of the transfer of the Company's system to the Post Office at the end of 1911 he was District Manager at Dublin, a position which he occupied until 1916, when he was transferred to Brighton to act in a similar capacity. There he remained for five years, seeing the Brighton system expand in that period from 10,000 to 23,000 stations. He was promoted in November, 1921, to the important District Managership of Birmingham, where he still remains. During his period of office, the telephones in the Birmingham district have grown from about 34,000 to upwards of 57,000.

A sufficient testimony to Mr. Currall's sound business ability will be found in the important posts which Mr. Currall has occupied.

He takes great interest in the various Staff social events and holds the opinion that these play an important part in the welfare and happiness of the Staff.

He does a considerable amount of reading. His outdoor recreations are motoring and, of course, golf.

"WHAT'S IN AN EXCHANGE NAME?"

THE subject of the naming of exchanges was dealt with very fully by Mr. Maycock in the December 1920 issue of this Journal. It is certainly a little startling to realise that so long ago as seven years we were preparing in such detail for the coming of automatics, but our inquiries on the subject had then gone little beyond the theoretical stage and perhaps a few notes on the practical application of the principles enunciated in that article may be not without interest.

In case the reader has not by him the article referred to I will repeat here, with some alteration, the conditions which govern the selection of exchange names. They are as follows:—

(*a*) The name must not have the same numerical equivalent as any existing or recommended name of an exchange within the 10-mile circle from Oxford Circus (i.e., the London Automatic Area).

(*b*) It must be phonetically satisfactory—not likely to be confused with an existing name.

These are the two essential conditions *sine qua non*. Others, to conform with which is highly desirable, are:—

(*c*) It should possess some topographical significance.

(*d*) It should be euphonious and free from unpleasant associations.

To these must be added two conditions, the observance of which experience recommends.

(*e*) It should not possess the same numerical equivalent as the name of any exchange which the London subscriber may believe to lie within the 10-mile radius.

(*f*) It should not offend local susceptibilities.

In regard to the last point, there is more feeling than would have been expected on the subject. We should hardly suppose, judging from what we are allowed to know of the attitude of the subscriber towards his telephone and his exchange, that he would attach any aesthetic or associational value to the name of the latter. But so it is. Gerrard and Avenue have already gathered round them a tradition and confer a certain cachet upon the subscribers privileged to put those names on their note-paper headings. It is different with others. The National Telephone Company once had an exchange called Deptford, and the subscribers on this exchange, most of whom were in the New Cross area, thought the name of that ancient and historic borough too plebeian for the inhabitants of the genteel suburb of New Cross, so they petitioned and had it changed. Quite recently a new exchange was opened at Fulham; the area covered almost precisely the area of the Metropolitan Borough of Fulham. It is surprising how many people who live in Fulham think or wish it to be thought that they live in Kensington; but in this case the Department had more courage than its predecessor and insisted upon the proper topographical appellation.

These, of course, are minor complications. The great difficulty in searching for a name is when the natural local name does not fulfil the conditions (*a*) and (*b*) above.

The names ruled out by condition (*a*) are quite definite, but the second condition is by no means so clear-cut or sharply defined as the first. It is known that some names are easily confused with others in transmission over a subscriber's circuit and even more so over an order wire, but it is not always clear what are the real causes of the confusion, and it cannot be accurately determined what combinations of vowels and consonants are most likely to be mistaken for other combinations. Thus, observations extending over a prolonged period gave the following list of cases where errors due to phonetic similarity were most frequent:—

Exchange Name.	Confused with:—
Bank	Park.
Brixton	Western, Richmond.
Bromley	Wembley.
Chancery	Hornsey.
Chiswick	City.
Dalston	Merstham, North.
East Ham	Merstham.
Eltham	Elstree.
Hampstead	Wanstead.
Hop	Park.
Hornsey	Molesey.
Kensington	Kingston, Paddington.
Kingston	Kingsbury, Kensington.
Kingsbury	Kingston.
Malden	Molesey.
Merstham	Dalston, East Ham, Western.
Mitcham	Richmond.
Molesey	Hornsey, Malden.
North	Park, Dalston.
Paddington	Kensington.
Park	Bank, Hop, North.
Richmond	Brixton, Mitcham.
Romford	Wanstead.
Sidcup	Sydenham.
Streatham	Sutton, Sydenham.
Sutton	Streatham.
Sydenham	Sidcup, Streatham, Tottenham.
Tottenham	Sydenham.
Wanstead	Hampstead, Romford, Woodford, Watford.
Western	Merstham, Willesden.
Willesden	Western.

N.B.—Some of these names have now disappeared, but they illustrate the difficulty.

It appears clear from this table that it is the vowel sounds which are most to blame for the mistakes made. The confusion is aided by the careless way in which those sounds are usually produced in English as compared with most other languages, with the result that several distinct sounds are represented by the same symbol while different symbols have precisely similar sounds (e.g., the "i," the "e," and the "u," in the words "sir," "serpent," and "surname," have identical sound values which I believe could not happen in any other language). Referring to the list above, the *i*, *o* and *a* in "Brixton," "Bromley" and "Chancery" are so near in sound to the *e* and *o* in "Western" and "Hornsey" that the close similarity of the respective consonants makes confusion easy. The second point that strikes one is that amongst the consonants that form the framework for the vowel sounds the labials are much less useful in creating a distinctive pronunciation than the dentals.

Another point brought out is that two syllable names are better than one and three than two. In the above list 67% of our one-syllable names, 52% of our two-syllable names and only 22% of our three-syllable names are confused with others. (For this purpose Sydenham, Tottenham and Willesden are treated as two-syllable names which, for all practical purposes, they are, as the current pronunciations are "Syd-n'm," "Tot-n'm" and "Will's-den.")

As, therefore, we have no definite rules which will enable us to avoid names liable to misunderstanding, every name proposed is subjected to the series of careful tests which were described in Mr. Maycock's article.

If no local names can be found to meet the essential conditions, an arbitrary name must be selected. This should preferably be a word indicating some abstract quality which may be applied to or suggests some aspect of the service which will be given (e.g., Progress, Reliance). If such a word cannot be found the only remaining qualification which can be applied is euphony.

An exhaustive search has been made of dictionaries and encyclopdæias and by this means a vast collection of names was found which fulfil condition (*a*). The next step was to withdraw

all those names which, though otherwise admissible, were unsuitable for a London Exchange, e.g., for different but perhaps obvious reasons, such names as Inability, Hoang-ho and Trotzky are not looked upon as possible names. These processes of elimination left a few thousand words, most of which, however, though possible, were decidedly unattractive. Further elimination left a few hundreds and as a final result, after the testing process, we have about 32 arbitrary names which have passed satisfactorily the phonetic tests and which can be drawn on when none of those having any associational value is admissible.

These preliminary considerations being disposed of, some account of the progress since the research method was introduced will perhaps be interesting. During that time names have been found for 74 new exchanges, while 7 existing exchange names have been changed (to meet the automatic conditions). Forty-one names have been chosen for exchanges projected but not yet opened, and as far as can be seen at present about 33 more will be needed for exchanges still in the stage of being planned.

Of the success of the system, the 48 selected names which are already in use (including two, Latchmere and Broadway, which have disappeared) may give some indication, little difficulty having arisen in connexion with any of them. It may be interesting to examine these a little more closely. Twelve of the names (Addiscombe, Wallington, Upper Warlingham, Upminster, Elstree, Eltham, Chislehurst, Fulham, Hayes, Hendon and Malden) are those of the borough or urban or rural district, or of the ancient village, now a suburb, which they serve. Eight (Albert Dock, Harold Wood, Havering, Mill Hill, Seven Kings, Primrose Hill, Clerkenwell and Colindale) are place names well known in the district. Sixteen (Bishopsgate, Chancery, Fitzroy, Waterloo, Broadway, Latchmere, Grosvenor, Langham, Maryland, Maida Vale, Popesgrove, Rodney, Sloane, Ravensbourne, Clissold, Buckhurst) are the names, frequently derived from the original manors, of streets, squares, rivers, &c., in the district. Two (Toll and Tandem) have been chosen for us by the Americans and the remaining 10 (Ambassador, Frobisher, Franklin, Kelvin, Royal, Reliance, Speedwell, Riverside, Grangewood and Mountview) are quite arbitrary. Of these names, Speedwell is perhaps a model of what an arbitrary name should be. It is phonetically good. The name itself is a pleasing one, with charming associations and yet not vulgarised by too copious use as the name of a suburban villa, and in addition, it contains within itself a suggestion of the kind of service which is to be expected from the exchange. Reliance has somewhat similar advantages. It is comfortable and optimistic. Ambassador is attached to what, if any, diplomatic quarter existed in London, would carry that title. Kelvin commemorates the name of our great man of science in what is pre-eminently the scientific quarter of London, South Kensington.

Grangewood and Mountview please the local authorities of East Ham and Hornsey respectively (as far as they could be pleased when losing their proper names) while Frobisher, Franklin and Royal are arbitrarily selected. If it be asked, "Why Franklin and Frobisher?" the answer must be that the names of such great Londoners as Shakespeare, Chaucer, Jonson, Dickens, Thackeray, Browning, Milton, Carlyle, Addison, Sheridan, Goldsmith, Siddons, Kemble, Rossetti and many others, clash numerically with existing names, and so do Tennyson, Coleridge, Shelley, Ruskin and Raleigh.

A list of the Exchanges already planned and named, but not yet opened, will further illuminate the subject, and will no doubt be of interest for other reasons.

Area.	Name Agreed.
Bayswater	Bayswater.
Beckenham	Beckenham.
Bermondsey	Bermondsey.
Castlebar	Perivale.
Chingford	Silverthorn.
Cricklewood	Gladstone.
Croydon Relief	Fairfield.
Ditton	Emberbrook.
East Finchley	Tudor.
Euston	Euston.
S. Kensington	Exhibition.
Hackney	Amherst.
Harold Wood	Ingrebourne.
Holloway	Archway.
Ilford Relief	Valentine.
Kentish Town	Gulliver.
King's Cross	Terminus.
Leyton	Leytonstone.
Maida Vale (Relief)	Abercorn.
Mansion House	Mansion House.
Merton	Merton Abbey.
Monument	Monument.
Norbury	Pollards.
Norwood	Livingstone.
Shepherd's Bush	Shepherd's Bush.
Stamford Hill	Stamford Hill.
Strand	Temple Bar.
Wandsworth Road	Macaulay.
Whitehall	Whitehall.
Woodside Park	Hillside.
Wood Street	Metropolitan, National, Empire.

Croydon once had a Fairfield and the road which led to it still bears that name. It will be remembered that Mr. Gladstone spent many week-ends at Dollis Hill, in the neighbourhood of Cricklewood. Ditton has running through its meadows a tributary of the Thames, known in its upper reaches as the Mole, but here as the Ember. Hackney was largely built upon the ancestral estates of the Amherst family, and the new suburb of Harold Wood is watered by a little brook bearing the romantic name of Ingrebourne. In the immediate vicinity of Ilford is an ancient manor and a beautiful public park known as Valentines. In Wandsworth Road, the area covered by which includes a large part of Clapham, occurs the one happy case where we are able to commemorate the name of its most famous resident. (It will, however, be impossible to commemorate Carlyle or Rossetti in Chelsea; Ruskin or Browning in Camberwell or Coleridge in Highgate.) Part of the great estates of the Duke of Abercorn fall within the district of the Maida Vale Relief Exchange. Leyton has been given the name of its junior suburb, Leytonstone, on account of the poor transmission value of its proper name, and it is, perhaps, fitting that the great exchanges rising on the immense site at Wood Street, in the heart of the City, should bear the resounding names of Metropolitan, National and Empire.

Silverthorn, Tudor, Gulliver, Hillside and Livingstone are purely arbitrary, while the remaining names explain themselves.

H. C. CORNER.

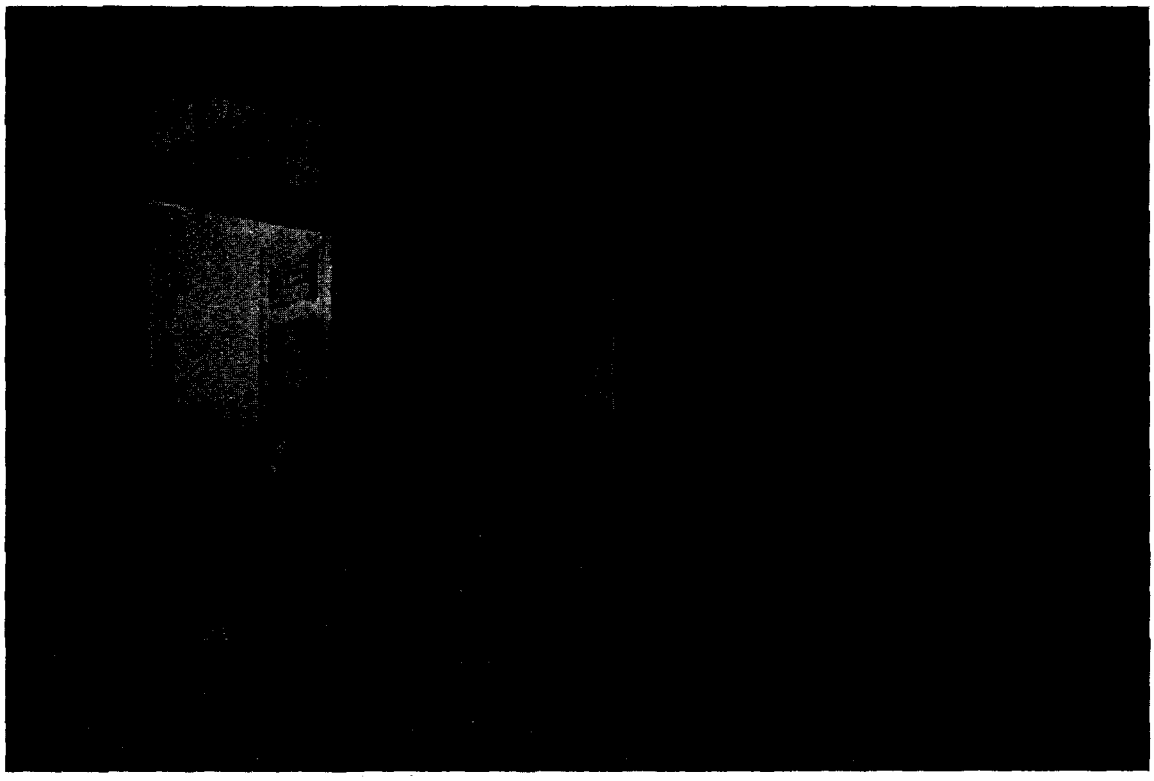
THE G.P.O. PLAYERS' DRAMATIC SOCIETY.

THIS Society encourages a high standard in Dramatic Art. Following on its successful production last October of "R.U.R.," pronounced by a dramatic critic to be one of the three outstanding service productions of the year, it has now selected for presentation "The Chinese Puzzle" (by Marian Bower and Leon M. Lion), a drama of diplomacy and Oriental mystery.

Dr. Neville Whymant, preeminent as an authority on Asiatic languages, and but recently returned from many years in the Far East, is very kindly lending his services to ensure accuracy of detail and of local colour.

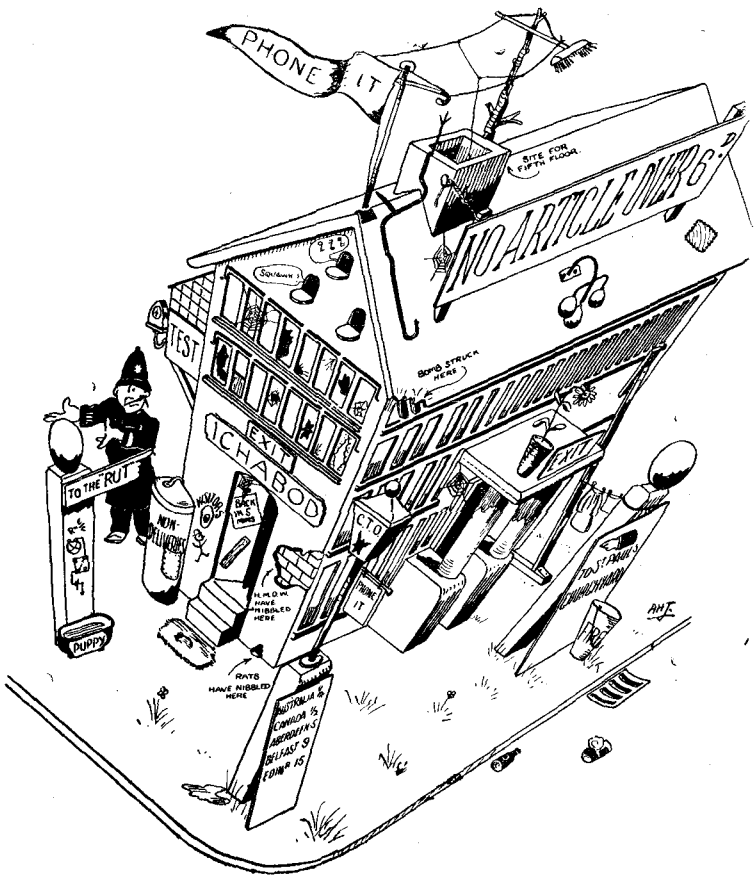
The production, under the direction of Major Hodgson-Bentley, Founder and Director of the Southend Repertory Theatre, will take place at King George's Hall, Caroline Street, Gt. Russell Street, W.C. (two minutes from Tottenham Court Road Tube Station), on Friday and Saturday, Feb. 17 and 18, commencing at 7.30 p.m. Tickets, 5*s.* 9*d.*, 3*s.* 6*d.*, 2*s.* 4*d.* (all reserved), may be obtained from the Hon. Treasurer, Mr. J. Scott (Room 12, 3rd Floor), G.P.O. North, E.C.1.

THE numerous friends of Mr. John Macfee, late Telephone Superintendent for Scotland and District Manager, Edinburgh, and who is now resident in Harrogate, will be glad to hear that he is making a satisfactory recovery after undergoing a serious surgical operation. The recovery has been so well maintained that a few weeks should see a complete restoration to health.



[Reproduced by the courtesy of "St. Martins-le-Grand."

"THE EVER OPEN DOOR." BY F.A.C.

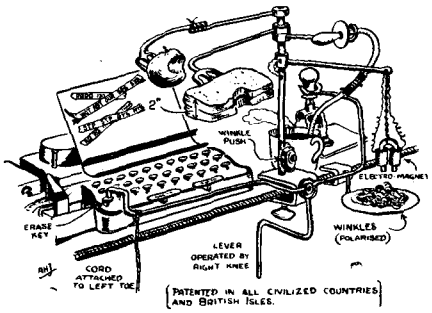


WORMS-EYE VIEW OF THE C.T.O. OR AS SEEN BY AN OFFICER SUFFERING FROM RULE 60.

A STEREOSCOPIC VIEW CAN BE OBTAINED IF THE PICTURE IS HELD HORIZONTALLY IN A GOOD LIGHT, THE LEFT EYE BEING PLACED AT BOTTOM LEFT-HAND CORNER. THEN SEE AN OCULIST. YOU HAVE ABTIGMATISM.

ARTISTS GAY AND GRAVE IN THE C.T.O.

PROPHETS, with dispositions of the gloomiest, may prognosticate the early decease of Telegraphy as a craft, and committees may sit on it—in more ways than one—but the sturdy good-humour and the versatile talent of the telegraphists of the C.T.O. remain very potent factors in giving practical evidence of the vitality of the present as of the past generations of telegraphists. As witness of this, the Christmas and New Year's greetings from the Supervising Officers and Staff of the "F" Division is again to the fore, and is again from the pen of the inimitable Mr. A. H. Johnson. The "card" this year contains eight pages of humorously descriptive matter and sketches descriptive of the C.T.O. present and future. Thanks to the



kindness of the artist who has loaned the blocks, we are able to publish two —No. 1, A worm's-eye view of the C.T.O.; No. 2, A peep into the future of mechanised telegraphy, when provision will be made for the automatic feeding of the operators during their non-stop eight hours duty!

Of a somewhat graver type of art, and one which reflects a very definite faith in the future, as in the present—need for a telegraph service of twenty-four hours per day 365 days of the year—is No. 3, a night-effect photograph entitled, "The Ever Open Door," by Mr. F. A. Christopher, of the Overseas Telegraph Room, C.T.O.

The reproduction of this work of art which we have obtained has been made possible by the courtesy of the Editor of *St. Martin's-le-Grand* and the artist who, it may be recalled, was awarded a bronze medal by the G.P.O. Arts Club.

It is recorded that a lady shed tears at the sight of the cat, but was reassured when she heard that the photo was taken on a warm summer night.

J. J. T.

TELEGRAPHIC MEMORABILIA.

AUSTRALIA.—Reuter's Sydney correspondent cabled that, "after a remarkable week of relaying through the Sydney station (2FC) every night between 10.30 and 11.30 p.m., when people throughout the State listened and danced to music from London, Christmas morning's re-broadcast was disappointing owing to the unsuitable hour—1.15 to 2 a.m."

The *Daily Guardian* (Sydney) reports that Australian manufacturers are becoming alarmed at the dumping of American sets upon the Commonwealth market at considerably under cost price. A meeting of Sydney radio manufacturers was held recently, and steps are being taken to form an Australian Radio Manufacturers' Association, with the main idea of protecting the home radio industry.

AUSTRIA.—The revival of Austria, now happily another factor towards the world's post-war recovery, is further evidenced by the inauguration, on Dec. 21 last, of the new wireless-telegraph service between Vienna and Constantinople.

To this may be added the fact that radio "taxpayers" numbered 287,197 on Dec. 1, 1927, of whom 200,428 were in Vienna; the latter figure includes 282 dealers. According to *World Radio*, over 97% of the city subscribers paid only 2 schilling per month, about 3*d*. per week.

Most of the Berlin newspapers on Dec. 1 published photographs telegraphed from Vienna. It was the first day of the new public service, and Prof. Carolus, the inventor of the process, states that "we can now telegraph a picture post-card size, in 10 minutes." The cost is 8*s*. for this size.

BELGIUM.—By arrangement with the Belgian Telegraph Administration the Western Union Telegraph Company has now been permitted to open offices of its own in both Antwerp and Brussels, where it receives and delivers transatlantic messages direct from and to the public. The service, it is understood, is exclusively for the Company's transatlantic traffic, and for use in connexion with their direct Americo-Belgian communication extended via the British land lines, the Anglo-Belgian cables and the Belgian land lines.

It is understood that teletype working on the direct London and Brussels telegraph circuit has passed beyond the experimental stage.

CANADA.—*World Radio* states that there are approximately 200,000 receiving licences in force. The radio branch of the Department of Marine and Fisheries has instructed radio inspectors to call upon all operators of receiving sets and to prosecute those who do not possess licences. A similar Dominion-wide "drive" was made last year.

CORSICA.—The Chamber of Commerce of Ajaccio considers that the two existing cables between Corsica and France have become insufficient, and is urging the French Government to lay another combined telegraph and telephone cable between the island and the mainland.

DENMARK.—While Prof. William Rung, of the Polytechnic Academy, Copenhagen, was seeking with his wireless set at night to tune in the Copenhagen broadcasting station, he unexpectedly heard an unknown station with a wavelength evidently near 350 metres, and heard a lecture in Danish, giving the impression of being well-considered propaganda. The Danish Government's Radio Council has started a search for the station, which is believed to be either on the Baltic coast or on board a vessel.

It is stated in London that the directors of the Great Northern Telegraph Company propose to issue new shares to an amount of £500,000, which will be ceded to a trust company. The latter will issue to the shareholders of the Great Northern Co. its shares to the extent of £450,000—equivalent to one £3 share for each £10 share of the Great Northern Co. now held. The scheme will come before a meeting of shareholders shortly.

EGYPT.—Early last month the Anglo-Egyptian wireless service was transferred to the Marconi Company in London and to the Marconi Radio Telegraph Company of Egypt in Cairo. The Abu Zabal wireless station, near Cairo, has been acquired by the latter company, and will in future be used only as a transmitting station, while a new wireless receiving station has been constructed at Meadi, a few miles to the South of Cairo, to provide a high-speed duplex service, enabling messages to be sent in both directions simultaneously.

Both the transmitting and receiving stations in Egypt are connected by special land lines to a new central telegraph office in the city of Cairo, where all operating processes will be carried out by remote control. The transmitting equipment at the Abu Zabal station now comprises a long-wave and a short-wave transmitter, and two additional transmitters for use with beam aerials are in course of erection. At the English end the Marconi Company is providing two additional beam transmitters to the equipment at the Dorchester beam station specially for the London-Cairo wireless service.

FRANCE.—It seems that the shelving by the Chamber of the proposed duty of 10 francs on wireless sets will affect the service much more than appeared at first sight. M. Bokanowski, who, as Minister of Posts and Telegraphs, is responsible for the control of broadcasting, lets it be understood, says *The Times*, that, unless the Chamber takes up the duty again at the second reading of the Finance Bill, the greater part of the musical and theatrical programmes of the French stations must be suppressed. Hitherto, it appears, the stations, most of which belong to the Government, have been able, in the absence of any law protecting authors' copyright, to transmit musical and theatrical performances without paying any royalties. A Decree issued last December put a stop to this state of affairs, and the new *régime* is to come into force at the end of this year. The new tax was to provide the Government with funds with which to pay the royalties.

Some of the private stations cannot survive the New Year, as the high taxes the Government propose to levy on them are exorbitant, states the Paris technical Press. The proposal was to raise the tax to ten francs. The decision to tax private transmitters and receivers was the principal recommendation of the Departmental Commission set up in Paris under the broadcasting reorganisation decree of Dec. 26, 1926.

According to *World Radio*, "Radio-Paris will blossom where other stations fade." This high-power station is going to have a new studio in a few days' time, and the power is going up to 20 kw.

Commenting on this condition of affairs, the Paris correspondent of the *Daily Telegraph* writes: "There are few of the principal countries in Europe where broadcasting is so backward as in France. The trouble is due to the difficulty of reaching a decision on the character of broadcasting—whether it should be a State monopoly or whether it should have a sort of controlled liberty." In order to effect improvements in the service a clause was inserted in the Budget imposing new taxes, but the Opposition tried to force a debate on the matter, with the result that the Wireless Clause was separated from the Finance Bill. This appears to have sent the Wireless Clause adrift and the present situation appears to be that the Wireless Telephony Act passed in 1926 is nullified by this non-ratification by Parliament. No resources are available, and in view of this precarious situation the Government has decided not to give authority for establishing private posts, but to submit to Parliament a bill for raising the necessary funds. As matters now stand, the existing private broadcasting stations may disappear before July 1 next.

The situation is further complicated by the action of authors and composers, whose works were broadcast without royalties being paid.

Broadcasting in France, adds the *Telegraph's* correspondent, requires to be completely overhauled, and much curiosity is felt as to the ultimate decisions of Parliament.

Reuter's Trade Service informs us from Paris that the manufacturers and traders in the radio-electrical industries in Strasburg have decided to form a syndicate of the radio-electrical industries to group manufacturers, traders, and Strasburg radio representatives. This body will extend its activity to the departments of the Upper and Lower Rhine.

A statue of the late M. Emile Baudot, the inventor of the well-known telegraph instrument bearing his name, was recently unveiled in the courtyard of the French General Post Office in Paris, Rue Grenelle.

GERMANY.—The *Deutsche Bergwerks Zeitung* says that producers of radio material in Germany are at present very busy. Orders from the trade, which were not very large in the autumn months, are now increasing. Difficulties are already beginning to arise at some factories in completing orders in the specified time, especially as supplies of raw material are sometimes not so quickly obtainable. It is generally estimated that Christmas business this year will exceed that of last year. Cheap simple sets and expensive luxury sets are especially required; medium quality sets are not much in demand.

The number of German receiving licences issued reached 2,000,000 on Dec. 15, 1927, an increase of 250,000 on the September figure.

Stations under construction and those projected are to be fitted with wooden aerial masts instead of the usual steel ones, says *World Radio*, as a result of the Munich station's success with this type of aerial support. The previous aerial system radiated only about 20% of the energy fed into it. When the steel masts were replaced by wooden ones, by way of less height, the percentage rose to 63%.

On the other hand, as will be seen from the following paragraph, the very latest German station still employs steel.

What is described as the most powerful station in Western Europe, was opened on Dec. 20 by the Minister of Posts. It is at Zeesen, 20 miles south of Berlin, and will be used in place of the present Königswüsterhausen. Its transmitting power is 40 kw., and its wavelength 1,250 metres. The aerial is carried by two 700-ft. high steel masts.

GREAT BRITAIN.—Among the developments in connexion with the new London Air Port at Croydon, officially opened on Jan. 9, is the provision of an entirely new wireless station, which is being erected for the Air Ministry by Marconi's Wireless Telegraph Co., Ltd., to replace the one that has done duty there for the last seven years. The new station will consist of a group of four 3-kw. transmitters, operated in conjunction with a direction-finding receiver. The transmitters will be capable of serving for telephony and continuous-wave and interrupted-continuous-wave telegraphy, the wave range being from 800 to 2,000 metres, and independent drive circuits will be incorporated to maintain constancy of frequency and wavelength. Energy for the transmitters is to be supplied by a common motor-alternator group, the power from which may be switched on to any of the transmitters. The new direction-finding receiver has selective characteristics, and incorporates filtering and amplifying devices; it will be arranged so that, if required, two or more circuits can be operated on different wavelengths for the reception of telephony and telegraphy on the same aerials. In order to keep the neighbourhood of the aerodrome as free as possible from obstruction, the

wireless masts and transmitters are being erected two or three miles from the air port and operated on the remote control system.

The B.B.C. has issued an interim report on the tests which have been carried out at the Daventry experimental station (5GB) during the past four months of working; it is as follows: When the station replaced the local Birmingham transmitter in August, 1927, a single low aerial was installed, but after a short trial it was found that the fulfilment of one of the main objects of the new station, namely, the provision of an adequate signal for Birmingham, could not be guaranteed. The reason was that shielding occurred from the masts of the long-range Daventry station (5XX), and therefore a second low aerial was erected in parallel to the first, designed to radiate in the Birmingham direction, considerable improvement being effected in the signal strength from the double aerial over the Birmingham area.

Having in mind the provision of data in connexion with the scheme of regional stations, the B.B.C. proceeded to erect masts, 300 ft. high, which it was thought might ultimately replace the low double masts; experiments have recently been carried out with the new masts, but it appears that the shielding effect in the Birmingham direction is likely to be accentuated by their use. The next step, therefore, will be to rearrange the 300-ft. masts in such a way as to maintain the present signal strength in Birmingham, while giving greater all-round strength to that portion of the rest of the country which is within range of 5GB. Until it is possible to guarantee that the field strength in Birmingham from the higher aerial is on its lowest terms as great as it is to-day, the 300-ft. masts will not be brought into regular service. The general efficiency of the new aerial has been definitely proved to be greater than that of the twin aerial at present functioning, and the experiments for which it is adapted will be of ultimate value in connexion with the regional scheme.

Statistics published in the *Wireless Trader* show that during October the total value of radio apparatus exported from this country was £93,476, including valves £15,760. Australia was the principal customer, taking goods to the value of £11,746 (valves £5,220); Poland was a close second with a total of £11,142 (valves £1,232). Other important customers were the Netherlands, £7,448 (valves £364); Japan, £6,383 (valves £1,069); Canada, £4,922 (valves £473); and the Irish Free State £4,402 (valves £944).

The Royal Meteorological Society is to be congratulated, remarks the *Electrical Review*, on having appointed a committee of experts to investigate the problem of atmospherics, more especially with reference to forecasting the weather. The popular theory that they are the result of electrical disturbance caused by thunderstorms seems to be open to doubt, and it may be that the real origin of certain atmospherics is as yet utterly unsuspected. The investigation is to continue.

The number of broadcast radio-telephone receiving licences in force in Great Britain at the end of December, 1927, was 2,383,726, plus 11,448 issued free to blind listeners. The increase for the month of December was nearly 30,000 and the total increase for 1927 was 216,915 new listeners.

The Marconi International Marine Communication Co., Ltd., and the Radio Communication Co., Ltd., have come to an agreement to amalgamate their operating and inspection services, says *The Times*. A joint service department of the two Companies has been organised under the name of the British Wireless Marine Service, which will in future deal with all matters relating to the appointment of operators to ships, the organisation of marine telegraph traffic, the fitting, maintenance, and repair of ships' wireless installations, and the provision of wireless service depots for ships in all parts of the world.

An "Exide" Research Scholarship has been established at Manchester University, available for fourth-year students willing to undertake original research work at the Physical Laboratories of the University, under Professor W. L. Bragg, F.R.S. The scholarship this year has been awarded to Mr. J. A. Darbyshire, who is carrying out, for the Exide Battery Company, some original research on lead oxides.

The Wireless Telegraphy Board has issued specification No. K201 for Neon Lamps (H.M. Stationery Office, price 2*d.* net) which has been prepared to meet the requirements common to the Royal Navy, Army, and Air Force. It covers technical requirements and tests, such matters as packing, marking, delivery, &c., which are not common to the services, not being specified. *Inter alia*, writes *The Electrical Review*, the current passed through the lamp as soon as the striking voltage causes a visible discharge must not exceed 4 mA under any condition; the capacity when measured at a frequency of 2,000,000 cycles per second must be between 2.5 and 3 micro-microfarads, and a life of 2,000 working hours is expected. The lamp is intended to be suitable for use as a high-frequency voltage indicator in wavemeters.

HOLLAND.—I understand, says the wireless correspondent of the London *Daily Telegraph*, that PCJJ, the well-known Dutch short-wave station formerly at Eindhoven, is now again transmitting from its new site at Hilversum. It will be recalled that the station was closed for six weeks to permit the transfer of plant and re-erection at Hilversum. It will transmit regularly on Tuesdays and Thursdays on the old wavelength, namely, 30.2 metres, from 6 p.m. to 9 p.m. Greenwich time.

INDIA.—The report of the Indian Institute of Science, Mysore, shows that one of the subjects of active research at the Institute during the past year was that of wireless telegraphy, the investigations being conducted under the direction of Prof. J. K. Catterson Smith. Continuous measurement of radio-signal strength has been made and new apparatus is under construction for extending the scope of three experiments as part of a general study of wireless transmitters; portable apparatus for measuring the modulation of radiation from a telephone transmitter has been constructed, short-wave circuits have been examined, and experiments on the damping of shock-excited radio circuits have been conducted. Anti-atmospheric properties displayed by a combination of frame-coil receivers have been investigated and distortion in audio-frequency transformers has been analysed by the cathode-ray oscillograph.

A special correspondent of the *T. & T. Journal* in India informs us that it has been decided to work the wireless telegraph circuit between Madras and Rangoon by means of Wheatstone in future, thus replacing the ordinary Baudot system which it is considered could be improved upon. It should however be noted that only an ordinary Baudot installation has been tried and not the Baudot-Verdan system recently described in this *Journal*, the latter not being available outside Europe.

ITALY.—The Department of Overseas Trade learns from a reliable source that Royal Decree Law No. 2,539/2,207, dated Nov. 17, 1927, published in the Rome *Gazetta Ufficiale*, No. 287, of Dec. 13, contains new regulations for the purpose of improving and developing broadcasting services in Italy. The measure provides for the institution of a higher committee of control at the Ministry of Communications, amends the conditions under which concessionary rights are granted, revises the charges for licences, and provides for special subscription rates for communes, organisations, and private individuals.

The Rome correspondent of the *Westminster Gazette* states that under a new decree, the subscription to the Italian National Broadcasting becomes obligatory for hotels and social clubs, tax ranging from £1 to £15 a year, according to their category.

All communes with over 1,000 inhabitants must also contribute to the National Radio Union, a contribution ranging from 10*s.* a year to £200 for large cities.

A fund of $25,000 (the income from which will be applied each year to post-graduate work in an American university of an electrical engineer from Italy) has been established by individuals, associations and corporations in the United States who are interested in electrical development, it has been announced by the Italy American Society. The fund has been raised to mark the one hundredth anniversary of the death of Alessandro Volta, and the student who will go to the United States will be selected competitively by the Associazione Elettrotecnica Italiana. In the United States the administration of the fellowship is in the hands of the Italy American Society.

MAURITIUS.—Reports from Port Louis state that the Christmas greetings from the British Broadcasting Corporation were easily heard in Mauritius at 10 p.m. on Dec. 25. Listeners also heard Australia on the same night.

NEW ZEALAND.—"New Zealanders," cabled a correspondent of the *Westminster Gazette* on the 4th ult., "danced to the music of 2 LO re-broadcast from Sydney last night."

PALESTINE.—There are thirty-two telegraph offices in Palestine. The length of telegraph wire on Jan. 1, 1926, was 1,429 miles; during 1925, a total of 307,165 messages were sent, and the gross revenue for that year was $143,515. The investment in the telegraph plant is given as $117,755 by an American technical journal.

PHILIPPINE ISLANDS.—The *T. & T. Age* informs us that the Philippine Government telegraph cable lines were recently repaired, a shipment of some 25 miles of submarine cable having been received by the insular Bureau of Posts from London, England. The greater portion of the new cables will be used to replace the old ones between Manila and Iloilo and Cobu in the Visayan Islands.

PORTUGAL.—Experts have arrived at Lisbon to arrange for the linking-up by radio-telephony of Madrid and Lisbon with North America, *via* London, reports Reuter's Lisbon agency.

RUSSIA.—Reuter's Trade Service, Moscow, informs us that crystals for wireless sets are now all imported into the Soviet Union. The radio-technical laboratory of the Institute of Applied Mineralogy and Metallurgy, however, after many experiments, has invented a crystal approaching imported crystals in effectiveness. The experiments are being continued, and the laboratory hopes to be able ultimately to produce a crystal that will do away with the necessity for importations.

SCOTLAND.—A new type of fire alarm has been installed by the Edinburgh Fire Brigade at six outside centres as an experiment. The alarm is contained in a box erected at a street corner, and is connected with telephone instruments at the central fire station, says *The Times*. Anyone wishing to report a fire must break a small pane of glass in the box; that causes a door to open automatically, exposing to view two apertures. Above one are printed the words, "Wait; fireman will speak," and above the other, "Reply here." With the smashing of the glass there is given simultaneously an alarm ring at the fire station, and the fireman on duty replies through the ordinary telephone transmitter, his voice being amplified in the street box, and can be heard 12 ft. away. The person reporting the fire then gives the necessary information through the other aperture. It does not appear to simplify matters so far as a dull Southerner can understand the arrangement!

SOUTH AMERICA.—Marconi short-wave "beam" services are now in operation from England to New York and South America, i.e., Rio de Janeiro

and Buenos Aires, the New York service supplementing the long-wave services which have been operated from the Marconi main telegraph office at Radio House, London, for some years. The South American services are entirely new, and place Brazil and the Argentine in direct wireless communication with London for the first time. The " beam " service operates both to and from Rio de Janeiro, but at present Buenos Aires has no " beam " aerials, so that while messages are sent from London by " beam " to Buenos Aires, there is no " beam " in the reverse direction. The services are operated from Radio House by remote control, the transmitting stations for the North and South American services being situated at Dorchester, and the receiving station at Somerton, about 30 miles from Dorchester. They are normally worked at between 100 and 200 words a minute, although over 300 words a minute have been worked quite satisfactorily during tests. The transmitting aerials at Rio de Janeiro have been so constructed that London, Paris, and Berlin will be within the " beam " when it reaches Europe, and the Rio stations can handle traffic for all three capitals. " Beam " receiving aerials are now being built near Paris for receiving from America, but none are yet in existence in Germany.

SWEDEN.—The Swedish Government Telegraph and Telephone Department estimates the revenue for 1927 at 86,360,000 kronor, which means an increase of 4% compared with the previous year. The surplus of income over expenses will amount to 19,100,000 kronor, thus representing an interest of 6.3% on the capital invested, which amounts to 310,000,000 kronor.

Reuter's New York agency reports that telephone conversation between New York and Stockholm, Sweden, was inaugurated on Nov. 29 by Count Adolf Hamiltonm, delegate to the recent Radio Conference, and is expected to be the beginning of a regular telephone service to Sweden. Similar services have been established to Antwerp and Brussels, but *calls to Paris have been difficult owing to the poor land wires.* [The italics are mine.]

Swedish registered listeners on Dec. 31, 1927, numbered 330,000, or 54.43 licences per 1,000 of the population.

According to *World Radio*, the Swedish Telegraph Board intends to increase the power of the Malmö and Göteborg stations from 1 to 10 kilowatts and to build a new medium-power station in the southern part of Sweden. Experiments for working more stations on the same wavelength continue; two small relay stations, one in the north and the other in the south, are already worked in this way.

SWITZERLAND.—A committee of experts has been summoned to meet early in 1928, to finish the technical examination of the question of the establishment of a League of Nations wireless station. In December, 1926, the Council asked the Committee on Communications and Transit to undertake immediately the necessary studies in order that the League might have at its disposal a sufficiently powerful wireless station to enable it to communicate by its own means with the greatest possible number of member States of the League, and to present a report to the Council so soon as possible on the subject. The Committee of Experts now summoned will determine in particular the essential features of a station to meet the League's requirements, the expenditure on building and upkeep, and general conditions of operation from technical and administrative points of view. On receiving the report the Transit Committee intends to establish a draft budget for the equipment of the station, to invite tenders from firms which, if necessary, might undertake the construction, calculate the possible extent of the traffic, and lay down the terms of the agreement necessary with various public or private wireless undertakings as regards the conditions of the exchange of traffic. It will be possible to submit the final report of the Transit Committee to the Council in 1928. The Committee of Experts is composed as follows :—Mr. Einthoven, wireless engineer at The Hague; General Ferrie, director of the military wireless organisation in the French War Ministry, president of the International Committee for Wireless Telegraphy; Dr. Jaegers, adviser in the German Postal Ministry; Colonel Lee, of the British General Post Office; and Prof. Vallauri, of the Royal Naval Academy, Livorno.

The Geneva correspondent of the London *Times Engineering Supplement* on the matter of general telegraphic communication between Geneva and London, in its issue of Dec. 31, writes as follows :—" The Council of the League of Nations has just been asked to report on the question of telegraphic communications between Geneva and London. Messages destined for the British Empire, the United States, Latin-America, and the Far East are all transmitted through London whither journalists accredited to Geneva direct their telegrams in order that they may be re-transmitted to their final destinations. In recent months and particularly during the naval conference the inadequacy of means of communication became very evident and brought about delays in the transmission of news generally. The channels at present are the Marconi Wireless Telegraphic Station at Berne, which is frequently affected by atmospherics, and the Geneva-Paris lines with automatic re-transmission to London in Paris. The establishment of a new line consisting of a direct wire between Geneva and London would constitute a real remedy for the present inconvenience. Arrangements would have to be made between the postal authorities of the three countries interested, namely Great Britain, France, and Switzerland. Sir Austen Chamberlain has promised to set negotiations on foot for this purpose." It should be noted that this does not refer to and must not be confused with the League's desire, mentioned above, to have a world-wide range wireless installation in order to be in a position at any time to communicate with all or any one of the League member States. The matter mentioned by *The Times* is that of better public telegraphic communication between London and Geneva.

The *Electrical Review* mentions that a demonstration took place at Geneva on Dec. 8 of the reception of broadcast photographs, drawings and manuscripts by means of new apparatus stated to cost less than the average three-valve receiver. This system, which has not yet been shown publicly in England, is an ingenious adaptation by Captain Fulton to the technique of broadcasting of a process invented by Mr. Thorne Baker, and used 15 years ago for the transmission of pictures by telephone wire between London and Manchester. The feature of the new system, which employs an electromagnetic method of synchronisation and records the images by electrochemical action, is that it can be manipulated by the average listener and thus differs from the more complex systems which, so far, have been used only for point-to-point transmission. Captain Fulton, says *The Times*, had both the transmitting and receiving apparatus in full view of his audience. The electrical impulses from the transmitter were relayed by telephone lines to the Geneva broadcasting station, some five miles distant, and the signals from that station were received in the demonstration hall on an indoor aerial. Under their influence the receiver traced with striking fidelity a counterpart of the original photograph. A portrait of postcard size was broadcast and received in four minutes, the middle tones being surprisingly well reproduced.

TURKEY.—It is reported by the *Financial Times* that the new radiotelegraph station at Angora has been carrying out tests with London recently and that it is hoped to establish regular communication in January, 1928. Has anyone heard it yet in Great Britain ? Or is Constantinople intended ?

A high-speed direct duplex wireless service was inaugurated by the Marconi Company between London and Constantinople on New Year's day.

U.S.A.—The recent statement in the House of Commons with regard to the losses incurred by the British Post Office on the transatlantic telephone service was read with much interest in New York. The American Telephone & Telegraph Company has also found the service not a paying proposition, but has announced that the service will be continued in spite of the fact that the loss incurred by it is relatively larger than that sustained by the G.P.O.

Mr. L. D. Batson, of the U.S. Department of Commerce, points out that telephone broadcasting services are now provided by 431 stations in 57 foreign countries, in addition to the 685 operating in the United States and its non-contiguous territories: Europe has 196; North America outside the United States, 128; South America, 52; Asia, 18; Oceania, 28; and Africa 9. The division of stations by countries gives Canada 59; Cuba, 47; Russia, 38; Sweden, 30; Australia and Germany each, 24; Argentina, 22; United Kingdom, 20; France and Mexico each, 18; Spain, 15; Brazil, 12; Chile, 9; Finland, 7; Switzerland, 6; and Austria, 5. There are four each in Belgium, Czecho-Slovakia, Uruguay, India, Netherlands East Indies and New Zealand; three each in Italy, Poland, China, Japan and South Africa; two each in Denmark, Estonia, Hungary, Irish Free State, Norway, Portugal, Bolivia and Algeria; and one each in Iceland, Latvia, Lithuania, Luxemburg, Netherlands, Turkey, Yugo-Slavia, Costa Rica, Haiti, Paraguay, Peru, Venezuela, Ceylon, Chosen, Kwangtung, Straits Settlements, Canary Islands, Egypt, Morocco and Tunisia.

Despite the pressure upon space—as usual !—one cannot refrain from quoting the experience of the *Daily Telegraph* wireless correspondent on the afternoon of Jan. 16 in connexion with the opening of the Pan-American Conference.

" I heard," said he, " upon picking up the receiver at Savoy Hill, orchestral music from Havana, Cuba, for Keston the listening post of the B.B.C. had picked up a short-wave broadcast from Schenectady and had transferred it to London by a telephone trunk line."

" Afterwards the reception was reproduced on a loudspeaker and we were able to hear part of President Coolidge's speech and the Cuban President's speech."

This was indeed an historic occasion for broadcasting whatever it may prove to be in other directions. The distance covered must have approached 5,000 miles, for the route was Havana to Key West; Key West to Schenectady by trunk land line; Schenectady to Keston by short-wave transmission and trunk underground line Keston to Savoy Hill.

The short-wave broadcast was made by 2XAD on 21.7 metres, with, of course, daylight reception.

Since our last issue there has been enough written in the Press on Beam *v.* Cables to fill quite a few numbers of the *T. & T. Journal.* As was to have been expected, all that was written was not well-informed, and extraneous matter, such as the dividing of all code words into groups of five instead of ten letters as is at present the international rule, has been introduced as though this were fundamental to the relative values of radio and cable telegraphy.

The *Electrical Review*, writing on electrical progress in 1927, in its New Year's Eve issue, said : " One of the most notable events in the history of telegraphy was the opening of commercial wireless communication between Great Britain and Australia on the ' beam ' system, early in the year, followed by further developments, which have brought wireless and cable telegraphy into acute competition. Both types are essential to the national and Imperial welfare, and the controversial questions which have arisen are now receiving serious consideration on the part of the Government and the companies concerned."

In their financial columns this same periodical gave a table showing the position of cable and wireless stocks in December, 1927, as compared with the same month in 1926, thus :—

Company.	Dec., 1928.	Dec., 1927.
Anglo-American Pref.	101	93½
Eastern Extension	17⅞	15
„ Telegraph	177½	145
Globe Ordy.	18½	14¾
Great Northern	27	38¼
Indo-European	47½	40
Marconi	13/9	37/6
Western Telegraph	17¼	14

However, since that date the Eastern and Associated Telegraph Companies and Marconi's Wireless Telegraph Co., Ltd., have made the following announcement :—

" Sir William Plender, on behalf of the Eastern & Associated Telegraph Companies, and Sir Gilbert Garnsey, on behalf of Marconi's Wireless Telegraph Co., Ltd., have been asked to co-operate with a view to making a joint report for submission to their respective boards as to a possible arrangement in the joint interests of the respective companies."

As these lines go off to the printer the definite announcement appears that " an Empire conference on cable and wireless communication has been summoned " and that " Sir John Gilmour, Secretary for Scotland, will preside over the conference and will be assisted by Mr. A. M. Samuel, Financial Secretary to the Treasury. Canada, Australia, New Zealand, South Africa and the Colonies will also be represented."

Having placed on record just a few particulars of a situation which may well turn out to be a most important juncture in the history of long-distance telegraphy in general and British Empire telegraphy communication in particular, there for the present, *sub judice*, the matter rests.

From Imperial to matters of more local interest and note that, on Jan. 10 at a meeting of the Institute of Post Office Electrical Engineers was an unusual, possibly an unprecedented, presentation to the Institute by Mr. F. A. B. Lord, of Messrs. W. F. Dennis & Co., of a number of films showing the manufacture of telephone and power cables at the works of Messrs. Felten & Guilleaume, and the laying of the Anglo-Dutch submarine cable from Domburg to Aldeburgh in 1926 by the cable ship *Neptune*. The total weight of the cable is 1,700 tons, is of the 4-quad type with a centre core.

It is extremely sad to have to record the tragic death of the much respected Mr. Docwra, late Asst.-Supt. of the C.T.O., who had only retired from active service about eighteen months. It appears that while attending to a faulty pipe in the roof of his house he fell into the cistern, was unable to extricate himself and was thus accidentally drowned.

Of the passing of Miss J. Anderson, an ex-Supervisor who retired in 1896, there is a fast-diminishing number in the service who would be likely to recall one who was of the old Electric Telegraph Company of 1861. Yet another link with the early days of T.S. Mrs. Paffard, wife of Mr. A. C. Paffard, who survives her, has also gone over to the great majority. The deceased lady left the service nearly 50 years ago upon her marriage.

To those who may read these three notifications and be in a position to communicate with any of the respective relatives, I have been commissioned to broadcast the very real sympathy and affection from the members of the C.T.O. Retired Supervising Officers' Society.

The additional post of one Superintendent, Higher Grade, for the Cable Room and Wireless Floor of the C.T.O. has been a welcome step. To this post Commander E. L. C. Grattan, D.S.O., R.N., late Asst. Inspector, Class I, Wireless Telegraph Establishment Secretary's Office, has been appointed, as from Jan. 1, 1928. The Commander is to be congratulated, for he has youth on his side !

To Mr. F. S. J. O'Shaughnessy, whose provisional appointment as an additional Superintendent to the Cable Room has now been confirmed as from Dec. 15 last, heartiest congratulations to one who has undoubtedly laboured hard and earnestly through the many difficulties of the past year or two.

Yet further hearty congratulations, and these to Mr. R. L. McLachlan and Mr. G. W. S. Austin, who take up the posts respectively of Asst. Superintendent and Overseer, Cable Room.

To Messrs. E. M. Draper, promoted to Superintendent, Lower Grade, Inland Telegraphs, C.T.O., and the sequential promotees Messrs. W. M. Knight and H. Young, Asst. Supt. and Overseer, also sincere felicitations.

Now comes the writer's penitential note, for to nothing but the fault of the writer can I ascribe the postponement of any reference to the retirement of Mr. G. F. Mansbridge, O.B.E., who, entering the C.T.O. as a telegraphist in 1886, soon became engrossed in the technical side of telegraphy and himself became teacher and lecturer in Electricity, Telegraphy, Mathematics, &c., passed into the Stores Department in 1895, and steadily rising, eventually became Vice-Controller of that department, which high post he held till his retirement last year. That he may have a lengthy and peaceful retirement, in the garden he loves so well and in company with those roses for which he has so great an affection, always presuming that the lure of Condensers and Inductance Standards will not intrude too heavily upon his spare (?) time is the sincerest wish of all his old C.T.O. associates.

Then again, there was the retirement of friend Farrar from the chargeship of North Walsham Repeater Office, where the co-operation of himself and staff with the Overseas Telegraphs has been a continuously happy feature for years. To Mr. Farrar a happy and lengthy retirement, and to his successor, Mr. T. Parker, whose excellent reputation has preceded him, a hearty welcome.

The January number of *St. Martin's-le-Grand* contains an excellent reproduction of a watercolour drawing, by the much respected Arthur G. Ferard, formerly of the Secretary's Office, of a " Courtyard at Palma de Mallorca." Also an article entitled " Side-Lights on the Washington Radio-telegraph Conference," over the well-known initials of F. W. P., through which the kindly humour of that personality cannot help but shine, as, for example, " Used Ford's from 30 dollars up ! Even a civil servant might be able to afford £6."

Transition.—In an age of transition it is the *direction* of the thoughts and aims of men which constitutes the radical difference or agreement between them rather than the exact *distance* that each may have travelled on the same road.—Seebohm on More.

J. J. T.

A BRIEF CHRONOLOGY FOR STUDENTS OF TELEGRAPHS, TELEPHONES AND POSTS.

BY HARRY G. SELLARS.

(*Continued from page* 93.)

1815 ... ... Soemmering, at Paris, exploded gunpowder by means of electric current passing through a cable laid at the bottom of the River Seine.

1816 ... ... Semaphore invented by Sir Home Popham erected on the roof of the Admiralty Office, London.

Steam communication established between Holyhead and Howth by means of the " Hibernia."

Ronalds laid, at Hammersmith, an experimental underground telegraph line composed of a copper wire enclosed in glass tubes encased in wooden troughs, and devised a telegraph system.

Andrew Crosse, electrician, said, " I prophesy that, by means of the electric agency, we shall be enabled to communicate our thoughts instantaneously with the uttermost ends of the earth."

Compass needles in London pointed 24 deg. 27 min. *west* of the true north.

1816, Oct. 28 ... Earl of Chichester and the Marquis of Salisbury appointed joint holders of the office of Postmaster-General.

1816, Dec. 13 ... Ernst Werner von Siemens born at Lenthe, Hanover.

1818, Jan. 6 ... Post Office opened in Dublin.

1818 ... ... Post Office took action against the keeper of the " New England " Coffee House for illegally collecting letters. Offender paid a penalty of £5 and expressed regret and action was withdrawn.

Compass needle pointed 24 deg. 41 min. west of the true north pole.

1818, Dec. 24 ... James Prescott Joule born at Salford.

1819 ... ... Oersted discovered that a needle could be deflected by the current passing through an adjacent coil, or conductor. (Oersted = Unit of reluctance or magnetic resistance.)

1819, Sept. 18 ... Jean Barnard Leon Foucault born.

1819, Nov. 30 ... Cyrus West Field born.

1820 ... ... Ampère, or Lyons, developed electro-dynamics and demonstrated the relation between magnetism and electricity. (Ampère = Unit of electric current.) Before the Paris Academy of Sciences, he described a telegraph system in which signals would be indicated by a small magneto placed under wires corresponding to the alphabet. He also devised a galvanometer.

Ampère, Arago and Davy, working independently, discovered how to magnetise iron and steel by circulating currents of electricity round them in spiral wire coils.

Dyer introduced a telegraph system.

Letters for East Indies, Cape of Good Hope, Ceylon and Mauritius allowed to be sent otherwise than through the Post.

Arago found that iron filings are attracted to a wire carrying a current.

Dr. Ure, of Glasgow, caused muscular movements in executed criminals by passing electric currents through the bodies.

1821 ... ... Pearson, of Boston, U.S.A., invented the "Domestic Telegraph," an apparatus with two dials and needles.

J. S. C. Schweigger, following Oersted's experiment, produced a "multiplier" composed of many turns of wire which increased the effect of the current on the needle.

Peter Barlow improved the mariners' compass and fixed the magnetic susceptibility of iron at 32.8 units.

1821, Aug. 31 ... Hermann Ludwig Ferdinand von Helmholtz born.

Ampère, prompted by Laplace, and following Oersted's discovery in 1819, suggested that a telegraph apparatus might be constructed composed of needles which, deflected in certain directions, would indicate different letters of the alphabet. He discovered that conductors carrying electric currents repelled or attracted each other, according to the direction of the currents.

Faraday showed how a magnet could be rotated by means of an electric current.

Seebeck produced electricity by heating pieces of copper and bismuth which had been soldered together.

First steamship used in the Mail Service—the "Lightning"—ran between Holyhead and Dublin.

1822 ... ... Seebeck discovered that a current can be produced in a closed circuit made up of two dissimilar metals, if the point of contact is heated.

Poisson stated that the powers of magnetic crystals would vary according to their positions.

Uncollected revenue due from certain postmasters, and other officers "cleared off by a warrant under the Royal Sign Manual."

1823 ... ... British Government declined an electrical telegraph system, preferring to rely on the semaphore.

Sir Francis Ronalds set up a telegraph system in which the transmitting and receiving apparatus consisted of circular brass plates on which were inscribed letters, figures and instructional words for the operators. In front of each plate was a disc with an aperture which allowed one letter and its corresponding figure or sign to be visible. The plates rotated by clockwork at the rate of one revolution per minute, the same letter being displayed simultaneously at both ends. A cylinder electrical machine charged the line as desired and the divergence of a pair of pith balls in front of the disc indicated to the receiving operator that the letter or sign visible at that moment has to be recorded. Ronalds made valuable suggestions as regards laying underground wires, and was the first to foresee difficulties arising from "capacity."

Lord Salisbury died and Lord Chichester became sole Postmaster-General. Only one person at a time has held the office since that date.

Karl Wilhelm Siemens born.

Sturgeon, of Whittington, Lancashire, published his work on electro-magnetism.

1824, June 26 ... William Thomson (afterwards Lord Kelvin) born at Belfast.

Gustave Robert Kirchhoff born at Königsberg.

1825 ... ... Sturgeon invented and named the electro-magnet.

An Act of Parliament allowed newspapers to pass free of charge through the post.

Mrs. Somerville demonstrated the polarity of a needle magnetised by violet rays.

1826 ... ... Quetelet, at Brussels, showed variations in atmospheric electricity in varying climatic conditions.

Matteucci showed experimentally the possibility of producing inductive effects by sudden discharges of static charges.

Matteucci and Nobili demonstrated that muscular contractions of human beings produce discharges of electricity.

1826, Feb. 16 ... Lindley Murray died.

Nobili discovered that peroxide of lead was deposited upon the anode during the electrolysation of a solution of lead.

1827 ... ... Action taken against Coffee Houses illegally collecting letters, but withdrawn on payment of the penalty.

Money Orders for Ireland printed on large forms so that a letter could be written thereon and postage reduced.

Le Baillif and Becquerel noticed that repulsion took place between antimony and the pole of a magnet.

1827, Mar. 5 ... Count Alessandro Volta died.

Snow Harris was the first to construct an electrometer for measuring the attraction between an electrified and a non-electrified disc. He also introduced a Unit Jar for measuring the charge of a battery.

Ohm defined the electrical law that the strength of a current in a circuit varies directly as the electro-motive force and inversely as the resistance. (Ohm = Unit of electrical resistance. Mho = Unit of electrical conductivity.)

1828 Sir Humphrey Davy invented an "Electrical Renewer," or relay, for strengthening current on line wires.

Joseph Wilson Swan born.

Joseph Henry improved Sturgeon's electro-magnet by using many turns of insulated wire.

Lord Crawford devised an electro-magnet.

De Haldat discovered that iron filings adhered to those portions of a steel plate which had been "written on" with the pole of a magnet.

Bidwell calculated the attractive power of an electro-magnet and the magnetic permeability of various metals.

Mitchell introduced the "double touch" method of producing bar magnets.

Tommasi claimed to have magnetised steel bars by passing hot steam round them in a spiral tube.

Cromwell Fleetwood Varley born.

1828 Dec. 22 ... William Hyde Wollaston, died.

1829 ... ... Bohnenberger introduced a Gold Leaf Electroscope with one leaf.

Fechner of Leipzig modified the electroscope of Bohnenberger.

Gaugain invented a discharging gold leaf electroscope.

Terquem proved that gold leaves in an electrified cage did not diverge.

Fechner proposed a telegraph system in which 24 needles and 48 wires were required to transmit the alphabet. He suggested that the effect at the receiving station might be increased by enclosing the needles of the needle telegraph apparatus in coils. (Schweigger had already done this in his galvanometer.)

There were 564 postmen in London and the "villages" of Islington, Camden Town, Kensington, Brompton, &c.

Committee of Revenue inquiry found Money Order Office being carried on as a private business by Messrs. Stow and Watts, and recommended that the Post Office should take control and any revenue which accrued.

1829, Sept. 4 ... Thomas Waghorn conveyed letters to India via Paris, Trieste, Alexandria and Suez.

1829, Sept. 23 ... General Post Office transferred to a new building in St. Martin's-le-Grand designed by R. Smirke.

1830 ... ... Wohler devised a battery with two plates of aluminium dipping into nitric acid and caustic soda, respectively.

Humboldt caused the muscles of fish to contract by passing currents through them, and drew attention to the fact that magnetic storms influence the compass needle.

Pouillet supervised the construction of an electro-magnet in Paris.

Professor Ritchie, of the Royal Institution of London, exhibited a telegraph system composed of 26 wires with 26 suspended magnetic needles, each surrounded by a coil of wire.

1830, Nov. 11 ... Mails carried by rail for the first time (between Liverpool and Manchester).

1830, Dec. 14 ... Duke of Richmond became Postmaster-General of Great Britain, and on April 14, 1831, was appointed Postmaster-General of Great Britain and Ireland.

1831 ... ... H. Pixii produced a machine for generating alternating electric current by the rotation of a horseshoe magnet with its poles near the core of a fixed electro-magnet.

Faraday introduced the "molecular" hypothesis of electricity and established the theory that induction is the result of polarisation of the particles of the medium separating the inducing body from the body on which it acts. He discovered that currents can be induced in a closed circuit by bringing a magnet near to it, and that a current of changing strength may induce a secondary current in an adjacent circuit.

Joseph Henry found that variations in the strength of an induced current could induce currents in a third closed circuit, that variations in the induced current in this third closed circuit could induce currents in a fourth, and so on.

Melloni made a thermo-electric pile composed of antimony and bismuth.

Nobili devised an astatic galvanometer using Schweigger's "multiplier" and two magnetised needles of equal strength fixed in parallel positions with opposite poles adjacent.

1831, April 28 ... Guthrie Tate born.

1831, June 13 ... James Clark Maxwell born.

1831, July 3 ... Edmund Yates born.

David Edward Hughes born.

Henry introduced a telegraph system in which the received current actuated the armature of an apparatus producing audible sounds arranged according to a code. He also built an electro-magnetic engine.

Melloni and Nobili constructed a thermo-multiplier.

Sir J. C. Ross found the magnetic north pole in Boothia Felix.

Separate Irish Post Office and Postmaster-General abolished.

Deputy Postmaster-Generalship of Scotland abolished.

Money Order Office in Ireland given to Mr. Lees in exchange for a Clerkship of the Munster Road.

1831, Nov. 24 ... Faraday's discovery of magneto-electricity announced to Royal Society.

1831, Feb. 13 ... Last man executed for stealing letters.

Professor Jackson experimented in electrical signalling.

1832, June 17 ... William Crookes born.

Charles Tilston Bright born at Wanstead, Essex.

James Wimshurst born in London.

1832, Oct. ... Morse, on a voyage from Europe to America, conceived the idea of an electro-chemical telegraph. Dr. Jackson, of Boston, gave him considerable assistance.

(In first Morse printer signals were recorded by chemical decomposition caused by current passing from platinum points which came into contact with paper moistened with acetate or carbonate of lead, or impregnated with turmeric and moistened with sulphate of soda.)

Pixii, following Faraday's discovery, constructed a magneto-electric machine, and included a commutator so that direct currents could be produced.

1833 ... ... Gauss and W. E. Weber erected a magnetic observatory at Göttingen and inaugurated a Magnetic Association. (Gauss = Unit of magnetic intensity.)

Gauss published the theory and method of measuring the intensity of terrestrial magnetism, and the strength of a magnetic pole.

Pixii, Clarke and Saxton generated alternating electric currents by revolving bobbins of insulated wire rapidly in front of steel magnets, a commutator rotating with the bobbins so that the generated currents passed in one direction.

Ritchie produced an electro-magnetic engine.

William Sturgeon introduced a galvanic motor.

S. Hunter Christie invented the instrument for comparing electrical resistances, now called the "Wheatstone Bridge."

Gauss and Weber, at Göttingen, devised a mirror galvanometer.

Gauss and Weber used an unequal telegraph alphabet in which the number of signals transmitted to represent any letter or figure did not exceed four. The alphabet introduced by Morse bears a strong resemblance to that of Gauss and Weber.

1834, Feb. 15 ... Sir William Preece born.

Peltier found that a current of electricity passed through a junction of dissimilar metals heated or cooled the junction, according to the direction of the current. He devised an electroscope and an electrometer.

Mrs. Mary Somerville published "The Connexion of the Physical Sciences."

Anthony Trollope entered the service of the Post Office.

Eduard Friedrich Weber devoted himself to magnetism and electro-dynamics.

Sir Charles Wheatstone determined experimentally the velocity of electricity.

Lenz thought the magnetism of an electro-magnet was proportional to the current and the number of turns in the coil. He concluded that, in all cases of electro-magnetic induction, the induced currents have such a direction that their reaction tends to retard the motion which produces them. Poggendorff introduced the "Bichromate" cell consisting of plates of carbon and zinc immersed in a solution of bichromate of potash and sulphuric acid.

1835 ... ... E. M. Clarke produced an electric gas lighter which was really a miniature electrical machine. He also invented a direct current magneto-electric machine.

(To be continued.)

RETIREMENT OF MR. F. H. HUGGINS: SOUTHAMPTON TELEPHONE DEPARTMENT.

A LARGE number of his colleagues met together on Jan. 4, to bid farewell to Mr. F. H. Huggins, Higher Clerical Officer, who is retiring on age limit after 39 years' service.

The District Manager, Mr. O. G. Lee, presented Mr. Huggins with a handsome cheque—a token of the high regard in which Mr. Huggins was held by the staff. Mr. Lee, in the course of a short speech, commented on the valuable assistance that Mr. Huggins had given him and said that he had found him to be a sincere and honest worker. The District Manager also mentioned Mr. Huggins' splendid sick record, and, in concluding, wished Mr. Huggins and his wife the best of good luck and future happiness and health.

Mr. C. S. Weston, Staff Clerk, followed and briefly outlined the many changes which have taken place in the telephone service during Mr. Huggins' long career. A point of particular local interest was that Mr. Huggins had witnessed the growth of the Southampton Telephone District from about 3,000 to 37,500 stations. Mr. Weston expressed thanks for the great help Mr. Huggins had given him and wished him long life and health.

Mr. A. L. May, Traffic Superintendent, offered his very best wishes.

Mr. Huggins, in replying, thanked the staff for their tangible expression of esteem and said how much he appreciated the kind words which had been spoken. He said he would always look back with pleasure to his association with the Southampton Telephone Staff.

The presentation closed with three hearty cheers for Mr. Huggins.

NOT A "FEATHER BED" PIRATE.

"... , who was fined £5 at ... for maintaining a wireless set and evading the requisite fee, was stated to have dismantled his aerial and attached a crystal set in the bedroom to a wire mattress. The signals were stated to be exceptionally clear."

The foregoing extract from one of our contemporaries shows some of the subterfuges adopted to avoid the payment of wireless licensing fees and, indirectly, the difficulties of detecting "pirates." It is a strange world where people will go to all this trouble to avoid paying one-third of a penny for an evening's entertainment and an unrelenting fate which finally increases the cost tenfold.

REVIEWS.

"The Elements of Telephone Transmission." By H. H. Harrison, M.I.E.E., M.I.R.S.E. (Published by Longmans, Green & Co. Ltd., London. vii + 147 pp. Price 5s., net.)

This book is stated to be "designed for the elementary student to whom the present text-books form somewhat difficult reading." The author assumes no mathematical knowledge beyond the elements of algebra and geometry, and endeavours to give a brief survey of the whole subject, including the necessary mathematical groundwork. Unfortunately, however, the task which he has set himself is one which is practically impossible. In his first chapter he endeavours, in 36 pages, to give the reader a knowledge of logarithms, the differentiation of algebraical, exponential and trigonometric functions, binomial theorem, exponential series, trigonometrical series, vector algebra and polar co-ordinates. As a series of notes by which a reader who has already done a considerable amount of mathematics may refresh his memory, this chapter is excellent, but we are afraid that no elementary student could possibly work through it without considerable assistance from a teacher. The method of presentation also is not helpful. In paragraph 26, for example, the symbol + is first used for the ratio of a geometrical progression and then for the radius of a polar curve.

In the same article the angle which the radius of this curve makes with the datum line is first denoted by θ, then by x, again by θ, again by x, then again by θ and finally again by x.

In paragraph 14 the author gives a graphical demonstration of the differential coefficient of Sin x. This demonstration is quite good, but at the end the author puts in the quite unnecessary and, for the beginner confusing note, that x is in radians and not in degrees, forgetting that the trigonometrical functions of a given angle are unaltered whatever units we chose to employ for expressing the magnitude of the angle.

Similar remarks apply to the remaining chapters, which deal with the theory of alternating currents, electromagnetic wave transmission and practical transmission conditions.

The reader who brings a trained mind to the book would derive much useful information from it, but we could not advise the unaided elementary student to use it as a text-book. The difficulties experienced in studying such a concentrated presentation of the subject are not lessened by the lack of orderly presentation of ideas which frequently occurs.

"The Cable and Wireless Communications of the World." By F. J. Brown, C.B.E., M.A., B.Sc. (Lond.), late Assistant Secretary of the Post Office. (Pitman and Sons. Price 7s 6d. net.)

Mr. Brown possesses an almost unique knowledge of cable and wireless matters and in this book we obtain the full advantage of that knowledge, couched in that lucid, vigorous and simple language which is characteristic of the author. Free from technicalities, but rich in accurate historical, geographical and financial information, this book enables one to obtain a complete bird's-eye view of the present position from the perusal of a mere 146 pages.

On the financial side Mr. Brown is handicapped by the fact that the published accounts of the British Marconi Company and the Radio Corporation of America do not distinguish between the service and manufacturing sides of their business, and, as he puts it, "any attempt to examine the general financial position of wireless communication with these companies omitted would be like "Hamlet" without the "Prince of Denmark."

We may hesitate to accept the conclusion that the wireless services ought to be content with the lower paid traffic while the cable services absorb all the higher paid traffic, or the underlying assumption that wireless messages will always be subject to interference and interception. We may even quibble at the statement that long-distance telephone communication between Great Britain and the more distant Continental countries is hardly a practical proposition so far; but these are relatively small matters compared with the advantage of the treatise as a whole. Those interested in long-distance communication will welcome the addition of this volume to their bookshelves.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations working at Nov. 30, 1927, was 1,587,493. New stations added during November numbered 21,709, and ceased stations 9,976, resulting in a net increase of 11,733 on the total at the end of October.

The growth for the month is summarised below:—

	London.	Provinces.
Telephone Stations—		
Total at Nov. 30	561,364	1,026,129
Net increase for month	4,657	7,076
Residence Rate Subscribers—		
Total	126,183	203,111
Net increase	1,770	2,226
Call Office Stations—		
Total	5,039	18,279
Net increase	32	132
Kiosks—		
Total	729	3,339
Net increase	31	111
Rural Party Line Stations—		
Total	—	10,138
Net increase	—	48
Rural Railway Stations connected with Exchange System—		
Total	—	843
Net increase	—	12

The number of inland trunk calls dealt with during October—the latest statistics available—was 8,583,262, an increase of 709,736, or 9%, on the total for October, 1926.

Calls made to the Continent during October numbered 30,587, and from the Continent 32,774, representing increases of 23% and 19.8% respectively on the October 1926 figures.

Further progress was made during the month of December with the development of the local exchange system. New Exchanges opened included the following:—

LONDON—Toll (additional), Hatch End, Merstham.

PROVINCES—Southport (automatic), Birkdale (automatic), Southwick (automatic), Bearsden, Rickmansworth,

and among the more important exchanges extended were:—

LONDON—Croydon, Kelvin, Popesgrove, Thornton Heath, Wanstead, Wimbledon.

PROVINCES—Colchester, Giffnock, Godalming, Morley, Bank (Liverpool), Waterloo (Liverpool), Sale, Shettleston, Shrewsbury (automatic), Winchester.

During the month the following additions to the main underground system were completed and brought into use:—

Northampton—Stony Stratford,
London—Amersham,
Bradford—Skipton,

while 82 new overhead trunk circuits were completed and 93 additional circuits were provided by means of spare wires in underground cables.

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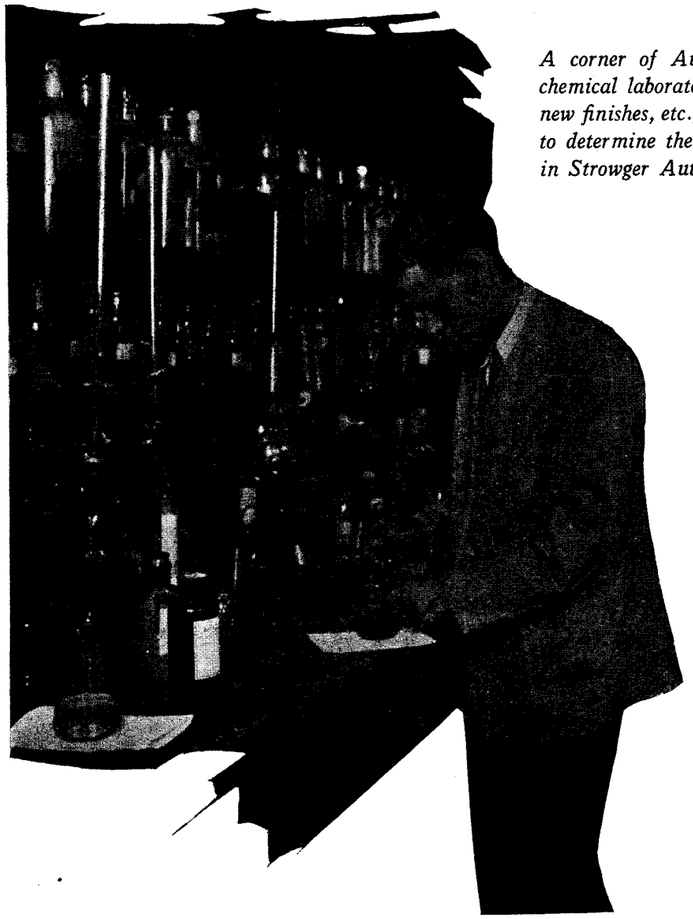

A corner of Automatic Electric Inc.'s chemical laboratory where new materials, new finishes, etc., receive careful analysis to determine their suitability for service in Strowger Automatic exchanges.

THE myriad of new products which modern chemistry has produced constitute an immeasurable force for civilization. Their effect on home and industry has been profound.

To make the best use of these materials in the manufacture of Strowger Automatic telephone equipment requires intensive research and judgment of a high order. A new insulating material, suited to certain electrical apparatus, may be utterly useless in Strowger Automatic switches. A new finish, apparently durable, may develop serious shortcomings when analyzed in the light of automatic telephone operation where "durability" means something more than a few years' service.

To put these new products to work in improving Strowger equipment and in lowering its cost to the purchaser, involves problems on which the Research and Development staff of Automatic Electric Inc. is constantly at work.

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The
Telegraph and Telephone Journal.

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NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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RURAL TELEPHONE SYSTEMS.

Now that the telephone system is well established, not only in every city, borough, county town, manufacturing town, and pleasure resort in Great Britain, but also in every fair-sized market town and in all the larger villages, the Post Office has to go to remote and unfrequented places when it seeks new worlds to conquer—places unknown and unseen even by the experienced traveller unless perchance he catches a glimpse of their distant spires from the passing train. Upwards of 140 new exchanges were opened by the Post Office in 1927, and almost all of these were of the rural type, representing in many cases an answer to the appeal of some parish council or some rural clergyman, acting as the spokesman of his flock, for the extension of the indispensable telephone to their village. When a minimum of eight subscribers can be obtained, the Post Office generally rises to the occasion and takes the risk of providing an exchange, thus placing even the sleepiest and most unprogressive hamlet in direct touch with the great world. We may venture to doubt whether a commercial company would feel itself impelled to extend the blessings of the telephone service to village communities in similar circumstances.

New exchanges were provided in fifty-five different counties in 1927 including the Orkneys and Caithness in the extreme North and Pembroke, Cardigan, and Cornwall in the West. Few of the places thus added to the telephone system are known to fame,—more than half of them do not even possess a railway station. Ilchester and Great Bedwyn returned members to Parliament before they were swept away with the "rotten boroughs" by the Reform Bill of 1830. Holy Island was a bishop's see until the year 900, but the rest of the villages are little known outside their own locality, save some dozen which may be familiar by name to railway travellers. Wetwang, Sampford Peverell, Great Tew, Constantine, Aston Clinton, Hurstbourne Tarrant, Cottesmore, Bozeat, Stoke Mandeville, Middleton Cheney, Chislet, and Dent, have a thoroughly English ring, but most of us would be hard put to it to find all of them on the map.

Wiltshire claims the greatest number of new exchanges with 8 (Great Bedwyn, Chirton, Wanborough, Chute Standen, Stapleford, Winterbourne Gunner, Handley, Landford); Norfolk comes next with 6; Aberdeenshire, County Down, Devon, Hampshire, Kent, Salop, and Suffolk have 5 each; Cornwall and Yorkshire, 4 each. Caithness, Banff, Dumfries, Northumberland, Durham, Lincolnshire, Staffordshire, Monmouth, Pembroke, and Somerset have 3 each. Thirteen counties lying between Ross-shire and Dorset have 2 each.

These towns, of course, obtain not only local service but are connected with the Post Office system by junction lines of a quality which ensure that the subscribers really do enjoy full communication with the great world. An eloquent testimony of this was the Christmas greeting which was recently passed over the transatlantic telephone from the village of Twigworth in Gloucestershire to San Francisco on the distant Pacific Coast.

HIC ET UBIQUE.

THE actual number of telephones working in Great Britain and Northern Ireland at Dec. 31 last was 1,633,802, made up as follows:—

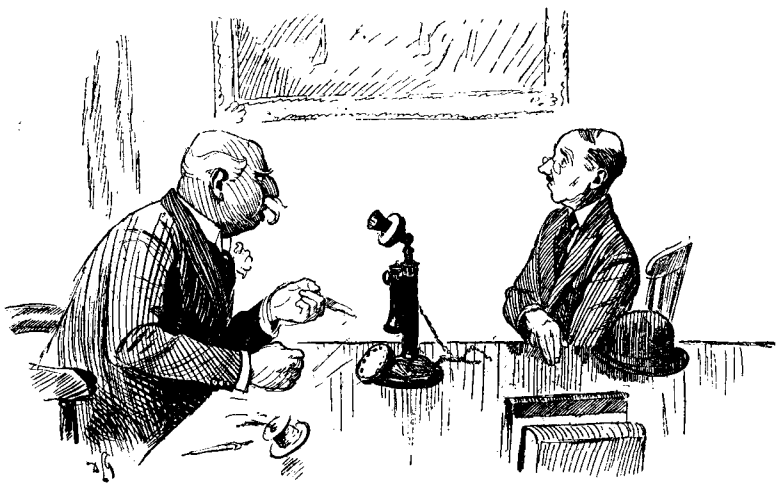
Post Office System ...	...	...	1,598,174
Maintained by P.O.	...	...	13,062
Hull Corporation System	...	...	15,422
Guernsey States System	...	...	4,053
Jersey States System	...	...	3,091
			1,633,802

The award of the Legion of Honour to a woman telephone operator in the employ of the Paris telephone service has been decided upon by the French Government.

The recipient, Mme. Baudesson, is at present a supervisor in the Littre exchange. She has been officially advised that the award is for "devoted service."

Mme. Baudesson has been a telephone operator at various exchanges in Paris since the age of 20. She is declared to have a remarkable technical knowledge of the telephone system.

As from Jan. 26 the telephone service to Canada, hitherto restricted to calls between subscribers in London on the one hand, and subscribers in Ottawa, Quebec, Montreal, Toronto, and Hamilton



Old Martinet (who has been receiving instructions in the use of the new automatic telephone): "And you expect me to fiddle about with my little finger and select the right number? What the devil d'you take me for—the educated pig at the circus?"

[*Reproduced by the courtesy of "London Opinion."*

(Ontario) in Canada on the other hand, has been available to subscribers in all parts of Great Britain. In Canada, communication is still limited to the above-mentioned towns.

Statistics from Esthonia for the year ended Mar. 31, 1927, show that the total number of telegrams handled during the previous 12 months was 351,000. The total number of telephone messages exchanged was 13,245,853. The total number of telephones was 11,723, of which 9,705 were apparatus belonging to the State, 926 belonging to subscribers, and 1,092 supplementary apparatus.

A commencement with the extension of the Transatlantic Telephone Service to the continent of Europe was made on Jan. 19, when the service was opened between the whole of the United States and Cuba on the one hand, and Brussels and Antwerp on the other hand. Extensions of this service to other European countries are planned to take place shortly.

The bulk of the telephone service of the City of Cologne, says Reuter, was changed over to the automatic system during the night of Dec. 10. The operation took several hours, and for that period the telephones could not be used, much dislocation resulting in consequence. The initial numbers of the previous system have been retained, giving the five integers which are necessary for the working of the automatic system.

The Department of Overseas Trade has published through the Stationery Office (4*s.* 6*d.* net) a composite report by British Consular officials upon conditions in various North African countries. The Algerian report states that the telephone service between Algiers and Tunis is in admirable working order. There are similar communications between Algiers and Oran, and it is hoped that the service between Oran and Rabat will shortly be completed, thus placing the whole of the North African coast line in direct telephonic communication.

A recent note in the Press stated that the Paris-Stockholm circuit (2,362 Km.) was the longest "through" trunk line in Europe. By "through" line is meant a trunk line connecting two towns without intermediate switching. The London-Stockholm circuit is, however, still longer, being 2,456 Km. in length. The London-Berlin line is 1,393 Km. long.

TELEGRAPH AND TELEPHONE FINANCE.*

BY SIR HENRY N. BUNBURY, K.C.B.

(*Continued from p.* 87.)

IF we look at the subject from another angle, we shall find the same process at work. Let us take the average prime cost, per station, of telephone plant, excluding land and buildings which in the Commercial Accounts are dealt with in a separate account. On Mar. 31, 1923, the average prime cost of plant per station was £55. In the succeeding years it has risen as follows :—

	£	*s.*	*d.*	
Mar. 31, 1924	56	8	0	
„ 1925	58	18	0	
„ 1926	61	16	0	
„ 1927	64	0	0	(approx.)

So that since 1923 the average cost of all plant, new and old, installed has grown by over 16%. The problem for the management is, will this growth be arrested or, alternatively, will there be a counter-balancing increase of revenue per station or decrease in operating expenses per station before we reach the point at which an increase in telephone rates becomes inevitable ?

I will now turn to another subject which has, at the present time, a very real and live interest, and that is the earning capacity of the Trunk system under the present tariff. Now there seems to be little doubt that Trunk business as a whole is remunerative, and certainly the more heavily loaded Trunk routes are very remunerative. But here, again, a tendency may be observed which is a little disquieting. In 1922-23 the average revenue from an Inland Trunk Call was 13.36*d.* In the succeeding years the corresponding figures have been as follows :—

	d.
1923-24	12.26
1924-25	11.25
1925-26	10.81
1926-27	10.64

and in 1927-28 the decline has still continued.

These figures include the local fee, and it must be borne in mind that not only was the local fee reduced to a 1*d.* in 1924, but there were some small reductions in short distance Trunk charges in July, 1923, and some larger reductions in July, 1924. But even after allowing for this it seems clear that the short distance Trunk traffic is growing more rapidly than the longer distance traffic, if, indeed, the latter is growing at all, as to which I have not any recent information. The same tendency has been observed in Germany and in the U.S. It suggests that we may have here a problem in the business economics of telephones which may become important. It is significant that the American Telegraph and Telephone Company, in October, 1926, reduced their longer distance charges and, we understand, are about to make a further reduction in those charges.

In order not to leave you with an unbalanced view of the financial position of the telephone service, let me conclude by saying that, in other respects, the last five years have shown a very satisfactory improvement. Operating costs and maintenance, in proportion to revenue, are steadily declining, and there has been a remarkable improvement in the collection of the revenue for which the greatest credit is due to the District Managers and their staffs. The outstandings at the end of a quarter have fallen to an extremely small proportion and the bad debts have become relatively insignificant. It must, however, be added that plant charges, as has already been said, form so large a proportion of the cost of telephone service that economies in operation and maintenance, valuable as they are, can do little in the way of redressing the balance. The figures are as follows :—

III.—*Telephone Service.*

	Percentage of Revenue.				
	1922-23. %	1923-24. %	1924-25. %	1925-26. %	1926-27. %
Administration, Operating, &c.	33.5	30.9	32.0	30.9	30.4
Maintenance	17.6	15.6	16.0	15.8	15.4
Accommodation ...	4.8	4.9	5.2	5.3	5.4
Miscellaneous (Travelling, Stationery, Printing, &c.) ...	1.5	1.7	1.9	2.0	1.9
Fixed Plant charges (Depreciation and interest)	33.7	35.2	39.2	42.6	45.3

* Paper read before the Post Office Telephone and Telegraph Society of London.

We will now turn to the Telegraph service, and it will be convenient to begin with the Inland service and then go on to look at the Telegraph service as a whole, for it must be remembered that the Inland and Foreign services are essentially what economists call "joint products," each leaning on and supporting the other.

The figures of the Inland Telegraph service for the quinquennium which we are studying are as follows:—

IV.—*Inland Telegraph Service.*

(Including Anglo-I.F.S.; Press Inland and Railway Pass.)

Average Cost of Living Index.	Year.	Expenditure.	Income.	Deficit.
93	1922-3	£5,461,000	£3,926,000	£1,535,000
77½	1923-4	4,992,000	3,625,000	1,367,000
77½	1924-5	4,939,000	3,444,000	1,495,000
77½	1925-6	4,862,000	3,290,000	1,572,000
75	1926-7	4,696,000	3,125,000	1,571,000

["Sutton" payments and wireless licence profits excluded.]

As you will agree, there is little comfort to be derived from them. The only factor that seems able to arrest in any degree the growth of the Inland Telegraph deficit is a fall in the cost of living; and while I personally expect some further fall to take place, it is not to be expected that it will be either considerable or rapid. A fall of 5 points in the average cost of living figure means, on the present staff, a reduction of about £113,000 in the cost of operation.

Replacement of pre-war by post-war plant is going on in the Telegraph service, but not only are the plant charges in themselves a relatively small factor of cost but the replacement is going on at a very much slower rate and I would hazard the opinion that it is being done at relatively lower prices.

We have so often discussed in this Hall one aspect or another of the problems of the Inland Telegraph service, that I will spare you any further disquisition on the subject this evening and content myself with giving you the figures, which show that things are not getting any better.

We come now to the Telegraph Services as a whole, which comprises, in addition to the Inland Service, the Anglo-Continental Services, the Imperial Cable, and the Point-to-Point and Ship-and-Shore Wireless Services. In the figures which I am going to give you the surplus of receipts from Wireless Receiving Licences, after paying the expenses of management and the share due to the B.B.C., have been excluded. Whatever that surplus may be, it should not be regarded as an element in the Telegraph Services operated by the Post Office. The figures for our five-year period are as follows:—

V.—*Telegraph Service—Inland and Foreign.*

Average Cost of living Index	1922-23. 93	1923-24. 77½	1924-25. 77½	1925-26. 77½	1926-27. 75
	£	£	£	£	£
Expenditure ...	6,942,000	6,424,000	6,463,000	6,461,000	6,401,000
Revenue* ...	5,510,000	5,209,000	5,099,000	4,998,000	4,921,000
Deficit ...	1,432,000	1,215,000	1,364,000	1,463,000	1,480,000

["Sutton" payments and profit on wireless receiving licences excluded.]

You will observe that whereas in 1922-23 the revenue from the Inland Service represented 71% of the total revenue, in 1926-27 it represented only 63%. In subsequent years, with the full revenue from the Beam Services, the Inland Telegraph revenue will form a still smaller proportion of the total.

You will also observe that throughout the period the Foreign Services as a whole have shown a profit; for the deficit on the whole service has been less than the deficit on the Inland Services taken by themselves. That profit keeps fairly steady at from £100,000 to £150,000 a year.

When, however, we ask where it comes from we find that there is, or at any rate has been until this year, only one golden egg in the nest, and that is laid by the Anglo-Continental Cable Services. And, unfortunately, for the three middle years of our quinquennium the revenue from these services was falling, the expenditure increasing and the surplus shrinking. Omitting the first year, 1922-23, when the cost of living figure stood at 93, the surplus on the Anglo-Continental Services has been as follows:—

1923-24	£223,000
1924-25	£179,000
1925-26	£166,000
1926-27	£212,265

Now while telephone competition is perhaps unlikely to have the same effect on the Continental services as it has had and will have on the Inland, it is a factor that cannot be ignored. We have, moreover, to bear in mind the loss of traffic that must result to our cable system from our own and the Marconi Company's Radio services to the Continent. We should be wise, therefore, to assume that the revenue and traffic of the Continental Telegraph Services, though we may perhaps hope for an arrest of the recent decline, will not show any marked tendency to increase. In the last year of the period the traffic was steady, the revenue rose, and the expenses fell, owing to the decline in bonus. There is therefore some reason to hope that an improvement has set in, but one year, and that a somewhat abnormal year, is not much to go on. It is to be hoped, however, that this year marks the end of the growth in the working expenses of these services.

As regards the Imperial Cable we can scarcely hope for any improvement; indeed, Beam competition may make things very much worse than they were in 1926-27. The Wireless Services as a whole, with the aid of the prosperous Beam Services, may be expected steadily to improve their financial position, and perhaps it is in that direction that our chief hopes must lie. At any rate they are new services still in the stage of formation and development when increasing efficiency can be attained as experience grows and the volume of traffic develops. They have all the advantages of youth.

It is always useful to see what other people similarly situated to ourselves are doing, so let us conclude in this manner.

As we have seen, in those countries which are already highly developed telephonically, there are signs of difficulties to come. They are being produced by two causes (*a*) the replacement of pre-war by post-war plant, (*b*) the tendency of the cost of the unit of telephone service to increase as the complexity of the system increases—a tendency which is well recognised by telephone experts. In countries, on the other hand, which are backward telephonically, it seems likely that progress will be steady and will not be hampered by financial difficulties other than those which impoverished Governments find in raising capital for any purpose. For this and other reasons there has been a marked tendency in foreign countries, where public utility services are administered by the State, to divorce the finance of those services from the national budget and to give them financial autonomy including borrowing powers. So long as Governments are in financial difficulties it is to be expected that this tendency will continue. The Italians have gone even further and have handed over their telephone services entirely to private enterprise.

As regards Telegraphs, nearly every country is in difficulties, and I am inclined to think that we are at the beginning of a period in which attempts will be made in many countries and in many ways to find a solution of the great problem, how to provide a self-supporting telegraph service in a telephonically developed country. Some attempts have already begun: notably in Germany. We are, I think, telegraphically speaking, at the end of one epoch, and I should like to suggest to your Committee that the next general paper which they invite on the Telegraph service should be one entitled "The Telegraph Service in 1950."

It should not be assumed that telegraphy is going to disappear. In this country the average distance of a telephone trunk call is about 40 miles, and the average distance of an inland telegram over 145 miles. That is a very significant fact. Telegraphy is, and seems likely to remain, the cheapest means of rapid communication over long distances. For this reason alone—and there are others—we are not in the least called upon to regard telegraphy as played out. What is necessary is that if the users of the Telegraph service ought to pay what it costs to render that service—and there seems to be no obvious reason why anybody else should pay it for them—it is incumbent on us to render the service with the highest possible efficiency and the lowest possible cost. And in considering whether the present level of efficiency can be increased and the present level of cost reduced there may still be something to be learnt from the resources of science and from modern ideas and methods of organisation.

It is therefore of some interest to see whether there are analogies in other branches of industrial production and service. And we have not very far to look. The problem of motor omnibus competition with electric tramways, and that of road transport competition with railways is almost a precise analogy. I think that the problem presented to the gramophone industry when Broadcasting emerged on the horizon was not very different. And similarly the competition of electricity with gas as a source of light, heat and power. I will not weary you with further examples for you can easily find them for yourselves. But I should like in conclusion to point out that in all these cases there is no suggestion that the older form of service can be entirely superseded by the newer. Even in the case of the London Tramways the authorities agree that trains and buses alone could not possibly cope with the peak traffic of London and that there can be no question of abandoning the tramways. On the other hand the tramways by themselves do not pay, and where free omnibus competition is allowed could probably not be made to pay except perhaps where exceptional and necessarily temporary advantages exist in the way of low capitalisation on a pre-war basis. Accordingly we find in such cases a general process going on—the attempt to reach the highest standard of technical operating and managerial efficiency, and to establish, where possible, co-operative rather than competitive working, in order to secure the concentration of each service on those functions which it can best perform.

For such purposes we in this country are in a favourable position, with our telegraph and telephone services vested in a single authority and operated under a common control. We are not faced, at the outset of our efforts, with the desperate problem of bringing rival vested interests into a common management and the co-operative habit. And in presenting to you the salient, and as it were, the dominating financial figures of the past 5 years, I have done so under the conviction that we as a great public utility service shall not, and indeed cannot stand still, and that the figures may be of some help as a primary indication of what our problems are going to be.

PRESS TELEGRAM WORK.*

BY J. NEWLANDS, C.B.E, C.I.E.

(*Continued from p.* 91.)

IT has occurred to me that possibly my audience here to-night would appreciate it if I gave them one brief glance into the actual conditions which existed under by far the largest of the Telegraph Companies. For this purpose I must quote a few sentences from a letter received some years ago from my old friend Mr. Andrew Gray, late Controller, Telegraph Department, Edinburgh. A few weeks ago I called upon him near Edinburgh and had a delightful chat on "Telegraphs." He is now in his 93rd year and must, I should think, be the "Father" of the Telegraph Service. He wrote to me as follows:—

> "I wonder what my old colleagues of the early pioneer days, with our sand and sulphuric acid batteries and imperfect insulation which would not carry our signals more than 200 miles, would think of it all could they "revisit the glimpses of the moon"? You say, truly enough, that "many important towns had no direct communication with London," and the reason is obvious. When I joined the Premier Company in 1853—six years after it commenced business—we had only Daniell's batteries and insulation that was put out of gear by a shower of rain. So that at that time *all* the traffic—down and up—had to be re-transmitted at York. The North circuit was an omnibus one for Newcastle, Edinburgh and Glasgow. Each of these places had it for 20 minutes every hour—ten minutes sending, ten minutes receiving—Hull, Leeds, Liverpool and Manchester had their own wires to York. You can readily imagine under these circumstances we were not greatly concerned about a little delay! This, of course, did not last very long. Liverpool and Manchester got through, and Glasgow then sent most of his work via the former town."

This quotation will enable you to judge how great has been the progress of the Postal Telegraph System since 1870, how enormously the means of communication have been multiplied, and it should, at the same time, reflect the highest possible credit upon the Engineering Department and all its officers for the truly wonderful manner in which they have been able to cope with every expansion of the business and with all the emergencies which have arisen from time to time during the chequered history of the State Telegraphs.

The ground is now prepared for the consideration of those parts of "The Telegraph Act, 1868," which bear upon the subject of my address to-night, viz., "Press Telegram Work." Let us inquire what were the salient points contained in the Act on this matter. There were two notable alterations. Firstly, the revised arrangements and reduced tariff for newspaper "Special" or "Private" wires, and secondly, the adoption of a uniform tariff for Press messages sent over the public wires.

As regards the first, "Special wires" were provided by the Telegraph Companies to a relatively small number of newspapers in Edinburgh, Glasgow and Dublin for *eight hours* in the night at an annual charge of £750. This included the cost of providing the staff to work the wires at both ends of each circuit. Slip and other essentials were thrown in as "extras" under the inclusive price mentioned.

They had arranged for cheaper rates as under:—

Wires under 100 miles	...	...	...	£600 a year.
„ „ 200 „	...	...	...	£675 „

No such shorter wires were in use.

Under the Postal Telegraph revised plan they stepped boldly in and offered "Special Wires" to any newspaper for *twelve hours* nightly (6 p.m. to 6 a.m., afterwards altered to 4 p.m. to 4 a.m.—if required) for £500, an all-inclusive charge covering, as before, staff, slip, &c., and irrespective altogether of distance. This gave an important extension of time and a greatly reduced charge. It seems highly probable that this low charge never proved remunerative to the Department for the services rendered. In any case it was estimated in the year 1912 that the loss on "Special Wires" was approximately £12,000, and, as a consequence, a new tariff for such wires was introduced soon after. In addition to this the staff on each "Special Wire" is now employed and paid by the newspapers and not by the Department. At the present date there are 30 "Special Wires" in use between London and provincial newspaper offices. All except two are "morning" papers, the two being Manchester *Evening News* and Leeds *Evening News*.

The value of a "Special Wire" to a busy "morning" newspaper will be best understood when I inform you that in September, 1870, six papers signalled each on an average 8,556 words per night, and, reckoning on six days per week for 52 weeks, this large total, if taken at 1*s.* for each 100 words, represents £1,341 12*s.* per annum.

* Paper read to the Post Office Telephone and Telegraph Society of London.

Passing on to the second notable alteration made by the Act, what do we find? Instead of the former Companies' plan of charging for Press messages at 30 words "day" rate or 40 words "night" rate, according to distance, 1*s.* up to 100 miles, 1*s.* 6*d.* up to 200 miles, 2*s.* above 200 miles and from 3*s.* to 6*s.* between Great Britain and Ireland, with a 25% "copy" rate *within the same town*, the Act introduced and imposed a uniform rate of 75 words "day" rate and 100 words "night" rate for 1*s.*, "with an additional charge of 2*d.* for every 100 words or 2*d.* for every 75 words, as the case may be, of the same telegraphic communication so transmitted to every additional address," wherever situated. In other words, the "copy" rate was henceforward to be nation-wide all over the United Kingdom, while at the same time extended hours were introduced for "night" Press rates. In order to realise the difference or full significance of this revised system of charging, let us see what the respective charges had been and were henceforth to be for one column of news matter of, say, 2,000 words. Mr. Disraeli had been delivering an important political speech in Edinburgh in 1868, and reference had been made to the telegraphing of that particular speech when witnesses were being examined. We may ignore the method of charging according to distance altogether and assume an average initial rate for the first address of 40 words at 1*s.* 6*d.*, and 25% for one "copy" for a second address in the same town. Therefore, 2,000 words at 1*s.* 6*d.* for every 40 words would cost for the first address 75*s.*, while the cost at the "copy" rate for the second address would be one quarter more, or 18*s.* 9*d.*, making a total of £4 13*s.* 9*d.* These were the Companies' charges.

On the other hand, the Postal Telegraph charge for 2,000 words at 1*s.* per 100 would be 20*s.* for the first address and twenty times 2*d.* for the "copy" to the second address, or 3*s.* 4*d.*, making a total of 23*s.* 4*d.*, as against £4 13*s.* 9*d.*—a dead loss of three-fourths.

Take a further illustration, on a wider scale and, as we all know, a much more likely one to happen. Assume that when Mr. Gladstone was delivering in Edinburgh one of his celebrated Midlothian speeches, and that 20 separate towns in the United Kingdom were taking a column report of 2,000 words. Assume also that in each of these 20 towns there was a secondary address or newspaper taking this particular column at the "copy" rate, thus making 40 addresses in all. The total cost of such an important Press message under the Telegraph Companies' exorbitant rates would have been, for the 20 initial addresses, as under:—

		£	*s.*	*d.*
20 times 75*s.*		75	0	0
20 times 18*s.* 9*d.*		18	15	0
Revenue ...		£93	15	0

This figure works out at £2 6*s.* 10½*d.* per newspaper address. Under the Postal Telegraph System this message would only cost:—

	£	*s.*	*d.*
For first address	1	0	0
For 39 copies at 3*s.* 4*d.*	6	0	0
Revenue ...	£7	0	0

A difference of £86 15*s.* on this single transaction. In this instance, as 40 separate newspapers would have been provided with an excellent summary of the latest and most up-to-date speech, good, readable news for their readers, then, as the total charge amounted only to the sum of £7, it is evident that the revenue received was only 3*s.* 6*d.* per newspaper address. As usual, this exceedingly small charge would not have included the cost of delivery. This works out at 2½*d.* per 100 words. Clearly, very cheap reading for the great British public and very profitable for the newspapers.

It is essential that I should bring it clearly within your comprehension that while the Telegraph Companies' "contract" scheme provided a really cheap service at 4*d.* per 100 words, it was only given to those who contracted for a full year. Anybody outside that contract, and indeed even those inside it, had to pay a most appalling price for any additional news not included within the scope of the scheduled "expresses."

I have so far only referred to Press messages of the length of one column, but, of course, many important political pronouncements subsequent to 1870 ran up to four columns in length, that is, 8,000 words, or thereabouts. Therefore the Telegraph Companies' charge for a message of such inordinate length would have been £15 for the first address and £3 15*s.* for one extra copy in the same town, while the Postal Telegraphs had undertaken to deal with such a message from, say, Glasgow to London, for 80*s.* for the first address and 80 twopences, or 13*s.* 4*d.*, for one extra "copy," which might have to be transmitted and delivered in Plymouth or in Cork, or anywhere else in the United Kingdom. We have thus:—

	£	*s.*	*d.*
Companies' charge	18	15	0
Postal Telegraphs' charge	4	13	4
Difference ...	£14	1	8

Therefore, these two supposed newspapers would receive four columns of good readable news matter carefully transmitted and retransmitted over the Postal Telegraph system, at almost exactly one-quarter of the cost which would have been chargeable under the Telegraph Companies' tariff.

Recollect that in addition the actual cost of delivering an 8,000 words speech, even in batches in two separate towns, represented a very considerable extra sum.

There was in existence, however, an alternative, or extra, tariff to cover the transmission of important "Specials" from the provinces to London newspapers only, if and when required. Each paper was then charged three guineas for an 1,800 word report or summary, and this extra ordinary tariff worked out at 3*s*. 6*d*. per 100 words. There was no "copy" rate for such Press messages.

It is desirable to prove and establish the fact that the charges made by the Telegraph Companies for all "special" reports and indeed for every kind of Press telegram which did not fall within the scope of the 4,000 words contained in their daily "expresses" were so high as to be practically prohibitive. The newspapers could not afford to pay the price. Such "specials" were a genuine luxury. Obviously there were then, as there have been ever since, hundreds of important events, the movements and doings of Royalty, political and election speeches, agricultural shows, mining, railway and shipping disasters, accidents, murders, trials, &c., occurring in the provinces concerning which a well-organised newspaper would have been glad to publish suitable reports. News is not all confined to the London area. It is not all gathered, manufactured and written up in Fleet Street, but this great mass of general news throughout the provinces had to be left unreported and unpublished except in purely local papers, because the cost of telegraphing it from place to place was prohibitive to all except the most prosperous newspapers. Can this statement be substantiated? Page 98, Minutes of Evidence taken before Select Committee on the Electric Telegraphs Bill. Questioner, the Chairman, Chancellor of the Exchequer examining Mr. William Saunders, Managing Proprietor of the *Western Morning News*, Plymouth, who was one of the newspaper representatives. "Question 1370. Apart from the news which is supplied to you by the agency of the Intelligence Department of the Telegraph Companies, do you occasionally have special messages?—Yes, we get them; but rarely, for the rates for their transmission are too high."

"Question 1371. So that if you want to go outside the exact scheme of news provided by the Telegraph Companies, you have to pay a very high rate?—Yes."

"Q. 1372. Is that practically found to be almost prohibitive?—Almost prohibitive; I find that 13 daily newspapers and 11 weekly newspapers during the last two months have received only about £48 worth of those telegrams; 24 papers in two months have spent only £48 on those telegrams for news from London." An average of £1 per month for each newspaper, or about 9*d*. per day.

"Q. 1373. Do you think that under the reduced rates proposed by the Post Office you will frequently have recourse to special messages?—I am afraid we shall spend a great deal more then."

Can you wonder that it soon became obvious something had gone wrong with the telegraph revenues? Or are you surprised to learn that by March 1875—only five years after the transfer—the Treasury felt impelled to appoint a special Committee to inquire into the financial state of the Telegraph Service. One of the members of that Committee was, fortunately, Mr. Henry Weaver, whom I have already referred to as having been the Secretary of the Electric and International Telegraph Company. He had expert knowledge and could compare the old and the new Press tariff.

This committee reported as the result of their investigation that the Press tariff was "essentially unsound." Thereupon the Postmaster-General made a strong attempt to get rid of the disastrous 2*d*. "copy" rate throughout the U.K.

On Dec. 23, 1875, he proposed to the Treasury "that the reduced charge of 2*d*. should be confined to copies distributed by hand, and that all messages which are telegraphed should be charged the full Press rates." Had this proposal been agreed to it was estimated that a gain of at least £30,000 per annum would have been secured, but the die had been firmly cast and it was found impracticable to reverse or revise the charges for Press telegrams which had been debated, agreed upon and finally incorporated in an Act of Parliament. It was too late to apply a remedy. Furthermore, the proposal was strongly, even bitterly opposed by the newspaper owners, many of whom, accompanied by 36 Members of Parliament, forming a most formidable deputation, met the Postmaster-General and discussed with him his proposal to effect an upward change in the tariff. They protested in vigorous terms against any change in the "copy" rate.

The leading speaker, Mr. Norwood, M.P., stressed the following point, viz.: "We regard the Press as an important educational machine and engine for the diffusion of knowledge, and we consider that the ample telegraphic reports which the provincial Press give their readers on matters of public interest are of importance in the tendency they must inevitably have, of advancing the intelligence of the masses." There is truth in the argument, but it did not bring grist to the telegraph mill.

When Mr. Herbert Samuel was Postmaster-General in 1911 he made a similar proposal to a strong deputation of the Press that the 2*d*. "copy" rate should be revised, but it met with the most uncompromising hostility. They would have none of it.

It was discovered about the same time in 1875 that the Postal Telegraph Department had somehow fallen into an erroneous method of "continuous counting," under which many separately transmitted messages had been charged as *one*, when, in reality, they consisted of many separate messages or batches of news sent by the Press Association or Central News under one or other of their numerous distinctive services. As a consequence a considerable loss had been going on since 1870. Mr. W. Saunders, of the "Central News," pointed out at the above-mentioned deputation the following curious fact: "By the Post Office Account for Feb. 11, 1876, I find that I sent a message on that day to 265 addresses, which is charged in your account £2 5*s*." This works out at 2*d*. per address, and, as these 265 separate messages would be distributed over England, Scotland, Ireland and Wales, involving numerous transmissions and retransmissions before they all reached their final destinations, it is perfectly obvious that this kind of work involved the Department in a palpable and dead loss. Recollect that in this instance once again the Postal Telegraph Service had to pay for the cost of delivering these 265 news items. At 1*d*. per message this would absorb £1 2*s*. out of the total revenue received of £2 5*s*.

Verily the balance of £1 3*s*. remaining would not leave much in hand to pay the poor telegraphists' wages, maintain the apparatus, wires, poles and buildings.

A separate Committee unearthed another similar case and they reported that: "To such an extent is this the case that one instance was adduced in evidence in which the Post Office was called on to deliver 1,640 messages for the sum of £1 15*s*. 2*d*., or one farthing each." The only possible comment I can make on this miserable result is that the Department may have paid out £6 16*s*. 6*d*. (at 1*d*. per message) in order to deliver this service, for which only 35*s*. 2*d*. had been paid by the sender.

This very peculiar method of "continuous counting" was *not* traceable to the Act of Parliament. It was probably introduced owing to some faulty construction being put upon the wording of the Act. It may have arisen either in the new postal "Intelligence Department," owing to improper counting, or it may have been due to some failure in the accounting system as applied to the services of the News Associations. In any case this palpable defect and loss of revenue was not in any way due to the Telegraph Staff. They carried out the transmission work all right, but it profited them not at all.

On looking backward over the past 57 years or more I am strongly inclined to the belief that the Post Office would have acted wisely if, on taking over the telegraphs they had scrapped the "Intelligence Department" altogether, just as they scrapped or gave up entirely those other functions of the I.D., viz.: the collection and editing of the news supplies. As the years rolled by and as the volume of Press traffic increased beyond all reasonable anticipation it became evident that much if not most of the initial delay which hampered and prevented the prompt transmission of Press work from London was directly traceable to its preparatory treatment within the "Intelligence Department." For example, the Parliamentary reports for the "morning" newspapers which were handed in at 6 p.m. and bore the code "F" used only to begin to trickle through on the first Scotch news wire by about 6.40 p.m. This clearly indicated a belated start and it led to numerous complaints which gave rise to much discussion.

The treatment of news in London is, properly considered, a national matter rather than a C.T.O. one. The whole process of dealing with both inward and outward news was remodelled towards the end of 1911 with the most gratifying results both to the Department and to the Press. Each of the News Agencies made due recognition of the improvement then effected. On Mar. 27, 1912, the staff engaged on news work within the Special Section, the Intelligence Department and the News Division numbered 356. Of these, 21 were Supervising Officers and 335 were full-time Telegraphists. I wonder what the figures are now, 15½ years later.

Let us consider other causes of the delay sustained by news messages when dealt with in the largest telegraph office in the world.

It was stated in June, 1913, that in the C.T.O. a large number of Press telegrams were received by tube and the tubing operation from the more distant offices often occupied over a quarter of an hour. These messages, received in the Central Hall on the ground floor, have to be re-tubed to the several floors of the C.T.O., which for telegraphic purposes is a most inconvenient building. From distributing points on the several floors the messages have to be taken by hand or carrier to the section containing the outgoing circuit and then again to the circuit itself. These processes take time, as there is a sortation at every point.

It is a most difficult matter to look forward 20, 30, 40, 50 years and estimate what will be the full effect of an apparently small omission. On the other hand, it is a comparatively simple matter to look backwards over a similar period of years and observe what a disastrous loss has occurred because some apparently slight concession has been, almost unwittingly, agreed to and inserted in an Act of Parliament, or, alternatively, that some little safeguarding clause has been omitted therefrom.

Those of us who have been intimately connected with the Telegraph Department know how depressing it has been to be constantly reminded that there is a heavy loss on telegraphs. In one of the Post Office publications issued in 1911 it is stated: "At no time has the revenue from the telegraph service been sufficient to pay the interest on the capital; and for the last 20 years the service has been carried on at a considerable loss. In the first place it is now believed that the terms of purchase were unduly favourable to the Companies, and the revenue has throughout been detrimentally affected by the low tariff granted to the Press under the Act of 1868, entailing an annual loss of about £225,000; and by the privilege of sending free messages conferred on railway companies by the same Act. Even under the commutation arrangement referred to above about a million and a quarter such telegrams are sent yearly—a loss of about £50,000."

I want you to observe how astute the railway managers must have been in 1868 in securing this vast and comprehensive privilege. Their use of the privilege grew year by year until it became a scandal and had to be commuted at excessive cost to the taxpayer.

It should never be lost sight of that if any private Telegraph Company had found that they were losing heavily year by year owing to their Tariff having been framed on too generous terms their first endeavours would have been to revise their charges, and, most assuredly, their wages bill for their operators would not have been allowed to go up and up as they have necessarily done under State control. There would have been no Parliamentary or other Committees to keep on adding to the cost of working their undertaking. Some people may be inclined to overlook this palpable fact.

In my judgment the worst feature of these recurrent Committees has not been that they increased the wages bill—that was inevitable—but rather that their cumulative recommendations have unquestionably imposed on the Department an enormous overload of absolutely unremunerative writing and checking labour in order to carry out their decisions. This is a most important point and one which ought to be remembered in future.

At this stage it may be well to interpolate that after the war the Press rates were altered, on Jan. 1, 1920, to 60 words "day" and 80 words "night" for 1*s*., with a copy rate of 3*d*., instead of 75 words "day" and 100 words "night" for 1*s*., and a "copy" rate of 2*d*.

Undoubtedly this may do some good, but, from the Post Office point of view, the "copy" rate is still *much too low* to make the business a paying proposition.

You may possibly recollect that the *Daily Mail* had a leading article headed, "Subsidised Newspapers. Press Telegrams below Cost." It proceeded to say, "When is the Government going to act? The charge for inland Press telegrams ought to cover all the cost of the service and should provide a reasonable commercial profit as well."

The *Daily Mail*, therefore, protests against the present method of undercharging for telegrams which are sent to the Press. Bravo! Admirable! I agree with every word quoted, but when I read the article I had a sort of lurking suspicion that behind the heroic call for economy there might possibly lie a subtle suggestion on the part of the wealthy newspapers that by increasing the costs all round it would result in the "Slaughter of the Innocents," that is, the total extinction of the poorer class of newspapers, thus at one fell swoop clearing off from the newspaper field much of the existing healthy and local competition which exists to-day in all directions.

However, we must now return to the text for this evening's discourse.

The immense increase in Press telegraphy which took place immediately on the acquisition of the telegraphs by the State is evidence enough that the Press rates must have been greatly lowered. The 4,000 words of the Telegraph Companies' days would be about two-and-a-quarter columns; in January, 1871—a year after the transfer—Mr. Scudamore wrote: "I have seen as many as twelve columns of telegraphic news in leading provincial journals." Query. What would he have found in 1927?

The most convincing method of indicating how immediately and how rapidly "Press Telegram Work" increased in volume under the Postal Telegraph System is shown by the yearly revenue, which leaped up and expanded at a great rate.

Detailed figures will be shown on the lantern screen. There are subjoined, also, some recent statistics showing the number of words in Press messages yearly for the past six years.

The £31,975 of 1870-71 had more than doubled by 1876-7. The revenue had trebled by 1882-3; it had quadrupled by 1896-7; and it reached its maximum of £148,394 in 1911-12. Unquestionably this clearly proves a growing appreciation by the newspaper press of the utility of the news services.

PRESS TELEGRAM REVENUE.

Year.	Revenue. £	Year.	Revenue. £	Year.	Revenue £
1870-1 ...	31,975	1889-90 ...	111,297	1908-9 ...	140,061
1871-2 ...	39,175	1890-1 ...	113,149	1909-10 ...	145,339
1872-3 ...	43,300	1891-2 ...	116,247	1910-11 ...	144,934
1873-4 ...	52,688	1892-3 ...	120,299	1911-12 ...	148,394
1874-5 ...	58,478	1893-4 ...	125,770	1912-13 ...	147,900
1875-6 ...	58,165	1894-5 ...	119,061	1913-14 ...	140,619
1876-7 ...	65,041	1895-6 ...	124,881	1914-15 ...	129,682
1877-8 ...	64,367	1896-7 ...	128,823	1915-16 ...	98,950
1878-9 ...	71,813	1897-8 ...	133,009	1916-17 ...	81,144
1879-80 ...	76,269	1898-9 ...	134,231	1917-18 ...	71,769
1880-1 ...	85,031	1899-1900	143,233	1918-19 ...	72,916
1881-2 ...	87,233	1900-1 ...	141,600	1919-20 ...	105,831
1882-3 ...	97,989	1901-2 ...	136,780	1920-21 ...	134,093
1883-4 ...	99,825	1902-3 ...	143,740	1921-22 ...	130,810
1884-5 ...	98,637	1903-4 ...	141,496	1922-23 ...	109,559
1885-6 ...	103,415	1904-5 ...	146,268	1923-24 ...	91,175
1886-7 ...	111,150	1905-6 ...	145,005	1924-25 ...	83,314
1887-8 ...	111,570	1906-7 ...	137,237	1925-26 ...	83,940
1888-9 ...	111,159	1907-8 ...	140,008	1926-27 ...	82,140

Notes.—Up to, and including, 1886-7 the figures are for "News Produce and Special Wire Rentals"; after that year they show the revenue from Press telegrams only.

From 1922-23, amounts collected for Press telegrams originating in the Irish Free State are not included.

On Jan. 1, 1920, the rate was altered from 1*s*. for 100 words (night) or 75 words (day), with a copy rate of 2d., to 1*s*. for 80 words (night) or 60 words (day), with a copy rate of 3*d*.

TOTAL NUMBER OF WORDS CONTAINED IN PRESS TELEGRAMS ORIGINATING IN GREAT BRITAIN AND NORTHERN IRELAND DURING THE YEARS OCTOBER, 1921, TO SEPTEMBER, 1927 (PARTLY ESTIMATED).

Year.	No. of Words.
October, 1921—September, 1922	81,063,076
October, 1922—September, 1923	74,680,759
October, 1923—September, 1924	70,227,915
October, 1924—September, 1925	70,519,270
October, 1925—September, 1926	67,916,617
October, 1926—September, 1927	68,294,366

(To be continued.)

TELEPHONE DEVELOPMENT ASSOCIATION.

AT the Annual General Meeting of this Association, on Jan. 17 last, the Chairman, Sir Alexander Roger, in a speech dealing with the activities of his Association and the telephone development achieved by the Post Office, said:—

I am sure you will agree with me that this is a record of progress on which the Post Office, and all other administrations concerned, deserve the warm congratulation of the business community.

The old-established telephone truth—that the existence of facilities and of efficient service stimulates the demand and creates the necessary volume of traffic and, therefore, of revenue to justify the capital outlay involved—is holding good. I notice that the latest available statistics reveal the fact that during the six months to the end of September last there was an increase of 17.6% in the number of calls made to the Continent, and of 11.4% in the number of calls received from the Continent, in comparison with same period of 1926. Trunk business in this country has also shown a substantial increase.

There can be no doubt that this steady extension of facilities promotes an increase in the revenue received from telephone calls and, at the same time, calls for and justifies the bringing into service of additional new plant.

* * * *

The year has also seen the opening of London's first automatic exchange at Holborn, on which point, though in another capacity, I feel I should take this opportunity of saying a word. Automatics in this country are not new; they are working, with complete success, in over 60 provincial towns up and down the country. The opening of the first automatic exchange in London simply means that the experimental period is over and that the gigantic engineering undertaking of the conversion to automatics of London's vast, complicated, multi-exchanged area—a job which will take 15 years or so to complete—has been definitely and quite successfully initiated.

Already the same result which has regularly followed the introduction of automatic working in other districts and in other countries—an increase in the number of calls put through the exchange—is reported in the Holborn telephone area, and I am confident that this welcome phenomenon will be intensified as the work of conversion proceeds. . . .

It has become almost a tradition in this country to talk about the comparative operating efficiency of other countries' telephone systems to the disparagement of our own, but, in this case, you can in all moderation claim it as a tribute to British enterprise that the first installation in connexion with the conversion of the London telephone system to automatics has almost instantaneously attained such satisfactory results.

* * * *

My view is that telephone growth has only just started in this country, and that, so far from foreseeing any slowing down in the demand during the next few years, there will be a constant increase, especially if our hopes of more settled conditions, and, as a corollary, of increased national prosperity, are realised.

Nothing can stop telephone growth in this country. It is a snowball movement which gathers volume and momentum with the passage of time, but we must not leave our snowball to come to rest and slowly to thaw away to nothing. As we look back periodically over what has been done we get a better perpective of what still remains to be done, and, so far from being discouraged by the magnitude of our task, we get an incentive to tackle with renewed energy and determination the job of helping to make Great Britain a well-telephoned and a telephone-using nation.

SECRET AND CONFIDENTIAL.

[*This document was discovered by the office boy in the waste-paper basket of a minor official in a State-owned industry.*]

THE ANNUAL REPORT OF THE PERIVALE ON THE PEAK TELEPHONE DISTRICT.

DURING the year 1927, the characteristic feature of the decrepit telephone system in the Perivale on the Peak Telephone District was that of continued increase typical of all years since the war. We believe that our annual contribution towards the reduction of taxation for business men has not decreased, for the total number of calls rose from 11,491,000 to 12,426,000, a net increase of 8.4%. Our total number of stations rose from 18,296 at the close of 1926 to 20,750 on Dec. 31 last, an increase of 13.7%. This result was doubtless due to Providence, for, judging from the general depression in privately-owned enterprises, the year 1927 contained no features conducive to improved trade—certainly not in a State-owned industry. Concurrently with this feature, the decline in the number of written complaints (from 5.2 to 4.1 per 100,000 calls) shows that the temper of the British Public is improving. This unexpected result possibly arises from the improved health of the community as a result of partaking of the patent medicines advertised in the Press by public-spirited newspaper proprietors.

The Department, fearing a comparison between its mediocre programme of plant re-organisation when compared with the vast extensions and improvements to be seen in progress on other systems of communication such as railways and canals, decided to replace three large exchanges by more modern types of equipment. Slushton-on-the-Ditch now boasts of a C.B.1 exchange. Diddleton Doddering delights in the perennial amusement of twiddling its dials, whether calls to the new automatic exchange are required or not. Indeed, so pleased was the community to have its ten-year old exchange brought up-to-date that the preselectors were all selected on the date of opening. A paragraph in the local press, however, made invidious comparisons between the automatic exchange and the new station recently erected by the North and South Railway, replete with centrally-heated waiting rooms, seats with radiator foot-warmers, automatic ticket machines, and driverless trains. The Department may some day, it is hoped, equal even the railways. It should be mentioned that a new exchange with continuous all-night service, has recently been opened at Ludnows Ware. Apparently in this sole feature the State-owned telephones have succeeded in establishing a record, for when railway stations and newspaper stalls were being distributed, Ludnows Ware was overlooked.

Towards the close of the year unusual climatic conditions prevailed. The week preceding Christmas had its usual heavy load augmented by a total stoppage of privately-owned road transport. Even motor mails suffered slightly. The reaction upon the decrepit telephone system was severe. In place of the usual no-delay service to London the traffic which amounted to 50% above any previous known record, caused an hour's delay on most routes. Strangely enough, the subscribers preferred to telephone their business rather than use the excellent train service. Immediately on the frost came a snowstorm of severity unequalled since 1881, or the Norman Conquest, whichever is the remotest. The actual number of trunk lines dislocated in this district was 27, out of a total of 497. It is understood that 200 were dislocated throughout the country, so that one or two must have been left standing somewhere. The proportion of subscribers' lines affected was somewhat less. It was observed that the roads and railways were not materially affected.

Far more damage was caused by the gale that followed. Owing to the negligence of the Department, it has never sought statutory powers to stay other people's trees, and, as a result, 31 trunk lines came down in this district alone. It is not known what steps the Postmaster-General proposes to take to claim damages from the owners of the trees, but being an un-commercial concern, no doubt this source of revenue will be overlooked as usual. In London alone, as a result of the floods, 2,000 subscribers' lines were flooded, and it is not known what happened to the other half-million.

The collapse of the telephone service, scandalous in itself, is overshadowed by one even more despicable. It is learnt on good authority that engineers and traffic officers have been heard uttering mutual congratulations over the events of the last few weeks. It is to be feared that this must be regarded as an ineradicable habit amidst the servants of a State-owned industry.

Curiously enough, it has been stated that the newspaper service broke down in one or two places where there *were* bookstalls, but this is doubtless an exaggeration.

Among the many novelties introduced by the Engineering Department of the Post Office for the edification and amusement of the clerical force has been the Beam wireless. This was originally intended to provide a Brighter London, but trade depression in commercial concerns was so severe that the effort was diverted to less useful purpose. It is hoped that when the Department is taken over by those financial interests who state they want to make money out of it, the Beams will scintillate still more.

OBITUARY.

MR. D. B. HOWIESON, NEWCASTLE-ON-TYNE.

IT is with deep regret that we record the death of Mr. D. B. Howieson, Traffic Superintendent, Newcastle-on-Tyne, who passed away after a short illness on Dec. 14 last. His death came as a great shock to his many colleagues and friends in all parts of the country, and particularly in the Newcastle and Glasgow districts, with which he has been so closely associated during his official career.

Mr. Howieson commenced his service in Glasgow in the Telegraph Branch in 1891, being appointed an Exchange Manager on the Telephone side in 1911 and Traffic Superintendent at Newcastle on April 18, 1926.

Although only a comparatively short time with us at Newcastle, he endeared himself to everyone with whom he came in contact by his fine personality and his great fund of good humour. It was characteristic of Mr. Howieson that everything he undertook to do he did thoroughly, and in times of stress or in the midst of distracting problems he could be depended on to relieve the situation by an anecdote appropriate to the occasion.

The interment took place at Heaton Cemetery, Newcastle-on-Tyne, on Dec. 16, and amongst those members of the staff present to pay a last tribute of esteem and affection were Mr. C. Creighton, Postmaster-Surveyor, Mr. J. D. W. Stewart, District Manager, Mr. J. Thompson, Traffic Supt., Glasgow (representing the Glasgow District Telephone Staff), Mr. Wickham, Traffic Superintendent, Mr. Robson, Chief Clerk, Messrs. Andrews and Bellwood, Sectional Engineers, Mr. B. Todd, Superintendent, S.B., and Mr. Knox, Postmaster, Whitley Bay.

Amongst the many beautiful floral tributes were wreaths from the District Manager's Office, Local and Trunk Exchanges, and from colleagues in all sections of the Glasgow Telephone Service.

PHONE-PHOBIA.

WE quote the following paragraphs by Miss Dorothy Dickson, the famous actress, from one of Messrs. Lyons' tariffs, where it appears under "Lyons' Sports Sheet":—

I have often wondered why so many people who ordinarily seem to have the most patient and kindly natures, become perfect bears as soon as they pick up a telephone receiver. At the sight of a telephone it seems that all their patience deserts them. They proceed to bully the operator almost before she has had time to repeat the number; all the nastiness of which they are capable is poured out over the telephone. Again I ask, why?

I have studied these telephone fiends pretty carefully, and I have discovered that they are all bullies at heart, and like all bullies they are also cowards, who do not dare to show this ugly side of their natures to people whom they meet face to face. The telephone operator provides an excellent invisible target for their arrows of abuse. The telephone is the safety valve which helps them to be more or less pleasant in ordinary conversation. It is so easy to be unpleasant to a person who cannot see you being unpleasant!

The telephone is an excellent test of character. A person who goes quietly into a telephone box and speaks charmingly to another unseen person is truly possessed of the educated heart. The precious "please" and "thank you," the smile of greeting which nobody sees, the soft, pleasant voice which broadcasts happiness wherever it is heard—these are the priceless things of life that are worth cultivating in order to make our world just a little more harmonious.

When you pick up a telephone receiver make a practice of smiling. It will help you to wait happily and patiently even if the operator does appear to have gone to sleep! And an occasional "please"—even though it does seem superfluous to you who are paying for your calls—may help you to get a little better service.

THE WORKING OF THE INTERNATIONAL TELEPHONE SERVICE.

THERE was a very good attendance at the Institute of Electrical Engineers, Victoria Embankment, on the 16th ult., when Mr. H. G. Trayfoot, of the Telegraph and Telephone Traffic Section, Secretary's Office, G.P.O., read an interesting paper outlining the history and development of the Anglo-Continental from its one trunk circuit between London to Paris up to its world-wide extension possibilities made possible by long and short wave radio-telephony.

Very slow progress was made up to 1914, then came the war with its scientific advances as applied to grim uses, the armistice and the apparent stagnation for four or five years due to the shortage of material in all belligerent, and even non-belligerent countries, until in 1923 was held the Preliminary Technical Conference on European Telephony, the formation of the International Consultative Committee in 1924, and the happy suggestion and its acceptance by the International Telegraph Conference of 1925 to place the C.C.I. under the aegis of the latter but to give it a separate existence and organisation, with the result that since that day European telephone progress has been made to a degree that would have been incredible at any previous stage in its history.

Among those present in the audience were noticed Mr. Gill, to whom Europe owes so much of its present international telephone development, Mr. Erikson, allied in the same good work, our own Lt.-Col. A. G. Lee, so closely associated with Anglo-American wireless telephony progress, and also Col. Shreeve and Commander Latham, whose names need only to be mentioned in electrical circles for due homage to be paid them.

Unfortunately, before the Chairman had divined their united intentions, all five silently stole away, so that the pleasure of hearing their voices was denied to us.

In the regrettable absence of the Chairman, Mr. L. Simon, owing to pressure of official duties, one of the Society's Vice-Presidents, Mr. G. Morgan, C.B.E., ably filled the chair.

The subsequent speakers also proved particularly interesting in their remarks, Mr. M. C. Pink, Asst.-Controller Telephones, who voiced a general if pleasant discontent with the existing confusion arising from the initials I.C.C. and C.C.I., each standing for more than one meaning; Miss Cox, Superintendent Exchange Staff, who became reminiscent of the long-past day of the Trunk transfer to their legitimate home *and* staff and also of the day when she and others heard the guns booming over the London—Lille trunk; while Mr. W. J. Hilyer, of the International Standard Electric Corporation, also added materially to our general knowledge by his succinct remarks. Accord was complete regarding the excellent co-operation given and the excellent service rendered by the distinguished M. Valensi, Secrétaire-Général du Comité Consultatif International des Communications Teléphoniques á Grande Distance, on all and every occasion when the international committees met either on telephone or telegraph technical matters.

J. J. T.

ANGLO-HUNGARIAN TELEPHONE SERVICE.

THE Postmaster-General announces that, as from Wednesday, Feb. 1, the Anglo-Hungarian telephone service (already available from all parts of Great Britain to Budapest) will be extended to all parts of Hungary. The charges for a unit call (three minutes' duration) *to any place in Hungary* will be as follows :—

	Day. (8 a.m. to 9 p.m.)	*Night.* (9 p.m. to 8 a.m.)
	s. d.	*s. d.*
From 1st British Zone ...	15 6	9 3
„ 2nd „ „ ...	17 6	10 6
„ 3rd „ „ ...	19 0	11 6

The Zones are the same as in the other Anglo-Continental telephone services.

THE INSTITUTION OF POST OFFICE ELECTRICAL ENGINEERS.

BOOTH-BAUDOT AWARD.

THE Council wishes to call attention to the "Booth-Baudot Award" of £5 which is now offered annually for the best improvement in TELEGRAPH, TELEPHONE or WIRELESS APPARATUS or SYSTEMS. The award for the year 1927 is governed by the following conditions :—

1. The Award will be restricted to employees of the British Post Office.
2. Applications for the Award should be made between Jan. 1 and Mar. 31, 1928, and such applications should refer to improvements made, or suggested, during the twelve months ending Dec. 31, 1927.

   Attention is drawn to the fact that recipients of Awards via the Post Office Awards Scheme in respect to any improvement in telegraph, telephone or wireless apparatus or systems are eligible to apply for the Booth-Baudot Award in respect thereto.
3. The Award may be withheld at the discretion of the Council of the Institution of Post Office Electrical Engineers if, after full consideration of the applications received, the adjudicators appointed by the Council are of the opinion that no award is warranted.
4. Applications for the Award, accompanied by full details of the improvement, should be addressed to the Secretary, The Institution of Post Office Electrical Engineers, G.P.O. (Alder House), London, E.C.1.

R. V. HANSFORD,

December, 1927. *Secretary.*

THE C.T.O. PENSIONERS.

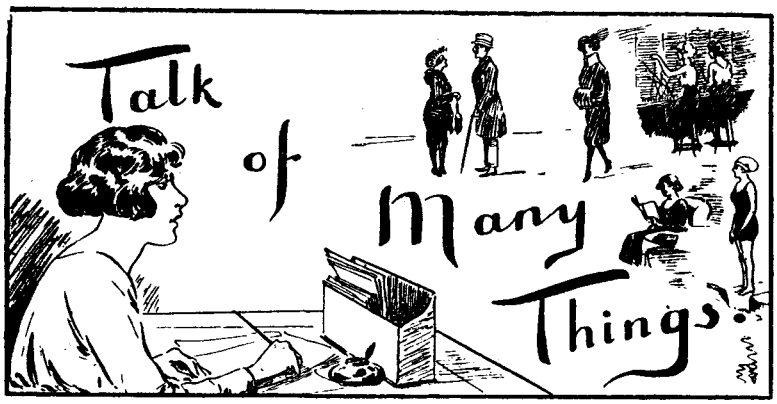
DESPITE the inroads made by Father Time upon the ranks of the Pensioned Ones, there was an increase of twelve in the attendance at the New Year's gathering held at the usual rendezvous at the Express Dairy's Bloomsbury premises on the 11th ult. In the absence of "Marshal Ney," who was unavoidably absent owing to building business at his riverside retreat, the chair was ably viced by Mr. E. L. Hilton, who has, it is understood, occupied a similar position on more than one previous occasion and in stormier times and conditions !

The arrangements were in the able hands of C.S.K., aided by that worthy and unobtrusive worker, H. Adams, who not only carefully checked the financial interests of the brotherhood, but collected the sum of 30*s.* for the flood victims from those present.

The names of those present will no doubt prove very interesting to both past and to many of the present members of the C.T.O. whose memories can take them back 5, 10, 15, or even nearly 20 years. There was actually an octogenarian at the gathering !

Messrs. W. W. Abrey, Geo. Adams, H. E. Adams, T. J. Allison, O. Arman, B. G. Askew, A. Bathurst, O. Bathurst, W. A. Batten, J. Bearman, H. E. P. Bell, G. T. Bennett, C. Bent, E. Bird, C. J. Boulton, H. J. Broughton, W. J. Callow, E. T. Chapman, H. W. Chapman, T. W. Charter, E. J. Clarke, H. C. Cook, J. H. Couldrey, J. H. Crook, H. G. Dicks, J. Downing, A. W. Edwards, O.B.E., J. S. Ellor, C. Elphick, H. W. Evans, F. Farnan, C. J. Faunch, F. J. I. Fischer, W. S. Fisher, E. Fulcher, F. J. Furby, R. A. Furness, P. Garrood, J. N. Geary, W. E. Gibbins, T. W. Gunter, W. Haggerty, F. W. Harrison, J. Havard, H. E. Higgins, E. L. Hilton, G. Janes, A. E. Johnson, D. W. Jones, A. W. Judd, C. S. Keen, R. E. Kemp, G. F. A. Lange, E. Lewis, C. R. Lowe, A. W. F. Ludlow, W. H. Marshall, F. W. Miles, C. J. Minors, J. Morgan, S. Morris, R. H. Mulock, F. J. Muller, M. Packham, W. Payne, S. Pearce, H. J. Penney, W. T. Picking, E. F. Poole, L. W. Powell, W. Plumer, H. W. Senhenn, J. H. Sherrington, S. J. Smith, W. J. Town, H. Trollope, C. J. Turner, W. Turner, W. J. Twyman, J. J. Tyrrell, E. A. Ward, J. H. A. Warran, W. A. Webster, A. C. Wheeler and R. Young.

WE TELEPHONISTS



The Telephone and the Cinema.

RECENT statistics show that the average person visits the cinema once every week and that a great number "go to the pictures" twice and three times a week. The influence of the films on the public for good or evil is tremendous and has been a subject of much comment and debate; for we are all affected by what we see, even though we may be unaware of its influence at the time.

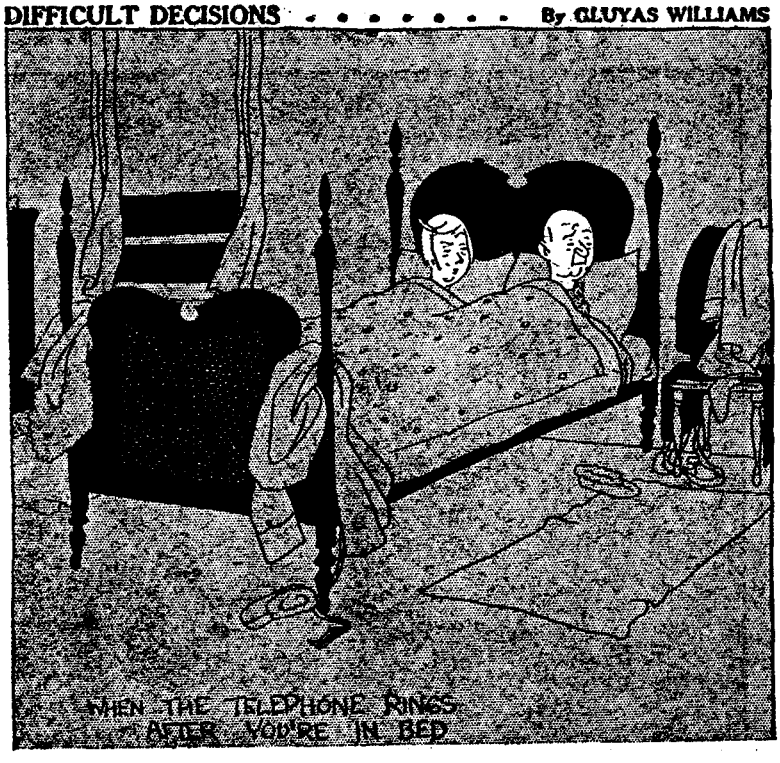
Now I have found from experience that in over 90 per cent. of screen romances the telephone plays an important part—a turn in the plot sometimes depending on its supposed use. "The Second Mrs. Fenway" is but one example out of many I could quote. Film producers find a place for a telephone (or two) everywhere—in a "movie" room we look for it as readily as for the door or table. I distinctly remember seeing one film in which the heroine considered it necessary to have her house so wired that she could telephone in her bath! and a bed telephone is quite common, of course. Office and boudoir, hotel and the cowboy's shack—they're all on the 'phone.

Mr. H. E. Powell-Jones was speaking a short time ago about persuading the public by means of advertising to acquire the telephone habit. There is probably no better spontaneous advertiser of the telephone than the photoplay, and one is tempted to believe that the great telephonic successes gained in America (the Big Home both of the telephone and the cinema) and in a lesser degree in our own country may be due in some small way to the prominence given to the telephone on the screen. For this large cinema-going public, imbued in some part with the same spirit which induces the youngsters to emulate Tom Mix by "acting as cowboys," becomes unconsciously familiar with the uses of the telephone. Thus, even though a business man in the humdrum of real life fails to observe the importance and indispensability of the telephone, yet once or more per week, by dint of an interesting story, the advantage of possessing a telephone is focussed on his undivided attention, and he is soon ripe for the canvasser.

Again, it rarely suits the purpose of the film producer to depict flaws in the use of the telephone—time is too precious and the story must proceed. As a result, film telephoning is somewhat Utopian. None of those hitches so inextricable from things human occur; no directories are ever consulted, there are no "number engaged" troubles and no delays; one merely touches the receiver and before a normal operator could say "Number, please?" one is through to the desired client (who is always in, of course). Trunk calls are made with the impassivity of an archangel. In fact, the way these film actors manipulate the instruments makes one wonder whether "automatics" are superfluous—all of which is very excellent advertising and gives the public a good impression.

However, in one particular we score over the Utopian telephony of the screen—we, in real life, make the instruments automatic, while reserving for ourselves the right to be human.

A. J. C., Preston.



[With acknowledgments to the "Evening Standard."

A.D. 1948.

And I saw in my dream a satisfied subscriber cheerfully awaiting the telephonist and chanting an old lay. And I caught the words "together" . . . . and "happy . . ."

M. CLAYTON.

A Telephone Romance.

(Continued.)

After they were "fully established" in their new home the bride suggested having a house warming, and as she had "Passed her efficiency test" at the "Local" "School" she volunteered to do the cooking herself.

The next morning she "Engaged" a maid at the "Registry" Office, who proved to be a "Civil Servant" but "Slow in clearing." From there she visited the market on a "Provisional" expedition, and here the surroundings struck an "Answering cord" in her memory, forming a "Connecting" link, for she had often been escorted here by her father in her childhood's days. After making "Special enquiry," she purchased a "Buff" "Orpington," which she was able to get at a "Reduced rate" (although the salesman said that it was on the "Top line" for birds), and as she did not ask for "Credit" she was given "Priority" and received "Preferential treatment." She would not allow them to send it home, although there was "No charge," but carried its "Buff form" in her arms. She felt very satisfied with her bargain, as her idea was not to "Break jack" (which was her pet name for her husband), for that would mean "Jack ending" his career. The next day she washed the "Blue print" covers, and later found that she had "No lines"; then "Had a faint recollection" of "Lending lines" to an "Adjacent" friend; when these were returned the maid, who was a close "Attendant," volunteered to "Hold the line"

[Photograph by W. T. Carter, Rochdale.

OPENING OF ROCHDALE NEW POST OFFICE.

The above group was taken at the opening of the new Post Office at Rochdale last summer. The following officers and others were present (left to right):—

1. J. M. SHACKLETON, Esq., Suptg. Engineer, N.W. District. 2. W. H. HICKSON, Esq., Town Clerk, Rochdale. 3. J. R. HEAPE, Esq., Rochdale. 4. A. R. MYERS, Esq., Chief Architect, H.M. Office of Works. 5. RANDAL BELL, Esq., Surveyor, N.W. District. 6. Lord DERBY. 6a (behind Lord Derby) R. B. RICHLEY, Esq., Clerk of Works. 7. H. WYCHERLEY, Esq., Deputy Mayor, Rochdale. 8. C. H. BRYNING, Esq., Mayor, Rochdale. 9. W. T. KELLY, Esq., M.P., Rochdale Borough. 10. T. HOWARTH, Esq., J.P. (Messrs. R. & T. Howarth, Contractors.) 11. W. CLARK, Mayor's attendant. 12. V. R. KENNY, Esq., M.B.E., Asst. Surveyor, N. W. District. 13. S. O. ALLEN, Esq., District Manager, N. W. District. 14. R. A. MOFFATT, Esq., Postmaster, Rochdale. 15. R. C. BALCOMBE, Esq., Sectional Engineer.

while the bride "*Pegged them*" with "*Plain white pegs*" and afterwards aired them on the "Fire line." Later in the day she was in a "Busy position" near the stove, her face a "Permanent glow." Here she had "All facilities" for cooking, and was anxious to make a good "Display." A "Hen-don" to a turn was used for soup, and after cooking the "Buff" "Orpington," she "finished" by making a "Current" tart.

As she had had a "Morning in" she thought she would like to "Lunch out," and on her return she rested during the "slack period" and then "changed" into her favourite dress (which she had "cut out" herself) namely "Red with a white dot" trimmed with a "Pouch" and "Finished" with a flowing "Panel"; she then did her hair in a beautiful "Wavy line."

About six o'clock "General Delay" from the "Canadian Service" arrived with a "Chattering relay" of friends. "General Post Office" arrived later and apologised for his "Late attendance," which he said was due to a "Traffic delay"; he added that he had to use an "Alternative route" and that he was further handicapped by his "Local knowledge" of the district being "Poor"; this the hostess had "No option" but to "Excuse" and then "Allotted" him a "Peg" to "Hang up" his "Service" "Cap."

The bridegroom, who arrived "keyless," had missed his "Connexion" and had had to run for a bus which he caught in a "Tick," but as he had always had a good "Running record" and had once broken the "All-London record" for "Speed" he was able to do this without effort; he then hurried home by a "Short circuit," but as the "Bell" was "Out of order" he could give no "Warning" of his arrival, and had to wait a long time before being "Answered."

The bride was just relating how, on the slippery day, she had gone from "Point to point" and eventually slipped down the "Wrong" "Area" and was treated by the "Medical Officer" for "Shock," when dinner was "Announced." The bridegroom, who had previously said that he would "Deal with" the bird himself, was "Allotted" the task of carving, but was at first "Unable to cope," this being due to "Poor manipulation"; he was also slow in "Tendering" the portions, so that each guest "Received"; a "Slow assignment."

At the "Termination" of the meal, the maid, "Using her initiative," and with "Discretion," "Challenged" the guests with, "Have you finished?" and then "Cleared."

Several presents were then presented to the happy "Couple," including a "Print," "White with black engraving," and a "Tin" of "Plug," which was the bridegroom's "Choice," and as he had always been a heavy smoker they felt that there would be no "Idle plug" left in the tin. After their "Prolonged call" the guests, after an "Exchange" of good wishes, departed, the majority to travel via "Willesden" "Junction" and the "Rest" to "Waterloo." We will now "Leave" the happy couple standing in "Tandem" beneath "Goffs Oak" (which was the scene of their first meeting) with a carpet of "Lee Green" beneath their feet and their faces turned to the "Western" sun; we trust that their affection will be "Retaining" and that they may "Speedwell," also that their way may be a "Purley" path up a "Primrose Hill," with no "Hayes" to cancel their happiness.

THE END.

D. D.

Sydenham Exchange.

A very successful Social was held on Jan. 3, 1928, at the Hamilton Hall, Forest Hill, in aid of the Exchange Library.

Mr. Townsend again obliged by acting as M.C., and his duties throughout the evening were somewhat arduous.

Our thanks are extended to Miss Bowley for her interest in the organisation of the Social.

Songs were well rendered by the Misses Cleave, Arnott, Jones and Whibley, while the violin and concertina solos were much appreciated. It was a matter for regret that time did not permit the audience to see more of Miss L. Brereton, whose exceptional talent was so well expressed in her solo dance. Thanks to the keen interest and enthusiasm displayed by the artists, the "Kirkdale Cronee's Revue" turned out to be a real success. The Chorus was trained by the Misses Picard and Brereton and the performance was very creditable. An amusing item of the Revue was the "Charladies Quartette," ably rendered by the Misses Arnott, Hammond, Bennett and Lock. Miss Whorwell took the part of "Mr. Matchmaker" in "The Registry Office" with ability, and each "applicant for marriage" acquitted herself well. The Sketch—"Travelling Abroad"—was successfully played, with the Misses Songhurst, Hammond and Bennett taking the chief parts, while "Teddy" and "Winifred" were splendidly portrayed by the Misses Lock and Payne. The parts of "Mr. and Mrs. Newlywed" were played with success by the Misses Dunton and Shingleton while those taking the parts of the French Customs Officers and the Swiss maid deserve special mention. Songs in French were sung by the Misses Mash and Jones, and Miss Huchin lent colour to the Sketch with her Oriental dance. We are indebted to outside friends for completing the "Strolling Players" quartette and we thank them for their assistance.

["*Belfast Telegraph*" *copyright.*

Mr. ALLAN MACLEAN,

Late District Manager, Belfast, notice of whose retirement, together with a short biographical sketch, appeared in our last issue.

A presentation of a book of Poems was made to the Producer, who afterwards thanked the artists for their splendid work.

We cannot too strongly emphasise our gratitude to Mrs. Brereton and Mrs. Lock for permitting rehearsals to take place at their homes. When one considers that the "Revue" comprised over thirty performers, the extent of our indebtedness can be realised.

We shall be glad again to welcome our many friends at a Dance and Whist Drive to be held on Feb. 7, 1928, and hope to record the same financial success as the Social has enabled us to do.

G. M. T.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), London, E.C.1.

BRIGHTON AUTOMATIC TRANSFER: VISITING THE SUBSCRIBERS.

BY GEO. H. CALCOTT, *Asst. Traffic Superintendent, Brighton.*

ONE of the most important jobs to be undertaken prior to an automatic transfer is the instructing of the subscribers; on it largely depends the success of the transfer from a traffic point of view, dialling troubles are reflected in unnecessary calls on the O levels.

As the Brighton transfer was a complete success both from the Engineering and Traffic points of view, it is thought that some details concerning the organisation for educating the public may be of help to those who are engaged in the preliminary work in other districts, incidently the humorous side may appeal to those not immediately concerned.

Unless redundant staff is available it is customary to recruit the prospective visiting officers from the Labour Exchange, and here it is possible to enlist the help of the Labour Exchange Manager, who is generally quite able and willing to make a preliminary selection, so that the Traffic Officer has only to sift out the best men. For this purpose, however, he will have to be like Pharoah of old, and "harden his heart," because it is impossible in a short interview always to do the right thing.

Having chosen the men the next step is to impart the requisite knowledge, and this does not present much difficulty as the standard instructions plus the experience of other districts can be drawn upon in order to draw up a set of instructions which any person of ordinary ability can understand.

Fortunately, in Brighton a large room was available (the old sorting office at the Head Post Office), in it were installed the various plans which the visiting officers would meet in the course of their visits.

The following synopsis of the lectures is given:—

PRELIMINARIES.

First Day.

(1) Name and address of each man.
(2) Signature to forms P. 10, P. 13.
(3) Insurance cards.
(4) Obtain signature for temporary pass cards.
(5) Conditions of employment.
(6) Hours of { duty 9 a.m. to 5 p.m.
{ training do.
(7) Afterwards 8.30 a.m. to 5 p.m. (1 hour for lunch).
(8) Dining Rooms at G.P.O. and North Road.
(9) Supply set of instructions to each man.
(10) Notebook, pencil, envelopes, &c., to each man.

NATURE AND OBJECT OF WORK.

(1)—(*a*) Its importance.
(*b*) Method of working.
(*c*) Supply instruction cards.
(*d*) Confirm directory particulars, &c.
(*e*) Compilation of data for various forms.
(2) Describe the present Telephone system in Brighton, contrast the new.
(3) Explain various telephone systems, i.e. magneto, C.B.S., C.B., and Automatic.
(4) Apparatus used by subscribers (exhibit).
(5) The various conventions used.
(6) Numbering scheme, why it is necessary to change numbers.
(7) Direct exchange line, the basis of the instruction—(*a*) pedestal, or (*b*) wall instrument—(exhibit the different types).
(8) The Dial, how it is used, contrast with former method of obtaining calls (exhibit Dial).
(9) The exchanges obtained by dialling, i.e. the automatic area.
(10) A straightforward call in the Automatic area, describe each operation in detail from the lifting of the receiver.
(11) Emphasise the importance of dialling the exchange required first.
(12) Points on which the caller must be clear.
(13) How a local call is charged.
(14) A straightforward call outside the automatic area, i.e. London, demonstrate and describe in detail.

(15) Flashing on trunk calls.
(16) How to obtain telegrams, describe and illustrate the method.
(17) How a fault or difficulty is reported.
(18) Enquiries regarding other P.O. services, accounting queries, &c.
(19) The difference between a straightforward call and a difficult call—
(*a*) engaged call;
(*b*) lines temporarily out of service;
(*c*) calls to spare numbers.

Second Day.

(1) Give a set of questions on previous day's work, correct and answer.
(2) Invite questions and answer.
(3) Visit demonstration set to hear tones.
(4) Examination of apparatus and practice. Each officer should have a thorough knowledge of preceding points before the next steps are taken.
(5) Exhibit direct line card, demonstrate how to insert telephone number.
(6) Instructions *re* fixing.
(7) Reports to be furnished.
(8) Explain each type of form and how to complete.

Third Day.

(1) Questions on previous day's work.
(2) The difference between the direct line and other installations.
(3) Auxiliary line.
(4) Installations wired to plan Nos.
(5) Describe in detail plan I.
(6) Emphasise the importance of listening for dialling tone.
(7) Describe in detail the cards to be exhibited at main and extension points.
(8) Plan I*a* difference between (other points in detail as for Plan I).
(9) Demonstrations of cards and all points covered, also practice on these installations.

Fourth Day.

(1) Questions on previous day's work.
(2) Various other plans in detail.
(3) The different cards to be exhibited and practice on all these installations.
(4) Combination of plans, i.e. plan 1 and 4, 5 and 7, &c.

Fifth Day.

HALL MULTI COIN BOXES.

(*a*) Mechanism.
(*b*) Different classes of calls.
(*c*) Notices.
Special instruction to be given in those cases where Hall boxes are wired to plan numbers.

Sixth Day.

RECAPITULATION.

(1) Go over every card again.
(2) Reports and office procedure.
(3) Queries.
(4) Dialling Tops.
(5) Directories.
(6) Rottingdean and Southwick now in local fee area.
(7) Extensions with coin boxes, i.e., other than Hall boxes.
(8) Draw attention to special arrangements at Rottingdean and Southwick.
(9) Final instruction as to duties for the following week.

(*To be continued.*)

LONDON TELEPHONE SERVICE NOTES.

Contract Branch.

THE amount of business done by the Contract Branch during the month of December was as follows:—

	Stations.
New business obtained	6,878
Ceasements	4,108
Net gain ...	2,770

During the year 1927 a net growth of 27,706 lines (8.9%) and 45,621 stations (8.8%) was realized in London.

Anyone who was interested in the unsolicited testimonial to the efficiency and courtesy of the service which we quoted last month may be interested in the following letter which was received just before Christmas:—

"In these days when one hears so much irresponsible talk of delays and discourtesy, &c., in connexion with the Telephone Service, I should like to send a word of personal thanks to you for your Department's *keenness* and *promptitude* in installing our two new exchange lines.

"You will be glad to know that this has been of considerable value and convenience to us, especially in view of the extremely busy season which we are now experiencing."

The Automobile Association required two additional lines to enable them to cope with reports as to the snow-blocked roads during the recent storm. The order was given on the Saturday forenoon and the work was completed the same day.

The South-East Contract Office has suffered a severe loss in the retirement of Mr. W. F. Hall, which took place on Jan. 4, and it is not too much to say that the loss will with difficulty be repaired. Mr. Hall entered the service of the National Telephone Company on Jan. 18, 1907, and had a varied experience in the City, South and South-East Contract Offices.

His colleagues bade him a formal farewell at a meeting on Dec. 30, when the District Contract Manager, in their name, presented him with a suitably engraved umbrella and a quantity of organ music in token of their esteem and regard for him. The Contract Manager, in making the presentation, referred to the very efficient manner in which Mr. Hall had performed his duties and to the regret everyone felt at his departure. He referred to the fact that Mr. Hall's name was almost invariably at the top of the list of orders obtained. It is interesting to note that the appreciation of Mr. Hall's services and personality came not only from his present colleagues but also from some who have now left the service.

Mr. Hall carried with him the best wishes of his colleagues for his future success.

* * * *

Post Office Sanatorium Society.

The second concert this winter organised by the L.T.S. was given at Benenden Sanatorium on Saturday, Jan. 14, to an appreciative audience of patients and staff of about 150. The artists were the Misses P. Pidgeon and M. M. Worth and Messrs. Hugh Williams, J. F. Hughes and T. Watler, with Mr. A. C. Vincent as accompanist. At the close of the concert, Dr. Spurrier, the medical officer, thanked the L.T.S. for organising the concert, and the artistes for their excellent performance, and emphasised the beneficial results such concerts have in brightening the lives of the patients, who naturally find the winter evenings tedious and irksome. Miss Worth, the secretary of the L.T.S. Constituency, suitably replied.

Three concerts in all are being given this winter, the expenses being defrayed by a "penny" collection amongst the staff, which realized over £35.

* * * *

Football.

Very little football was possible during the period just before and after Christmas. Frost and snow followed by rain, played havoc with the ground at Raynes Park, which for a time afforded splendid skating facilities, and later formed part of a vast lake. Subsequently the important Cup Tie announced for Jan. 7 was postponed.

A further disappointment was experienced the following Saturday when both teams were in attendance but the referee declared the ground unfit. It is doubtful if the match can be played there as the ground does not seem likely to recover for some time, and the match must be decided at an early date.

In view of the difficulties being experienced with the ground steps will have to be taken to obtain accommodation elsewhere, and it is almost certain that fresh quarters will be found for next season.

* * * *

Netball Competition.

Following the generous offer of a Cup by Miss J. Liddiard, the Sports Association have arranged a Netball Competition. Nineteen entries were received and the following teams meet in the First Round:—

Central *v.* Kensington	Rodney (A) *v.* Tandem.
A.R. 2 *v.* A.R. 3.	A.R. 7 *v.* Rodney (B).
A.R. 6 *v.* Riverside.	Trunk (A) *v.* A.N. & Address.
Croydon *v.* Thornton Heath.	A.R. 4 *v.* Avenue.
A.R. 1 *v.* Clerkenwell.	Trunk (B)—Bye.

The progress of the Competition will be reported in these notes.

THE

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CONTENTS.

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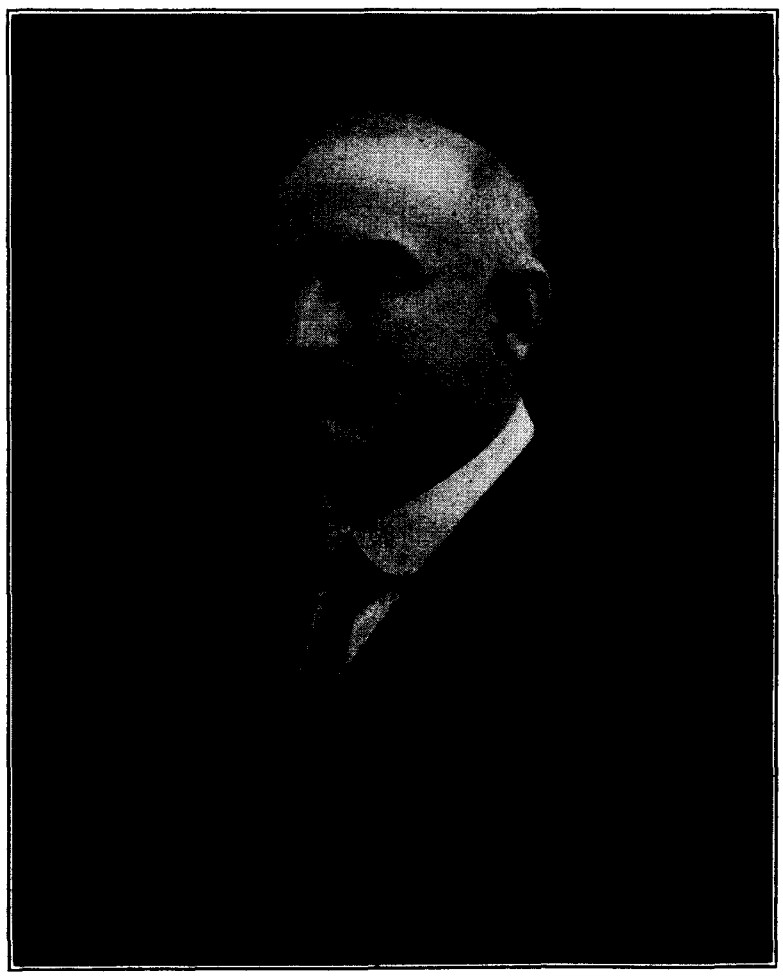
All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.*4.

TELEGRAPH AND TELEPHONE MEN AND WOMEN.

L.

MR. F. S. J. O'SHAUGHNESSY.



"Beam" wireless services are so much in the forefront at the present time that is is appropriate that the portrait this month should be that of Mr. F. S. J. O'Shaughnessy, Superintendent, Cable Room Establishment, Central Telegraph Office, who is particularly identified with the Beam Section of the Central Radio Office.

Mr. O'Shaughnessy, who is 55 years of age, has spent the whole of his official career in the Central Telegraph Office, and what he does not know about telegraph practice in general and international telegraph practice in particular is hardly worth knowing. He has been attached to the Central Radio Office since its inception and has seen it grow from small beginnings to the large organisation with a staff of 300 men which it is to-day.

During the past year, which saw the opening of Beam Services to Australia, India and South Africa, Mr. O'Shaughnessy's responsibilities have been particularly heavy, and the success of the new services has been due in no small measure to his organising ability. His burdens might have weighed heavily on any man, but fortunately he is gifted with a ready wit and a happy disposition which have carried him through the year and left him with undiminished vigour and zest to face further developments as they come along.

THE TRANSATLANTIC TELEPHONE SERVICE.

JOINT SESSION OF THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, AND THE INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK.

MANY readers of this Journal will have noticed in the daily Press recently a brief account of a joint session of the British Institution of Electrical Engineers in London and the American Institute of Electrical Engineers in New York, and may be interested in some further account of an event which must have brought a touch of romance even to the most habitual and blasé use of the telephone as a means of communication.

The American Institute had arranged to hear at its annual mid-winter meeting two papers on the transatlantic telephone service, and it was in connexion with these papers that the idea of a joint session by means of the radio link with the British Institution was developed. In London the Lecture Theatre of the I.E.E. was full to overflowing at 3 p.m. on Thursday, Feb. 16, when the proceedings opening with the first presentation of a most graphic film called "Voices across the Sea," depicting the progress of a call from San Francisco (Cal.) to Plymouth (Eng.). The film conveyed to the mind, in a way impossible by other means, a sense of the great distance covered by such a call (in this hypothetical case some 7,000 miles) and demonstrated clearly the steps involved in the connexion and, in particular, the differences in the paths of the incoming and outgoing speech, the former crossing the ocean from Rocky Point, Long Island to Cupar, Fifeshire, and the latter from Rugby to Houlton, Maine. No one interested in the romance of long-distance communication, or in the romance of human achievement, should fail to see this film when it is "released" for general public exhibition.

After the exhibition of the film, the two meetings were simultaneously addressed by the chosen speakers. In London, those in the lecture theatre heard all the addresses from a loudspeaker suitably situated, the British speakers using a transmitter placed in the Council Chamber, and in order to identify the speaker holding the meetings at the moment, and thus to dispel the natural doubt as to whether he was in London or in New York, his photograph was displayed on the screen during his remarks. In New York, the arrangements were exactly similar, loudspeakers in the auditorium of the Engineering Society's building conveying to the audience the words spoken in both London and New York.

At the commencement of the joint proceedings, Mr. Bancroft Gherardi, President of the American I.E.E., invited Mr. Archibald Page, as President of the older, British, I.E.E., to act as Chairman of the joint meeting. Mr. Page then spoke to both the meetings, predicting that the occasion would be long remembered by all present and would be quoted by succeeding generations of electrical engineers as marking an important milestone in the advancement of electrical science.

Mr. Gherardi followed with an address in which he referred to the steps in progress by which telephonic communication had grown from its crude beginnings to the wonderful event of the moment. Mr. Page then spoke again, in the name of the British Institution of Electrical Engineers, welcoming the advent of a means of communication which would assure closer and closer association between the English speaking races. Dr. F. B. Jewett, Vice-President of the American Telephone and Telegraph Company, following, spoke of the co-operation which had made this event possible.

Col. T. F. Purves then addressed the joint meeting, speaking of the wonder and romance of the occasion and of the great possibilities which it opened up for closer relationships between nations by the simple and natural medium of direct speech to a combined audience.

General J. J. Carty then proposed the following resolutions :—

"Whereas on this sixteenth day of February, 1928, the members of the Institution of Electrical Engineers assembled in London, and the members of the American Institute of Electrical Engineers assembled in New York, have held, through the instrumentality of the transatlantic telephone a joint meeting at which those in attendance in both cities were able to participate in the proceedings and hear all that was said, although the two gatherings were separated by the Atlantic Ocean ; and as this meeting, the first of its kind, has been rendered possible by engineering developments in the application of electricity to communication by telephone ; therefore ;

"Be it resolved that this meeting wishes to express its feelings of deep satisfaction that, by the electrical transmission of the spoken word, these two national societies have been brought together in this new form of International Assembly, which should prove to be a powerful agency in the increase of good will and understanding among the nations ;

"And be it further resolved that a record of this epoch-making event be inscribed in the minutes of each society."

These resolutions were seconded by Sir Oliver Lodge, and carried unanimously by each section of the meeting, which then adjourned.

So ended an event likely to become historic in the annals of telephonic progress, a first step opening up a vista of immense possibilities.

The whole of the arrangements passed off without a hitch, every word spoken in New York, even the applause of the audience there, being clearly heard by the meeting in London. It may be mentioned that this was the first occasion upon which a loudspeaker has been used for the reception of transatlantic speech in public.

W. C. G.

RETIREMENT OF MR. A. RAMSAY LAMB.

IT was with many regrets the Staff of the District Manager's Office, Chester, bade farewell to Mr. Lamb, who had been their District Manager for a period of 15 years and who retired on Jan. 31. The farewell function took the form of a Whist Drive and Dance, arranged by the Staff. Mr. G. W. Campbell, Contract Manager, acted as Chairman and Mr. A. Roberts, Staff, Officer, kindly undertook the duties of Host. In addition to the personal staff, several visitors were present, including Mr. Baillie (Surveyor, North Wales District), Mr. Gauntlett (District Manager, Liverpool), Mr. Urwin (Contract Manager, Liverpool), Mr. Calvert (Head Postmaster, Chester), Lt.-Col. Todd (Head Postmaster, Stoke-on-Trent), and the Head Postmasters from Conway, Whitchurch, Llandudno, and Wrexham.

Presentations were made to Mr. Lamb by Mr. Gauntlett on behalf of the District Managers, Mr. Calvert and Lt.-Col. Todd on behalf of the Head Postmasters in the North Wales Survey, each of whom paid high trubite to the kindliness and courtesy which had always been displayed to Head Postmasters throughout the district.

Mr. Baillie, the Surveyor, kindly made the presentation on behalf of the staff. In wishing Mr. Lamb happiness in his retirement, special reference was made to Mr. Lamb's career with the National Telephone Company and to the tremendous change which took place after that Company was absorbed into the Post Office.

Tribute was paid to the extraordinary way in which Mr. Lamb had adapted himself to the new requirements. All present then joined in singing "He's a Jolly good fellow."

In replying, Mr. Lamb spoke very feelingly of his association with the District Managers throughout the country, and with the Head Postmasters in the North Wales Survey. His remarks as to the kindly treatment received from Mr. Baillie and his thanks to the staff for their loyalty and help, will long be remembered by those present.

The presentations took the form of an electric standard reading lamp from the District Managers, a silver tray and delicate china coffee cups, &c. from the Head Postmasters, and a Chesterfield suite, solid silver salver and two Pouffes from the Staff. Mr. Lamb had previously received a silver coffee service from the Staff of the Surveyor's Office, Shrewsbury.

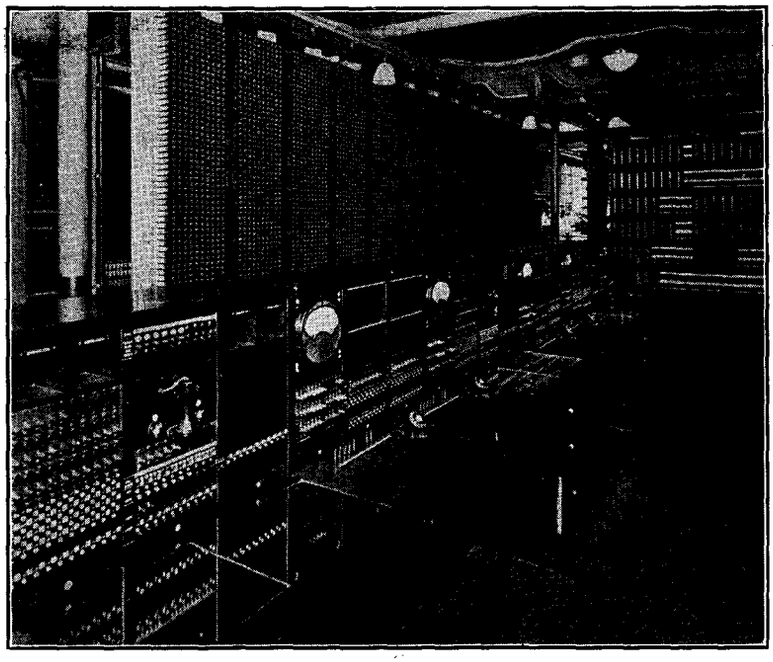
After the dance, the evening ended with the singing of "Auld Lang Syne."

CONVERSION OF NOTTINGHAM AREA TO AUTOMATIC WORKING.

NOTTINGHAM enjoys the distinction of figuring as the first English city in the 1928 Post Office programme of conversions from manual to automatic telephones. The work of construction and preparation has been in progress for some considerable time, and the inception of the automatic system marks another era in the history and development of a city already rich in historical and industrial archives. Chosen by the Danes for winter quarters in 868, Nottingham constituted one of their five burghs. William I erected a castle there, which was demolished in 1644 by Cromwell's orders after being held alternately by the conflicting forces during the Civil War. Parliaments were held at Nottingham in 1334, 1337, and 1357, and it was the scene of the conference of the judges with Richard II, in August 1387. Edward IV assembled his troops at Nottingham in 1461, and it was the headquarters of Richard III before the Battle of Bosworth, in 1485. In later years, Nottingham became the centre of the lace-making and cotton-hosiery industries, nearly all British laces being made there. It was in Nottingham that Richard Arkwright, in 1769, erected the first spinning frame ; it was here, also, that James Hargreaves sought sanctuary in 1768 and reconstructed his " Spinning Jenny " after its initial destruction by the mob at Blackburn.

Towards the close of the 18th and the beginning of the 19th centuries, Nottingham was, in fact, the theatre of contending forces arising out of the substitution of mechanism for slower manual processes, and witnessed the Luddite disturbances of 1811. The Luddites were bands of rioters organised for the purpose of destroying machinery, under the mistaken impression that it led to unemployment. The leader of these bands took the name of " General Ludd," and the riots began with the wanton destruction of stocking and lace frames, but ultimately gave way to severe repressive legislation. In a sense, therefore, the introduction of Strowger automatic telephones into Nottingham is a case of history repeating itself, although, in these more enlightened times we all recognise the benefits which mechanism confers upon the community, and there is no likelihood to-day of the resurrection of a " General Ludd."

With a population at the last census of some 263,000, the city calls for adequate telephone facilities, and the present scheme covers a multi-office Strowger Automatic Network, comprising the Central Exchange in George Street, and three satellite exchanges, Sherwood, Arkwright Street, and Basford, respectively.

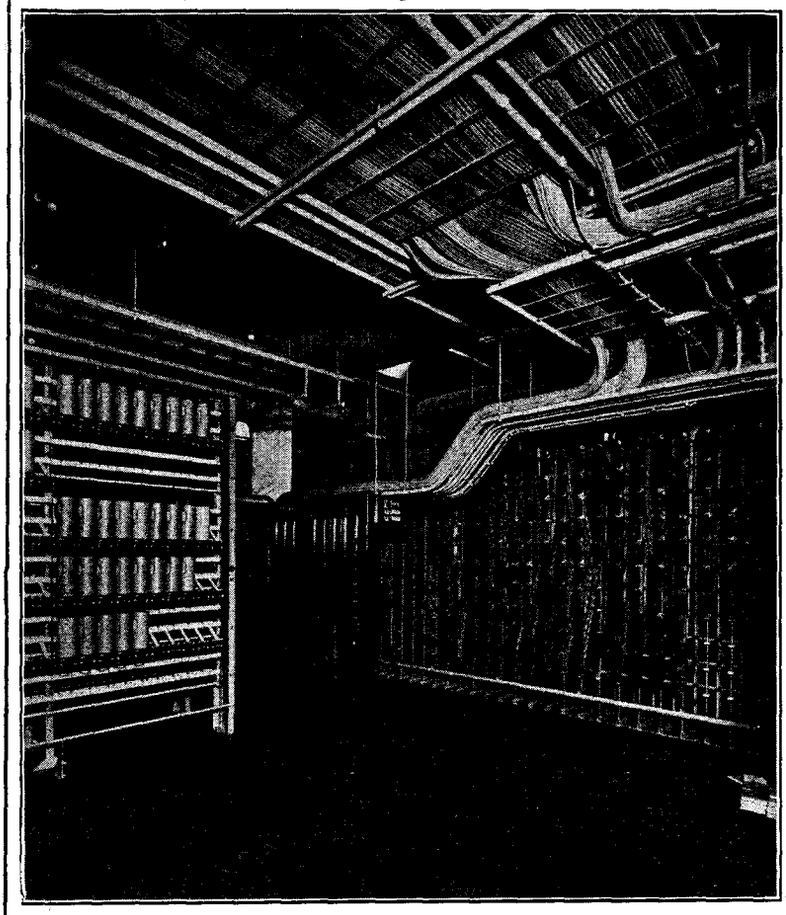


NOTTINGHAM CENTRAL EXCHANGE.—SUBSCRIBERS' METER RACK AND TEST DESKS.

The system is four and five digit, some subscribers having four-figure and others five-figure numbers allocated to them. The initial digits of subscribers associated with Nottingham Central Exchange are 2, 3, and 4, respectively ; whilst access to subscribers whose lines terminate in the satellite exchanges is obtained by dialling initial digits " 6 " for Sherwood, " 7 " for Basford, and " 8 " for Arkwright Street. In other words, the directory numbers of subscribers in these three areas commence with the digits mentioned.

The following numbers are allocated to special services :—

Trunk and Junction operators	"70"
Phonograms	" 90 "
Enquiries	" 91 "
Service Lines	" 92 "
Rural Party Lines	" 93 "
Records	" 94 "
Test Clerk	" 99 "



SELECTOR TRUNK BOARD, MANUAL FUSE BOARD AND INTERMEDIATE DISTRIBUTOR FRAME. (NOTE COMPLEX OVERHEAD CABLING IN RUNWAYS).

Operators at the following manual exchanges will dial-in direct to Nottingham automatic subscribers, but outgoing traffic will still be handled manually.

Beeston.	Carlton.	Arnold.
Bulwell.	Radcliffe.	Ruddington.

The manual operators at Nottingham are also provided with facilities for extending calls incoming to Nottingham automatic subscribers from outlying manual exchanges.

Nottingham Central Exchange is at present equipped for 7,500 lines, of which 1,170 serve private branch exchanges, whilst 150 are allocated to coin-box telephones.

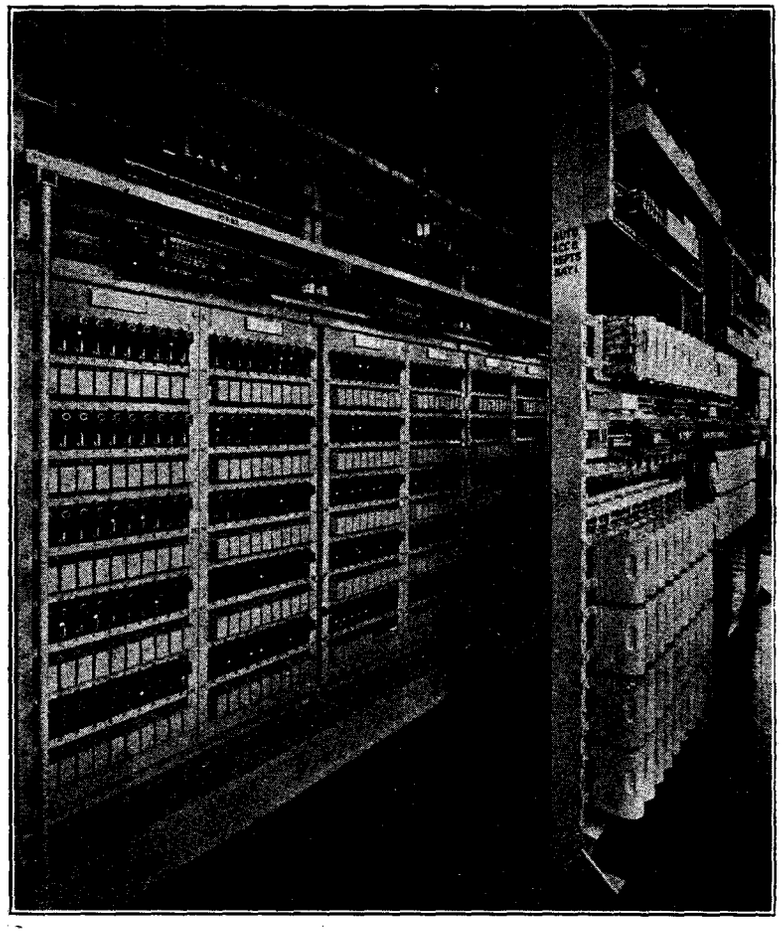
In addition to the necessary complement of lineswitch units, the Central equipment includes 12 trunk boards, accommodating the various group selectors.

The first group selectors at Nottingham Central Exchange serve both main and satellite exchanges, being concentrated at that point. Apart from lineswitch units, the switching equipment at the satellite exchanges is confined to second, third, and final group selectors.

The line switches at Nottingham main and satellite exchanges are of the " homing " type, being associated with the " graded " method of trunk distribution. Under this arrangement the wipers do not remain on the contacts corresponding with the trunk last used by that particular switch, but return to the " home " position whenever the calling subscriber replaces his receiver at the conclusion of a conversation. There are 25 sets of contacts in the " bank " of each homing lineswitch, one set constituting the home position and the remaining 24 being available as outlets to first-group selectors. On removal of the receiver by the calling subscriber, the homing lineswitch immediately searches the trunks outgoing to first selectors, in numerical order, commencing with No. 1. The advantages claimed for this principle of homing lineswitches, employed in conjunction with graded trunk distribution, are economy in switching equipment and more efficient trunking.

Of the three satellite exchanges, Arkwright Street has a present capacity of 1,500 lines and an ultimate, under existing arrangements of 2,000. The switchroom here is on the ground floor, and it is proposed at a later date to provide for further extension to an ultimate capacity of 3,400 by adding another floor to the accommodation already available.

Sherwood exchange is equipped for 2,000 lines, with provision for ultimate expansion to 3,200; whilst Basford serves 1,500 at present and aspires to 2,200 before its accommodation becomes unduly taxed.



SHERWOOD EXCHANGE.—LINESWITCH UNITS AND REPEATER RACK.

Each of the four exchanges is equipped with plant for furnishing the current necessary to operate the Strowger mechanism and energise the subscribers' telephones.

That at Nottingham Central comprises duplicate main storage batteries of Tudor Accumulator Co. manufacture. Each battery consists of 25 cells, arranged on single tier racks, the present capacity being 3,161 A.H. at the 9-hour rate. There is sufficient space in the lead-lined wood containers to increase this capacity to 5,640 A.H. in accordance with the growth of the exchange and the consequent increased demand for current.

Charging of these batteries is provided for by two motor-generator sets, furnished by Newton Bros., Derby. Each set comprises a protected type shunt-wound motor driven from the local 400 volts D.C. supply, direct-coupled to a shunt dynamo with provision for voltage regulation between 50 and 68 volts. The output is 900 amperes at 57 volts.

Current for ringing is furnished by one or other of duplicate ringing dynamotors, one of which, normally in service, is arranged to work off 200 volts D.C. supply, whilst the other, a stand-by machine, is wound to operate on current from the main exchange battery. In the event of failure of the city's electricity supply, ingenious automatic switching arrangements substitute one machine for the other and give warning of the failure, thus ensuring continuity of service.

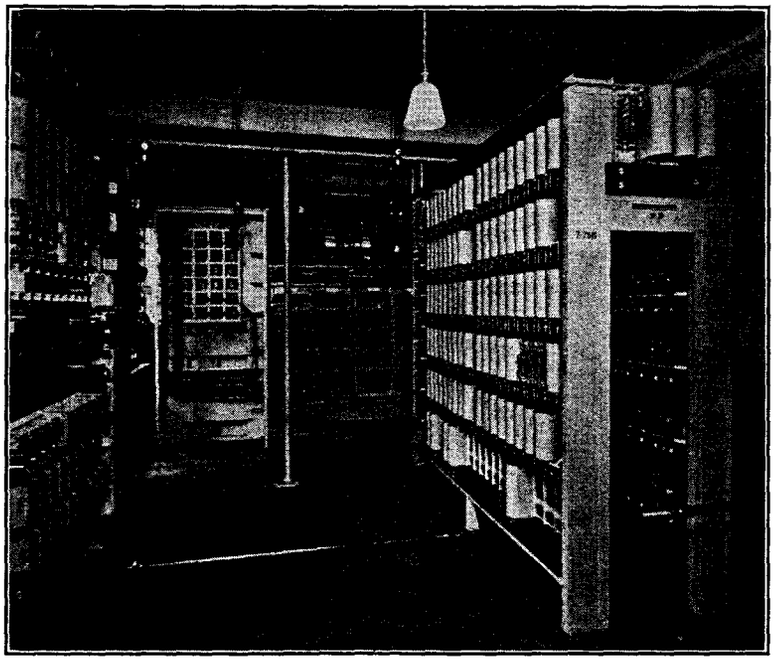
Control of the batteries and charging machines is concentrated on a three-panel power board which carries the necessary instruments and switchgear for this purpose. The motor-starting control gear comprises Brook Hirst pillars, embodying multiple lever-type starters with contractors; no-volt and overload release, and a D.P. slow-break isolating switch. Similar, though smaller power plants are installed at the satellite exchanges, Tudor batteries featuring in each. The charging machines, however, are by Cromptons of Chelmsford, and are only duplicated at Basford.

As with all other Strowger equipped automatic telephone exchanges on the Post Office system, those at Nottingham are furnished with very comprehensive supervisory equipment which, like the mechanism with which it is associated, is automatic in its action and simplifies maintenance to a routine standard. Broadly, the supervisory system, which varies in its application according to the particular section of the equipment with which it is associated, provides for giving visual, and in some cases, audible warning of an abnormal condition at any point in the exchange. All circuits terminate at the supervisory panel, and provision is made for classifying them as desired, into one of three grades of urgency—urgent, non-urgent, and non-audible. The two first-named are arranged to give both visual and audible warning by lighting warning lamps and ringing a bell, whilst the third grade light warning lamps only. This arrangement applies to both central and satellite exchanges, but in the case of the latter, which will frequently be unattended, there is a further provision for extending the supervisory circuits to Central exchange so that the whole Nottingham system may be supervised from that point when no local maintenance staff is on duty at the satellite exchanges. For this purpose the warning signals are classified into two grades only—urgent and non-urgent, the latter including the non-audible group.

It speaks volumes for the reliability of Strowger equipment and is a tribute to the efforts of those who have developed the system, that comparatively large exchanges, like the Nottingham satellites and corresponding sub-exchanges in other cities and towns, serving some thousands of subscribers, can be left to look after themselves for comparatively lengthy periods at week-ends and other times when a reduced staff is on duty, and without prejudicially affecting the service. As previously intimated, the supervisory circuits in such cases are extended to the Central exchange, and any abnormal condition arising locally during the absence of the staff is promptly and automatically recorded at the Central exchange, whence the position is handled, either by sending a man out to the exchange affected, or by instructing a local resident member of the staff to attend and do what is necessary, as indicated by the supervisory signals at Central. So thorough are the supervisory arrangements, that individual subscribers are seldom, if ever, aware that any abnormality has arisen, since it is dealt with long before it has time to affect them.

The only equipment individual to a subscriber, is his actual line to the exchange premises, the lineswitch on which it terminates, and the meter which records his calls.

Should any derangement occur in the intervening mechanism, such as the selectors which act as links between the calling and the called subscriber during the progress of a call, the act of momentarily restoring the receiver and re-dialling will pick up another normal switch in the group, which will extend the connexion in the usual way. Unless, therefore, his line is actually broken or deranged by storm or other unforeseen contingency, the subscriber served by this equipment is never likely to experience any dislocation of his telephone service.



BASFORD EXCHANGE.—REPEATER RACK, LINK FRAME, LINESWITCH UNITS AND SELECTOR TRUNK BOARD.

The whole of the automatic equipment for all four exchanges has been manufactured and installed to the order of the British Post Office by Automatic Telephone Manufacturing Company, Ltd., Strowger Works, Liverpool.

The grafting of an automatic system on to an existing manual network in a city the size of Nottingham, without interrupting the existing service, calls for the exercise of considerable engineering skill, and the Post Office Engineering Department is to be congratulated upon the satisfactory manner in which this revolutionary change has been brought about.

TELEGRAPHIC MEMORABILIA.

AUSTRALIA.—At the annual meeting of Amalgamated Wireless (Australasia), Ltd., Sir George Mason Allard, chairman of directors, said: "While the profits from the 'beam' service are not of anything like the exaggerated proportions that have been reported, I hope that the results of the full year's working will be found satisfactory. Difficulties at the Canadian end have caused delay in the opening of the Canadian 'beam' circuit, but these difficulties are now being overcome, and the opening of the service is expected in the near future."

Mr. R. W. Dalton, Senior Trade Commissioner in Australia, in his annual report to the Department of Overseas Trade, and reviewing the general conditions in the Commonwealth, made the very interesting declaration that there was an increase in the imports of telegraph and telephone cable, almost all of which imports came from the United Kingdom.

AUSTRIA.—*World Radio* states that owing to bad weather, the construction of the new Linz station has been seriously interrupted, through the subsidence of some of the walls upon which an additional storey was being erected. The apparatus for the new station has arrived from London, and it is hoped that the station will be ready for work by the middle of the present month.

The transformation of the Rosenhüegel station to a working capacity of 60 kw., and a nominal capacity of 200 kw., is proceeding rapidly, says the *Electrical Review*, and in a few weeks all will be ready. During the last few days of the change over it will be necessary for the Stubenring station to do all the work.

BELGIUM.—The United States Ambassador and M. Lippens, Minister of Railways and Communications, on Jan. 19, opened a wireless telephone service between Belgium and the United States. The experiment was highly successful, voices from America being heard with great clarity. The British and Belgian engineers who have carried out the work were warmly congratulated on the remarkable results achieved, says Reuter's Brussels Agency.

Communication was established via the Anglo-Continental cross-Channel submarine telephone cables and the British radio stations at Rugby and Cupar.

CANADA.—From Brandon, Manitoba, Reuter's Agency cables that Mr. Bracken, the Premier, promises that the Manitoba Government will erect a radio broadcasting station in that town, which will be the most powerful and up-to-date in Canada.

In a survey of engineering construction work in prospect for the current year in Canada, the *Times Engineering Supplement* states that the Bell Telephone Company of Canada alone intends to spend approximately $22,000,000 during 1928 on additions to plant.

"Wired-wireless," a system of communication which has hitherto been regarded as mainly applicable to relatively short-distance messages, is to be tried in Canada between Vancouver and Montreal, says the Canadian correspondent of the late *Westminster Gazette*.

At a cost of £500,000, the two cities are to be linked up by this new system, which is already proving a success between Montreal and Winnipeg, over a distance of 1,200 miles.

"Wired wireless," it may be added, is not exactly new to North America, as the system has been proved practicable in the United States over fairly lengthy distances.

CYPRUS.—The cable-laying vessel "Colonia" reached Haifa on Jan. 11 in connexion with the laying of cables between Port Said, Haifa and Cyprus on behalf of the Eastern Telegraph Company, says Reuter's Jerusalem correspondent. (See also under Palestine.)

CUBA.—A company has lately been formed in Havana, with the title La Compania Cubana Radio Telegrafica, to organise a wireless-telegraph service between Cuba and Spain.

CZECHO-SLOVAKIA.—The number of wireless subscribers at the end of last year exceeded 200,000. In 1925 the number increased to 18,000, says *World Radio*, and towards the end of 1926 reached 128,000. During 1927 the total passed 150,000.

EGYPT.—Further extensions of Marconi wireless telegraph services are announced. A direct high-speed duplex service was inaugurated between London and Constantinople on Jan. 1, and from Jan. 15 the Egyptian service hitherto operated by the British Post Office, as is now generally known, was operated by the Marconi Company in London and by the Marconi Radio Telegraph Company of Egypt in Cairo. The Abu Zabal station has been acquired by the latter company, and will in future be used only as a transmitting station, while a new receiving station has been constructed at Meadi, a few miles to the south of Cairo, in order to provide a high-speed duplex service in place of the present simplex service. Both the transmitting and receiving stations are connected by special landlines to a new central telegraph office in the city of Cairo, where all operating processes will be carried out. The transmitting equipment at Abu Zabal now comprises long-wave and short-wave transmitters and two additional transmitters for use with "beam" aerials which are in course of erection.

FRANCE.—Since the last issue of the *T. & T. Journal* the critical condition of the French Broadcasting stations has been considerably eased. The enforcement of a Decree Law which prohibits broadcasting by any private station has been modified, says the *Daily Telegraph*. The decree, signed by the Minister of Commerce in December, 1926, actually came into effect on Jan. 1, but the broadcasting companies were allowed one month's grace, which expired on Feb. 1, though in the case of the Radiola Company the period of grace was six months. All the other broadcasting stations were reminded by a Ministerial circular that their activities must cease until a new arrangement for the control of broadcasting had been elaborated. Urgent representations were made to M. Poincaré and to the Minister of Commerce, for relaxation of the strict provisions of the decree, pending examination by the Council of Ministers of new proposals for the regulation of broadcasting.

On Feb. 2 it was announced from the Ministry of Commerce that broadcasting might go on as usual pending further orders, since it had been decided that the matter was one which the Ministry of Commerce was not competent to settle, and must be dealt with by the Council of Ministers, and subsequently by Parliament.

Some time ago it was announced that the French Government contemplated the establishment of two or three high-power stations and eighteen lower power stations, and that broadcasting would become a State monopoly. But so far these schemes have not materialised. One big difficulty is that of finding the necessary money. There is only a nominal licence fee of 1 fr. (about 2*d*.) per annum at present, and even that has been found almost impossible to collect. For their revenues the French stations depend almost entirely on advertisements.

The new direct Western Union cable connecting Paris, Havre and New York was opened to traffic on Feb. 6, being the first cable between France and the United States which does not touch land at any intermediate point, whether in England or the Azores; it is the longest existing cable between Europe and America, measuring 3,750 miles. It was kept busy all day, and short message from Paris to New York were transmitted in the record time of 30 seconds, answers being obtained in three minutes; the distance between Paris and San Francisco was covered in five minutes—presumably with a clear line throughout. In any case, these additional cable facilities do not give the appearance of submarine telegraphy as a dying industry!

GREAT BRITAIN.—The following dividends have been declared in connexion with the Anglo-American Telegraph Company, Ltd. A final dividend of £1 10*s*. per cent. on the consolidated ordinary stock, making £3 15*s*. per cent.; final dividend of £1 10*s*. on the preferred stock, making £6 per cent.; and a first and final dividend of £1 10*s*. per cent. on the deferred shares, as for 1926.

The British Broadcasting Corporation is to develop simultaneous broadcasting from several stations of a single programme and transmission to the Empire by arranging for the retransmission in this country of items originating in foreign stations, and therefore is to establish land-line contact between a number of foreign stations and 2LO; the Vienna-Thanet cable has proved a satisfactory medium. It is understood, says the *Electrical Review*, that immediate co-operation is forthcoming abroad, and that the Union Internationale de Radiophonie has long fostered the idea of an exchange of programmes between different countries.

The Empire Conference on Empire Communications which the Postmaster-General announced in the House of Commons on Dec. 19, had been called by Great Britain, began on Jan. 16, and, according the *The Times*, was attended by the following:—

Great Britain.—Sir John Gilmour, M.P., Secretary of State for Scotland (chairman) and Mr. A. M. Samuel, M.P., Financial Secretary to the Treasury.

Canada.—Sir Campbell Stuart, Canadian representative on the Pacific Cable Board, with Mr. L. J. Gadoury, Deputy Postmaster-General for Canada, and Commander Edwards, Director of Canadian Radio Services, as his advisers.

Australia.—Mr. Clive Baillieu, with Mr. H. P. Brown, Director-General of Posts and Telegraphs, as his adviser.

New Zealand.—Sir James Parr, High Commissioner, with Mr. Milward as his adviser.

South Africa.—Mr. H. J. Lenton, Postmaster-General.

Irish Free State.—Mr. R. J. Cremins.

India.—Sir Atol Chatterjee with Mr. M. G. Simpson and Mr. P. J. Edmonds, as advisers.

Crown Colonies.—Sir Samuel Wilson, Permanent Under-Secretary of State for the Colonies.

Secretariat.—Secretary to Conference, Sir Norman Leslie (Committee of Imperial Defence). Asst. Secretaries: Mr. C. R. Price (Dominions Office) and Mr. H. G. G. Welch (G.P.O.).

Television, the unique monthly organ of the Television Society of England, Number One of which was issued this month, is a very safe indication that the newest science is coming into its own. Added to this may be cited the fact that component parts of the Baird apparatus are actually on sale at one of the largest of London's stores!

Telephone and Telegraph Services.—The Post Office's commercial accounts for the year ended Mar. 31, 1927, show that the surplus on the telephone service reached £283,375, against £550,830 in the previous year. The deficit on the telegraph service was £1,349,112, approximately £50,000 more than in 1925-26. The income from telegraph business was £4,777,295, a decrease of £61,582, and that from telephone business was £17,302,674, an increase of £1,365,123. The expenditure on both services amounted to £912,894, an

increase of £28,290, while depreciation thereon reached £4,664,225, some £525,692 more than in the previous year.

A correspondent of *The Times Engineering Supplement* in Geneva reports that in connexion with the advance of wireless in Switzerland, about 5,000 licences have been granted at Geneva, 6,000 at Lausanne, 16,000 at Berne, 32,000 at Zurich, and 3,000 at Basle. This development is likely to create a demand for large numbers of imported sets and accessories. British manufacturers should be able to profit accordingly.

HOLLAND.—Messrs. Philips Lamps, Ltd., announce that their short-wave station (PCJJ), recently rebuilt, is now transmitting every Tuesday and Thursday, from 18-21 hours, G.M.T., on a wavelength of 30.2 metres, as before.

This statement confirms the information given in these columns last month.

ICELAND.—Test transmissions started recently on a wavelength of 192 metres from a station erected at Akureyri, on the north coast of Iceland, by Mr. F. L. Hogg, a London engineer. The station has been subscribed for in this country and in the U.S.A., and is under the control of a representative of the Christian Missions In Many Lands. There is also a station at Reykjavik, the capital of Iceland. The new station's call signs are NI (North Iceland) and G2SH.

INDIA.—With reference to the "piracy" trouble in India, Reuter's Bombay Agency reports as follows :—

"The unsatisfactory financial position of broadcasting in India, which has aroused comment with regard to the extent to which "piracy" is being practised, is ascribed in the latest issue of the Broadcasting Company's organ to the Government's attitude towards "piracy" and also to its omission to take steps to enforce the laws regarding receiving licences. In this connexion the Posts and Telegraphs Department has recently inaugurated strict supervision of sets in Bombay City, which has revealed that a large percentage of listeners have no licences. While the authorities are reticent, it is understood that steps are being taken to ensure that all listeners in future shall take out licences. A commentary on this is furnished by the fact that over 600 applications for licences were received during three weeks in Bombay City alone, compared with fewer than 2,000 for the whole of British India to the end of October. It is believed that listeners up country are equally lax, and it is urged that dealers should insist on the production of a licence before selling a set.

ITALY.—The submarine telegraph cable of the Compagnia Italiana dei Vavi Telegrafici Sottomarini connecting Rome, Malaga, Las Palmas, St. Vincent, Rio de Janeiro, Montevideo and Buenos Aires, which was opened on Oct. 12, 1925, has recently been augmented by two new sections—a Rome to Barcelona cable and a Barcelona to Malaga cable.

A Royal Decree published in December last, says the *Electrical Review*, creates a new situation and reflects the decisions of the Commission for the Control and Development of the Broadcasting Service, which was appointed in January last year.

According to *World Radio*, the Unione Radiofonica Italiana, which has carried on the service since its beginning in 1924, has been converted into the "Ente Italiano per le Audizioni Radiofoniche" (E.I.A.R.), to whom the service has been exclusively entrusted, for the period of twenty-five years commencing Dec. 15, 1927.

The following items in the new arrangements are selected as likely to prove most interesting :—

The Unione Radiofonica Italiana (U.R.I.) undertakes to transform its organisation and to increase its present capital from lire 6,200,000 to lire 8,200,000. The new shares are being offered to the present shareholders and the wireless industry, to the wireless and electrical trades, to the Society of Authors, theatre proprietors, the Press, musical editors, and to radio listeners. Until Dec. 15, 1928, the capital of the company will have to be increased to lire 10,000,000. With a view to ensuring the Italian nationality of the new body, the shares are nominal, and they will be negotiable in Italy only. The ordinary revenue of the company will consist of the subscription fees and 90% of the taxes on sets and materials, the remaining 10% being for the benefit of the State. The Superior Committee of Supervision will be attached to the Ministry of Communication (Director-General of Posts and Telegraphs); it will consist of sixteen members (including the chairman), drawn from the trade, industrial, intellectual and juridicial circles, and will be all appointed by the Prime Minister. Special committees of supervision will be established in the Italian Mediterranean possessions, to which the decree is extended. Contrary to expectations, taxes on certain materials have not been abolished, but only partly modified, and new ones have been created. The tax of lire 6 on each valve (whether new or regenerated) remains, as does the tax of lire 12 on each crystal set, and lire 24 on each loudspeaker (even when built in the set); the tax of lire 36 on each valve set (not including the tax on the valves) has been abolished and instead of it an *ad valorem* tax of 2% on each valve set has been imposed, with a minimum of lire 30 (not including the tax on the valves). New taxes concern: headphones, lire 3 (single), lire 6 (double); variable condensers, lire 6; h.f. or l.f. transformers, lire 6; and multiple valves, lire 6; as many times as valves are contained in the multiple valve. For the purpose of controlling the payment of taxes by the public, radio dealers are compelled to keep inventory books, in which entries have to be made of the materials acquired and sold. The annual subscription fee to the broadcasting service has been reduced from lire 96 net to lire 72 net (with possibility of payment in monthly instalments). Schools, educational bodies, &c., are exempt from the obligation of subscription, as are military hospitals and military homes. The above-named subscription is, however, for particular persons only, and compulsory subscription will be applied to administrations of towns, with a minimum population of 1,000 inhabitants (lire 50 a year), there being fourteen categories between the minimum and the maximum. Another class taxed with the compulsory subscription comprises the hotels, thermal and hydrotherapic establishments, watering places, picture houses, kursaals, educational, cultural or sporting clubs, and associations, the fees varying from a maximum of lire 1,500 per annum (*de luxe* hotels), the group being divided into sixteen categories. The scheme foresees the substitution of the existing Rome station and the building of several new stations, to be opened in 1928, 1929, and 1930, respectively.

The *Daily News* Rome correspondent wires to the effect that an invention by Signor Manrico for ensuring the secrecy of wireless communications has been taken over by the Italian Government in "the interests of national defence" by a decree dated during the month of January last.

Naturally there is considerable reserve maintained as to the details of the invention, continues the correspondent, but it is stated to be based chiefly on a system of telegraphy and radio-telegraphy in combination with a special typewriter.

It is understood that the invention is based on the possibility of direct Hertzian waves at will which suggests some form of beam system.

Signor Compare was in London for some time, and has been experimenting also in Berlin. He has made recent experiments in the presence of the Italian Under-Secretary for War, Signor Cavalrelo.

MEMO.—There have been several systems of this species mooted during the last few years, especially the use of a permuting typewriter keyboard.—[*Ed., T. & T. Jl.*]

NORWAY.—The *Central News*, cabling recently from Oslo, asserts that Lars Christensen, who sent out the Norvegia expedition which occupied Bouvet Island in the icy wastes of the South Atlantic, and hoisted the Norwegian flag there on Dec. 1, has taken steps to erect a wireless meteorological station on the island.

The occupation of Bouvet Island by the expedition led to a curious dispute between the British and Norwegian Governments, both of which claimed possession, but there should be no dispute as to the value and importance of erecting a wireless station on the island. If conditions permit the station will work all the year round, and will thereby be able to give vital weather forecasts to South Africa, South America, and all navigation in that part of the Antarctic. Lars Christensen will cover all the cost of erection and the running of the station.

The Norwegian Broadcasting Company announces the paying number of listeners to have been 61,848 in December, 1927.

NORTHERN IRELAND.—The Western Union Telegraph Co. opened a new office in Belfast on Jan. 26, thus inaugurating a direct cable telegraph service between that city and New York.

PALESTINE.—The laying of a new cable to link Palestine with the submarine telegraph system of the world has been completed for traffic by the Eastern Telegraph Company. The cable connects Larnaka (Cyprus) and Haifa, and is the first submarine cable to be laid to Palestine. The Eastern Associated group is now at work on underground lines between Port Said and Suez, in order to bring about direct communication with India. By means of the "regenerator," complete automatic working is made possible, and the need for re-transmission eliminated. (See also under Cyprus.)

PERSIA.—Reuter cables from Teheran that the wireless experiments which have just been concluded between Angora (Turkey) and Teheran, having proved successful, the Ministry of Telegraphs has notified the public that messages can now be accepted for Angora by this means.

PHILIPPINES.—A wireless telegraph service between the Philippines and French Indo-China and the Kingdom of Siam was recently inaugurated by the Radio Corporation of the Philippines. Automatic transmission and reception gives direct communication between Manila and Saigon, says the *T. & T. Age*, while messages to Siam are sent via Saigon.

SOUTH AFRICA.—A chorus of praise has greeted the performance of England's short-wave Empire transmitter (5SW) at Chelmsford, says *World Radio*. Dr. J. Lunt, of Kenilworth (late member of the Royal Observatory staff, Cape Town, who was in England about a year ago), is acting as the pick-up station for the Cape Town broadcasters, and his co-operation is efficient. Signals fade after ten o'clock, although during the past month, it has been noticed that the fading hour is gradually lengthening.

. Cape Town's two radio inspectors have been very busy of late: ten prosecutions have been effected during two months in the Cape Peninsula, and about twenty others are to appear before the magistrates shortly. There are very few real "pirates" (listeners who have never taken out licences), the majority having been fined £2 for failing to renew their licences within 14 days of expiry, or notifying the P.M.G. that a permit is wanted to keep the set without using it.

SWEDEN.—From Stockholm we hear, through Reuter's Trade Service, that the Swedish Government has authorised the telegraph authorities to spend kr. 5,970,000 during the next year on the extension of the telegraph and telephone systems. A sum of kr. 1,900,000 will be used for telephone cables between Stockholm and Gaefle and Norrkoeping and Linkoeping, and kr. 3,350,000 for the continued construction of automatic telephone exchanges at Stockholm and Gothenburg.

Further information from the same source states that an expenditure of kr. 465,000 is also to be devoted to the "reinforcement" of the Gothenburg and Malmoe broadcasting stations, "during the next year," which latter term probably refers to the Swedish financial year. In any case the money appears to have been duly voted, and the following from *The Electrical Review* shows the extraordinarily successful condition of broadcasting in that country. Says the *Review* :—"Swedish broadcasting in 1927 yielded a net profit of about 600,000 Swedish kronor, against 400,000 kronor in the previous year, and there are not less than 53.6 radio sets per thousand inhabitants, according to an official report from the Royal Telegraph Administration, which claims that next comes England with 53.

"The figures for other European countries are: Denmark, 44.8, Austria 43, Germany 28.1, Norway 22.1, Switzerland 15.9, Czecho-Slovakia 15.2, Hungary 9, Finland 8.8 and Belgium 4.6. After deducting 6% interest on the capital invested by the Government in the broadcasting business, the net profit of the year means an increase of 150% since 1925."

SPAIN.—From Madrid it is cabled that the Spanish Trans-Radio Company has just been formed, with a capital of four million pesetas (about £143,000), which has been fully subscribed. This company, which has recently obtained a concession from the Spanish Government for a public international wireless service, comprises the National Spanish Wireless Company, the concessionary for all internal wireless services, which holds the rights in Spain for all Marconi patents; the Iberian A.E.G. Co., concessionary for the Telefunken Co.'s patents; and the Spanish Wireless Company, concessionary for the patents of the Compagnie Générale Francaise de T.S.F.

SWITZERLAND.—The Geneva correspondent of the London *Daily Telegraph*, writing from Geneva at the end of January (too late for publication in our last issue), says that the question of the erection of a League of Nations wireless station is still occupying the attention of an expert committee under the chairmanship of General Ferrie, Director of Military Radio-telegraphy in the French War Ministry.

The names of the full committee were given in last month's issue.

The correspondent in question makes it very clear that this wireless station would be established at the Secretariat of the League, and, in time of crisis, would enable urgent wireless communications to be carried on with the countries concerned, particularly European countries, and would at ordinary times be serviceable for the purpose of telegraphic correspondence connected with the League.

Such a wireless station would be under the entire control of the Secretariat of the League, and would be worked by officials of the League, independently of the Swiss Post Office or any other post office. The station would have a range covering at least the whole of Europe.

It would also appear to be necessary to re-emphasize the warning that this scheme for a "League" wireless station has nothing to do with any other demand, Press or public, for increased telegraph facilities between Geneva and London, which, it is understood, are receiving consideration in the appropriate quarters.

TANGIER.—A Franco-Spanish Conference has been sitting at Tangier, reports Reuter's agency, to examine the possibilities of linking Tangier up by telegraph and telephone lines with the French Moroccan zone. The lines would have to cross the Spanish zone, and two possible solutions have been worked out for submission to the two Governments: one is for a line along the Tangier-Fez road, and the other for a line on the Tangier-Rabat road via Larache.

U.S.A.—The lease of the high-power trans-oceanic radio station at Sayville, Long Island, by the Postal Telegraph Company, the Commercial Cable Company, and the newly-formed Mackay Radio Company is an important step in ship-to-shore communication to compete with the existing organisations. World-wide communication such as is planned will mean combination of cable and radio services, each supplementing, but not necessarily supplanting, the other. The transpacific radio link between San Francisco and Honolulu will be completed this summer, and by the end of the year a link will be established with the Philippines. Simultaneously the Atlantic radio service between the entire Eastern coast of America and ships will have been gradually built up, and with the completion of the Pacific wireless stations the Mackay companies with Sayville as their base will have commenced an Atlantic radio service in competition with the existing agencies, says the *Daily Telegraph*, but it is not known which countries the Commercial Cable Company intends to approach in pursuance of its scheme for a trans-atlantic wireless service. The station at Sayville, Long Island, was originally operated by the German Telefunken Company, which built it in 1912, its chief purpose being to communicate with the station at Nauen. On July 15, 1915, the U.S. Navy radio service took over the station.

The Federal Radio Commission opened its hearings on Jan. 17 on the need for long-distance broadcasting and telegraph transmission on short waves. Representatives of newspapers, press associations, telegraph companies, and the Government Department of Industries were present to claim short-wave allocations. Mr. Mackey, representative of the communication system, said it was desired during the next five years to establish short-wave point-to-point radio circuits between New York, Chicago, San Francisco, Galveston and elsewhere, co-ordinating with the present wires. The *New York Times* attorney said his newspaper desired to establish a station for Washington and the Pacific coast.

The first demonstration of broadcast radio television arranged by the Radio Corporation of America is reported to have been successfully carried out on Jan. 13, says the *Electrical Review*, before groups of engineers, scientists and newspaper men, who, standing before home television sets, saw moving images and heard voices of a man and woman transmitted from the General Electric Co.'s laboratories several miles distant. The pictures were so lifelike that smoke from a cigarette was transmitted as perfectly as on the screen. The receiving sets were installed in three different homes, and all functioned equally well. Transmission was on a 37.8-metre wave-length, while the voice was simultaneously transmitted on 379.5 metres.

The *Electrical Review* announces that the Radio Corporation of America has obtained from the Federal Radio Commission 16 licences for short-wave transatlantic communication, while three similar permits covering service to insular possessions in the Pacific have been issued to the Federal Telegraph Company, now owned by the Postal Telegraph-Cable Company. The adaptation of radio to commercial purposes through the use of short waves was considered by the Commission on Jan. 17 and 18.

Actual semi-public trials of television across the Atlantic have since been made by the Baird Television Development Company of London, with imperfect results, certainly, but sufficiently well-advanced to inspire confidence. In fact, "it was possible to see faces and hands and lips moving and to distinguish between a man and woman's face." This was one of the stages reached, it will be recalled, by Mr. Baird when working on his first experimental between the centre of London and one of its suburbs, and there appears to be little doubt that the arrival of motion pictures across the ocean is only a matter of time and that, according to Captain O. G. Hutchinson, Managing Director of the Television Company, not a very long period either. As reported by Reuter's Agency, the Captain announced that a two-way public television service between London and New York would be opened before the end of the year.

He said that a televisor similar to that used in his recent test was being completed and would be installed at some convenient point on Long Island, whence it would be connected to a transmitting station in New York.

An interesting article in the *T. & T. Age* explains, *inter alia*, that in 1920 the Institute of Radio Engineers and manufacturers co-operated with the National Fire Protection Association in working out rules governing radio installations. Rule 37 of the Code applies specifically to radio, and at the 1927 annual meeting of the Association the Article Committee on Rule 37 made some recommendations for changes probably to appear in the next edition of the Code, which is divided into two parts: one governs mainly the construction and mechanical support of the antenna, the earth (or counterpoise system) and protection of the system from heavy static accumulation and discharge due to lightning; the second part has to do with transmitting installations.

Six years' experience has led members of the Code Committee to believe that the addition of an earthing switch contributes nothing of advantage in the way of protection; in those cases of the switch having served to prevent damage, in most instances it was apparent that the arrestor employed was not of good design, was too small in dimensions, or was not constant and dependable in action. Arrestors are intended to discharge from line to ground any foreign current due to a potential exceeding the breakdown of the arrestor, say, 400 volts. The insulation resistance between the line and ground terminals, with d.c. of not less than 100 volts, should be not less than 100 megohms when dry and not under 10 megohms under service conditions, out of doors. A serious hazard is that the antenna may fall or swing into contact with high-voltage power wires; indeed, already much of the damage done has been due to just such happenings.

The Post Office Relief Fund quietly continues its good work and expended no less a sum than £36,000 during the past twelve months.

Inaugurated in 1914 it made itself responsible for all cases of need arising amongst the dependents of P.O. men called to the colours.

By 1919 over £440,000 was collected which made it possible for every P.O. case to receive assistance without going to any other fund and by so much relieving the financial strain elsewhere.

The total amount disbursed since 1914 amounts to £412,000, mainly in giving assistance to the 3,200 widows, 5,700 orphans and 1,500 other dependents of those who had lost their lives, numbering in all over nine thousand men.

At the present moment £15,000 annually is being spent on grants to widows and £20,000 per annum on secondary and technical education.

The expenditure is so framed that the Fund should become exhausted at the moment its liabilities cease. Three years ago it was feared that the assets might not be sufficient to carry through the work. A special appeal to the staff resulted in the collection of a further £15,000 and the position is now satisfactory. Practically all the work is voluntary and has been shared by every rank in the Department.

If any excuse were necessary for giving the above *resumé* of this amazing result of co-ordinating effort, it is to be found in the fact that so unostentatiously is the work carried on that there are actually scores of the post-war young men and women of the service who are unaware of what has been and is still being done.

That potent force in this organisation in its early stages, Mr. Arthur G. Ferard, of the Secretary's Office, since retired, must indeed look back with satisfaction at the way in which his many lieutenants of all grades throughout the country carried on the good work.

The C.T.O. 1927 collection for the Hospital Saturday and Sanatoria Funds amounted to £280.

The C.T.O. Benevolent Fund, however, needs more members in order to keep up its prestige in the Orphanage and other benevolent circles.

For "Draper" please read "Diaper" in the C.T.O. Inland promotions paragraph of last month's Memorabilia—and with apologies!

Further promotions in this department are the following: Mr. E. S. Pratt, Overseer, to Assistant Superintendent, and Messrs. C. C. Norris, W. H. Ward and W. R. Smith to the rank of Overseer, to whom sincere felicitations.

There is quite a galaxy of Cable Room names in front of me as having received appointments of a "provisional" nature, and all that one can do is to proffer the heartiest hopes that each "Provisional" will soon become "Substantive." The conditions in the Overseas Telegraphs must surely be absolutely without precedent, especially when one hears of three score and more recruits marching Londonward from the Provinces!

Since writing the preceding paragraph one notes with extreme satisfaction the confirmation of both Mr. F. A. Sleat's appointment as Asst. Supt., and that of Mr. A. M. Pearson as Overseer, on the Cable Room Establishment.

It is meet to record in these columns the much-regretted death of Professor H. A. Lorentz, F.R.S., which took place on the 4th ult. Born at Arnheim, Holland, in 1853, he took the degree of Doctor of Philosophy at Leyden in 1875 and has occupied the Chair of Mathematical Physics at the University of Leyden for nearly half a century.

Lorentz developed the electro-magnetic theory of light and laid the foundation upon which Einstein raised the theory of relativity. It was Lorentz who discovered that sun-spots were electric cyclones.

Telegraphic Optimism.—Sooner or later the telegraphs, and *not* the mails, will be the usual long-distance channel for but the most trivial communications.—The Empire Press Union.

J. J. T.

TELEPHONE PROGRESS REPORTS, 1927.

WE have received copies of the Annual Progress Reports for several districts. We regret that space does not permit us to publish more than the following brief extracts from these interesting documents:—

LONDON.

The outstanding events in the past year have been the opening of the first public automatic exchange in the inner London area and the establishment of a mechanical tandem junction exchange in connexion therewith; the inauguration of wireless telephone services to the United States and Canada; development of the telephone services to European countries, and the opening of an additional exchange to improve telephone communication between towns in the area served by the Toll Exchange. These items are referred to in more detail later in this report.

Holborn automatic exchange, which will ultimately accommodate 9,400 lines, was opened on Nov. 12, 1927, with the transfer of 4,820 lines from the Holborn manual exchange.

It will shortly have 500 lines transferred to it from other exchanges.

There are a number of novel features incorporated in the design of this exchange which have caused its erection and opening to be watched with great interest by the whole telephone world. One of the most important features is a piece of apparatus known as a "Director" which performs a number of functions, one of which is to direct telephone calls along various predetermined channels. From time to time it is necessary to vary these channels in order to improve the service and the "Director" may be set so as to comply with the varied requirements. The automatic apparatus will receive a call from a subscriber, select the required exchange, find a disengaged junction line to that exchange, test the called subscriber's line to ascertain if it is free, send out ringing current to the subscriber and transmit various signals to the calling subscriber, one of which indicates that the wanted subscriber is being rung, another that he is already engaged, or another that for some reason the subscriber is unobtainable.

The operations to be performed by subscribers on an automatic exchange when making a call differ from those required of subscribers on a manual exchange. In order to show subscribers the new methods, literature has been issued and visits paid to subscribers' premises. Notwithstanding these measures, many subscribers failed to appreciate the requirements at first, and this fact, coupled with the large number of calls out of curiosity during the first few days after the opening, threw a great strain upon the equipment and caused congestion. The subscribers are now getting accustomed to the new methods and the apparatus is performing its normal functions in a very satisfactory manner.

There are now 118 exchanges in the London Area (including Trunk, Tandem and Toll exchanges) as compared with 112 last year.

The number of exchange lines at the end of 1926 was 298,766. At the end of 1927 the number was 327,043, the net increase for the year being 28,277, or about 9.5%.

The proportion of residence lines is increasing considerably, and it is evident that the advantages of the telephone to suburban users are being more fully appreciated.

Private wires, which connect subscribers' offices without passing through a public exchange, now total 15,123.

The total number of telephones—exchange and private—at the end of 1925 was 519,969, and at the end of 1927 the number was 565,590. The rate of increase was thus about 8.8%.

The total number of manually operated private branch exchanges now installed in the London area is 24,250; an increase of 1,280 during the past year. There are also 121 private branch exchanges of the automatic type, as compared with 97 at the end of 1926.

The Department supplies telephonists where desired to staff private branch exchanges in subscribers' offices.

An appreciable amount of work is involved in the large number of removals from one address to another, and alterations to apparatus at the request of subscribers which are effected every year. Approximately 34,330 such cases were dealt with during the past year.

The number of call offices working at the end of 1926 was 4,686. At the end of 1927, the number was 5,076, the increase for the year being 390.

The number of kiosks open at the end of the year was 755. These kiosks provide day and night service.

The opening of Holborn exchange has already been mentioned. It is anticipated that early in 1928 Bishopsgate and Sloane automatic exchanges will be opened, to be followed during the year or early in 1929 by Western, Monument, Bermondsey, Maida Vale, Temple Bar, Langham and Edgware. Up to the present, 24 specifications have been issued covering the initial equipment for 133,000 exchange lines. The exchanges concerned will ultimately accommodate over 175,000 lines.

In addition, equipment studies for the purpose of specifications have been completed for 15 exchanges with a total capacity for over 58,000 lines initially, and 116,000 ultimately. Preliminary details have been settled for a further 34 exchanges.

In all, 73 exchanges are thus concerned, involving the ultimate provision for over half a million telephone subscribers.

LIVERPOOL AND DISTRICT.

New manual exchanges of the latest type have been provided at Huyton and Maghull, and new exchanges which are now under construction at Garston and Stockton Heath will be ready for service early this year. A site has been acquired for a new exchange building at Neston and a telephone exchange will also be opened shortly in connexion with a new exchange area to be formed at Norcott Brook, Cheshire.

A considerable extension has been made to the equipment at Wallasey, and equipments at Helsby, Rainford, Golborne and many other exchanges have been improved and increased. Additional equipment has been installed at Prescot, and arrangements have been made for providing additional equipment at St. Helens to meet requirements until the conversion to automatic working takes place in 1930.

During the year ended Sept. 30, 1927, 7,390 new telephones were fitted. After allowing for cessations this shows a net increase of 4,004, or approximately 6½%. The number of telephones increased from 34,910 in September, 1912, to 65,638 in September, 1927—a growth of 88% in 15 years.

The provision of additional underground cables to meet the demand for new subscribers' circuits is a continuous process and new services can be given within one or two weeks from the date of the order to proceed. Occasionally an isolated case of delay may arise, but happily these cases are rare, and can usually be attributed to causes which could not be foreseen.

In addition to the large number of cables which have been provided during the year for new subscribers' circuits, new main cables have been brought into use between Liverpool and Bootle, Waterloo, Crosby, Hightown, Formby, Old Swan and Huyton. New cables are to be provided in 1928 to Manchester, Huddersfield, Leeds, Colwyn Bay and Rhyl.

Several additional long-distance circuits from Liverpool and the surrounding areas to London and other important centres have been brought into use during the year by means of the various repeater stations associated with the main underground cable routes. Arrangements are in hand for providing telephone repeater apparatus at the Liverpool H.P.O. which will result in further improvements in the transmission on long-distance calls from the subscribers in the Liverpool district.

MANCHESTER AND DISTRICT.

During the twelve months ended December, 1927, the number of new telephones fitted is 9,162. After allowing for cessations 4,852 new stations were added, an increase of 6.23% on the December, 1926, figure. The number of telephones has increased from 32,946 in September, 1912, to 82,575 at December, 1927, a growth of 151% in 15 years.

The number of effective trunk calls and telegrams for the year ended December, 1927, is 6,218,106, being an increase of nearly 400,000 over the

corresponding period last year. The local calls for the year ended September, 1927 (the latest figure available), is approximately 61,000,000, an increase of 4,000,000 over the previous year.

Progress on the new telephone building in Chapel Street during the past year has been satisfactory and it is anticipated that it will be ready in October, 1928, for the installation of the advance manual switchboards required in connexion with the opening of the Ardwick, Collyhurst and Moss Side automatic exchanges. This equipment will take approximately 12 months to instal. The new exchange buildings for the Ardwick, Collyhurst and Moss Side areas, which will be the first in the Manchester area to be converted to automatic working, are also progressing satisfactorily and it is expected that they will be ready for the installation of the equipment by March, 1928. The present plans provide for the opening of the first unit of 10,000 lines, to be known as "Blackfriars," in the Chapel Street building in 1931. The conversion to automatic of many other parts of the Manchester area is also expected to be completed early in 1931. A considerable amount of underground work involving the laying of blocks of conduits or ducts, for the accommodation of cables has been necessary in connexion with the Manchester conversion scheme, and 120 miles of single duct have already been laid. Additional work at present in hand involves a further 100 miles of single duct and these include large nests along Deansgate (44 miles), Sackville Street (40 miles), and Pinmill Brow (16 miles).

A new exchange has been opened at Stalybridge, and extensions of existing equipment have been provided at 21 exchanges, including Wilmslow, Eccles, Bramhall, Heaton Moor, Pendleton and Rusholme. The supplementary equipment at Oldham is being increased to accommodate 840 additional lines.

During 1928 new exchange installations or extensions to existing equipment will be carried out at Disley, Irlam, Marple, Trafford Park, Stockport, Middleton, Chorlton, Sale, Leigh, Buxton and other exchanges. The automatic installation at Shaw will be opened early in 1928.

Schemes are in preparation for the provision of additional cables between Manchester and Rochdale, Ashton, Middleton, Heaton Moor, Macclesfield, Chinley, Preston, Chester, Stockport, Buxton, Liverpool and Leeds.

WEST YORKS DISTRICT.

During the year ended Dec. 31, 1927, a steady increase in the number of lines and stations has been maintained, the figures being as follows :—

	Lines.	*Stations.*
At Dec. 31, 1926	38,667	59,197
Added during 1927	5,055	7,972
At Dec. 31, 1927	40,817	62,483
Net gain (after allowing for cessations)	5.5%	5.5%
Trunk calls		5,615,929
Local and Junction Calls		38,456,222

There has been a marked increase during the year in the use made by subscribers of the facilities for telephoning telegrams from office or house to the Post Office.

Telegrams so passed by subscribers	1927 ...	430,325
	1926 ...	388,825
	Increase ...	10.6%

The time save by telephoning a telegram is appreciable and obvious.

During the year just concluded exchanges at several important towns in the West Yorkshire District have been transferred to more commodious premises either specially built or adapted. The towns concerned are Brighouse, Shipley, Dudley Hill, Low Moor, Halifax and Wakefield. At the two latter, the automatic system similar to that in operation at Leeds has been installed whilst at the remainder of the towns named central battery equipment has been provided. In connexion with the Wakefield automatic exchange a satellite exchange has been opened at Sandal, and another will be opened in the near future at Lofthouse Gate.

At Keighley, Armley and Hipperholme new buildings have been specially designed for the accommodation of automatic telephone equipment, the installation of which is already in progress.

At Sowerby Bridge the manual exchange will be converted to the automatic system in a few months time.

Additional exchanges at Aberford, Oakwood (Roundhay) and Kirkburton have been approved, and proposals are under consideration for exchanges to be installed at Kippax, Hunslet, Middleton and Adel, and for the transfer of existing exchanges to more suitable premises at Ossett, Morley and Rawdon. Of these exchanges, Oakwood, Middleton, Hunslet and Adel will be worked on the automatic system.

In the Bradford local telephone area negotiations are in hand for the acquisition of sites upon which to erect buildings for new automatic exchanges at Manningham, Great Horton, Laisterdyke and Undercliffe. It will be some time before these exchanges can be brought into use but when available they will not only relieve the present Bradford C.B. exchange, but also form a nucleus for the conversion of the Bradford telephone area to automatic working.

The development of the Leeds authomatic exchange, both as regards the steady increase of subscribers' lines and junction circuits, has made additional accommodation essential and this is being provided.

A BRIEF CHRONOLOGY FOR STUDENTS OF TELEGRAPHS, TELEPHONES AND POSTS.

BY HARRY G. SELLARS.

(*Continued from page* 106.)

1835 ... ... Steinheil produced a magneto-electric machine, and improved the telegraph of Gauss and Weber. His receiving apparatus in response to positive or negative currents produced dots on moving paper strips, or sounds on two bells of different tones. Steinheil may be said to be the father of printing and acoustic telegraphs.

James Henry Leigh Hunt, referring to the Admiralty telegraph, said: "Where the poor Archbishop sank down in horror at the sight of King Charles's execution, telegraphs now ply their dumb and far-seen discourses, like spirits in the guise of mechanism, and tell news of the spread of liberty and knowledge all over the world."

London divided into ten postal districts, each with a "Surveyor" in charge.

Death penalty for stealing letters abolished.

Rates of postage, London to York, 11*d.*; to Edinburgh, 13*d.*; to Dublin, 16*d.*; to Gibraltar, 34*d.*; to New York, 26*d.*; to Madrid, 23*d.*; to Rio de Janeiro, 32*d.*

1836, March ... Cooke, at Heidelberg, saw a pair of needles fitted up for signalling in the manner suggested by Ampere and Laplace.

1836, June 10 ... André Marie Ampère died.

De la Rue observed that copper deposited on the copper plate of a Daniell cell took the exact impression of the plate. He also produced a chloride of silver battery.

Cooke showed Faraday a needle apparatus he had constructed for exhibition to the directors of the Liverpool and Manchester Railway. He used three line wires, three needles, and an alphabet formed by alternate currents.

British Government allowed newspapers to pass free of charge through local penny posts.

Daniell devised a battery made up of copper, zinc, sulphate of copper and sulphuric acid.

Stamp duty on newspapers reduced to one penny.

Mr. Stow died, and, no new partners having been allowed to enter the Money Order Office business, Mr. Watts remained sole proprietor with a capital of £2,000.

Number of Money Orders issued—55,000.

1837, Jan. ... Packet Services transferred from the Post Office to the Admiralty.

1837, June 10 ... Cooke and Wheatstone patented a five-needle telegraph for which five wires were necessary.

1837, July 3 ... Mail carried from London to Birmingham by coach and thence by rail to Liverpool and Manchester.

1837, July 12 ... Act passed empowering the Postmaster-General to charge for registration of letters provided Post Office had no liability in cases of loss.

Professor Wheatstone proposed laying a cable from Dover to Calais to be worked by the needle apparatus introduced by Cooke and himself.

1837, July 25 ... Wheatstone, Cooke, Brunel and Stephenson proved the practicability of the five-needle telegraph by experiment between Euston and Camden Town on the London and Birmingham Railway.

Pouillet improved upon Schweigger's galvanometer and invented the "Sine" and "Tangent" galvanometers. Used as a standard the resistance of a measured column of mercury.

Charles J. Page, of Salem, Massachusetts, discovered that a faint click is heard when a bar of steel is magnetised or demagnetised. By rapid magnetisation and demagnetisation he obtained sounds which he called "galvanic music," and showed that the production of sound by electricity was possible by the transmission of currents in rapid succession round an electro-magnet.

1837, Sept. ... Morse, assisted by Gale and Alfred Vail, produced and exhibited in New York a telegraphic recording apparatus which indented marks of varying length on paper tape in response to electrical impulses received from a distance.

Brothers Highton devised a single needle telegraph apparatus and a key with two tappers which was used extensively by the Post Office.

Prof. Whewell defined "polarity" as "opposite properties in opposite directions, so exactly equal as to be capable of neutralising one another."

Faraday, unaware of Cavendish's researches, discovered specific inductive capacity, and measured its value in various substances. He also demonstrated with his "Ice Pail" that an induced charge is equal to the direct charge produced by contact with the inducing body, and coined the word "dielectric."

Volpicelli showed that vibrations produced electrification.

Erman drew up a list of metals which could be electrified by percussion.

Peclet found that the degree of electrification depended on the materials rubbed together and the velocity of movement.

Glover calculated the electrical resistance of various metals.

Bosanquet calculated the magnetic permeability of various metals.

Archibald Smith fixed the magnetic susceptibility of iron at 80 to 90 units.

Stoletow fixed the magnetic susceptibility of iron at 21 to 174 units.

Thalen fixed the magnetic susceptibility of iron at 32 to 44 units.

Forbes found that the resistance of iron increased if its temperature is raised.

Cumming discovered that the thermo-electric properties of iron and other metals were inverted when the circuit was heated above a certain temperature.

Kinnersley invented the Electric Air Thermometer to investigate the heating powers of an electric discharge.

Favre conducted experiments on the relation of the energy of an electric current to the heat it develops.

1837, Oct. ... London Electrical Society formed. President, William Sturgeon; Treasurer, John Peter Gassiot.

Johann Philipp Wagner invented the electro-magnetic hammer.

First steamer ("William Fawcett") employed in carrying mails to Spain and Portugal.

Rowland Hill published a pamphlet advocating postage at the rate of one penny for half an ounce. Messrs. Warburton and Wallace, members of the House of Commons, supported the proposal strongly.

Overland Mail Service to India established, Thomas Waghorn taking the mails across Egypt.

Postmaster-General empowered to hand letter bags to Masters of outward bound vessels who were bound to receive and deliver them.

Money Orders for Great Britain printed on large forms similar to those introduced for Ireland in 1827.

Rowland Hill suggested the use of adhesive postage stamps, and stamped covers. William Mulready, R.A., designed the earliest form of stamped envelopes. Adhesive stamps were issued in sheets which had to be divided by means of scissors.

Average postage on inland letters estimated at 8¾*d*. Postage between London and Edinburgh 1*s*. 1*d*. for a single sheet.

1838, Jan. 6 ... A sorting carriage (an adapted horse-box) ran experimentally between Birmingham and Liverpool. (Frederick Karstadt, son of a Post Office Surveyor, first suggested Travelling Post Offices.)

1838, Jan. ... Commissioners of the Post Office Enquiry recommended the establishment of a letter registration system with a fee of 2*d*. and a liability limit of £5.

1838, Mar. 31 ... Steamship "Sirius" left England for America with mails.

1838, June 19 ... Decided to make the Travelling Post Office a permanent institution.

1838, July ... Steinheil discovered accidentally that only one wire was necessary to effect communication, the earth being used to complete the circuit. He tried to use the railway lines between Nuremberg and Fürth as a telegraph circuit but failed to insulate them efficiently.

Cooke and Wheatstone installed the telegraph between Paddington and West Drayton and took out a patent for laying telegraph wires formed into a cable in iron piping.

1838, July ... Edward Davy, of London, invented a relay or, as he named it, the "Electrical Renewer," in which two needles responding to negative and positive currents, respectively, brought batteries into circuit and re-transmitted the signal. Davy also devised a "Chemical Recording Telegraph" in which the incoming signal caused a metallic point to come into contact with a strip of calico passing over a revolving copper cylinder. The calico being impregnated with Iodide of Potassium and Chloride of Lime, the received current set up chemical decomposition and a permanent mark was recorded.

(To be continued.)

PROMOTION OF MR. RODGER TO DISTRICT MANAGERSHIP, BELFAST.

AT a meeting of the West Yorkshire District Discussion Circle the opportunity was taken by the telephone staff and associated departments in the West Yorkshire District on Tuesday, December 20 last, to congratulate our Traffic Superintendent on his promotion to the rank of District Manager, Belfast. Mr. Rodger came to Leeds from Glasgow at the transfer, and during his stay took a leading part in social as well as official affairs.

Under his auspices the West Yorkshire Telephone Benevolent Fund and the West Yorkshire Telephones Discussion, Recreation and Social Circle were successfully launched. The fund created by the Benevolent Fund has done invaluable work to necessitous telephone and engineering officers both established and unestablished in the district, and much of the credit for its success is due to Mr. Rodger.

A presentation to Mr. and Mrs. Rodger on behalf of the officers of the West Yorkshire District, in the form of a cabinet gramophone, was made by the Postmaster-Surveyor (Mr. W. H. Hancock).

Mr. T. A. Bates (District Manager), who opened the proceedings was ably supported by Messrs. T. B. Johnson (Supt. Engineer), G. S. Wallace (Asst. Supt. Engineer). Messrs. Lawrence, Tate, Moseley (Exchange Supt. Leeds), and Midgley (Asst. Postmaster, Bradford) also spoke.

Amongst the large and representative gathering were Messrs. E. Francis, Sectional Engineer, F. C. Winter, Head Postmaster, Wakefield, A. Cameron, Head Postmaster, Keighley, and J. F. Hunter, Supt. Survey Branch.

After the presentation a short entertainment was given by the "Hello Girls," supported by Mr. G. McElvie who related a number of North Country jokes. The remainder of the evening was spent in dancing and in listening to short demonstrations on the gramophone.

PITMANS' DICTIONARY OF INDUSTRIAL ADMINISTRATION.

WE have received an advance copy of part I of this work which will be completed in about 30 fortnightly parts at 1*s*. 3*d*. monthly. It is a kind of encyclopaedia which will cover almost entirely new grounds, and contain articles of a constructive nature by experts on the varied problems which confront industry. Amongst the contents of the first number we notice articles on Accidents, Addressing, Administration, Advances to Industry, Apprenticeship, Benevolent Funds, Bonus Payments, which, perhaps, will give a good idea of the wide scope of the work. The Editor is Mr. John Lee, C.B.E., M.A., M.Com.Sc., who hardly needs any introduction to our readers. The distinguished list of contributors is too long to quote, but in it we notice the names of many Post Office men, such as Sir Henry Bunbury, Mr. G. F. Mansbridge, Dr. H. H. Bashford, Mr. C. M. Macdermott, Mr. G. T. Archibald, and Mr. J. J. Tyrrell.

We wish the venture the success which we feel sure it will obtain.

PROGRESS OF THE TELEPHONE SYSTEM.

THE following gives a brief review of the growth in the telephone system during the year 1927.

The total number of stations working in the Post Office system at Dec. 31, 1927, was 1,598,174 representing an increase of 121,174, or 8.2%, for the year. The figures for London, England and Wales (excluding London), Scotland and Northern Ireland separately are as follows :—

	Total No. of Stations. At Dec. 31, 1926.	At Dec. 31, 1927.	Increase.	Increase. %
London	519,969	565,590	45,621	8.8
England and Wales (excluding London)	800,016	865,634	65,618	8.2
Scotland	137,949	146,751	8,802	6.4
Northern Ireland	19,066	20,199	1,133	5.9

Residence rate installations at the end of December numbered 127,721 in London and 205,206 in the Provinces, the total, 332,927, representing an increase of 41,227, or 14.1%, for the year. The net increase in business exchange installations for the same period was 30,824, or 5.4%. At Dec. 31, 1927, the residence rate subscribers represented 35.6% of the total exchange subscribers.

The total number of call offices working at Dec. 31 last was 23,503, of which 5,069 were connected with London exchanges and 18,434 with Provincial exchanges. The increase for the year was 2,010, of which 1,480, or 74%, were Kiosk call offices. Kiosk call offices in the London telephone area numbered 733, and in the Provincial districts 3,463, as compared with 418 and 2,298 a year ago.

During the year 1927, 124 new rural exchanges were opened under the Rural Development Scheme of 1922, bringing the total number opened under the scheme up to 1,115. In addition, a further 46 exchanges were under construction at the end of the year.

The total number of exchanges working at Dec. 31, 1927, was 4,277, of which 2,810 serve rural areas.

Rural party line stations numbered 10,174, the net increase in 1927 being 216, or 2.2%. With the increased provision of exchanges in rural areas, the net demand for rural party line service is diminishing, owing to transfers to exclusive lines to the new rural exchanges.

The number of railway stations in rural areas connected with the telephone exchange system at Dec. 31, 1927, was 854, representing 923 telephone stations. The rural railway station circuits added during 1927 numbered 133, of which 115 were call office circuits with special facilities for inward calls to the railway company's officials.

The number of effective calls originated during 1927 is estimated at 1,151 millions, representing an increase of 79 millions, or 7.4% over the total for 1926.

At the time of going to press, complete results for 1927 in respect of trunk calls were not available ; but for the 12 months ended Nov. 30 the number of inland calls was 99,286,784, an increase of 7,201,285, or 7.8%, over the total for the corresponding period of the previous year. For the same period the number of outgoing international calls was 317,925, compared with 258,076 in the 12 months ended Nov. 30, 1926, an increase of 59,849, or 23%.

Further progress was made during the month of January with the development of the local exchange system. New exchanges opened included the following :—

PROVINCES—Lewes, Nottingham (automatic).

And among the more important exchanges extended were :—

LONDON—Epsom, Maryland, Sloane.

PROVINCES—Bangor, Boxmoor, Formby, Gt. Yarmouth, Higher Broughton, Hinckley, Knock, Maryhill, Mossley Hill, Nuneaton, Parkstone, Rhyl, St. Albans, Salisbury, Southampton (automatic), Sunbury, Whitefield, Whitstable.

During the month 70 new overhead trunk circuits were completed, and 76 additional circuits were provided by means of spare wires in underground cables.

WORLD-WIDE RADIO VIA RUGBY.

THE following is a copy with names omitted of an interesting report by the Traffic Branch of the Marconi Company. It speaks for itself.

During the course of the month I have handled six important radios for . . . . Company, and in each case the shipowners have expressed to me their satisfaction of the excellent service given. In regard to item (5) they think we really excelled ourselves, and I understand the receipt of such an early reply caused quite a stir in their office, and many very complimentary remarks were passed.

(1) 10/11/27 p.m. Message for s.s. . . . . *re* clearing tanks prior to dry-docking at San Pedro ; ship then probably 1,000 miles West of Peruvian Coast, bound San Pedro. [Message sent via Rugby—reply received via Talcahuana, Sunday 13th.]

(2) 10/11/27 p.m. Message for s.s. . . . . directing ship from Curacao to Tampico ; ship then 6 days out from Falmouth. [Message sent via Rugby—reply received next day via Pennland and Devizes.]

(3) 16/11/27 p.m. Message for s.s. . . . . *en route* Buenos Aires to San Pedro ; then about 1,200 miles West of Callao (Peru). [Messages sent via Rugby—reply received via Los Angeles, early morning 19th.]

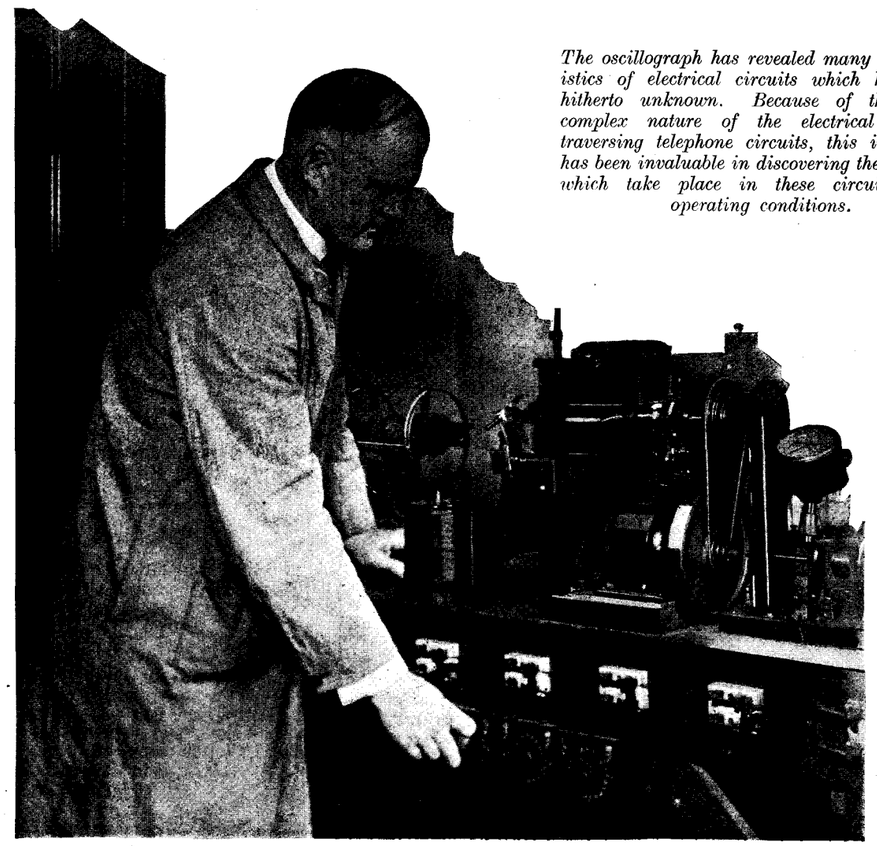
(4) 23/11/27 p.m. Message for s.s. . . . . diverting ship from Minatitlan (Mexican Gulf) to Curacao ; ship *en route* from Rio then about 400 miles North of Para. [Message sent via Rugby—reply received, early afternoon 24th.]

(5) 29/11/27 a.m. Message for s.s. . . . . diverting ship from Curacao to Minatitlan (Mexican Gulf) ; ship then about 36 hours off Curacao. [Message filed about 11.40 a.m., sent to Post Office, routed via Rugby—with note requesting inclusion in mid-day programme, urgent ; ; Message delivered and reply timed as filed, 13.30 GMT was received via Trinidad about 4.30 p.m.]

(6) 29/11/27 p.m. Message for s.s. . . . . diverting ship from San Pedro to San Francisco and other urgent instructions ; ship then about 1,200 miles West of Calloa. [Message sent via Rugby and reply received via Los Angeles, p.m. 30th.]

Where Strowger Automatic Leadership Begins—

The Research Laboratory



The oscillograph has revealed many characteristics of electrical circuits which have been hitherto unknown. Because of the highly complex nature of the electrical currents traversing telephone circuits, this instrument has been invaluable in discovering the reactions which take place in these circuits under operating conditions.

THE Research and Development Engineers of Automatic Electric Inc. use many sensitive and complex instruments which enable them to *know exactly* rather than to guess what occurs in any circuit. The oscillograph, for example, accurately records the reactions in an electrical circuit during any given period of time, even to the very smallest fraction of a second, by means of a sensitized film rotating at a high rate of speed, upon which are focussed several narrow beams of light which are controlled by current changes.

The development of Strowger Automatic telephone equipment to its present state of highly satisfactory and economical operation, has not been due to chance or guesswork. It is the result of detailed and scientific study by highly trained and experienced engineers, using the latest and best experimental equipment and methods known to the world of science. The reliability and efficiency which have become synonymous with the name Strowger have resulted from a consistent policy of development whereby new ideas are always subjected to the conservative judgment of long experience.

More Than 3,500,000 Strowger Automatic Telephones in Service or on Order Throughout the World

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STROWGER AUTOMATIC

The
Telegraph and Telephone Journal.

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Editing and Organising Committee - - - J. STUART JONES. W. D. SHARP. J. F. STIRLING. W. A. VALENTINE. J. W. WISSENDEN.

Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. XIV. MARCH, 1928. No. 156.

SHIPS THAT PASS IN THE NIGHT.

"SHIPS that pass in the night, and speak each other in passing,
Only a signal shewn, and a distant voice in the darkness.
So, on the ocean of life we pass and speak one another,
Only a look and a voice, then darkness again and silence."

Thus wrote Longfellow in those not far distant days when communication between ships at night was of the most casual kind, if indeed circumstances permitted any communications whatever, when even in daylight the range of communication was very limited.

It is no exaggeration to say that the shipowner lost touch with his galleons and their valuable cargoes as soon as they had left territorial waters, and that the possibilities of his getting a subsequent message from a passing ship were indeed remote. Lloyds services might give him information as regards the arrivals and departures from ports; but little, if any, other information reached him from the high seas. For these reasons the masters of ships were either bound to follow explicitly and without deviation their sailing instructions, or to exercise on behalf of the owner a very wide discretion as regards the disposal of cargoes and other germane matters. Either arrangement was not without its difficulties. For instance, a shipowner might have received information of vital importance to his interests—such as the existence of war or labour unrest at the port of destination—after a vessel left the home port, but he was unable to make practical use of it until he learnt of the arrival of the vessel at the port, when it was probably too late to act.

The term "Ships that pass in the night" thus had a real meaning in those days, but in the second quarter of the twentieth century Longfellow would probably have chosen other words to convey his meaning. The inspiration of Mr. Marconi has changed the whole state of affairs. Ships are no longer dependent for communications on daylight or on other passing vessels; they are in constant touch with one another, with their owners and with their ports of arrival and departure; and, perhaps, best of all, they can summon the nearest ships to their assistance in case of need.

The financial importance of the development of world-wide radio communication is considerable, and one important aspect of it—the power to divert a ship from one port to another without delay—can be realised by a study of the results of five messages given in another column. The saving of one day only in the travelling time of a big ship leads to a considerable economy in coal, wages, &c.; and although as a commercial proposition the expensive Rugby wireless station may not be returning a dividend to the Post Office, there is no doubt that a country like Great Britain, which depends almost entirely on its maritime activities for its raw materials and for marketing its manufactured goods, must derive much benefit, financial and otherwise, from a system which enables it to maintain constant control over all its many ventures on the high seas.

HIC ET UBIQUE.

WE congratulate our contemporary, *Electricity*, now nearly forty years old, on its new format. It is printed on excellent paper, profusely illustrated by really good blocks, and contains many novel features.

According to the *Manchester Guardian*, between 1916 and 1927 telephones installed in Winnipeg increased from 24,993 to 46,076, or nearly 100%. The population of the city is about 200,000. In Winnipeg there are almost exactly twice as many telephones in use as in the whole of the rest of the Province. Over 75% of the telephones are listed as "residence."

Statistics of the Greek Postal, Telegraph and Telephone Department show that there were 5,417 subscribers and 8,468 telephones in existence in Greece in 1926. The largest systems were Athens: Athens, with 1,800 subscribers; Salonika, with 700; and Piraeus, with 726. The Telegraph system consisted of 18,561 km. of line route and 47,989 km. of wire.

The *Daily Telegraph*, in a humorous leaderette entitled "What's in a Name?" rather misses the point of Mr. Corner's article in last month's *Journal*. It concludes:—

The Postmaster-General has thought it out, and dictionaries and encyclopædias, we are assured, were called in aid by his scholarly department. The glorious result is before us. Henceforth if men seek the neighbourhood of King's Cross, they shall ring up Terminus. It is a grand conception, the work of a master mind. Those who live in South Kensington shall now be set down as on Exhibition, and we feel already the warmth of their gratitude.

Hackney shall bear the name of Amherst, which must have cost the Postmaster-General profound research. A region of Clapham may well be content in its connexion with the most illustrious of the Clapham school, Macaulay. Whether the Tories of Cricklewood will like to be sealed of the tribe of Gladstone we are not so sure. The Postmaster-General forgets his first principles. Shall Cricklewood have no susceptibilities ?

If the Post Office had only to consider local susceptibilities, euphony, and freedom from unpleasant associations in the selection of names for London exchanges, the task would be simple. But in addition, and first of all, the name must not have the same numerical equivalent of any other name of an exchange within 10 miles of Oxford Circus. Secondly, it must be phonetically satisfactory, from a transmission point of view. Mitcham may be an excellent name for an exchange in the Mitcham district, euphonious, grateful to local susceptibilities, geographically apt and so forth, but if it be found in practice to be frequently confused with " Richmond," for example, it has to be ruled out.

According to *Telegraphen Praxis*, the number of wireless subscribers in Germany had surpassed two millions in the middle of last December.

A further extension of the Transatlantic Telephone Service to the Continent of Europe was made on Feb. 10, when service was opened between the United States and Cuba on the one hand and Berlin, Frankfurt and Hamburg on the other hand. The quality of speech was excellent. The Chancellor of the Reich spoke to the Acting Secretary of State in Washington, who also exchanged greetings with the United States Ambassador in Berlin. The German Postmaster-General also spoke to the German Ambassador in Washington, expressing the hope that the new telephone facilities would tend to bind together the three peoples of Germany, England and the United States. A number of commercial calls followed.

Conversation to America from Germany passes over the Anglo-Continental cables to the London Trunk Exchange and thence by land line to the Rugby Wireless Station. Speech from the United States to Europe is received by wireless at Cupar, in Scotland, passes by land lines to the London Trunk Exchange, and thence via the sea cables.

Service between the United States and towns in Holland was opened at the end of January, whilst, on Feb. 20, the trans-atlantic service was extended to Stockholm, in Sweden.

The French Administration, who have adopted the Rotary system for the conversion of the Paris telephone area to automatic working, expect to put the " Carnot " exchange in service during this year, followed by the Gobelins, Diderot, Vaugirard, and Toudaine exchanges. Automatic working is already in force at Nice, Orleans, Le Havre, Vichy, Montpellier, Reims, Nantes, Marseilles (Colbert exchange). It will be shortly in service at Bordeaux, Troyes, Marseilles (Dragon exchange), and Lyons (Franklin and Burdeau exchanges).

Subscribers' complaints sometimes take the form of humorous efforts. The following letter was recently received by a District Manager from a subscriber in the Provinces :—

Dear Sir,

You remember Harry Tate's motor-car scene at the Empire :—

Harry Tate struggles with the car for half an hour, all to no purpose. The following dialogue ensues :—

His Little Boy : " I know what's the matter with the car, papa."

Harry : " What is it, my son ? "

Little Boy (in Cockney twang) : " It won't go ! "

We know what was the matter with our 'phone yesterday—

" It didn't go, puppah."

" We know what's the matter with it to-day ?—It won't go ! "

" We know what will be wrong with the telephone to-morrow, puppah."

" What will be the matter, my son ? "—" It won't go ! ! "

" Will our telephone ever be right, puppah ? "

" I am afraid not for long, my son."

" Do you pay money for the telephone whether it is right or wrong ? "

" I am afraid I have to, my son."

" Why don't you tell the telephone people what you think of them ? "

" I will, my son."

Yours faithfully.

It may be observed that there was no fault on the subscriber's line at the time the complaint was made. He was trying to get the exchange from his home extension whilst the circuit was switched through to his office.

A Somerset subscriber wrote to his District Manager :—

" A Bath call is now a complete wash-out."

But what did he expect ? He should have put in a call for Willoughby Waterless (Leicestershire) or Stoke Dry (Rutland).

THE WORKING OF THE INTERNATIONAL TELEPHONE SERVICES.*

BY H. G. TRAYFOOT.

THE advance of technical knowledge during the present century has enormously increased the range of long-distance telephony. Not only has transmission vastly improved but communication has become more stable.

This improvement has been brought about in the main by the loading of telephone circuits and by the perfection and use of the thermionic amplifier in telephone repeaters associated first with aerial wires and later with wires in underground cables. More recently wireless telephony has still further extended the range.

Until the introduction of the telephone repeater, progress in international telephonic communication was relatively slow. It was carried on almost entirely by means of overhead circuits subject to more or less frequent interruption. Efficient maintenance was moreover by no means an easy matter in the absence of any form of unified control of the testing staff.

The telephone service between England and the Continent was inaugurated in April, 1891, when two circuits were brought into use between London and Paris, and communication with Belgium was opened in 1903 with two London-Brussels circuits. At the outbreak of war, 23 years after the commencement of the Anglo-Continental service, there were but 13 circuits in operation and they carried about 1,000 calls a day.

It was during the war that the application of the telephone repeater to practical working was developed. Thermionic repeaters were apparently first used commercially in 1914 in connexion with an overhead line between New York and Chicago, and the further development of this apparatus enabled the American Telephone & Telegraph Company to open a commercial service between New York and San Francisco, a distance of 3,400 miles, in January, 1915.

The application of telephone repeaters to cables was also made early in 1915, repeaters being installed in Philadelphia on a New York-Washington circuit, 220 miles in length.

The telephone repeater was used on an extensive scale by both sides during the war. Mr. Höpfner, of the German Administration, has stated that by the use of repeaters it was possible to maintain communication between Berlin and Constantinople as well as with the German Headquarters in Macedonia, Roumania and Russia, and that 100 repeaters were used for these services. By similar means communication was maintained between the allied headquarters in France and Italy.

* Paper read before the Post Office Telephone and Telegraph Society of London.

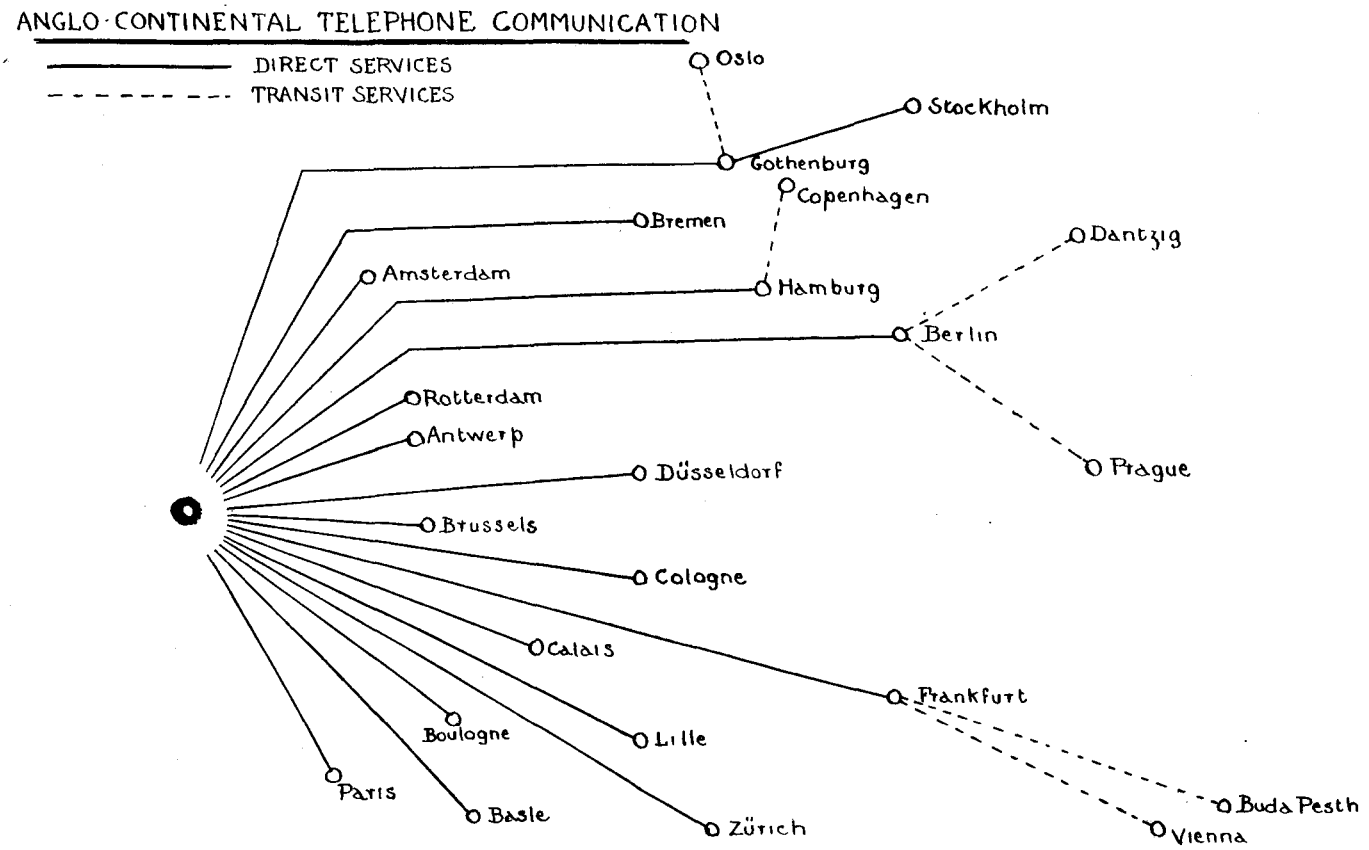


DIAGRAM A.

Our own engineers made effective use of repeaters in the internal services of Great Britain during the war, more particularly after the destruction of the overhead lines during the great storm of March, 1916, when, by the application of repeaters to existing underground plant, communication was maintained at a critical time between London and the military headquarters in the north of England and Scotland.

To those who possessed full knowledge of these developments the possibility of a vast expansion of international services was apparent.

But for several years after the war the energies of all the European countries were engaged in the difficult task of providing a sufficiency of plant to meet the demands of their internal services, which were very great during the post-war industrial boom.

Negotiations were, however, opened in various countries for extensions of international services and in September, 1922, an Anglo-Dutch service was opened by the provision of two circuits, between London and Amsterdam and Rotterdam respectively, a third circuit being formed subsequently by superposition. Matters have progressed very rapidly since that time and there are now in operation for the Anglo-Continental services 57 circuits, as compared with 13 in August, 1914, while the number of chargeable minutes per day has increased from 3,000 to 12,500.

During the year 1927 the progress was particularly rapid. On Jan. 3, the Anglo-German service was greatly extended. Additional circuits to Berlin and Hamburg were brought into use and direct communication established between London and Frankfurt, Bremen, Cologne and Düsseldorf.

In May, following the completion of a new submarine cable and new underground work in Belgium, the Anglo-Belgian service was re-organised. Additional circuits were brought into use and the older circuits replaced by conductors of greater efficiency.

Further services were opened as follows:—

With the Free City of Danzig in June, with Stockholm in June, with Copenhagen in July, with Oslo in September and with Vienna in December. On January 1 of this year, services were opened with Prague and Buda Pesth respectively.

Direct communication between England and Switzerland was also established during the year by the opening of direct London-Zurich and London-Basle circuits. Previously calls had been effected via Paris when traffic conditions on the lines between Paris and Switzerland were favourable. This was not often the case.

The accompanying diagram, marked A, shows the distribution of the circuits now working on the Anglo-Continental services. The London-Berlin circuit, with a route length of 865 miles, is the longest all-cable circuit in commercial use in Europe. The London-Stockholm circuit, with a route length of nearly 1,500 miles, has but 250 overhead.

The diagram marked B shows the development of the traffic on the more important Anglo-Continental services. The diagram C of the Anglo-Swiss traffic indicates the rapid development of the service since the establishment of direct communication.

The Anglo-French service is at the moment the poorest of the more important Anglo-Continental services from the point of view of rapidity of connexion as well as of transmission, but a great improvement will be effected when the new cross-channel cable is completed and can be worked in conjunction with the new Paris-Boulogne underground cable.

Development on a similar scale has taken place in most of the Continental countries.

For example, Holland opened a service with Belgium in 1895, with Germany in 1896 and with France in 1913, but since 1922 communication has been established with Great Britain, Denmark, Luxembourg, Czechoslovakia, Switzerland and Austria.

Until comparatively recently most of the international circuits working in Switzerland were short-distance circuits working between places comparatively close to the frontiers, although extensions were made from the frontier exchanges to more important towns further afield. Communication was established between Switzerland and France and Germany respectively in 1892, but none of the Swiss towns had direct lines to Paris until 1920 or to Berlin until 1922. Swiss towns have in addition obtained direct communication during the last few years with London, Vienna, Prague, Brussels and Amsterdam.

Notwithstanding the enormous advance in technical knowledge, it is extremely doubtful whether it would have been possible to open so many new international services within a comparatively short period had not the facilities for co-operation between the technical staffs of the European administrations been greatly improved.

The International Telegraph Règlement, which regulated the international telephone services until recently, made no mention of technical requirements and it provided no machinery for co-operation between the staff responsible for the construction, the maintenance and the operation of the services. The section relative to telephone working formed but one chapter of the 80 odd chapters in the Telegraph Règlement. The latter came into existence as the result of the foundation of the International Telegraph Union, with Headquarters at Berne, after the Telegraph Conference of Paris in 1865. The chapter relative to telephones was introduced at the Conference of the Union held at Berlin in 1885 on the initiative of the German Administration, who pointed out that the use of the telephone service was growing daily and that there was an increasing need for extending the service beyond the national frontiers. In this way international telephony came under the protection of the International Telegraph Union.

By 1914, the chapter had grown considerably, but the provisions were, in the main, in the nature of fundamental principles. The small amount of technical detail included referred solely to the traffic aspect of the working.

A year or two after the war a writer in the French official publication known as the *Annales des Postes, Télégraphes et Telephones* had advocated the formation of some new body to facilitate co-operation between the staff engaged in technical work in Europe, but nothing appears to have been done at the time to follow up the proposal.

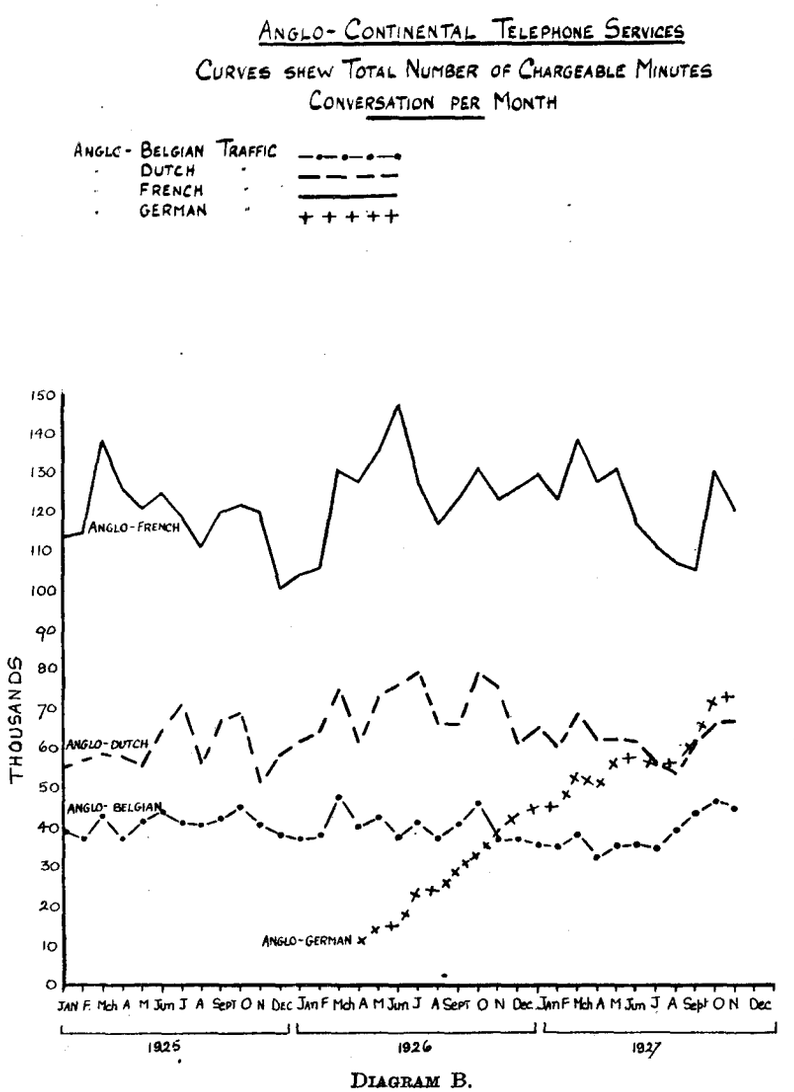


DIAGRAM B.

In November, 1922, however, Mr. Frank Gill, in his presidential address to the Institute of Electrical Engineers, after detailing the enormous advance in long-distance telephone working in America, made a strong plea for the adoption of some unified method of handling the international telephone services in Europe.

He outlined several alternatives, but the only one which appeared to have any immediate prospect of success was a proposal that the Administrations operating the services should combine to form a new organisation to deal with the technical and other problems involved.

Shortly afterwards, the French Administration, on the initiative of the late Monsieur Dennery, an Inspector-General of Posts and Telegraphs, invited 5 other Administrations to send delegates to Paris to consider the formation of an association of this character and in March, 1923, a meeting was held, the countries represented being Belgium, France, Great Britain, Italy, Spain and Switzerland.

This Conference, known as the Preliminary Technical Committee for Long-Distance Telephony in Europe, recommended that a new organisation, to be open to European countries generally and to be known as the "International Consultative Committee for Long-Distance Telephonic Communication," should be set up forthwith.

This Committee was to be charged, in the first place, with unifying the views of the various countries on international telephony and with collecting information on technical and statistical matters bearing on the subject. The resolutions passed by the Committee would be in the nature of recommendations, with which the European Administrations would be asked to conform as closely as possible, as much in their own interests as for the general good.

The Preliminary Conference also passed with unanimity a considerable number of resolutions on various engineering and traffic questions and drew up provisional programmes of new circuits to be constructed.

The proposals of the Preliminary Conference were accepted by 19 nations, each of which sent delegates to the first meeting of the International Consultative Committee held at Paris in 1924. The Committee drew up a Constitution, appointed a sub-committee, to consider in detail the subjects to be discussed at the next Conference, agreed on a scheme for the division of the working expenses of the Committee, and discussed the resolutions adopted at the Preliminary Conference, many of which were modified. The study of several new problems was also undertaken, notably the question of adopting an international unit of transmission and the preparation of a scheme for calculating the charges for international telephonic communication. A new programme of work to be undertaken was also prepared.

At the second meeting of the Consultative Committee (by this time known generally as the C.C.I.) in June, 1925, the scope of the work was again considerably extended, notably in the direction of the study of transmission problems and questions relative to the protection of telephone lines from the disturbing influences of power installations. For the first time, the Conference was attended by representatives of the more important European companies concerned in the manufacture of telephone plant, by representatives of the International Railway Union and the International Conference of Systems on High-Tension Electrical Energy. The representatives of private industry were not admitted to the full meetings of the Consultative Committee and had no voting power on the sub-committees which they attended, but their collaboration in the work of the Committee has added greatly to the value of the decisions taken.

At this Conference an interesting question was raised. The Consultative and Technical Committee on Communications and Transit appointed by the League of Nations suggested what would have been, in effect, the affiliation of the C.C.I. with the League. But there was at least one strong reason why such an amalgamation could not be arranged. Germany was not then a member of the League, although she was participating most actively in the work of the C.C.I.

The proposal of the League was consequently rejected, although it was decided to forward to the Technical Committee of the League copies of all resolutions adopted by the C.C.I.

There had from the outset been concern in certain quarters owing to the fact that the C.C.I. had no official or diplomatic sanction as an international organisation and the incident just mentioned probably added to the disquietude felt in those quarters. Accordingly, when the International Telegraph Conference met at Paris in September, 1925, an effort was made

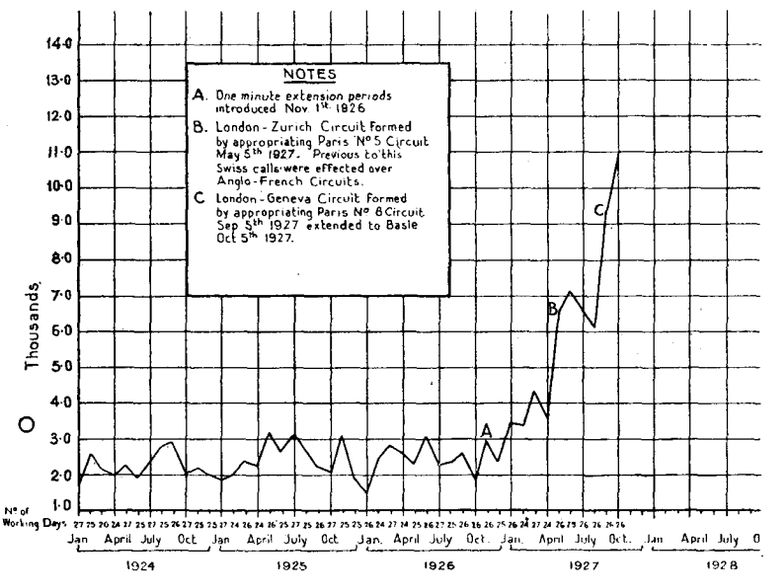


DIAGRAM C.

to form a general Technical Committee, to be associated directly with the International Bureau at Berne, and to deal with all questions relative to electrical communication, both telegraph and telephone. This Committee would, had it been established, have taken over the work of the C.C.I.

A more satisfactory solution was, however, arrived at. A paragraph was inserted in the Règlement sanctioning the establishment of a Consultative Committee charged with the study of standards regulating technical and operating questions relative to international long distance telephony. This Committee was, however, allowed to maintain a separate organisation and the C.C.I. was thus able to continue its work without interruption.

The Telephone Section of the International Telegraph Règlement was the subject of prolonged discussions. The British contention was that the Règlement should be a statement of general principles and that a detailed code of working instructions should be prepared as an entirely separate matter by the C.C.I.

In the result the old Règlement was very considerably amplified but many of the new services and methods introduced were not made obligatory, *i.e.*, their introduction in individual services was to be subject to special arrangements between the Administrations concerned.

A brief reference to some of the leading provisions of the Règlement will convey some general idea of the lines on which the international services are worked.

(1) "The Administrations shall maintain and work their lines in such a manner as to ensure a staple and rapid service, with good transmission. The Administrations shall conform as far as possible to the recommendations issued by the C.C.I. on long-distance telephony as regards equipment, apparatus, relays, loading, transmission equivalents, &c."

The first part of this paragraph is delightfully vague. No lead is given as to the steps to be taken from a traffic standpoint to ensure "a staple and rapid service." Indeed, there is nothing to indicate what is to be regarded as a "rapid" service. The same cannot be said of the second part as one record alone of the proceedings of the C.C.I. contains nearly 300 pages of recommendations on engineering matters.

(2) "International calls have priority over inland calls on the internal circuits in the countries concerned."

(3) "Urgent private calls having priority over ordinary private calls *may* be admitted by special arrangement, at a charge equivalent to three times the charge for an ordinary call."

The British Administration has not taken advantage of this provision.

(4) "Lightning calls having priority over all other private calls *may* be admitted, by special arrangement. The charge is fixed at 10 times the charge for an ordinary call."

The British Administration does not admit calls of this category. It may be stated that very few such calls are made even in countries where this class of call is permitted.

(5) "Government calls, urgent and ordinary, with priority over private calls of the same category, are admitted."

(6) "Subscription calls at fixed hours for a period of at least one month are allowed, by special arrangement."

During the slack hours, the charge is half the ordinary rate. During the busy hours if such calls are permitted, the charge is three times the ordinary rate. Subscription calls during the busy hours at urgent call rates were not provided for previously.

In the international services in which this country is concerned, subscription calls at half-rates are permitted during the slack hours and ordinary calls at three-fifths of the ordinary charge are also permitted during such hours. Subscription calls are not, however, accepted during the busy hours.

(7) The charges for international calls are made up of terminal charges and, where appropriate, of transit charges. Most of the European countries are divided into zones for the assessment of charges to places distant from the frontiers. For this purpose Great Britain has three zones.

Each Administration fixes its own terminal and transit charges and is credited with these portions of the total fee. The gold franc is the monetary unit adopted as the basis of international charges.

At the Conference in 1925 a determined, but unsuccessful, effort was made to lay down definite figures as a basis for the calculation of international charges. This was strongly opposed by the British representatives, but the proposal was defeated because the Administrations which desired to insert figures could not agree as to what the figures should be.

"Each Administration which furnishes a line through its territory to form part of a direct line between two other Administrations has the right to demand a minimum revenue."

(8) "All calls equal to or less than 3 minutes are charged for as for 3 minutes. When the duration exceeds 3 minutes, a charge per minute is made for the period exceeding the first three minutes."

This was a highly important innovation. In the old Règlement, calls were charged for in indivisible periods of 3 minutes. The new arrangement involves some loss of revenue, seeing that about 10% of the international calls originated in Great Britain are of 4 minutes' duration and 12% of 5 minutes' duration. Conversation is limited to 6 minutes if other calls are waiting to be effected on the same route.

The average duration of an international call originated in Great Britain is about 5.2 minutes.

(9) "A subscriber may specify that a call is to be cancelled if it has not been effected after a certain interval has elapsed."

(10) "If one or other of the subscribers does not reply, an Administration *may* levy a special charge for the work performed."

An effort to make such a charge obligatory was strongly resisted by the British representatives and was defeated only by a small majority. The British contentions were that charges for incompleted calls cause irritation to subscribers, and that the cost of operating such calls should be taken into consideration when the general tariff is fixed. It was also pointed out that when such charges were made in this country the total revenue derived from them was very small..

(12) "A demand for a call may be accompanied by a préavis, the object of which is to advise a subscriber's station that the demander of a call wishes to exchange a conversation at that station with a person designated by name."

The préavis service has been highly developed in the Scandinavian countries. The service is different from the "person to person" service of which so much use is made in America, under which a particular person is named to take the call at each telephone and the call is not effected until both these persons are in attendance. Even in Europe the arrangements for working the préavis system are not by any means uniform. The Scandinavian system is more closely allied to the American "person to person" system than that in use in Germany. In Sweden, if the particular person is not in attendance when the call matures only the préavis charge (i.e., one-quarter of the unit fee) is collected. In Germany both the full basic charge and the préavis charge are collected. The préavis service is not at present in use on the Anglo-Continental services, but the introduction of some system of calls for particular persons seems imperative if these services are to become as popular as they deserve to be.

(13) "The signal indicating the conclusion of a call must be given by the subscribers concerned."

This implies that there is no obligation on the part of the Administrations to advise subscribers that the period demanded has expired. It is, however, the practice in this country to give a subscriber a notification to this effect at the end of each period of 3 minutes and to ask him whether he wishes to extend his call. The British Administration appears to be the only one which adopts this procedure which is needless to say a great drag on the operating.

(*To be continued.*)

PRESS TELEGRAM WORK.*

BY J. NEWLANDS, C.B.E., C.I.E.

(*Continued from page* 113.)

ON Dec. 2, 1904, the Postmaster-General, Lord Stanley, M.P., was informed by a newspaper deputation that "the number of words in Press messages has increased since the Department took over the wires from about 20 millions to 760 millions a year." It had been multiplied, then, by 38 times !

After the transfer the Postal Telegraph Department had, on Oct. 18, 1870, only three YQ circuits in the Central Telegraph Office used exclusively for sending news, viz. :—

(1) London, Nottingham, Sheffield, Leeds, Newcastle-on-Tyne, Edinburgh, Glasgow.

(2) London, Birmingham, Liverpool, Manchester.

(3) London, Bristol, Exeter, Plymouth, Cardiff, Newport, Gloucester.

The total number of separate towns which had been supplied by the Companies was 144, with 306 subscribers for news, while the Post Office immediately took on 365 towns, with 1,106 subscribers for news. These numbers were very soon considerably expanded.

Owing to the enormous increase of Press work the number of YQ circuits in the C.T.O. for news traffic alone gradually rose to 23 and these wires had ramifications all over Great Britain and Ireland. The more important of these circuits were duplicated, triplicated after 6 p.m., and even quadrupled for very special occasions, such as the "Budget" or any other Parliamentary event of surpassing importance. Frequently on busy Parliamentary nights as many as 500,000 words were sent. On one occasion the total reached 1,050,500 words. That was when Mr. Gladstone introduced the Home Rule Bill for Ireland on April 8, 1886.

Of course, there were many other towns of minor importance which could not be accommodated on the above-mentioned 23 special wires in the News Division of the C.T.O., consequently the punched slips for all such places had to be conveyed by hand and in large numbers throughout all the more important divisions. There the news was sandwiched in along

* Paper read to the Post Office Telephone and Telegraph Society of London.

with the public telegrams, but of course, this procedure resulted in delays, which were apt to lead to strong complaints from the newspapers situated in those towns.

The News Division had a system of pneumatic perforators capable of producing as many as eight slips for distribution to various circuits. It had a most carefully selected body of telegraphists, who were ably supervised. The apparatus and also the wires were of the best available kind and everything possible was done to secure a prompt and efficient service. While I occupied the position of Controller of the C.T.O. scarcely anything gave me more genuine pleasure than to watch the expert disposal of the vast volume of news traffic on such a day as that of the "Budget."

The News Associations occasionally offered well-deserved praise to the Telegraph Department, but they more frequently blew cold rather than hot, and they, together with newspaper proprietors and Members of Parliament, organised repeated deputations to the Postmaster-General as a means of demonstrating the delinquencies of that oft-maligned Department. According to them, the postal telegraph system had become inadequate to provide for the increasing hurry, competition and earlier publication of the provincial newspapers. The "evening" papers especially demanded to be put more upon an equality with the larger and wealthier "morning" papers, many of which possessed special or private wires from Fleet Street direct into their publishing offices and this great advantage enabled them to compete on unequal terms with numerous small papers in their vicinity. They made use of the "Stop Press" and rapid delivery by motor vans. The number of "evening" newspapers has increased enormously since 1870, when there were but three or four deserving of the name. At the present time they number about 100, and of these no fewer than 80 are connected with the Press Association system. The other 20 are mainly small local sheets. The "evening" papers of to-day are the direct product of the low telegraph rates introduced under the postal system, and for their daily news supply they are almost entirely dependent upon the cheap "copy" rate messages or their equivalent as now furnished by the P.A. or other news agencies. There could be no more cogent argument in favour of the contention that the low Press rates greatly benefited the newspapers than is to be found in the rapid, almost miraculous expansion of "evening" papers, both as regards their numbers and importance. They have not only multiplied, they have advanced in every possible way until they are now an absolute necessity for the reading public. Moreover, they are requisite for local advertising. By means of their numerous editions they cater for all classes as they cover not only general home news and foreign from Reuters, but also every possible phase of sport, such as racing, cricket, football, shooting, swimming, greyhound racing, tennis, golf, aviation trials, coursing, billiards, &c., and every conceivable "stunt" which is likely to interest the public.

The newspaper proprietors were keenly desirous of being able to set aside delayed or belated news after it had been handed in to the Central Telegraph Office, London, for transmission in order that "RUSH" messages containing news of a far more important kind might be immediately dealt with on request. The Post Office being bound by its rigid system of "Code Time," could not possibly agree to such a revolutionary proposal.

When Mr. Sydney Buxton (now Lord Buxton) was Postmaster-General in 1907 a definite move forwards was inaugurated and the way was gradually cleared whereby the Post Office finally agreed to lease wires either to the Press Association, the Central News or other Press agency, as they had done for many years to newspapers. This enabled them to form joint telegraph circuits from their own offices directly connected with either "morning" or "evening" newspapers. These wires, if suitably routed and managed, would admit of 4, 6 or 8 papers being joined up on one circuit. It was not until the year 1920 that the P.A. began operations on this plan in a very cautious manner. The first P.A. joint wire was from London to Bristol. Exeter, Plymouth, Newport, Cardiff, Bath and Swansea were soon added and this was called the "Bristol Area." The scheme commenced operations to a number of these places on Mar. 1, 1920, and it proved an immediate success. After a reasonable period had elapsed, fresh extensions were made and new "areas" were gradually opened at Birmingham, Manchester, Leeds and Glasgow. These were termed P.A. "Centres." The wires—half of which are underground and half aerial—are leased from the Post Office at highly remunerative rental terms. In order to avoid confusion with existing Post Office codes it was decided for the sake of simplicity to use the first two letters only, thus :—

BI —Birmingham.
BR—Bristol.
MA—Manchester.
LE —Leeds.
GL —Glasgow.

The Head Office in Fleet Street is, of course, P.A. This simple plan made it easy for the P.A. Editorial Staff to memorise the selected code letters. Each of these "Centres," together with the wires they control in their own area, will be illustrated on the screen, thus showing how the various newspapers in towns throughout the United Kingdom are grouped around their appropriate "Centre."

Much valuable assistance has at all times been rendered to the P.A. by the staff connected with the G.P.O. Secretariat, by the Engineer-in-Chief's officers, by the C.T.O. and all Test officers throughout the country. Prompt and immediate attention has been given whenever required and faulty wires have been "made good" just as readily as if they had been public wires belonging to the Department. The relations between the P.A. and the G.P.O. have been most amicable.

We have two wires between London and Bristol, two connecting the P.A. with Birmingham and Manchester, two connecting the P.A. with Leeds, and two connecting Manchester with Glasgow. The second wires, London to Bristol and Manchester to Glasgow, are "night" wires only, opening at 4 p.m. All other wires throughout the country are single wires, leased for the full 24 hours per day, and in their totality they carry a very heavy load of daily traffic. The Bristol and Birmingham "Centres" are connected together and so are Manchester and Leeds. These cross-country circuits are primarily provided as reserves and they have frequently been found to be most useful in emergencies.

The lantern slides give a clear idea of the ramifications of the P.A. joint wire system, and of course it will be understood that, apart from our "Centres," all outgoing wires terminate within newspaper offices, and, by a definite arrangement, their Telegraph Room is always placed in close proximity to the sub-editorial department in order to reduce to a minimum any possibility of delay in transmission. This also eliminates delay in delivery by boy messengers. A rapid means of conveying important "results" or "rush" messages directly to those who manipulate the linotype machines is arranged for within each newspaper office. No device is neglected which may facilitate the prompt handling of the "news" and every second of time counts, especially where there is opposition to be contended with.

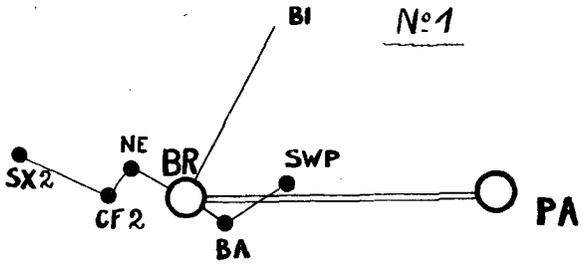
The general equipment in Byron House, the headquarters of the P.A., is replete with every means of expediting the treatment of the work. There is a pneumatic tube from the dispatching room, which is connected with the editorial, the joint service, the racing and golf departments, a Lamson lift from the editorial, a house telephone system, two teletype circuits to the C.T.O., a similar one to the Royal Law courts, two wires to the House of Commons. As a rule there are eight provincial YQ wires linking up to P.A. centres and to all intervening newspaper offices. The instrument room is so arranged that the "copy," on receipt, is placed on a small distribution table, each page is dated and timed in one operation and passed on to the punchers, who operate anything up to seven Kleinschmidt keyboard perforators right and left of the circulation table, which, in reality, is our "Intelligence Department." It is a *one* person job, and the traffic is rapidly handled. When the punching operation is completed, the perforated tape is wound up on a slip wheel, which, with the "copy," is at once conveyed to the number one or first wire, where as a rule immediate transmission takes place. The wires are arranged in two groups of three, and one of two, YQ circuits. While the original punched slip is running through number one transmitter it automatically throws off two replica slips and these are utilised for immediate transmission over the second and third groups of YQ wires. This device ensures that practically all offices are being supplied as nearly as possible simultaneously. It is not an uncommon thing for a brief "RUSH" message to be circulated, punched and run through on all eight circuits in one minute, if there are no interruptions at the time.

When there is an important trial in a provincial town the P.A. leases a local telephone and passes over it either the evidence or a summary of if and the verdict. These are re-circulated over the entire P.A. telegraphic system. On repeated occasions this work has been so smartly done that newspapers in the locality of the court have preferred to take the P.A. report rather than rely on their own correspondents handing in separate Press messages to be signalled over the Post Office public wires, where there may be congestion and consequent delay. In like manner the results of all by-elections are telephoned direct to the P.A., usually from the building where the poll is declared, and the process of 'phoning, punching and transmission is accomplished so rapidly that the information may be signalled all over our system before many in the crowd outside the polling place are even aware of the "result."

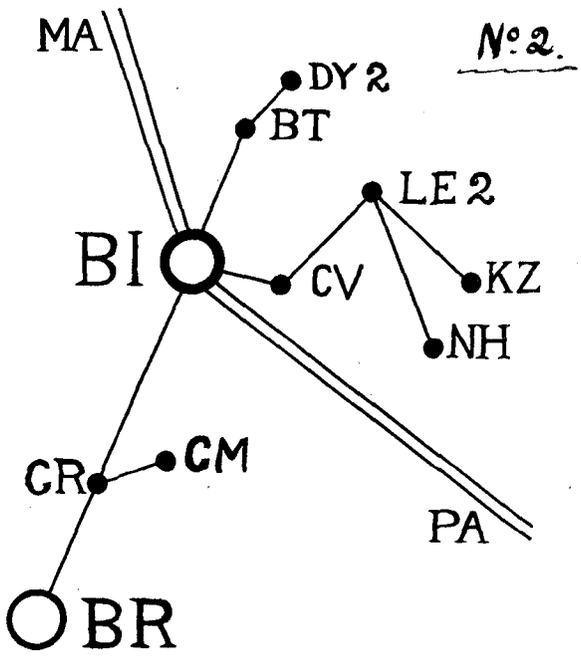
An equally great feature would be made of the prompt disposal of the verdict in an important murder case where the trial had taken place in the Old Bailey. The Press Association is out to beat, in point of time, any other distributive news agency if it be at all possible. On one occasion a most enterprising London paper obtained its first intimation of a certain Royal event from its provincial office in the Midlands, where they had received the news from the Press Association a considerable time before. This gives evidence of enterprise and up-to-date methods.

All evening newspapers now devote much space to general sports, and particularly to the "results" at race meetings. In these circumstances the Press Association makes a supreme effort to obtain and rapidly transmit all such items. How is it done? A representative of the Press Association sits usually in a direct line with the winning post, or as near to it as he can get, at all important race meetings. He has continuous command of a telephone circuit from the racecourse, which is led into the respective offices of the Exchange Telegraph Company and the Press Association in London. We shall imagine he is at Epsom dealing with the most famous of all races, "The Derby," on June 1, 1927. The great race is timed for 3 p.m., but a few difficulties arise in getting all the horses placed in their respective positions for the start. There may even be one or more false starts, but finally the "Off" is telephoned at 3.9 p.m. and is at once telegraphed. The "Derby" takes about 2½ minutes to run. Meanwhile all our circuits have ceased working, specific instructions having been previously issued that on no account whatever must anyone interrupt after the "Off" has been signalled. All must be on the alert. There is a tense and eager "hush." Meanwhile the horses are careering round the world-famous Epsom Racecourse, with its multitudinous crowd. All the jockeys are anxious to win. At each transmitter in Byron House (Press Association Head Office) there is placed a typewritten list giving the number and name of each running horse, together with the jockey's name. We know to within a few seconds

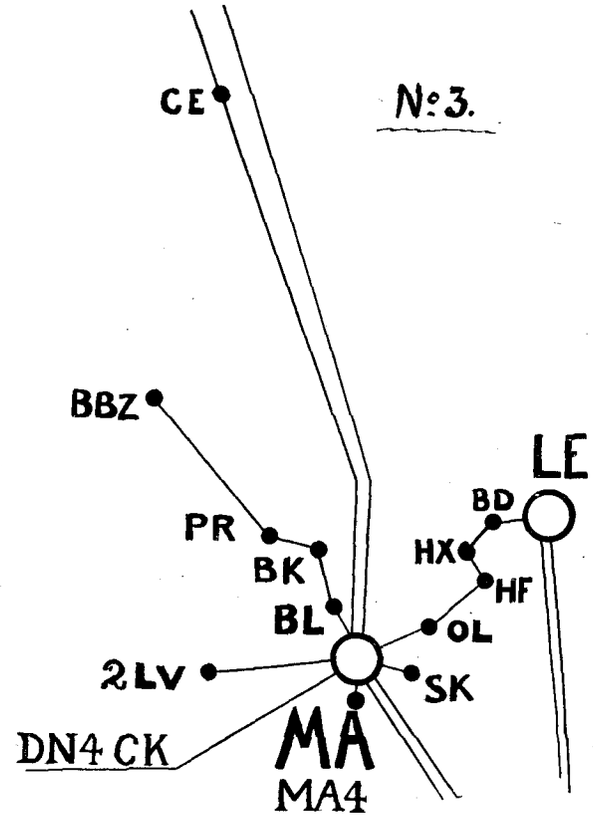
DIAGRAMS ILLUSTRATIVE OF MR. NEWLAND'S ARTICLE.



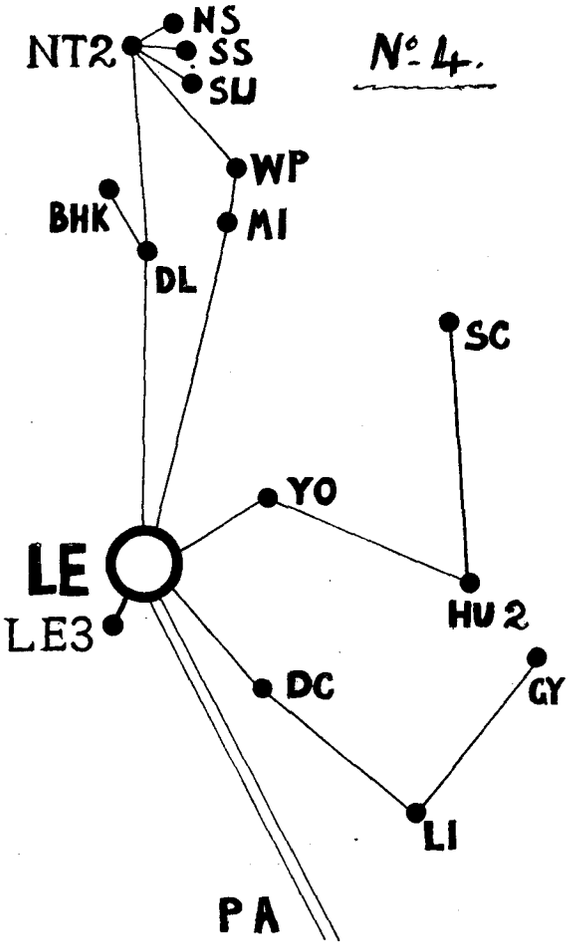
BR = BRISTOL.



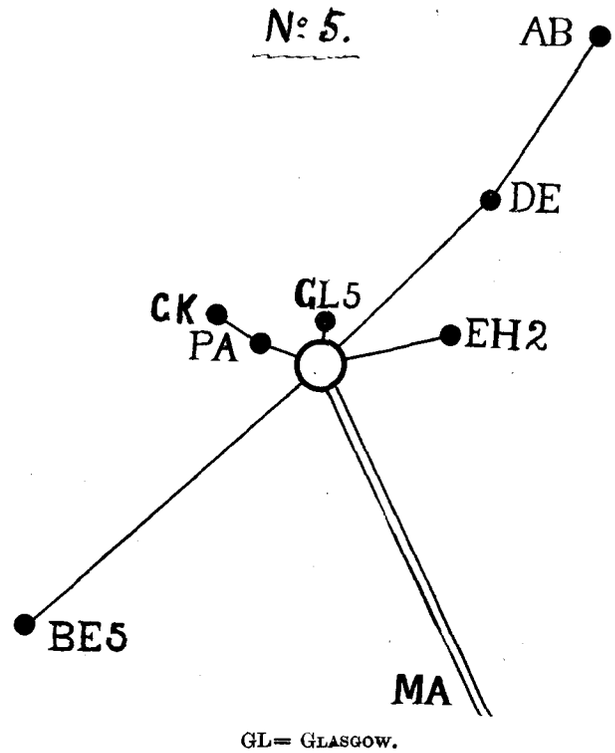
BI = BIRMINGHAM.



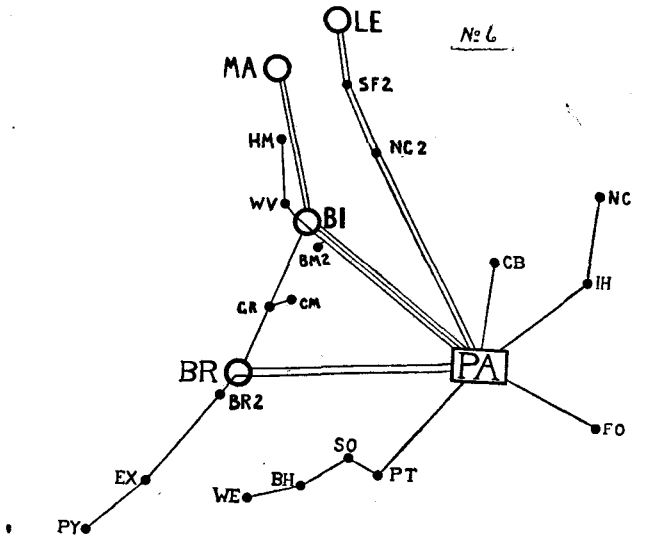
MA = MANCHESTER.



LE = LEEDS.



GL= GLASGOW.



GENERAL SCHEME.

when the race should finish. At 3.10 our expert telephonist sings out "At Tattenham Corner 'Call Boy' is leading 'Shian Mor and 'Sickle.'" Then, almost precisely at 3.11½ he calls out "Number three, 'Call Boy,' the winner," followed by "Number ten second" and "Number seven third." Each operator "keys" by Morse instantly the 1st, 2nd and 3rd number and name and immediately thereafter a punched confirmation is flashed by fast speed Wheatstone over the wires lest any error or mis-sending may have occurred. So rapidly is this process carried out that the fact that "Call Boy" has won is all over our system from Plymouth to Aberdeen, from Cork to Belfast, before the winning horse has been pulled up after passing the winning post. Indeed, all the provincial centres reported next morning that the "result" reached all offices at 3.11¾. So much for effective organisation and so much from an excellent and willing body of carefully selected and thoroughly efficient telegraph operators, not only in London, but at each P.A. provincial centre. The main function of the Exchange Telegraph Company—whose operator has been "listening in" on the same racecourse telephone—is to use their tape machines to advise newspapers, clubs, hotels and bookmakers in London of these and similar "results." Their keyboard tape machines are slower in their operation than our P.A. telegraphic system and it may be confidently affirmed that all our subscribers have the "winners" as speedily as the Exchange Telegraph Company's subscribers within London. Visitors to Byron House are staggered, as a rule, at the rapidity of the operation. That is as it should be, on the principle that "if a thing is worth doing it is worth doing well." By the way, as regards the Derby "result" last June, the Exchange Telegraph Company's Dublin office volunteered the information that "we had beaten the wireless." We have certainly left the carrier pigeons at Goodwood far behind!

Provided you can get into direct communication by telephone with every subscriber precisely at the psychological moment there is no known system so rapid and reliable as that of telephony, but, on the other hand, the Press Association system of joint wire telegraphy working through automatic Creed receivers and utilising a method of human repeater from point to point is an easy "second" and is probably the quickest known means of telegraphing urgent news over a wide area. It could scarcely be improved upon.

The "Budget" is treated in an equally prompt manner. We deal with "points," "column summary" and a "verbatim" report for the larger "morning" papers. The "points" are those items where the Chancellor of the Exchequer either imposes a fresh tax or increases an existing one, or, alternatively, where he reduces or abolishes a tax. As soon as these "points" are uttered in the House of Commons they are telephoned to Byron House and transmitted to all our newspaper subscribers almost red hot out of the Chancellor's mouth. The "Budget" is our high-water mark day for excessive pressure. Every page in the summary or column report and also those in the verbatim report in sections is transmitted and delivered in strict page order. This is a great boon to sub-editors.

Similar rapid treatment is accorded to all important messages specially marked "RUSH."

These observations will enable you to appreciate the great advantage which our system possesses in not having to regulate our traffic by "code time." To the utmost possible extent we endeavour to meet the up-to-date requirements of the newspaper press.

The P.A. deals in numerous services and these may be reckoned up to about 150 in all. Every newspaper can, therefore, specify exactly which of these services it will take and pay for. Unlike the practice of the Telegraph Companies with their 4,000 words a day, take it or want it, each paper now receives precisely what it has ordered and it receives just what it wants for publication. Moreover, their lists of services can be varied at will at any time.

Market Reports.—Formerly all market reports were handed in locally to the nearest postal telegraph office and transmitted thence to all subscribing newspapers on behalf of the P.A., C.N. and Exchange Telegraph Co., but as soon as the P.A. telegraph system had been developed nation-wide I made a businesslike suggestion that to the utmost possible extent these market reports should be handed in at one or other of our own offices and circulated direct to the respective newspapers. This plan was gradually adopted and resulted not only in an accelerated treatment with earlier delivery but also in very considerable economy of costs for transmission.

Many of my audience will recollect that an important committee appointed to consider the question of high-speed telegraphy, after hearing much evidence, furnished a long report dated Jan. 19, 1916. That document was signed by Cecil Norton, Assistant Postmaster-General, as Chairman, and by Messrs. J. Gavey, John Lee, W. M. Mordey, A. M. Ogilvie, W. Slingo and A. B. Walkley. In paragraphs 39 and 40 they "dealt with the special requirements of news traffic." It is interesting to read the following extracts from paragraph 40. "The Press representatives who gave evidence before us frankly admitted that the news service gave general satisfaction, and disclaimed all intention of having asked for a hearing in order to make complaints." . . . "The evidence given on behalf of the newspapers in smaller towns did not suggest that there was any ground for complaint except for the almost inevitable fact that news does not reach small towns quite as soon as it reaches large ones. The installation of the Creed receiving apparatus at small offices would be impracticable on the ground of expense and we fear that newspapers published at such towns must continue to receive their news after their competitors, and without the aid of printing telegraphy, until progress has been made which will enable the Post Office to extend printing methods to such offices and to remodel greatly the present methods of news circulation."

That is a remarkable extract, but I think you will admit it is far more remarkable that the Press Association, alone and unaided, has already developed its entire system by the installation of Creed receiving apparatus at six "centres" and 123 newspaper offices, so that to-day the smaller towns alluded to are actually receiving their news supply at the same moment as their competitors in the larger towns. The alleged impracticability, "on the ground of expense," has been entirely overcome and the receiving apparatus has all been paid for out of revenue during the past seven years. It may be fairly added that we have by the same process remodelled greatly the methods of news circulation. The results achieved are something to be justly proud of.

All our wires are now arranged on the "leak" principle instead of each office being in "series." This plan has greatly reduced the number of interruptions as minor apparatus troubles do not stop the entire circuit.

We manage to carry on under very simple but perfectly definite rules, 38 in number, and these are found to work smoothly and effectively as the regulations are easily remembered and carried out.

The Press Association never complains to the Post Office if interruptions are suspected or known to have been due to stormy weather or other similar cause of breakdown.

The newspapers now pay in full for all the news supplied to them by the P.A.

It may be added that while the Press Association system has been gradually built up at great cost its proved efficiency has fully justified the expenditure incurred. All our subscribers recognise this fact and they are satisfied.

One of the most surprising facts is that the whole staff employed at Byron House, including supervision, operating and clerical force, consists of 45 persons, 34 male and 11 female. This staff covers both day and night service. The women cease work at 8 p.m.

In addition to the foregoing, we have four highly-skilled mechanics thoroughly accustomed to and conversant with Wheatstone, Creed and other telegraph apparatus, including keyboard perforators.

On an ordinary average day the Press Association deals with about 75,000 actual words. On a busy day the number ranges up to over 90,000. The removal of this quantity of traffic from the public wires should have given a great measure of relief to the Central Telegraph Office and also to a large number of provincial telegraph offices where newspapers are published, enabling the latter especially to modify their irksome night duties and reduce their heavy costs.

It must also be pointed out that the Press Association now pays to the Post Office many thousands of pounds per annum for costly wire rentals and "power leads." At the same time the large expenses for wages, at approximately one hundred offices dealing with the Press work now passing over the Press Association joint wire system, has been transferred from the Post Office altogether and is now borne by the proprietors of the newspapers and the Press Association. The savings thus effected when added to the economy of apparatus and slip at all news offices, the reduction of staff, supervision and lighting, the simplification of the C. & A.G. system of accounts should total up to a very considerable sum. I can only hope that the Post Office has earmarked all these economies and has reaped some clear and well-defined profit by the removal to other shoulders of a large mass of work which they always protested was performed at a heavy loss.

If my work at the Press Association has enabled the P.O. to "cut" some of its losses I shall be for ever thankful to have been of some practical use in that direction.

THE G.P.O. PLAYERS DRAMATIC SOCIETY.

The Chinese Puzzle.—A Play in Four Acts, by Marion Bower and Leon M. Lion. At King George's Hall, Caroline Street, W.C. Feb. 17 and 18, 1928.

IT is really refreshing to find a play which includes in its cast an oriental—especially a Chinese—who is not the villain of the piece ; and who does not move in a sinister atmosphere of pistolry. There are in this play two Chinamen, an international financier and sundry diplomats, and yet the only gun which goes off is a " great gun " from the Foreign Office ! No pistols, no poison, no dope ! Even the adventuress (if we may so style the heroine's mother—excellently played by Miss Cowan) is only on the stage for a few minutes in one act. This is evidently no stuff for the red-blooded he-man, the amateur of lethal weapons whose formula for a play must contain an adequate co-efficient of corpses. It will, nevertheless, please all those who like a moving and well-constructed play the interest of which is maintained to the very end.

The Marquis Chi Lung considers himself under a sacred debt of gratitude to the late Sir Roger de la Haye, a debt which he is biding his time to pay in full to Sir Roger's son. The Marquis appears at the young Sir Roger's country house to negotiate (with the tacit blessing of the Foreign Office, to which Sir Roger is attached) a Chinese loan with Paul Marketel, the international financier. When the transaction has been concluded and the document is in Sir Roger's desk, it is surreptitiously photographed by the heroine (Naomi Melsham) at the instigation of her mother, and the precious secret is soon blazed abroad in the Press. Sir Roger is disgraced for his alleged want of care and, under a cloud, has to resign from the Foreign Office.

In Act III, ten months later, we find Sir Roger married to Naomi, and the Marquis Chi Lung hard upon the discovery of the author of the premature disclosure of the loan. He has a fine oriental contempt for women, and considers that Sir Roger can easily buy another wife when the present one is duly shown up.

But, by degrees, he comes to learn that by thus clearing Sir Roger's character he will also destroy his life's happiness ; and then—not out of consideration for the wife, but out of devotion to his benefactor's son—Chi Lung takes the disgrace upon himself and declares that *he* divulged the secret, and so repays his debt at the price of his own honour, leaving Sir Roger in ignorance of his wife's lapse. The scene in which he confronts the wife with a slip of paper on which is written, in her husband's handwriting, the name of the spy to whom her mother had sold the secret, is intensely dramatic, and was well-contrived and wonderfully well acted by all concerned in it.

It will readily be gathered that the outstanding character in the play is the Marquis, and right well this character was suited to the finished style of Mr. John Cahill, who looked and acted the part to the life. Alike in his oriental detachment and in his more lofty moments, he invariably struck the right note. Another prominent role, that of Paul Marketel, was well portrayed by Mr. Jack Scott, who assumed the bonhomie of the important man of millions with a dignified ease. A great success, too, was Mr. Sellars, in a happy personification of the lively Frenchman. Armand de Rochecorbon. But what is especially worthy of remark was the general high level of the whole cast. Mr. Pilkington as Sir Roger, Mr. Storr as Billy, Mr. Doust as the Chinese Secretary, and Mr. Gartland as Sir Aylmer Brent, all merit special commendation. Of the ladies, Miss Kathleen Ling well sustained the exacting part of Naomi, who is under duress in the first act and in an agony of remorse throughout the others. It was, perhaps, difficult for her to escape a note of monotony in the somewhat unrelieved atmosphere of trouble in which she lives. Miss Kathleen Emery left nothing to be desired in her rendering of the elder Lady de la Haye, Mrs. Dorothy Smith made the most of the role of Victoria Cresswell and Miss Law was very natural as Lady de la Haye's young ward.

The play was excellently produced and staged, and bore evidences of the meticulous care which had obviously been spent on every detail. The producer, Mr. Julian Mitchell, had a well-deserved ovation from the players at the close.

W. H. G.

REVIEWS.

" History of Radio Telegraphy and Telephony." Written and illustrated by G. G. Blake, M.I.E.E., F.Inst.P. (Published by Messrs. Chapman and Hall, 11, Henrietta Street, Covent Garden, W.C.2. pp. XIX + 426. Price 25s. net.

This book was originally published by the Radio Press Ltd., and was reviewed in the April (1927) issue of the *Telegraph and Telephone Journal.* The publication has now been taken over by Messrs. Chapman and Hall, by whom a reprint has been issued. The get up of this reprint is on the same high level as that of the earlier issue, and the book continues to be a valuable work of reference on the development of the art of radio Communication.

" The Call Indicator System of Automatic Telephony." By A. G. Freestone, of the Engineer-in-Chief's Office, Post Office, London. Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. This book deals entirely with the equipment necessary in manual exchanges in a very large city, like the Metropolis, during the transitory period between full manual working and full automatic working. The system is that installed by the Automatic Telephone Manufacturing Company at " B " positions in the manual exchanges of London, so that a subscriber on an automatic exchange can operate a call to a manual exchange in precisely the same way as he does one to another automatic exchange. In this limited sphere the book seems complete ; the type is good, the circuit diagrams are clear and easily read ; and the volume can be confidently recommended to those having a general knowledge of the principles of automatic telephony, who wish to pursue this important branch of the development.

" Practical Electrician's Handbook." Editor, H. T. Crewe, M.I.M.E. S. Rentall & Co., Ltd. London. (Proprietors and Publishers, Odhams Press, Ltd. Price 2s. 6d.)

We welcome the reappearance of this hardy annual, larger and fuller of information than ever. Amongst the additional matter included in the new " Pocket Book " is a section devoted to electricity as applied to marine work, whilst electrical refrigeration is also fully covered in a further section. It contains full information about dynamos, electric lifting magnets, filtering machinery, miners' lamps, searchlights, comparative resistance values, temperature coefficients, of the resistances of metals and alloys, and electrical measurements in general. In fact, it contains useful electrical information of all kinds and there is an excellent little diary included.

RURAL TELEPHONES IN SASKATCHEWAN.

ON May 1, 1927, the total pole mileage of rural telephones in the Province of Saskatchewan reached 59,956, serving 66,830 subscribers, and carrying 202,000 miles of wire. Connected to these rural systems by means of long-distance lines erected by the Government, there are 800 cities, towns, villages and hamlets. Saskatchewan's rural telephone lines are built through the issuing of Rural Telephone debentures. Of total expenditures on the system to May 1, 1927 of $17,227,933 only $8,974,447 then remained unpaid, a remarkable fact considering that 89% of the rural telephone systems have come into existence since the passing of the Telephone Act by the Legislature at the session of 1913-14, and that the building of lines during the war days was handicapped both as to obtaining materials and money. Most of the rural systems are, therefore, only a few years old and on the average are half paid for already.

BRIGHTON AUTOMATIC TRANSFER: VISITING THE SUBSCRIBERS.

BY GEO. H. CALCOTT, *Asst. Traffic Superintendent, Brighton.*

(*Continued from page* 120.)

Before the subscribers were visited each officer had to satisfy the lecturer that he could perform the duties, and arrangements were made for a telephone to be connected direct to the automatic exchange; an actual demonstration of the working was required to be given to a member of the staff. A note was made of any errors, and the points on which difficulty had been experienced were again gone over with the visiting officers.

Some weeks prior to the transfer a map of Brighton was procured, and the town divided up into districts, an endeavour being made to equalise the number of subscribers in each district. Numerical cards of the subscribers were sorted into district order and subsequently re-sorted into street order. From these were compiled daily lists of 25 subscribers per list.

Each officer was allocated a district as far as possible near his home, and remained on the district until every subscriber who could be visited had been interviewed, thereafter he was required to help in another district until the whole area had been covered.

During the first fortnight no attempt was made to deal with unsuccessful interviews, these were reserved until every subscriber had been called on, then each officer dealt with the difficult cases in his own district until they were either cleared or it was definitely established that the subscriber was away from home.

With a large body of men it would be strange if all were bright and alert, it was therefore not surprising to find one or two individuals who it was necessary to spoon-feed.

The writer vividly recalls an experience in this connexion.

The lecturer had spoken for the first day on the nature of the work and given a brief description of some of the apparatus.

On the second day, before proceeding he asked the class if anyone would like to ask any questions on the previous day's work. "Yes, Sir," replied a diminutive man in the corner, "shall we receive any instructions before we visit the subscribers"!!! What the lecturer said is not recorded.

Visiting the subscribers is an entertaining experience to anyone with a sense of humour as the following anecdotes will show:—

A visiting officer called at a high-class hairdresser's and duly instructed the proprietor in the mysteries of the dial. To demonstrate the various tones it was necessary to put the line over to the automatic exchange. By this time all the customers in the shop had become interested, and gathered round the embarrassed officer, while the proprietor handed the receiver to each customer in turn in order that they might be initiated into the wonders of the "ringing-tone."

Another visiting officer had occasion to call at the house of a Jewish lady, who did not seem to be at all clear as to the method of obtaining calls, eventually after a long and careful demonstration the officer was about to depart when the lady said: "One moment, please. How do I get London?" "You dial 0," replied the visiting officer. "Oh, I see," said the lady; "How do I get Bethnal Green Eye Hospital." Collapse of visiting officer.

One of the men (the slow-witted one referred to previously) thought it was essential to fill in the remarks column on all his forms, and the recording clerk was much amused to read such remarks as the following:—

"Old lady, testy and cross."

"In holding receiver I happened to touch an electric radiator rod—one gets a shock sometimes."

(One could have wished that the shock had sharpened his mental faculties.)

Another visiting officer was demonstrating to a subscriber when there was a loud "rat-tat." When the door was opened, a squad of policemen entered and arrested the subscriber. He is still wondering whether it was collusion between the Department and the police.

Hall Multi-coin boxes are a source of mystification to some people, and the operations of buttons A and B are difficult to grasp. Imagine, however, the feelings of a visiting officer who discovered an old lady endeavouring to obtain 4*d*. change from sixpence, and quite indignant because she was unable to get either a local call or her change.

Just before the exchanges were transferred, the engineers were very busy testing all the switches, and it occasionally happened that a visiting officer, in dialling a test number, was answered by an engineer. This was very embarrassing at times, as the following story shows:—

Scene, in a drawing room of a lady's house in a fashionable part of the town.

Demonstrator instructing lady subscriber in the use of the dial.

Demonstrator: "Now, madam, I will ask you to dial a number which I know is unobtainable, so that you can hear what is called the 'Unobtainable tone.' Now, Madam, lift the receiver and listen for dialling tone, and dial 21901. Now, Madam, that is the unobtainable tone which you hear."

Lady visitor (being ushered into the room by the maid): "Hullo, Mabel; just receiving your lesson?"

Lady Subscriber: "Yes, isn't it simple? Why, when a number is unobtainable, you hear a man's voice say 'Half a mo, Harry, I've just dropped my blanked pliers.'"

VOICE FREQUENCY TELEGRAPHY.

AN interesting if rather lengthy paper was given on this subject at the monthly meeting of the P.O.T. and T. Society on the 20th ult. by W. D. Hamilton, Esq., A.M.I.E.E. (of the E.-in-C.'s Office), at the I.E.E. before an audience, which certainly as regards its size, was hardly worthy of so fascinating a subject. There was some hesitation at first on the part of members to participate in a discussion, partly because of the lack of time which the lecturer had left over, and partly, no doubt, because the technical meal had contained so much mixed nutrition that digestion was necessarily slow. However, Messrs. Bowthorpe, Cohen, Colliver, Symes, A. E. Thompson, and others from among the members and visitors, placed some very thoughtful points of view, both *pro* and *con* before the assembly and the lecturer.

Mr. Symes, for example, cited the success which the system had obtained over the land sections of some of Anglo-German circuits. Mr. Colliver urged the necessity for more clear-cut signals in these days of precision machine telegraphy and asked whether the attenuation faults could not be adjusted.

Mr. Thompson of the International Standard Electric Corporation maintained that it was no good of talking about high speeds, all that was needed was low frequencies, a good multiplex system, and a multiplex for each. Thus with keyboard perforators for multiplex and start-stop systems you could multiplex your multiplex, and could utilise *standard* apparatus at each end instead of umpteen systems.

At this point the writer with no little regret was compelled to leave, and thus is unable to report either the replies of Mr. Hamilton or the encomiums of the patient Chairman, Mr. L. Simon.

J. J. T.

LONDON TELEPHONE SERVICE NOTES.

Contract Branch News.

THE amount of business done by the Contract Branch during the month of January was as follows :—

	Stations.
New business obtained	9,286
Ceasements	3,696
Net gain ...	5,590

The net gain is 598 more than the figure for January, 1927, and is the second highest on record for the month of January—the record being 5,672, in January, 1926.

It is interesting to know that the new business figures for January this year shows an increase of 224% over the figure for January, 1912, whereas the ceasement figure has only increased by 168% and the increase in the net gain is 276%.

The number of kiosks in London is steadily increasing and now exceeds 800, whilst there are 147 more in course of erection. It was interesting to read the reference to kiosks in Sir Percival Phillips article in the *Daily Mail* on Jan. 24 on the "Changes I see in London" (after an absence of 16 months). His words are worth quoting.

"How long have we yearned for brighter telephone booths. Lots of them dotted about in the most unexpected places, beaming on the night wayfarer like pleasant little lighthouses. I came upon one at the side of a lonely street where sixteen months ago a public telephone was as inaccessible as on Hampstead Heath."

"Heinz Disappearing Hare" was the description shown on a recent directory form—the question is whether a famous advertisement will now have to be altered to 58 Varieties.

Football Notes.

Football is a strange game and the L.T.S. team have contributed in large measure to many of the seasons unexpected results.

Here is the record of the team for the matches played between Jan. 14 and Feb. 11.

Second Round Cup Tie against Taxes, 1st team, away, won 3-2. Ministry of Health, at home, League Match, lost 5-1. Taxes 2nd team, League Match, away, won 11-6. Ministry of Pensions, 3rd Round Cup, at home, lost 4-2.

It is significant that the team's most meritorious performances have been achieved on opponent's ground, and this has been noticeable throughout the season. Evidently the atmosphere of Raynes Park has not the influence that one generally attributes to teams playing on their own ground.

It astonished the critics to learn that the Taxes had been dismissed from the Cup competition on their own ground, and the loss of two points against the Ministry of Health was probably due to the reaction following a strenuous Cup tie only a few days previously.

The win against the Taxes 2nd eleven was a personal triumph for Cowdray, who, from the inside left position, scored 8 goals, which is a League record. The final act in the drama was the defeat at home in the 3rd round of the Cup.

Two things seem to have contributed to the defeat, one was the apparent misfortune in being drawn at home, and the second was due to the failure on the part of the defence to play to the referee's whistle.

Apart from this little more need be said of the match, except that the game was evenly contested, and the luck, which is often an important factor in Cup Ties, favoured the winners.

* * * *

London Telephonists' Society.

On Saturday, Jan. 28, the Annual Dance of the London Telephonists' Society was held at the Bishopsgate Institute, E.C.4. The far-reaching interest felt in this event resulted in a large gathering of members and friends, whose anticipations of pleasure were apparently fully realised.

The Sixth General Meeting of the Society was held on Friday, Feb. 3, in the City of London Y.M.C.A., Aldersgate Street, E.C.4.

The very delightful concert was given by members of the staff of Thornton Heath Exchange. A pastoral dance provided great pleasure, not only by reason of its charm, but also its entire freshness. Quaint poems beautifully rendered, together with some splendid pianoforte playing, gained applause, which adequately expressed the appreciation of the audience.

A paper was then read by Miss Pyne, of Victoria Exchange, whose treatment of her subject, "American Woman and Business," made it of absorbing interest.

Various social, political and domestic aspects of American life were mentioned, and anecdotes recounted, to indicate clearly some of the differenc in the lives of normal English and American people.

While in Chicago, Miss Pyne visited a telephone exchange. Her descriptions of some of the operating procedure, and of the conditions under which the work is carried out were of particular interest.

"Is the Social and Welfare Side of Exchange Life Sufficiently Developed?" was the title of the debate which followed. The arguments for and against were very cogently presented by two telephonists from Gerrard Exchange, Miss Binder and Miss Lambert, and an animated discussion arose out of their premises.

The social and sports side of Exchange life, especially, aroused keen argument, but of the welfare side we heard less. We were, however, reminded of the many benefits provided for the staff, and the number of things done to promote health and comfort. A magnificent effort made a few years ago was brought to our notice, when by means of a bazaar, a sum of £2,500 was raised for the benefit of certain hospitals, and a hope was expressed that in the near future, a similar effort might be made.

At the conclusion of the meeting, a vote of thanks was passed to Miss Pyne, Miss Binder and Miss Lambert, and to the ladies from Thornton Heath Exchange, whose concert had been so enjoyable.

GLASGOW TELEPHONE NOTES.

THOSE of us in the Glasgow District—and there are many—who knew him, endorse most cordially the comments of our Newcastle colleagues as to the genial personality and general outstanding characteristics of the late Mr. D. B. Howieson. We had known for some time that he was not enjoying the best of health, but no one suspected that the call was so near at hand. The news cast a gloom over the whole office, particularly in that section with which he had been most actively associated. In very truth, it can be said of our late colleague that :—

"To live in hearts we leave behind
Is not to die."

On Thursday, Jan. 26, the Exchange Staffs held a dance at the "Waldorf" which is situated in the famous Sauchiehall Street of this city. A pleasant evening was spent and the assembled company seemed thoroughly to enjoy themselves. Among those present were Colonel and Mrs. Westbury, Mr. and Mrs. Coombs, and Mr. Johnson; also Misses Cameron and Mortimer of the Central and Douglas Exchanges. The arrangements were in the capable hands of Miss H. B. Mowat and her fellow Committee members, and right well had everything been done. It was the general opinion that these functions were of great assistance, in the sense of members of the staff knowing and appreciating each other from new angles, and the hope was expressed that a further dance on similar lines might be arranged before the end of the season.

Tuesday, Feb. 14, was a red-letter day in the annals of the Traffic Branch, for on that date, Mr. James Robertson, Traffic Superintendent II, attained his 60th birthday, and by the same token put aside his official duties for the new, and not trivial, responsibilities of a "gentleman of leisure." "James," as he is affectionately called by those of us who have been honoured by his personal as well as his official friendship, has a breezy and altogether delightful personality, and his retiral leaves a gap which will be most difficult to fill. Naturally, Mr. Robertson could not be allowed to fold up his tent and steal silently away, though no doubt he would have preferred that type of exit, so a social evening has been arranged by his colleagues, as to which we shall have more to say next month.

This same Feb. 14 witnessed another function, and one in which the Central Exchange Staff was concerned, to wit, a Tea and Concert to the "Boys" who are still resident in the Glasgow Bellahouston War Hospital. The tea was enjoyed by all those present, particularly the special "Hot Pies" which had been provided. The concert consisted of a Pierrot Show by the "Dusky Ten," a group of young Glasgow artists who gladly gave their services. Miss A. F. Cameron, the Central Exchange Officer-in-Charge, presided, and she was supported by Mr. and Mrs. Coombs, Miss Kay (Trunks), Miss Wallace, and other members of the Exchange Staffs. Colonel Westbury was unavoidably absent by reason of indisposition, happily only temporary. Incidentally it strikes the writer, and perhaps it will the reader, that these efforts on behalf of our wounded soldiers and sailors, some ten years after the cessation of hostilities, betoken a wonderful sense of loyalty on the part of the staffs responsible. When the War fever was raging and concerts to our "Boys" were fashionable, the going was easy, but as time passes, recollections fade and enthusiasm is apt to wane, thus making "the going" more difficult. It takes more than these things, however, to damp the ardour of the ladies who, in the main, are responsible for these happy gatherings and the writer is quite sure that the sincere reception and appreciation of their efforts by those who have sacrificed so much for us, carry their own reward. Later on, perhaps, we shall be in a position to indicate just what has been done since the cessation of hostilities. Meantime, Ladies and Gentlemen, please carry on with the good work.

We have just finished another series of Exchange Staff meetings. The general feeling is that much good has been accomplished and that the extra work entailed has been worth while. During the Autumn and Winter months of 1926-1927, no less than fifty-five meetings were held at which matters pertaining to the service were discussed and illustrated in various ways by means of official charts. In the 1927-1928 session a further 49 meetings took place, and while to a certain extent some of the original ground was retraversed, for the most part the discussions and illustrations went a stage further and much new ground was broken. There is wonderful potentiality in these meetings if they are handled and run in the proper spirit. Those of us more directly concerned have great faith in the scheme, and not without reason, but of that more anon.

For some time past an epidemic of marriages has been raging in the Douglas Exchange. On Monday evening, the 13th instant, the Supervisors and Telephonists met over a cup of tea to congratulate Miss M. McCallum, the latest "victim." An enjoyable programme, consisting of music and songs, was followed by tea, and in the course of the evening, Miss Mortimer, the Douglas Exchange Supervisor, presented to Miss McCallum a beautiful canteen of cutlery from the Supervising and Operating staffs, with felicitations to "Pearl" on entering her new life.

On the occasion of his marriage, Mr. J. F. Brodie, Contract Officer, was the recipient, with the good wishes of his colleagues, of a table electric lamp.

Mr. R. F. Forsyth, Contract Officer, was presented with a silver tea service by his colleagues as a token of esteem and regard on the occasion of his marriage.

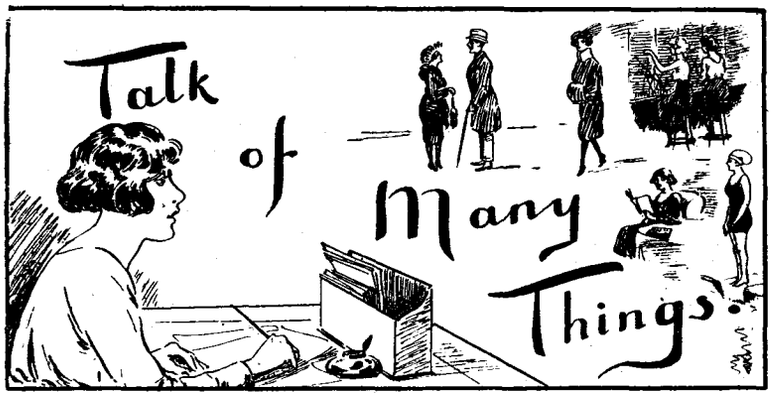
"J. L."

ON EARLY DUTY.—(*Contributed.*)

ONE morning I went southwards by tram over Jamaica Bridge, and a passing glance gave me a charming aspect of the River. Looking east I saw the lights shine out like fairy lamps and they were reflected sparklingly on the lazily, rippling water. The spires and chimney stacks pierced the grey red sky of the waking day, and the bridge wrapped in the early morning mist seemed like a pathway to "the Other Threshold." I thought how often do we pass such a scene as this without realising its beauty—and went on my way rejoicing in the picture which I knew would be an inspiration all the work-a-day day.

M. H. T.

WE TELEPHONISTS



Ants.

WHY on earth I should write about ants I don't know. You are probably not interested in them and neither am I—or so I believed—but I seem impelled to say something about them. I tried to think of another subject, but so soon as I settled upon one I was conscious of the word "Ants." I saw it without looking, I heard it without listening. I could not free myself either from its sound or its appearance. Sometimes it was written and sometimes printed. It appeared plain and in colours. It whispered and it glimmered, it shouted and it blazed. I dreamed of it when sleeping, I murmured it in waking, and it haunted me from dawn till dark. Nothing was free from its association, and whatever the matter in hand or mind, whatever the circumstance, there was always the persistent sensation of "Ants" as a background, as a complement, or as an enveloping atmosphere. It was intangible and yet it filled the universe. This continued for days—ants, ants, always ants—a monotony of sound and a repetition of sight, until the very word seemed like a haphazard collection of letters, stupidly arranged and without the slightest sense or meaning. Most words appear and sound silly if looked at, and listened to, for long enough.

I referred the problem to a friend, but although his intentions are always good, he is so very literal that I felt from the outset that it would be useless. "To get rid of ants," he said, "pour boiling water on them, or take them to

the Zoo and give them to the Ant-eater." The more I tried to explain my difficulty to him the more he told me about ants—big ants and little ants, red ants and white ants, blue ants and green ants, flying ants and submarine ants. He said that they were very intelligent and civilised, and lived in highly organised communities. He had once met an ant (or some ants, I forget which) who had eaten a man out of his clothes. It, or they, had taken the man out completely and had just left his clothes standing. His friends only realised that he wasn't inside because his hat was resting on his collar. As they remarked afterwards, "We knew that there must be something wrong, for he never wore his hat like that." On another occasion, when my friend was living abroad, the ants had eaten all his furniture, but Mr. Drage had been very nice about it although it was not strictly covered by the policy. He told me that ants were sometimes confused with the wife of an uncle, but that the confusion was due, as a rule, to dialect and not to appearance. The difference between them was easily discerned. An ant was invariably surrounded by a group of sluggards engaged in complimenting it upon its industry, and anxiously picking up hints on leading a useful life. No one, he said, would ever think of rallying round the wife of an uncle for such a purpose.

He told me a lot more, full of interest, of course, but quite devoid of assistance, so I approached another friend. "Ah, yes," he said, "You are suffering from a repercussive odontoglossum—something like a recurring decimal with spots every so often." This is the most I can remember of his diagnosis. "Tell me," he said, "do you ever find that a particular tune has been running through your head for days on end, so that you cannot forget it or stop it?" "Yes," I said, "I have had that experience." "What do you do about it?" he asked. "Why, nothing, of course," I replied. "Just so," he said, "You wouldn't! What you should do is to exercise your will power. Take hold of that tune and say to it 'This has got to stop!' Then proceed firmly to the music room and sing it right through once, slowly and emphatically. Then tell it to go and never to return unbidden." "Is that effective?" I asked. "An absolutely infallible remedy," he said, "although from what I remember of your voice, your neighbour would probably assist in producing the desired oblivion. Good morning."

His system seems to work, because for the life of me I can't remember what it was I was going to write about this month.

PERCY FLAGE.

Sydenham Exchange.

Miss G. Turner is to be congratulated on the two short plays written and produced by her at the Sydenham Social, Jan. 3, under the titles of "The Registry Office," and "Travelling Abroad." Each play was an unqualified success, and added greatly to the enjoyment of the evening.

May Miss Turner live long and produce many more!

M. A.

Putney Exchange.

On Saturday, Jan. 14, poor children of the Earlsfield district were entertained at Fairlight Hall by the staff of Putney Exchange.

After partaking heavily of tea, the children were delighted to once again see their old friend Mr. Harker in his role of clown.

Then Punch and Judy told their tale, accompanied by enthusiastic yells from the audience, and later whistling, mouth-organ, and singing competitions were held.

A fairy cottage, erected by the engineers, gave a picturesque touch to the hall, and when the entertainment had come to an end, suddenly Grandmother emerged therefrom to water her plants. Along came Red Riding Hood and later Mr. Wolf made his pounce, and the fate of the dear old lady could be heard happening within the cot. Red Riding Hood managed to soothe the fearsome beastie and together they gave presents to all who called at the cottage.

Mention must be made of the excellent little band organised by the staff and of Messrs. MacFarlane & Lang, and Abdulla, for sending novelties.

Altogether, a jolly evening, and an encouragement to a repetition next year.

L. J.

Wimbledon Exchange.

The Staff of the Wimbledon Telephone Exchange gave a party to 130 poor children in the district on Saturday, Jan. 21. At 4 p.m. they sat down to a sumptuous tea to which they did full justice, and there were loud cries of "more jelly; more chocolate biscuits!"

Afterwards they played games and sang choruses, and the latest ragtimes conducted by one of the staff. At a quarter past five they were entertained by a fairy and two friends, who gave character songs and recitations to their great amusement.

Then Father Christmas arrived amid great applause and distributed gifts, helped by the fairy, from the prettily decorated tree. The girls received dolls dressed by the staff and the boys had humming tops, mouth organs, jazz bands, mechanical toys, printing outfits, &c. They also had balloons and bags of sweets which came out of a huge cracker hanging from the ceiling.

After singing "God Save the King" they filed out and each received an apple, an orange, and a bright new penny—and we enjoyed it quite as much as they did.

E. M. B.

Brixton Exchange.

A very enjoyable social evening was spent by the staff in the dining room at Brixton on Wednesday, Jan. 18. A hearty vote of thanks is due to Mr. Townsend, our Service Superintendent, who so kindly acted as M.C., also our Chief Supervisor, Miss Liddell, who did all in her power to make the evening a real success, and Miss F. A. Foster, who with other Supervisors worked hard in arranging everything.

The entertaining part of the programme, i.e. songs and recitations given by our different colleagues, goes to prove that there is some real talent at Brixton, and every item was thoroughly enjoyed. We hope this evening will be the first of a series.

The amount of £11 11*s.* 0*d.* was sent to the Queen's Hospital, Frognal, Sidcup, at Christmas, for additional wireless installation, to add further interest to the lives of those who gave so much for their country in the Great War.

A. C. V.

Tottenham Exchange.

A new swimming club has been organised in connexion with the Tottenham Exchange and is to be known as the Grove Swimming Club.

For the purpose of obtaining funds a Social was held on Dec. 8, 1927. The programme which included songs, recitations, dances, games, and competitions was arranged by the staff, and much talent was shown.

A Christmas Gift stall was a very successful feature of the evening.

Mr. Collins kindly acted as M.C., which role he filled very ably; and the venture was an entire success.

C. PHILLIPS, *Captain.*

A Lament.

Oh, where is our lost Mr. Flage,
Who sparkles on the ladies page;
His absence fills us with alarm,
We trust that he has met no harm.
Our spirits have all sunk to zero,
Fearing the floods have claimed our hero.
Or has our enemy the 'flu
Now marked him as a victim, too;
And doth his eye with fever glow,
Pending a visit from M.O.
Or "Brighter thought," the shops he views,
To catch a bargain for "The News."
Eyes socks and collars at the sale,
Provided for the festive male.
What e'er has happened, let us know,
To leave us is an awful blow.
Come back again to tell the tale
About "The worm," "The shrimp," "The snail."
Come back again with fun and laughter,
And make us happy ever after.

D. D.

We are happy to know that a glance at the first article will reassure our contributor. This month "The Ants" have it.

The Central Xmas Party.

Our Central Xmas party,
On the 17th of Jan.
Was much enjoyed by one and all,
On fun there was no ban.

But the feature of the evening,
Which was greeted with a roar,
Was Central's first dramatic club
Acting "The Bathroom Door."

The latent talent here displayed
Was really good to see;
For budding stars tripped on the stage
And acted splendidly.

Miss Morris who produced the sketch
Acted the gay young beau;
Made love to Prima Donna,
In manner far from slow.

And soon another sketch we'll see,
With the same maidens fair;
The name of it will be "Mere Man,"
I hope you'll all be there.

D. D.

Several articles have had to be held over this month owing to lack of space. They will appear in the April issue.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal,* Secretary's Office, G.P.O. (North), London, E.C.1.

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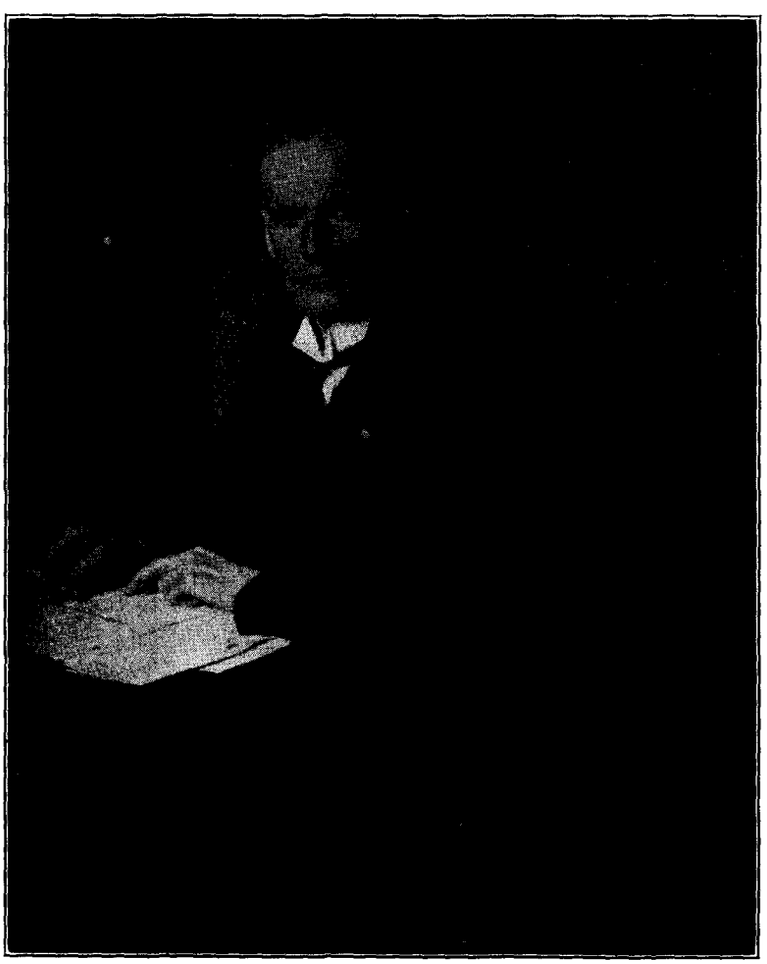
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

LI.

MR. CRAWFORD J. MILLAR.



MR. CRAWFORD J. MILLAR, the District Manager of Telephones at Bristol, has filled a number of important posts in the Telephone Service. Mr. Millar began his career in Glasgow (that nursery of many of our successful business men). After a number of years in the office of the Provincial Superintendent for Scotland he was appointed Assistant District Manager at a difficult period in the history of the National Telephone Company. The Corporation of Glasgow was starting opposition and the Company was hampered by the refusal of the Municipal body to grant underground facilities. A strenuous period of service was ended when the Corporation gave up the fight, and its system was acquired by the Post Office.

At the transfer to the State he was Manager of the West Scotland District, stationed at Glasgow, but served during 1912 in London on the Metropolitan development study. Since then he has been District Manager at Exeter, Edinburgh and Gloucester, and at the end of 1921 was transferred to Bristol.

Mr. Millar has done good work at Bristol and the district has been much extended during his period of office.

A man of attractive personality, tactful and possessing literary ability of a high order, he has endeared himself to all who know him by his courage, loyalty and devotion to duty.

RECOVERING THE WASTE.

BY E. J. JOHNSON, *Glasgow.*

IN industrial operations there is a certain percentage of waste and the reduction of this to the smallest possible amount frequently has a decided effect on the profitableness or otherwise of the concern. In the manipulation of telephone traffic there is wastage, represented by lost or ineffective calls. Unfortunately these cannot altogether be avoided, but anything which can be done to reduce them is so much waste recovered and is therefore all to the good.

What does the average telephone subscriber require his telephone for? In the great majority of cases to obtain rapid communication with the person he wants at the moment. In other cases it is desired that there be uninterrupted facilities for incoming calls. One of the measures of the efficiency of the telephone service is, therefore, the proportion of calls which are immediately effective out of the number required. This being the case the percentage of effective traffic is a very important factor in the telephone service to both classes of telephone user. Given a reasonably efficient telephone service, improvement can only be made by attacking the waste operating products, in other words, the lost calls. Any reduction in the number of these is, therefore, an asset to the administration and to the user.

Observation of the service tells us that there are such things as lost or ineffective calls, subscribers' reports confirm and at times hammer home the feeling that they are there in quantity, and cause unnecessary annoyance, which should be removed.

The main items of ineffective service which make up the total of lost calls are as follows :—

Number Engaged ;

No Reply ;

Wrong Number ;

Miscellaneous ; (that is such items as Cut Off, Third Subscriber connected, Junction Engaged, &c.).

For many years effort has been concentrated on improvement from within, until a saturation point was reached, or in other words the proportion of effective calls remained stationary. When attempting to prevent waste it is usually best to tackle the biggest items first, and as " Number Engaged " is the cause of the greatest loss, this requires early and vigorous treatment by tracing overloaded lines and filtering the calls passed over them. The particulars so obtained are usually sufficient to convince the subscriber that he is losing business, and that it is in his interest to increase his installation.

A campaign on these lines has been in force at Glasgow for some time with gratifying results, as shown by the reduction in the percentage of calls lost because of Number Engaged, indicated by the six monthly averages of the service observation figures given below :—

1926.		1927.	
Jan. to June.	*July to Dec.*	*Jan. to June.*	*July to Dec.*
10.2	9.5	9.0	8.5

It might be suggested that the reduction is due to a fall in the calling rate, but this is not so as there has been a slight rise, the average for all the exchanges under observation being 5.8 for 1926 and 5.9 for 1927.

To secure a reduction as shown by these figures demands steady and persistent efforts on the part of the Supervisors in the Exchanges and members of the Contract and Traffic staffs.

As the known busy lines are disposed of it will be necessary to take preliminary records of engaged traffic on all lines in the Exchanges, and so make certain that no single line or group of lines is overloaded. When a stable figure has been obtained it will still be necessary to keep the subject in mind, as the growth of business may in a few months cause a subscriber's installation to be insufficient to properly carry his traffic. It will not, of course, be possible to entirely do away with loss from this cause, as occasions arise when even lightly loaded lines are engaged when required for another call, but it should be possible to reduce the figure to 8 or even 7%.

The responsibility for loss of efficiency from this cause is a joint concern, shared by the administration and the subscriber, but until the condition of affairs has been pointed out to the subscriber the administration should take the greater portion of the blame. After the subscriber has been advised, the responsibility for losing calls, or causing trouble to his clients is his.

The next item of waste, in order of numerical importance, is that due to " No Reply " on the part of the subscriber. To receive the intimation " No Reply " is a disappointing and irritating experience for which the subscriber is almost always responsible. On the other hand the administration might give the subscriber the benefit of its experience and offer expert advice, particularly in those cases where the subscriber wishes his telephone placed in a position which is not favourable to a quick answer being given at all times, or where the bell cannot be heard all over the house or office.

From an analysis of over 5,000 cases of " No Reply " it appears that the chief reasons for failure to answer are due to (1) the wanted subscriber being out ; (2) not hearing the bell ; (3) not being able to answer before the connexion is cleared ; and, in a few cases, (4) faulty apparatus.

Many subscribers require education on the importance of smart attention to telephone calls ; this is best accomplished by visiting and pointing out the trouble caused to clients. Tactful suggestions as to possible improvements which can be effected by the provision of suitable apparatus and its manipulation are usually gladly accepted and improvement results.

There are, however, certain classes of subscribers who are not particularly anxious about their incoming calls, and so long as their outgoing calls are satisfactory do not desire any improvement. Trouble will also be given by the one person or other office, which is frequently closed.

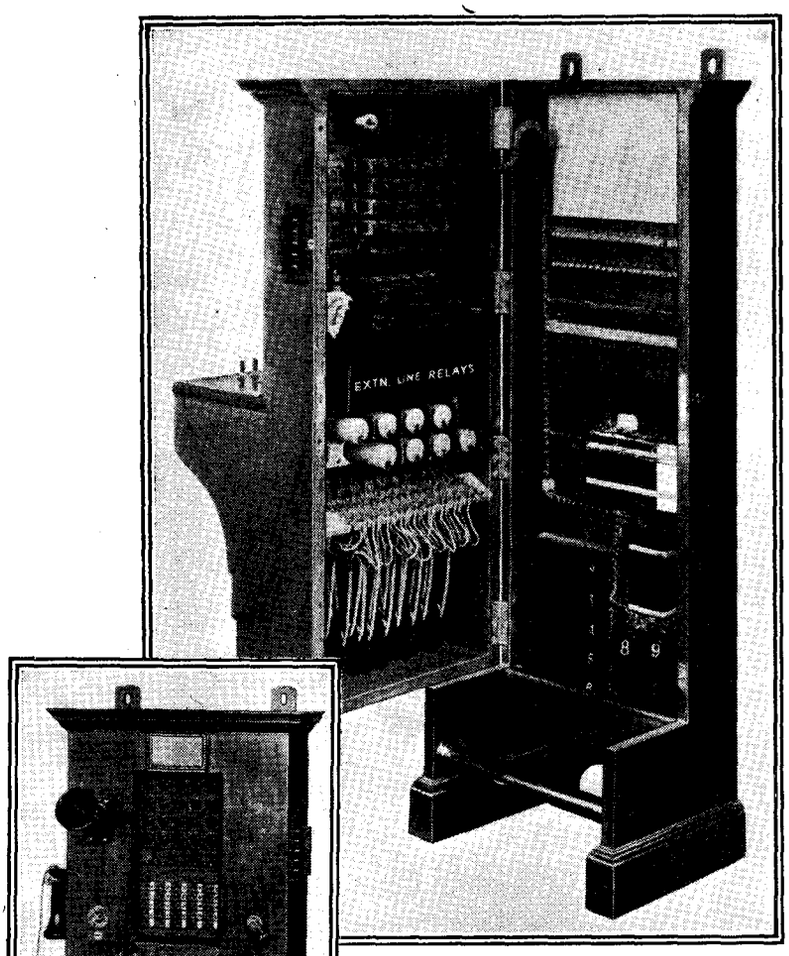
If it were not that Directory space is so valuable, an intimation of the hours of business in these and other appropriate cases might be an advantage. Houses are frequently closed for long or short periods and shops &c. during meal times, and there are also calls made outside ordinary business hours. These and similar cases make it impossible to do away entirely with the trouble, but there is little doubt but that it can, and should be, reduced.

An experimental trial of the visitation of subscribers has been in force for a few months in this District, but sufficient time has not elapsed on which to base a definite opinion as to the permanency of the result.

The following comparison of figures are of interest as showing what improvement is possible :—

PERCENTAGE OF CALLS LOST THROUGH " NO REPLY " :—

	1926. *Before Visiting was tried.*	1927. *Visiting in Progress.*	*Improvement.*
October	2.0	1.8	0.2
November	1.6	1.0	0.6
December	2.9	1.8	1.1



WIRING

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British and Dominion Post Offices ; Admiralty ; War Office ; Air Ministry ; Crown Agents for the Colonies ; India Office ; and Telephone Companies throughout the World.

Makers of the "Laryngaphone" Noise-proof Telephone.

The progressive improvement indicates that the advice to the subscriber is having the desired effect and that if kept up for a considerable time will be productive of good results.

Another source of waste is caused by Wrong Numbers, and from recent investigations it appears that the subscriber and the administration are about equally responsible. Phonetic similarity of numbers, indistinct speaking, and switching errors are the chief reasons for this trouble.

The proportion of calls lost from this cause is in the neighbourhood of 1½% and should be capable of reduction. The subject is, however, an elusive one and demands further study and attention before it is safe to say much about the possibilities of reducing the trouble. It is considered that about 1% is a reasonable figure for Manual Exchanges. A point to remember is that one of these errors annoys two persons—the person calling and the person called.

A number of calls are lost from various miscellaneous causes, that is such as Cut Off, Third Subscriber connected, Junction Engaged, &c. The administration may be said to be responsible for practically all of these causes. Individually they are of comparatively small account as the percentages are fractional, but at the same time they are tiresome items of the service and require watching and curing if possible.

When a telephone service is reasonably efficient further improvement can only be made by careful attention to minute details and progress is relatively slow.

The following figures show what has been done in the face of very considerable difficulty. They are the average of the service observation percentages of calls effective on the first application for periods of six months and are :—

HALF-YEAR ENDING :—

June, 1926.	*Dec.*, 1926.	*June*, 1927.	*Dec.*, 1927.
86.0%	86.2%	87.3%	87.5%

an increased percentage of 1.5. This does not look much, but it means that on a daily traffic of 200,000 calls 3,000 more are completed with the same labour, or number of switchings as formerly. In terms of money value, a waste operating effort costing approximately £6 5*s*. 0*d*. is transformed into an immediate revenue value of £12 10*s*. 0*d*.

This phase of the efficiency of the service affects Automatic systems in much the same way as Manual systems, with the exception that ineffective machine switching operations will probably not be so costly as Manual, but the incentive of an efficient service to the user is worth a great deal, as the greater the efficiency the greater the use made of the service, with corresponding advantages to the revenue.

Is not the success of a telephone service dependent on its time-saving qualities ? The user is not concerned as to where the loss of time is, he wants his message to get there, and it is up to the administration to remove all possible obstacles and so prevent loss of time to the user from such causes as Number Engaged, No Reply, Wrong Number, Junction Engaged, &c., in addition to providing for prompt answer to calls and efficient switching. It is suggested that 90% of calls effective on the first application is a possible standard which should be satisfactory all round, and which should be obtainable without undue expense to subscriber or the administration.

These notes deal only with the waste in delivering the finished product, that is, the effective call. Doubtless there are other phases of waste which are deserving of consideration, and these notes may suggest a theme for an article in the *Journal* to someone who has been making investigations and so bring them into the open and add interest to the "Telephone" Section of the *Telegraph and Telephone Journal*.

SPAIN'S NEW TELEPHONE SYSTEM.

BY MAURICE K. MCGRATH
(*Assistant Vice-President, International Standard Electric Corporation*).

(Reproduced from *Foreign Trade* to which we are indebted for permission to use the illustrations.)

WITH the introduction of electrical communications into the game of commerce, Spain registered the same interest as the other European nations in the development of the various methods that were invented. But like a majority of her neighbours, she placed the telegraph and the telephone in the custody of the Government.

In the case of the telephone, there grew up in the course of time a mixed service, partly government-operated, and partly in the hands of private concessionaires, who were faced with the prospect of turning over their properties to the Government at the expiration of fixed periods. The long-distance lines were partly in the hands of the Government and partly owned and operated by private concessionaires who operated, among other things, the local services of the two principal cities, Madrid and Barcelona, where were to be found more than a fourth of all the telephones in Spain.

Some of the telephone service, both local and inter-urban, was owned and operated by provincial governments. There existed numerous small municipal local telephone plants. Also there was a variety of small local concessionaires. In the central government, the telegraph and the telephone were administered in the same department. Many towns had the telegraph and the telephone stations in the same office, many other towns had one service but not the other, and there was a vast number of communities that had neither

The development of a telephone system is an expensive proposition. It is well known that governments generally have experienced difficulty in providing adequate appropriations to build up and keep up the telephone service, because of the many other demands upon their treasuries. For a small municipal government, this problem becomes immeasurably greater. A small private concessionaire does not have the access to the money markets, an opportunity to make his appeal widely heard, or sufficient actual or potential revenue.

In Spain, the result was that the telephone service, while pretty good in some spots, was decidedly bad in many others, and did not exist as a practical nation-wide network of communications. There were many different types of materials and equipment. Much that was obsolete still continued in use. Apparatus that long since had passed its heyday struggled on in the losing fight to transmit the human voice intelligibly. Lines in many places were decrepit. Some circuits were of copper, some of iron, and others that consisted of the two metals of decidedly different conductivity, placed in parallel.

There was no uniformity or standardisation of equipment, materials or practices. Even in Madrid, there were two distinct types of telephones in service, the common battery and the local battery, and there were scores of different makes throughout the country. Switchboards frequently consisted of several positions of distinct epochs in the progress of the telephone science, and produced by different manufacturers. One might have found in Spain examples of almost anything and everything that had ever been used in the telephone industry anywhere.

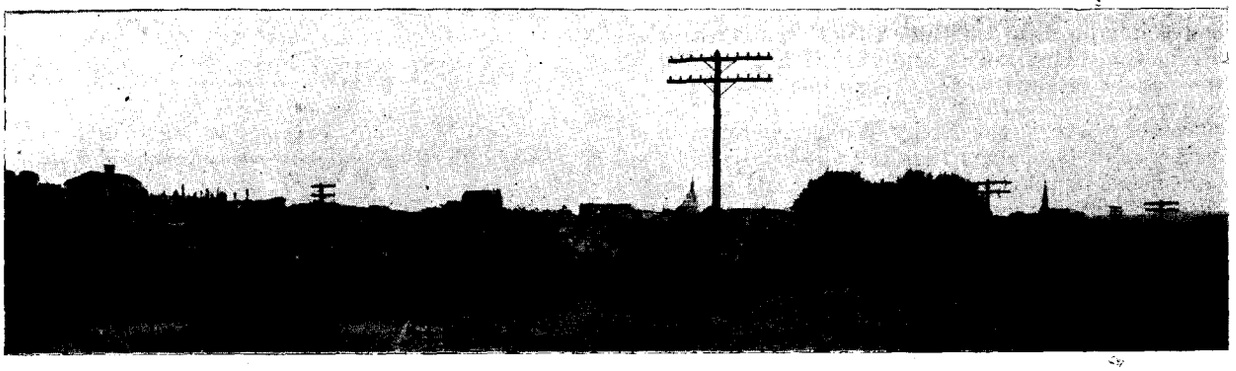
In several places, the switchboards were so old that the operators had to work standing up as was the practice in the early days of Alexander Graham Bell in Boston, carrying long cords from one part of the room to another, and shouting the numbers back and forth to each other. In one city, there were three distinct methods of ringing, and each operator had to remember what type of telephone each subscriber had, in order to call him. Directories were published by private concessionaires, who exploited them for advertising purposes, got them out whenever it appeared most profitable, and paid no serious attention to the accuracy or practicability of the books. The Madrid directory was published in Barcelona, and the Barcelona book in Madrid.

All of this added to the cost and other difficulties of maintenance. In fairness it must be said that there was also some efficient modern equipment in service, but it does not require a technically-trained mind to appreciate that it was not practicable to make the two classes work together harmoniously. The subscriber who was lucky enough to be served by up-to-date equipment suffered nevertheless from the bad equipment that served the person he wanted to call.

Subscribers were allowed to own their telephones and private switchboards. Hence many bought second-hand equipment that was not properly conditioned, others bought solely with an eye to the cheapness, and generally they kept this apparatus in service long after it should have been retired.

Insulations had rotted away, especially where exposed to the weather. There were electrical leakages and the induction, cross-talk and all the other ailments that contribute to make telephone conversations inaudible or drown them out with other noises.

Switchboards were over-congested. Local service was slow and noisy, and long distance service much worse in both respects. There were waiting lists years old of persons who had applied to have telephones installed. In



The Madrid-Zaragoza telephone line entering Guadalajara.

a majority of cases, a subscriber could not make a long-distance call from his own telephone, but had to go to the public telephone office and wait for hours in the uncertain hope of getting a connexion, or make an appointment to come back later, probably the next day. All of the principal arteries of long-distance communication were overcrowded, and during the better hours of the day they were held on a contract basis by important and frequent users, such as newspapers, banks and brokers. To talk from one end of the country to the other was absolutely out of the question.

Such was the situation when, in August, 1924, the Spanish Government, after a painstaking study of the problem, and actuated by a determination to provide the country with a complete, up-to-the-minute telephone service such as her commercial and industrial importance and aspirations deserved, entered into a contract with the newly organised Compania Telefonica Nacional de Espana allowing it to buy, operate and develop all of the various telephone services in Spain, including that of the central Government itself. This contract placed upon the Company the definite obligation to accomplish in five years the very sizable task of completely reorganising and rebuilding the entire telephone service, extending it to hitherto neglected points, and making it equal in quality to any in the world.

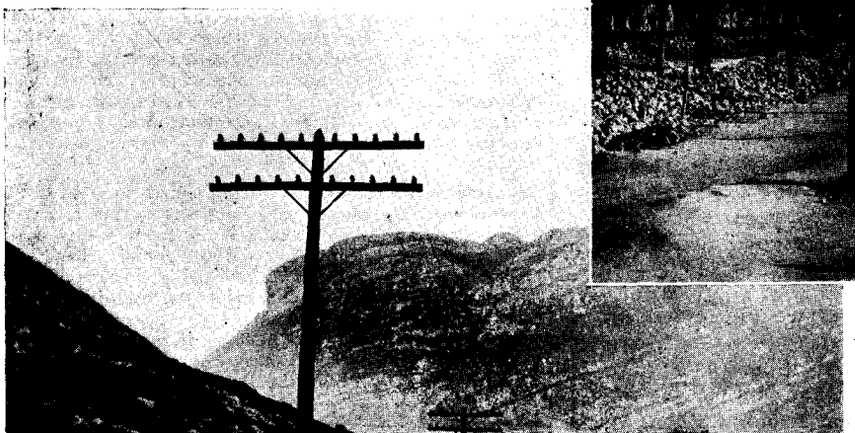
The Company obligated itself to favour local industry to the extent of buying all materials and equipment possible in Spain, provided the prices were not more than ten per cent. higher than in the foreign market, and of doing whatever it could practicably to encourage Spanish industry to supply its needs.

This last-named agreement called for a sweeping survey of the national industry, followed by a campaign to put at the disposition of Spanish manufacturers the specifications and samples of the materials, tools and equipment that would be required. Information was given regarding the extent to which these things would be needed, quantities and times of delivery and everything else that would assist manufacturers in preparing to bid and to make good subsequently on their orders.

While many of the things wanted were already being produced in Spain, it was found generally true that the supply was not up to the additional demand that the new Company and its big job had created over night. A great many other things on the list were not being produced in Spain, but the investigation showed that there was raw material and the potential possibility of creating national production in these lines.

Assured of this new market, manufacturers enlarged their plants, or added departments or features to their organisations. New plants came into existence. The wheels of industry quickened perceptibly from one end of Spain to the other, for the demands were large and varied.

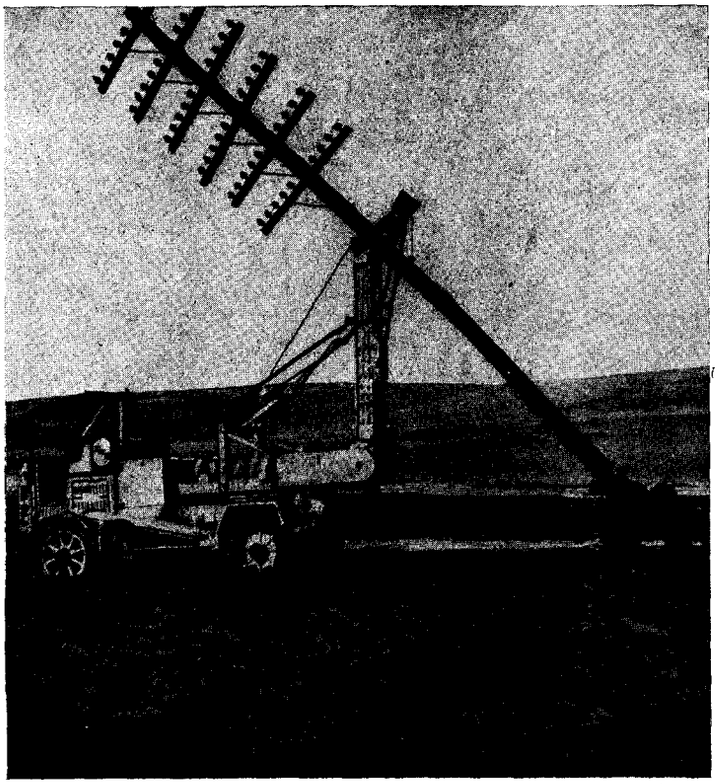
A school for telephone linemen, established in Madrid to train the Spanish construction gangs.



The telephone line from Santander to Bilbao passing through the rugged Mountains of Vizcaya. From Bilbao there is a prolongation to San Sebastian, where it connects with the Madrid-Paris line, thus providing communication between France and all the north coast of Spain.

Although Spain is Europe's first copper producer, it should not be difficult to realise that her production of this metal, which had suffered a set-back at the close of the World War, took a jump when the telephone company set about to tear down all the old iron wire and string only copper

from the Straits of Gibraltar to the Bay of Biscay and from the Levantine shore to the Portuguese frontier. For not only were all the old lines rebuilt from the ground up and the number of circuits increased, but a vast system of new highways of speech were laid out across the map of Spain.



Modern methods of rapid telephone construction in Spain. This American four-wheel-drive machine bores the post hole with a great auger and then plants the pole with the aid of two men.

The new programme also meant prosperity for the woodsmen of the Pyrenees for the plans called for new poles throughout the nation, and the specifications for a much sturdier type of pole than any in use.

New buildings were to be constructed throughout the land, ranging from the immense headquarters and automatic central office, Spain's "Woolworth building," on the Gran Via of Madrid, down to modest two-storey structures on the principal streets of small provincial capitals. That feature of the programme touched a different group of national producers: the iron-masters, the quarrymen, the brick makers, the lumbermen, the cement manufacturers, the glaziers, the cabinet makers, the plumbing outfitters and all the rest.

There were cables to be bought in tremendous quantities, underground conduits, tools galore, motor transportation, furniture, messenger cables, insulated wires, batteries, to say nothing of the more technical requirements of the enterprise, such as telephones, automatic equipment and switchboards.

Of course, much of this demand was of an emergency and temporary nature, but nevertheless the creation of a full-sized and progressive telephone system on a real nation-wide scale meant a certain new and permanent market for all of these things.

Some early orders had to be placed outside Spain, for supplies that did not exist there, or that were not yet being produced in sufficient quantities, but Spanish producers were given the benefit of as large a slice of the orders as they could handle. With this encouragement, production in those lines began to register immediate growth, until to-day there remain very few things that the telephone company cannot buy in the home market.

There was some manufacture of lead-covered cables in Spain, but not enough to meet the rush requirements of the big task. There was also some manufacture of telephones of a suitable model, as well as small switchboards, cords, and various parts. There was, however, no manufacture of automatic central office equipment and supplies.

As the contract called for the establishment of automatic service in seventeen cities within five years to which list the Company graciously added three more cities, and as the production of that sort of highly scientific and exact machinery calls for specialised factory organisation, including equipment and personnel, of a nature that demands time for development, the first orders for automatic went abroad.

However, inspired by a sure and active market, there was organised in Madrid in 1925 a company for the manufacture of all sorts of telephone supplies, including automatic equipment, known as the Standard Electrica, S. A., associated with the International Standard Electric Corporation, owner of numerous telephone patents of the utmost importance. This company was headed by the Duke of Alba and Berwick, as president, and a group of leading Spanish bankers, together with certain American technical experts.

The Standard Electrica, S. A. took over the Barcelona factory of the Telefonos Bell, S. A., originally a subsidiary of the International Western Electric Company, and a small factory of electrical supplies in Madrid; but it set about at once to build two large new factories. One, for the manufacture of telephone cables and cords in Santander for domestic and export consumption, was inaugurated on Aug. 25, 1927, by King Alfonso, and started off on a full production basis the next day. The other, for the manufacture of Rotary automatic equipment and other telephone mechanisms, is being built in Madrid alongside the smaller one, and is nearly ready to start production with a previously trained personnel.

So much for the direct influence on the commercial life of Spain produced by the construction of the new telephone system. It is obvious that to put so much money in circulation in a constructive undertaking has had a further influence in augmenting the public buying power, which has inevitably stimulated both domestic and foreign trade.

More indirectly, perhaps, but no less certainly, the creation of an extensive and efficient telephone service has assisted powerfully in the commercial and industrial progress of the nation in all lines. This is an influence that is destined to become greater year by year as the telephone habit grows among a people who heretofore have had to get along the best way they could without it.

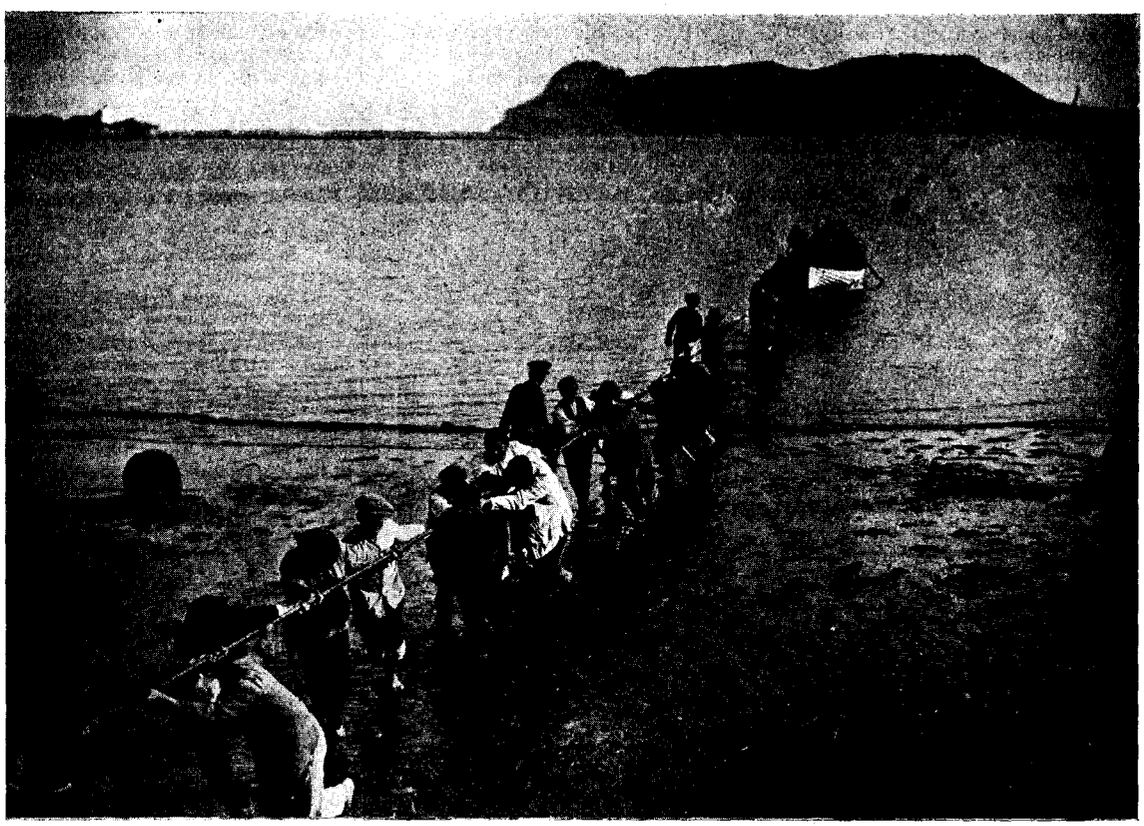
To-day, the telephone service between Madrid and Barcelona, for example, is almost as rapid as local service. The average connexion is

Telephone engineers inspecting the telephone line built in 1925 into the valley of Aran at the foot of the Spanish Pyrenees to bring communications to a rich but hitherto isolated district.

made in less than five minutes, and frequently it is more a matter of seconds. Service on all the principal lines is on an average basis of less than ten minutes, and the majority come within the five-minute class. It is thoroughly practicable and convenient to talk from one extremity of the peninsular to the other.

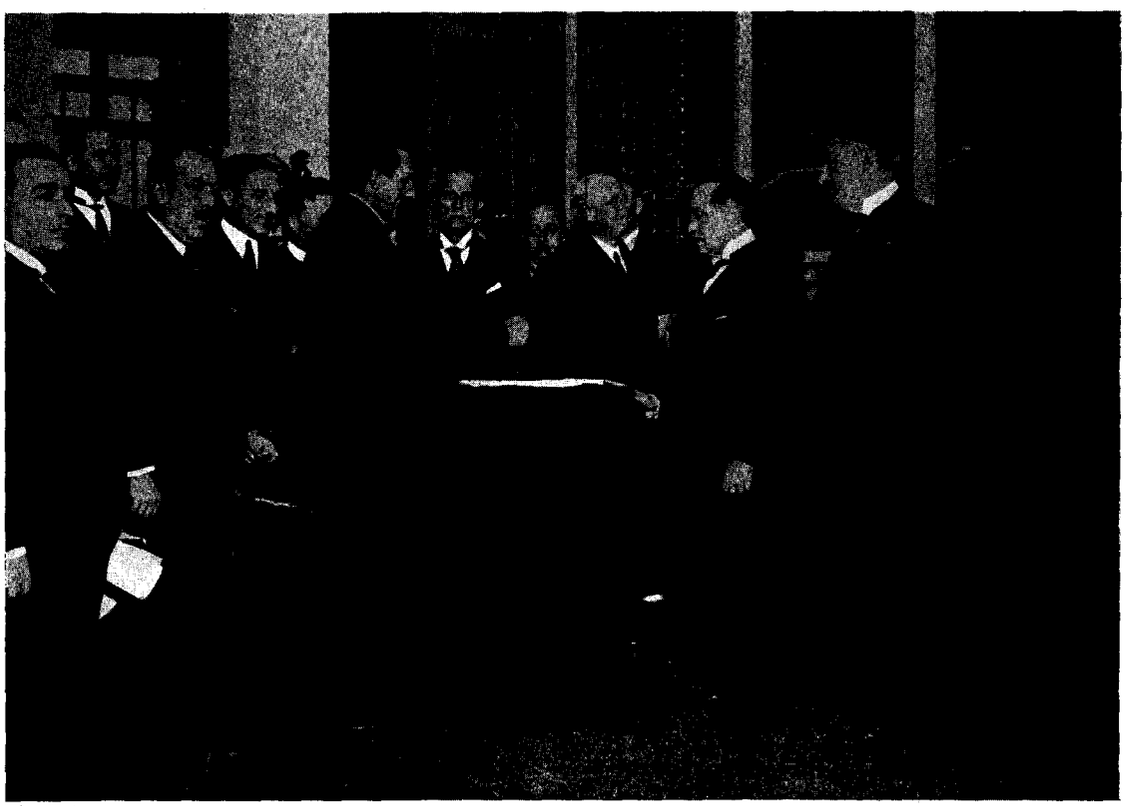
If a ship puts in at Gibraltar, the captain can, to-day, get in quick communication with a shipper or an agent in Bilbao, Santander, Vigo or Coruna on the north coast, Cadiz, Malaga or Almeria on the south, or Alicante, Valencia or Barcelona on the east. A tourist in San Sebastian can make his hotel reservations in Sevilla by telephone. An olive oil producer in Jaen, in the south, can keep in touch with the market in Barcelona and make his sale by telephone. Merchants can direct the operations of their travelling salesmen or agents throughout the country, or solicit the trade directly by telephone. In fact, the uses of the telephone in business life in Spain are now as multiple and beneficial as in the United States.

But the benefits of the telephone for the Spanish public are not to be restricted to the limits of their own kingdom. Lines are now being completed that will connect with the new line the Portuguese government is extending from Lisbon to the frontier, and shortly there will be direct international service from the Spanish capital to that of the neighbour republic on the west.



Landing the submarine telephone cable that unites Africa with Europe on the beach at Algeciras. The Rock of Gibraltar may be seen in the background.

Vast improvement has been made, and others are now nearing completion, in the international service between Spain and France. The French Government is completing additional circuits to Irun, and very shortly better facilities are promised over the Paris-Madrid line. Arrangements have been made to extend the service from Madrid to London via Paris, and it is hoped that this will be an accomplished fact in the early part of 1928.



King Alfonso XIII inaugurating the automatic [telephone service in Madrid, 29 Dec., 1926. Facing the King with one hand on the table, is the Marqués de Urquijo, president of the Compania Telefonica Nacional de Espana and a director of the International Telephone and Telegraph Corporation.

The next great step will be to flash the greetings of Spain across the Atlantic to the New World that her navigators discovered. Then Commercial telephone service will be a reality from every part of Spain to the subscribers of the Bell System in the United States and Canada, and those of the associated companies of the International Telephone and Telegraph Corporation in Cuba and Mexico.

The development has not been limited to the inter-urban service, or the joys of telephoning in comfort to him whose interests lie afar. The change to automatic service has already been accomplished in five cities, including Madrid, the type of equipment being the Rotary, the same which the French Government has also adopted for Paris. Work is under way to give automatic service to fifteen other cities before the autumn of 1929.

In smaller towns, the local telephone service has been reorganised or completely reconstructed. In hundreds of communities that had only long-distance service local systems have been installed, and up to the middle of last October, 499 towns had been connected to the service which previously had been completely isolated telephonically.

Even in the larger cities that eventually are to have automatic service, the manual service has been enlarged and improved generally to take care of the public needs provisionally until the permanent change can be realised.

In Madrid, for example, one new manual exchange was built to relieve the desperate congestion in the down-town area for a year, pending the completion of the new automatic plant.

Underground cables are being substituted for over-head wires and cables in all the more important cities as a part of the reform of the local service. This work is planned with an eye to the future, so that more cables can be put into service as the growing demands for service require, without the necessity of digging up the streets again, at least within the present generation.

The underground cable plant and the complete new automatic service throughout the city of Madrid were inaugurated on Dec. 29, 1926, by King Alfonso XIII. On the same occasion, His Majesty broke the European long-distance telephone record, speaking over a circuit 3,800 kilometres long from Madrid to Coruna via the four corners of his Kingdom.

This circuit took in Ceuta, in the Spanish protectorate of Morocco, by means of a submarine cable that was laid from Algeciras, Spain, to Africa four months after the signing of the contract with the Compania Telefonica Nacional de Espana. This was the first spectacular achievement of the new Company, although, as a matter of fact, telephonic communications had been established a month previously between Madrid and Tetuan, the Spanish military headquarters in Morocco, by the installation of emergency repeaters, the extension of the southern trunk line to Algeciras, and the ingenious application of a government telegraph cable to telephone uses by the engineers of the International Telephone and Telegraph Corporation, who are the technical advisers of the Compania Telefonica Nacional de Espana, and who have directed the construction programme.

That the telephone is really being used in the business life of Spain is indicated by the fact that the Company is now handling more than 5,000,000 long-distance calls a year and more than 3,400,000 *telefonemas*, which are written messages transmitted verbally. The number of long-distance telephone calls made in Spain last September showed an increase of 27% over the figure for the corresponding month of the previous year. Some of these calls are social, but the great majority are of a business character.

The Spanish press depends almost entirely upon the telephone for its news. Not only do reporters use the telephone on their daily rounds as they do in the United States, but nearly all of the out-of-town news is transmitted by telephone. There is no great general press association in Spain in any way similar to the Associated Press, but each newspaper has its staff of correspondents who send in *telefonemas* or more generally dictate their news over the long-distance telephone.

Madrid, being the capital, is the most important news centre. It is also, curiously enough, the exact geographical centre of the peninsula. The result is that the telephone system has been developed roughly in the form of a wheel, with Madrid as the hub, and lines extending from it in all directions to important coast cities, which are united by lines that skirt the coasts and frontiers, and are comparable to the rim of the wheel.

This is a notable advantage not only for the Madrid newspapers in harvesting news from the rest of the country, but also for the army of correspondents who live in the capital and talk daily with the string of papers, large and small, which they represent. In the business and official centre of Madrid, the Company has fitted up a species of club as headquarters for the correspondents, where they may collect and prepare their items, and transmit them from specially constructed booths.

One of the most difficult and spectacular news stunts that the Company is called upon to handle in this way is the transmission of the lucky numbers in the drawing of the Christmas lottery. The interest in the results is nation-wide and most intense, and the rivalry among the correspondents is keen. The drawing begins at 9 a.m. in the Mint. As each number winning a prize is drawn, it is telephoned immediately to the press room in the telephone office, where the correspondents relay the information to their respective newspapers.

Of course, only the largest newspapers care to take the entire list in this way, but every newspaper is interested in the principal prizes, and in all prizes that fall to their respective localities. The drawing lasts about four hours, and often some of the big prizes, even the capital one of 15 million pesetas, do not appear until near the end. Then it is a race to see who can get the first extra on the streets. There used to be tremendous outcries in the newspapers over the slowness or the complete failure in the transmission of the list, but last Christmas it reached the farthermost corners of Spain without the least delay.

The authorised capital of the Compania Telefonica Nacional de Espana is 600,000,000 pesetas of common stock and 600,000,000 pesetas of 7% preferred. Of this, 50,000,000 pesetas in common stock and 200,000,000 in preferred is actually in circulation. The preferred issues have all been absorbed quickly in the Spanish market.

The president of the Company is the Marqués de Urquijo, head of the chain of banks which bear his name, and one of the foremost industrial figures in Spain. He has associated with him on the board a select group of Spanish financiers and several of the chiefs of the International Telephone and Telegraph Corporation.

There are in round number 11,000 employees, virtually all Spanish, and the majority of them former employees of the old telephone systems that were purchased by the new Company. There are a few technically expert Americans and other foreigners, mostly retained in a temporary capacity for the training of the personnel and the completion of the big construction job.

A school has been established by the company in Madrid, available to all the personnel, where regular courses are given in all subjects affecting the work of the company, from the Three R's up to office work and electrical engineering.

In this school, among the many students who have passed through, it is worthy of note that every cable splicer who has worked on the construction of the underground systems of Madrid, Barcelona and the many other cities, received his entire training from the ground up here under Company teachers, for cable splicing was an unknown trade in Spain before the new telephone organisation came into being. Here, too, were trained the linemen who built the new long distance plant; and here the telephone operators of Madrid, whose old jobs died the night the automatic came to life, have been trained for new jobs in the Company.

THE C.T.O. LIBRARY.

THIS admirable institution, so enthusiastically and efficiently organised and managed, celebrates its fortieth birthday during the present year, and the satisfaction expressed in the Committee's Annual Report for the year ended December, 1927, is fully justified.

Figures, it is said, may be induced to prove anything, but the straightforward figures as given in this report attest their own truth thus:—

Quarterly subscriptions have advanced from £64 13*s*. 0*d*. to £72 15*s*. 6*d*., and the total for the year shows an increase of £41 9*s*. 6*d*. over that of 1926.

The rise in income has been maintained for 32 consecutive quarters, the figures in the first quarter of 1925 being £43 14*s*. 0*d*., and in the last quarter of 1927, £72 15*s*. 6*d*. The yearly income is now £270 13*s*. 0*d*.

The quarterly totals for membership during the same period have risen from 484 in the first quarter of 1925 to 803 in the last quarter of 1927.

The membership, which for the December period numbered 803, is analysed thus: 548 men and 255 women; representing 1,093 fully paid shares.

As a result of the increasing membership, the number of books issued has steadily risen, and the totals from 1920 are as follows:—

1920	14,774	1924	26,173
1921	18,489	1925	32,466
1922	20,720	1926	42,781
1923	23,881	1927	51,698

Deducting closed periods for stocktaking and public holidays, the total for 1927 thus gives a weekly issue of well over one thousand books.

The Committee make gracious recognition of the friendly and practical assistance of the ex-Controller, Mr. John Lee, and gratefully place on record the valuable help of their late and much esteemed President.

Under the most friendly ægis of Mr. J. Stuart Jones, Mr. Lee's equally interested and sympathetic successor, not forgetting that hard-working Librarian, Mr. A. Pethurst, there is every hope that the close of the fourth decade behind this self-supporting, staff-controlled C.T.O. amenity will see the attainment of yet greater achievements.

Due acknowledgment is given to the score or so of donors from whom additions to the library have been received during the year, for the voluntary assistance of certain members during the strenuous stocktaking period, and last, but not least, to the Controlling and Superintending officers and to the members for their most loyal support. J. J. T.

OBITUARY.

MR. W. W. GOULD, GLOUCESTER.

WITH deep regret we announce the death of Mr. W. W. Gould, Clerical Officer with allowance, Gloucester District Manager's Office, who, after a long and trying illness, borne with fortitude, passed away on Feb. 5 last. By his death the Department has lost a zealous officer.

During his service at Gloucester, Mr. Gould had earned the confidence of all members of the staff who feel very keenly the loss of a respected colleague.

Mr. Gould was well known in the Midlands where 14 years of his official career were spent. He entered the service of the National Telephone Company at Wolverhampton in 1899, and was transferred to the service of the Post Office on Jan. 1, 1912.

Prior to the transfer of the National Telephone Company's system to the Post Office, he served on the Inventory Staff.

In October, 1912, when the Wolverhampton District Office was closed, Mr. Gould was transferred to the Birmingham District Manager's Office, and a year later was promoted to the rank of Overseer at Gloucester.

TELEGRAPHIC MEMORABILIA.

AUSTRALIA.—Reuter's Canberra agency states that the report of the Australian Postmaster-General for the year 1926-27 shows a loss of £172,000, as compared with a loss of £285,000 in the previous year. During the year international messages containing 4,418,000 words were dispatched *via* the Pacific cable and 3,940,000 words were received, yielding a revenue of £66,000, as compared with £72,000 in the previous year. Over the Eastern Extension cable messages containing 5,533,000 words were dispatched and 5,645,000 words were received, yielding a revenue of £114,000, as compared with £121,000 in the previous year. From the inauguration of the "beam" wireless service on April 8, 1927, to June 30, 1927, 760,000 words were sent from Australia and 571,000 received. The report adds that because of its high speed, great capacity, and other considerations this service has materially strengthened the chain of Empire communications.

The Canberra correspondent of the *Daily Telegraph* also reports that Senator Thomas, on Mar. 9, moved a resolution that plain language messages by "beam" wireless should be charged at 1*d.* per word. He said that at this rate the traffic would increase to 50,000,000 words annually, which would yield a revenue of £208,000. As the company paid £8,000 in the expenses of running the traffic, there was no reason why with a penny a word it should not make ends meet. If necessary, the Government should take over the business. The debate was adjourned.

In the same report of the P.M.G. of Australia it is also recorded that during the period mentioned there were 225,000 wireless licences in force, of which 119,000 were in Victoria. The total fees amounted to £307,000.

Reuter's Trade Service, Melbourne, adds the interesting information that it is understood that the Postmaster-General's Department is endeavouring to persuade the private broadcasting companies in Australia to co-operate with the object of saving unnecessary expenditure and improving the broadcasting services all round. The Department thinks it possible, by effective co-operation, to save £30,000, which might put non-paying stations on a sound basis. The suggestion for co-operation came originally from the Royal Commission on Wireless, which discovered an unequal state of affairs in the relations of stations in the Commonwealth. The Commission suggested that the revenue of all stations be pooled and that £5,000 operating expenses be paid annually to each station.

The same agency also informs us that a Roman Catholic broadcasting station established at the Eucharistic Congress office, St. Mary's Cathedral, Sydney, has been given a thorough test. The new station is working in conjunction with 2UE, Randwick, a "B" class station, and it is stated that 2UE has been specially leased for the Eucharistic Congress to be held at Sydney this year.

The general manager of the Broadcasting Company of Australia Pty., Ltd. (3LO), Melbourne, has announced details of a new plan for investigating atmospherics, and wireless fading shortly to be undertaken by 3LO. The Wireless Institute of Australia is expected to co-operate in the experiments, which it is hoped will show, in a general way, where static and fading are at their worst.

From the *Electrical Engineer of Australia and New Zealand* we gather that the Postmaster-General's Department intends to effect a re-allocation of broadcasting wavelengths. The wavelengths of Class A stations will not be altered greatly, the tendency being downwards to 300 metres for main stations and to 250 metres for country stations. The Class B stations will accommodate between 200 and 250 metres.

BOUVET ISLAND.—According to the London *Telegraph*, Lars Christensen, who sent out the Norwegian expedition which occupied Bouvet Island in the South Atlantic, has taken steps to erect a wireless meteorological station on the island. If conditions permit the station will work all the year round, and will thereby be able to give vital weather forecasts to South Africa, South America and all navigation in that part of the Antartic. It is understood that Lars Christensen intends to defray the entire cost of the erection and the running of the station.

CHINA.—The *Electrical Review* reports that the radio station at Harbin commenced broadcasting on Jan. 1. The wavelength is 445 metres, and its signal is COHB. It is said to be the largest station so far constructed in North China.

The *Electrical Review* says that in addition to the short-wave wireless station recently built at Nanchang, Kiangsi provincial capital, the authorities are contemplating the construction of a broadcasting station there and the installation of receiving sets in all districts in the province, so that lectures and news may be broadcast from the capital to the whole province. A short-wave wireless station has also been built at Kiukiang, Kiangsi province, for military use.

CONGO (THE).—An agreement has been arranged between the Government authorities of French Equatorial Africa and the Belgian Congo for the laying of telegraph and telephone cables across the Congo river between Brazzaville on the one side and Kinshasha-Leopoldville on the other.

FRANCE.—The future of broadcasting in France is still undecided pending a full official inquiry. In the meantime the broadcasting interests are being permitted to continue their activities, though this concession has only been granted after strong protests against the earlier edict that all private broadcasting must cease on Feb. 1, as already mentioned in these columns. A Paris correspondent of the *Wireless World* states that official plans provide for the division of the country into eighteen "transmission districts," each served by its own Government station. In Paris, Bordeaux, Grenoble, Lille, Limoges, Lyons, Marseilles and Toulouse official stations are already in operation. It is expected that each station will eventually have a power of 3 kw.

Though nothing is yet definitely known of the broadcast system that the Government is preparing, it would seem that the State monopoly project has been seriously compromised by recent events. The *Wireless Trader* reports that the mass of opinion, outside circles interested in State industry, is against State monopoly. On the other hand, the situation of wireless is now fundamentally altered inasmuch as the regulation of it is at last recognised as a question of national importance, a point which, in fact, is not infrequently missed on *this* side of the Channel, not only regarding broadcasting but as regards the more recent developments of radio communication. A settlement outside Parliament is no longer possible. It is doubtful whether anything will be done before the new Parliament meets, and the only certainty of the moment is that the Government has not taken sides with the State monopoly party (Post Office officials), or the partisans of "controlled liberty" (the trade and most of the general public).

The wavelength of the Tour Eiffel station, now 2,650 metres, will be reduced to 1,400 metres before the end of the current year. This is a consequence of the decision of the recent Washington Congress, fixing at 1,340-1,875 the zone for long-wave stations. It is believed that the power of the station will at the same time be advanced to 100 kw.

The Paris correspondent of *The Times* reports that the Chamber adopted, on March 13, a measure introduced by the Government to regularise, until definite legislation is passed, wireless broadcasting from French stations. This measure authorises the Government to renew the broadcasting licences of all stations existing before Dec. 31, 1927, the date when the last legislation on the subject expired. Broadcasting stations created after that date must be closed, and those which have been transformed or improved must revert to their original condition within a month of the promulgation of the Bill. The erection of new stations will not be permitted for the present, but those devoted to experiment and research will be allowed to function.

GERMANY.—Reuter's Essen agency cables that owners of wireless sets have formed a union for the purpose of protecting their rights, and have affiliated themselves to the National Society and Rhenish-Westphalian Wireless Dealers' Federation. The first move of the new Union is to pass a resolution, which has been forwarded to the Government Commissioner for Wireless, the Postmaster-General for the Dusseldorf area, the Oberburgermeister of Essen, and the Chief of the Essen Tramway Administration, to the effect that owners of wireless sets will decline to pay the Government licence fees unless and until the interference with reception caused by the overhead wires of the tramways is abolished. Many experiments have been made, and are still being continued, to overcome this trouble.

The new broadcasting station at Kaiserslautern, inaugurated on Feb. 20, is at present limited to a power of 2 kw., but if no interference is caused to French communications, it will be increased to 4 kw. The station works on a wavelength of 204.1 metres, and programmes are relayed from Stuttgart and other stations in the area.

The report of the Siemens and Halske Company states that the works were adequately occupied during the year ended Sept. 30, 1927. The advantages of rationalisation were generally counterbalanced by increases in production costs, and in many branches advances in prices had to be made. In foreign markets the instances were increasing in which it was no longer possible to sell manufactures with advantage. Business revived in the second half of the year. In the telephone branch mention is made of noteworthy orders received from Italy, Holland, Finland, China and Japan. Telephone cables were ordered for the Reich postal service. An important reparation transaction was represented by a long-distance telephone cable between Paris and Bordeaux, which was ordered by the French administration.

The death of Mr. Alexander Siemens at his home at Milford-on-Sea, England, on Feb. 16, has been recorded with deep regret by the British electrical press. Born in Hanover in 1847 he came to England in 1867 and joined the firm of Siemens Bros.

He assisted in erecting the Indo-European telegraph line in 1868, and in laying cable in the Black Sea in 1869. In the early 'seventies he worked as a pupil of the late Sir William Siemens, assisting in building regenerative gas furnaces and in laying submarine cables from 1875 onwards.

He was entrusted with the management of Siemens Bros'. Electric Light Department about the year 1873 and installed the electric arrangements for the lighting of the Albert Hall and the British Museum Reading Room, and also the electric illumination of Godalming, Surrey, the first town in England, I believe, to have electric lighting.

He was twice President of the Institution of Electrical Engineers, in 1894 and 1904, as may be seen recorded on the walls of the marble entrance hall of the Engineers' Institute, Victoria Embankment, London.

He became a naturalised British subject as far back as 1878, and leaves behind him probably a record period of years of close and prominent association with electrical service and industry, and the latter covering quite the earlier years of telegraph and telegraph cable development.

GREAT BRITAIN.—*Parliamentary Queries.*—On Feb. 21 Mr. Kelly asked whether, in view of the delay which occurred in telephoning and telegraphing by reason of the number of overhead wires brought down in recent storms, any further extensive scheme of transfer to underground cables was to be entered upon.

Sir W. Mitchell-Thomson, the Postmaster-General, said that a large number of overhead trunk telephone and telegraph wires had already been placed underground, and further routes were being so transferred. Where practicable a service by means of alternative underground wires was maintained when overhead routes were put out of service by storms. The isolation of commercial centres by breakdown of overhead lines was now rare and of brief duration.

As an example of the nature of the extensions of the underground system in Great Britain the following news-item may aptly be quoted hereunder :—

" It is expected that work will be commenced in May in connexion with the construction of an underground telephone and telegraph cable to link up Aberdeen with London and intervening centres. The cable from Aberdeen will extend for approximately 50 miles to Arbroath, where it will be linked up with one from Dundee. About six miles of duct work have been completed from Dundee to Monifieth, to which place a cable is being laid, and advantage is being taken of this work, and ducts for the Dundee-Arbroath cable are being constructed at the same time."

On Feb. 21 Captain Streatfield asked the Postmaster-General whether he would consider reducing the telephone rentals charged to farmers from business rates to residential rates.

Sir W. Mitchell-Thomson regretted that he was not in a position to give farmers exclusive telephone lines at lower rates than subscribers engaged in other businesses. A telephone service for farmers and residents in rural districts was available at specially low rates by means of rural party lines.

On Mar. 5, in the House of Commons, Capt. Fraser asked the Prime Minister whether he could now state what decision had been arrived at by the Government regarding the broadcasting of controversial matter.

Mr. Baldwin said that the Government had reviewed the decision, taken at the time of the constitution of the British Broadcasting Corporation, under which the Corporation had been prohibited from broadcasting : (*a*) Expressions of opinion by the Corporation on matters of public policy, and (*b*) statements involving matters of political, religious or industrial controversy. The Government had decided that the first of those prohibitions, i.e., that on the issue of " Editorial " pronouncements, must be maintained ; but the second should be withdrawn forthwith.

On Mar. 7, Sir William informed Mr. Ammon that the number of messages sent or received by the Post Office beam services during the week ended Feb. 26 was : Australia, 7,130 ; Canada, 4,686 ; India, 15,122 ; and South Africa, 8,516.

There was evidence that the total traffic with the Dominions by cable and wireless was now considerably greater than it was before the beam services were established.

On Mar. 13 Sir William stated that wireless licences covering experiments in television had been issued to a number of persons. He understood that tests had been carried out, but his technical advisers considered that the matter had not yet advanced beyond the experimental stage.

On March 19, in the House of Commons, Earl Winterton (Under-Secretary for India), in answer to a question regarding Beam-Cable fusion and cable rates to India, said no representations had been received from India regarding apprehension lest a merger of the Marconi Company and the Eastern Telegraph Company might deprive the Indian public Press and trading community of the benefits of the telegraph services, but the Government were fully alive to the possible danger of a monopoly and an artificial inflation of cable charges to and from India.

On March 22 the Prime Minister, on the Cable and Wireless merger, made the following statement : " The Government and the Imperial Wireless and Cable Conference have no previous knowledge of the details of, and have no responsibility for, any financial arrangement or merger of the Eastern Telegraph Company and the Marconi Company.

" As regards the general question, I cannot make any statements in advance of the reports from the Imperial Wireless Conference, which only on Monday received proposals from the two companies.

" Since hon. members have systematically inquired as to the attitude of the Government, I think it only right to say that the Government, while it is prepared to join in discussing measures for working arrangements, is not committed, even in principle, and reserves freedom of action in regard to any proposals for transferring the operation and control of Imperial wireless services at present administered by the Government."

The Report of the Committee appointed by the Postmaster-General last July, " to examine the possibility of effecting substantial economies in the working by the State of the Inland Telegraph Service," was presented to Parliament on the 22nd ult., and contains many interesting criticisms and suggestions.

Senatore Marconi, in a recent statement in London, was understood to say that great as had been the developments of wireless since the introduction of the " Beam " those of the next two or three years would be even more sensational. He was certain that before very long we should be in telephonic touch with all the Dominions. He hoped to have the necessary arrangements ready for telephony between England and Canada in about a couple of months.

Technically the whole thing could be completed in a very few months, given the necessary Government co-operation, and with the Government, said the Senatore, rested entirely whether the scheme was encouraged or delayed.

According to the *Times* he expatiated on the immense development of the means for transmitting facsimiles of whole sheets of typescript in their original form. Very shortly they would try it with Canada.

Senatore Marconi appears convinced that ultimately facsimile would supersede Morse—for purely business and social traffic it is presumed.

The Imperial " Beam " wireless services were carrying a larger volume of traffic than any other wireless services in the world, and in the next few months services would also be working from France, Germany, the U.S.A. and Japan. Spain was opening direct communication by " Beam " with North and South America. Japan already had a wireless service to the U.S.A. and was about to introduce direct wireless services with England, France, Germany, Italy, India and Argentina.

Mr. H. G. Williams, M.P., Parliamentary Secretary to the Board of Trade, recently referred to a new invention of wireless direction-finding by the rotating loop system, which was likely to revolutionise methods of navigation. He said up to now the proportion of ships fitted with wireless direction-finders was small, but that number was steadily increasing. Experiments were now being carried out with the rotating loop system which, if expectations were realised, would place wireless direction-finding at the disposal of ships which were equipped with ordinary wireless apparatus.

The number of receiving licences issued in Great Britain and Northern Ireland brought the total number of licences to the remarkable figure of 2,418,131 not including 14,255 free to blind people. The actual increase for the month of January of this year was 34,405. By the end of February there was a further increase of 33,000 on the January figures bringing the total to 2,451,051. Since the beginning of December there has been an addition up to the end of February of 95,000 new licences or an average increase during a period of three months of over one thousand per day.

It is considered in some quarters that these increases are largely due to the opening of the Daventry experimental station, 5GB.

Be this as it may, it is nevertheless a curious coincidence that, quite unconnected with radio or broadcasting, and when reading an account of German Opera in the Ruhr by Cyril Scott, I ran across the comments of an Essen musical director who, speaking to the English critic on musical taste in England, declared that, " in the field of broadcasting some of the best music comes from Daventry.

Not so long ago a company was formed at St. Annes to furnish the public with a " wireless-on-tap " service. Over 300 houses in the town are now using the service, a loudspeaker, connected like a telephone to a control distributing station, being installed in every house ; by turning a switch, or putting in a plug, the occupants receive the wireless broadcast programmes just as they would on a receiving set with a loud-speaker ; no wireless apparatus is required in the house. A small weekly rental is charged, but there is no capital outlay. A larger company is now being formed to develop the service throughout the Fylde area.

During a storm on Feb. 10, lightning struck the aerial of the Community Radio Company's receiving station at St. Annes, but it passed safely to earth, and no damage was done.

The death took place at Barrowford last week of Mr. Barnabas Faraday, a descendent of the famous Michael Faraday, at the age of 85.

The Winnipeg correspondent of *The Times*, reporting on the event of the establishment of direct telephone communication by radio between Winnipeg and London, adds that in the near future the service will be extended to France, Germany and other European countries. The calls are made via Chicago, but should the system proposed by Marconi's be established to Canada, Winnipeg will be able to communicate with London by an all-Canada route, as direct telephone connexion with Eastern Canada will be established next month.

According to the London financial journals the balance sheet of the American Telephone & Telegraph Co. as at Dec. 31 last shows a surplus of assets of $272,435,982. The total income for the past year was $216,524,824, and the net income was $128,614,910, of which dividends absorbed $97,379,934. The total carried to surplus was $79,173,841.

The Bell System accounts for the year show total operating revenues of $894,699,173, and a net income of $166,059,152. Dividends absorbed $112,401,125, and $101,596,892 was carried to surplus.

The Federation of British Industries has written to the Chancellor of the Exchequer and the Postmaster-General urging that " the transmarine services, wireless and cable, at present operated by the Government, should be transferred to commercial hands. The Federation points out that, in spite of high charges, there were deficits amounting to something like £1,500,000 a year on the telegraph services, wireless and cable, operated by the General Post Office. Commercial operation was more likely to have beneficial results, by relieving the taxpayer of the deficit and by an improvement in the service.

It was of importance that the "Beam" service should be developed in the interest of cheap and rapid communications, and the Government was asked to give an assurance that nothing would be done to hamper the freest and fullest development of wireless telegraphy."

Recent developments regarding cables and wireless interests amounting to well over fifty million pounds sterling have quickly shown that the entire matter is one that has the possibility of wide-reaching re-percussions within it; maybe in unlooked-for directions from a national and inter-colonial view-point. The paragraph quoted above from the F.B.I. is therefore simply inserted to keep our readers in touch with events, and opinions which bear upon matters telegraphic and the present transition period.

With the latter end well in view it will not be out of place to emphasise the American estimate of radio and cable under "U.S.A.," as expressed in the last paragraph by Mr. Clarence Mackay, it is only fair to mention that the one thing which set the share market boiling was the result of the conference between the wireless and cable interests and the issue of the following statement by the Eastern and Associated Telegraph Companies and Marconi's Wireless Telegraph Co., Ltd., on the 14th ult.

"An arrangement has been provisionally arrived at, on the recommendation of Sir William Plender and Sir Gilbert Garnsey, between the boards of the Eastern and Associated Cable Companies and the Marconi Wireless Telegraph Company for a fusion of interests through the medium of a proposed holding company subject to a satisfactory agreement being made with the British Government and the Governments of the Dominions and India, and also to acceptance by the stockholders and shareholders of the companies concerned.

"No announcement of the terms of the arrangement can be made in the meantime, as its consummation is dependent upon the conditions above mentioned. "(Signed) J. DENISON PENDER,
"Inverforth."

The total face value of the shares of the two interests is said by the London Press to reach the enormous figure of £53,000,000, of which that of the Eastern group reaches no less than 36½ millions.

The *Daily Telegraph* City editorial ended its week-end view of the situation on Mar. 15 with the following words: "A considerable time must elapse before the approval can be obtained and the position become clearer. Until the scheme is more detailed and later figures are available of the earnings of the companies concerned . . . there must be considerable room for differences of opinion."

On the top of the Eastern-Marconi combination comes the news from across the Atlantic of the huge American fusion with Mr. Mackay as President, and so the telegraph world moves on!

HOLLAND.—The Second Chamber has passed a Bill providing for the official regulation of broadcasting. The new law will be incorporated in the Telegraph and Telephone Act, and will be put into effect by Order in Council. An amendment was moved and accepted to provide for the equal division of the hours of transmission between the various broadcasting societies, i.e., neutral societies, Roman Catholic, Orthodox Protestant, &c., and was duly accepted. A Government proposal to levy a fee of ten florins for each receiving set was withdrawn.

HUNGARY.—Budapest informs us through the medium of Reuter's Trade Service that a wireless telephone company has been founded for the purpose of installing receiving sets on the trains of the State railways and also in the waiting rooms at the big stations.

Arrangements are being made to increase the power of the Vienna broadcasting station, and it is stated, says the *Electrical Review*, that the new Budapest station will be more powerful than the existing one. The number of radio subscribers in Hungary is 800,000, the bulk of whom are in the Budapest area.

INDIA.—A definite advance has been made by the Telegraph Department in India with regard to the quick transmission of heavy Press messages to different stations at one and the same time. The Department has now carried out successful trials in transmitting messages to offices in different directions in one operation from Delhi. In this arrangement, the Baudot printing telegraph system of working is used. It is understood that the Department proposes to adopt this system of control in large telegraph offices which would enable engineers to get the best results out of the lines and apparatus available. With regard to the service between India and Burma, which has often been subject to delays on account of damage to the line by storms, the difficulties are being overcome by a special system of wireless working, and delays to Indo-Burma traffic are now a rare occurrence.

As regards broadcasting, the following two paragraphs, respectively on the authority of the Indian correspondent of the London *Daily Telegraph* and Reuter's Bombay Agency, clearly show the present situation.

The future of broadcasting in India is a matter for speculation. The Company has apparently been unsuccessful in its attempt to obtain a subsidy from the Government of India, and Mr. Eric Dunstan, the manager, after having an interview with the Viceroy, has left for England to endeavour to interest wirelesss manufacturers in the provision of further capital to put broadcasting in India on a firm basis.

Following upon the unsatisfactory financial position of broadcasting in India, attributed largely to the extent to which "piracy" is practised, rumours have been current recently regarding the future of broadcasting in India. It is now understood, however, that the Indian Broadcasting Company has definitely decided to continue its present services both in Bombay and Calcutta, but the hours of broadcasting will be slightly reduced as from Mar. 1.

IRISH FREE STATE.—At a recent meeting of the Free State Broadcasting (Advisory) Committee, says the *Electrical Review*, it was stated that the Committee had considered the suggestions received from listeners in response to the invitation recently issued. Thirty-eight letters were received from a total number of 27,000 licensees, and it was agreed that the criticisms and suggestions which they contained could not be accepted as sufficiently representative of general opinion on programmes to justify any serious attempt to frame programmes in accordance with them. It was found to be impossible to reconcile in any general way the views expressed. The Committee recommended, however, that the broadcasting officials should consider the letters carefully, with a view, so far as they might judge best, to framing programmes so as to preserve a fair balance between the various classes of programme items, while maintaining such a general standard of programmes as would ensure the value of broadcasting as a means of public education in the musical as well as in the general sense.

ITALY.—"*Secret*" *Telegraphy*.—The Italian Government has acquired, in the "interests of national defence," an invention covering "a system of telegraph and radio-telegraphy combined with a method of typewriting adjusted to guarantee security of communication," says the *Morning Post*. The inventor is a Leghorn engineer, Manrico Compare, who, finding little encouragement in London, communicated his experiments to the Scientific Congress at Innsbruck, and it was there that the Italian Government opened negotiations for tests that have ended in the acquisition of the patent.

It is understood that the invention is of the cryptograph type and is not unknown to telegraph engineers. If so it is not likely to prove of practical use so far as commercial telegraphy is concerned.

The Rome correspondent of the *Financial Times* reports that the Compagnia Italiana dei Cavi Telegrafice Sottomarini (Italian Submarine Cable Company) proposes to reduce the value of its assets in accordance with the gold parity of the lira. A shareholders' meeting is convened for Mar. 31, when sanction will be asked for correspondingly reducing the company's capital, which is at present 300,000,000 lire, of which 250,000,000 lire is paid up. At the same meeting the re-increasing of the capital will be considered.

NORWAY.—The Oslo correspondent of *World Radio* reports that the directors of the Broadcasting Company have now definitely approached the Norwegian Government (Board of Trade Department) with a detailed and exhaustive statement of the state of broadcasting in Norway, and the methods by which pressing difficulties might be met. The question of the establishment of one large and powerful station, they say, is vital for the future welfare of broadcasting in Norway. The financial aspect of the situation is dealt with in the report to the Board of Trade. It is suggested that the Broadcasting Company should be granted a renewal of the concession, and that the State should take over the station at its current value. The establishment of a large station at Oslo would leave several of the company's present stations available for use in other parts of the country. It is hoped that the matter will be decided quickly so that the planning of the proposed powerful new station may be begun without delay, with a view to its being ready for broadcasting some time next autumn.

SWEDEN.—The *Electrical Review* informs us that the number of licences for radio broadcasting sets in Sweden during the past year rose by 85,574, an increase of more than one-third since 1926. At the end of 1927 there were 328,133 licensed sets, representing 54 sets for every thousand inhabitants. This is claimed to be a world's record. The new broadcasting station at Motala, in Central Sweden, is said to be the strongest and technically the most modern in Europe, and the Stockholm correspondent of *World Radio* reports that, for the purpose of freeing it from interference with the new Zeesen station, the wavelength of Motala has been raised to 1,380 metres. Boden's wavelength is also changed, in consequence of interference with Stambul. It is now transmitting on 1,190 metres.

Nearly 350,000 licences were issued in Sweden by March 1. This is an increase, since the beginning of 1928, of about 20,000.

U.S.A.—*Automatic Control and Signalling*.—The Chicago and North-Western Railway has announced that a system of automatic train control costing $3,000,000 (£600,000) will be installed along a distance of about 500 miles, from Chicago to Omaha, the longest stretch in the world over which such a system will have been established. The New York correspondent of *The Times* states that trains will be automatically stopped at danger signals without the intervention of the driver, thus ensuring safety, even when the driver fails to notice a signal or if for any reason it is out of action. The system will also enable passenger trains to travel at a maximum speed of 70 miles an hour in all weathers, a speed not considered safe in bad weather on lines where automatic control has not been established. The system will have been completed along the Chicago-Omaha line by May 1. The first installation of this system was made in Iowa in September, 1925. It is worked by means of an electric current along the rails, which is picked up by coils on the front of the engine. The first danger signal to the driver is a whistle caused by this current, and the speed of the train is reduced automatically to 20 miles an hour. A second whistle follows, and if both whistles are ignored by the driver and the train is still running, full controls are applied and the train is automatically stopped.

The New York correspondent of *The Times* reports that engineers of the General Electric Company announced on Mar. 3 the development of a high-power short-wave wireless valve. The new valve is a vacuum tube 5 in. in diameter and about 2 ft. long. It is set in a wooden cage, surrounded by wires, condensers, and electric meters. It operates as a self-excited oscillator on a six-metre wavelength, and is capable of radiating from 10 to 15 kw. of high frequency power, or about 50 times as much as any other short-wave tube has been known to produce. The valve is connected through a coupling system to a copper bar, about 10 ft. long, which is able to radiate into space the full 15 kw. generated by the oscillator.

During last year only 494 tons of insulated wire and cable were exported from the United States, as compared with 738 tons in 1926.

President Newcomb Carlton has recently announced in San Francisco, Cal., that the plan of the Western Union Telegraph Co. to lay a high-speed cable between Seattle, Washington, and Japan has been abandoned. The reason for this, according to the *Telegraph and Telephone Age*, is the inability of the telegraph company to meet the requirements of the Japanese Government. The Western Union now has under consideration plans for laying a cable across the Pacific via the southern route, starting at San Francisco, touching the Hawaiian Islands and stretching to the Philippine Islands, which would be the main terminal in the Far East, instead of Hakodate Island, a Japanese possession.

The report of the Radio Corporation of America for the year ended Dec. 31 last states that a reliable system of high-frequency directive transmission, known as the R.C.A. Projector System, has been developed by the engineers of the Corporation, and is now in operation on several circuits. This system, says the *Electrical Review*, in efficiency, compares most favourably with the performance of the Marconi "beam" system, and offers some advantages in simplicity of construction and adjustment. The latest developments in short-wave radio communication have been made available in the A. E. F. G. consortium of stations in Argentine and Brazil, in which the R.C.A. is a partner, and increased efficiency has resulted. The development of the "Projector" system is the patent of the R.C.A., and companies owning other stations, which may use it in the future, will have to do so on some arranged formula with regard to royalties.

Cable v. *Radio from an American point of view.*—The *Financial News* reports that at the recent general meeting of the Mackay Companies, the president, Mr. Clarence H. Mackay, drew attention to the important extensions to the radio services acquired by that cable company during the past year, and the active entry of the company into the wireless field at an early date. He referred, says the Montreal *Financial Times*, to the acquisition of the Federal Telegraph Co., operating a point-to-point system and ship-to-ship service of radio transmission, but emphasised the fact that the entry of the company into the wireless field was not occasioned through any fear of adverse competition from this direction, but by reason of the realisation that the radio can be rendered a most valuable supplement to the wire system.

The maximum efficiency in public communication service would be only attained by co-ordinating communication by telegraph, cable and radio, which included facsimile and photo-electric transmission.

Since our last issue television has been again to the fore, but except for the mirrored transmission of the movements of a young lady, at the Baird Television Development Company's laboratory in Long Acre, London, to the Berengaria, 1,500 miles from land, the one or two other transmissions from the same studio, though obviously those of living people, were not actually recognisable, as was the fiancee of the chief wireless operator of the ocean liner mentioned.

This was on Mar. 6 or 7, and the following news item from Hartsdale, New York, through Reuter's agency, is further evidence that though, perhaps, on the road to success television over distances so great as that represented by the Atlantic is still very much "in the air."

"On the night of Feb. 8 a man and a woman sitting before electrical apparatus in a London (England) laboratory were seen by a group of people in a darkened basement in Hartsdale village, New York, U.S.A., who watched them turn their heads and move from side to side; the images were crude and broken, but they were images nevertheless. The demonstration was made by the Television Development Company, of London, using short-wave wireless sets for transmission, and a televisor invented by Mr. John L. Baird for reception."

The *Electrical Review* of April 15 last year described similar results over a distance of 250 miles between New York and Washington, which employed apparatus designed and manufactured by the Bell Telephone Company, but a big advance upon this was the Baird trials in this country over English land lines last year. However, if the art of television is still in a primitive state," to quote from a technical contemporary, telephotography and that across the Atlantic is coming into practical use between the U.S.A. and Great Britain, according to the London *Daily Express*, which has adopted the system of the Bell Laboratories for use between its London and Manchester offices, and which rather bewilderingly, to the lay mind, described its trans-Atlantic sample pictures as 'Telephoned from America," apparently because the transmission was by radio.

Simultaneously with this announcement other London newspapers, the *Daily Telegraph*, *Daily Mail*, &c., appear to have adopted the Telefunken-Karolus-Siemens system of Telephotography for the same purpose of providing their readers with the latest *illustrated* news from all the large centres, and all are to be congratulated upon their enterprise, while the part which the Post Office Engineering Department will play in providing immediate, stable and alternative line communication should also not be left out of the picture.

To those who are sufficiently interested in it, it may be mentioned that the German system—which has for some time been working regularly between Berlin & Vienna—was described in the March number of the *T. & T. Journal* last year, p. 102-103, when the following observation was made: "The system is undoubtedly an excellent one and will naturally receive closer attention in the technical circles interested."

Of the Bell, or American, system of telephotography, without having practical knowledge, one is not entitled to judge, but from the description given by the *Daily Express*, which described "a small glass bulb coated with potassium—a device known as a photo-electric cell," there are evidently similarities in the American and German systems, for in the Siemens photo-electric cell the photo-active surface is also potassium.

There is a fairly long list of personal items this month, for which the Managing Editor will no doubt find space, and the obituaries all show how Time is gently removing some of those to whom—even a few on the present retired list of the C.T.O.—we looked up in past days.

Miss E. M. Macnamara's death took place in Anerley in January last. Entering the C.T.O. in 1882, in twenty years she had reached the position of 1st Class Supervisor and the successive rank in 1908, retiring owing to ill-health in 1921, which, unfortunately, continued in a greater or lesser degree until her demise. She had a very charming nature and in great favour with all who knew her inside and outside the office.

Then Miss H. H. Breden, late of the Trunk Telephones, who, after some considerable period of ill health, passed away on Jan. 22, at her home in Askrigg, Yorks. Miss Breden was formerly of T.S., which staff she joined in 1873. She was a most capable officer and very adaptable, as her career well proved. She had a first-class experience of practical telegraphy and for some time took duty in the Racing Room and later in the Metropolitan Gallery, from which latter floor she was selected for duty in the Telephone Room, then an absolute novelty, and in 1901 became an Assistant Supervisor in charge of the new "Switch Room," or Trunk Exchange, on the second floor of G.P.O. West—now the French Division of the Cable Room—subsequently, in 1902, being appointed to supervisor of the Trunk Telephones, G.P.O. South, which appointment she held until her retirement early in 1916.

On Feb. 12 Mr. Andrew A. Frew passed over. One time Superintendent of the C.T.O., after paying a visit to relations in South Africa a year or two back, he contracted a long illness soon after his return, apparently the result of, or at least following a, motor tour in Scotland. Mr. Frew commenced his Post Office career as far back as 1869, in the N.W. District.

Mr. George Gall, Deputy Controller, Edinburgh Postal and Telegraph District, retired on reaching the age limit after 43 years' service, on Mar. 3, and was presented with a bureau by his colleagues.

Mr. John Low, Overseer in the telegraph department, G.P.O., Edinburgh, retired under the age limit on Mar. 1. During the war Mr. Low served for some months as telegraphist with the Grand Fleet at Scapa Flow.

The following promotions in the C.T.O. are noted and those concerned are to be congratulated upon their respective rises in the official world.

Inland.—Mr. J. Rees, Asst.-Supt., to be Supt. Lower Grade. Miss J. M. Rintoul, Supervisor, to be Supervisor Higher Grade.

Overseas and Wireless.—Mr. H. G. Sellars, Provisional Asst. Supt., to Asst. Supt., Cable Room.

Mr. V. E. Fauvelle, Provisional Overseership, also made substantive.

The following, on the Cable Room Establishment, have been appointed to fill the post of Provisional Asst. Supt., and Provisional Overseer, respectively: Mr. J. P. Fox and Mr. W. T. Moon.

To these latter one would say Good Luck!

One has occasional shocks from correspondents, although the writer has had no real cause to grumble throughout nearly fourteen years' connexion with this journal and as a scribbler in its pages, either concerning letter-writers or critics. In the beginning of February, however, I received a letter from a Britisher in the South of France who, writing of "one of your very interesting articles in the *T. & T. Journal*—then added the date, "September, 1923," and went on with a request for the verification of a quotation I then gave from Zola, on "Electricity," now nearly five years ago.

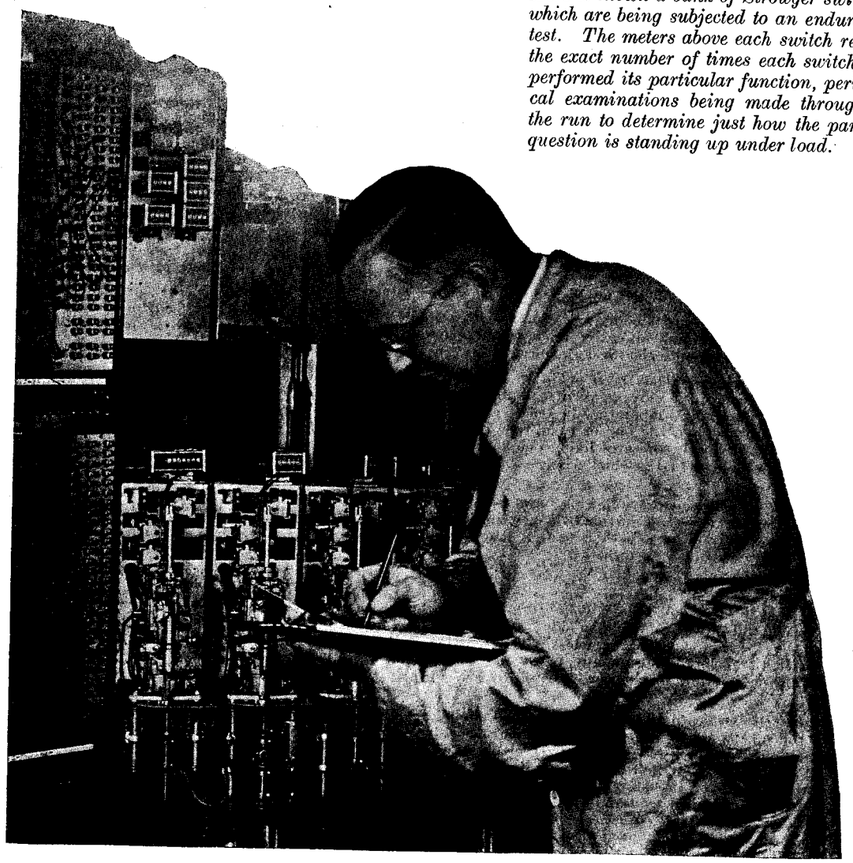
I am glad to say that, thanks to an old friend in Paris, I was able to give chapter and verse and, in case any of our readers should wish to refresh their memories by writing to me for further particulars, the quotation was from Zola's "Travail"—the second of his "Quatre Evangiles," and on this occasion the original and not an an abbreviated translation will be given:—

L'Electricité.—Un jour doit venir où l'électricité sera à tout le monde, comme l'eau des fleuves, comme le vent du ciel. Il faudra non seulement la donner, mais la prodiguer, laisser les hommes en disposer à leur guise, ainsi que l'air qu'ils respirent. Elle circulera dans les villes telle que le sang même de la vie sociale. Dans chaque maison, il y aura de simples robinets à tourner, pour qu'on ait à profusion la force, la chaleur, la lumiére aussi aisément qu'on a aujourd'hui l'eau de source. Et la nuit dans le ciel noir, elle allumera un autre soleil, qui éteindra les étoiles. Elle supprimera l'hiver, elle fera naitre l'éternel été en réchauffant le vieux monde, en montant fondre la neige dans les nuages.

J. J. T.

Where Strowger Automatic Leadership Begins—

The Switch Endurance Test



Here is shown a bank of Strowger switches which are being subjected to an endurance test. The meters above each switch record the exact number of times each switch has performed its particular function, periodical examinations being made throughout the run to determine just how the part in question is standing up under load.

THE ability of Strowger Automatic switches to withstand long periods of continuous operation has been thoroughly investigated and tested in the Research and Development Laboratories of Automatic Electric Inc. by the most ingenious and exacting methods that expert technicians can devise. Every improvement or slight change in design is similarly subjected to rigorous tests which crowd years of service into a short period of time. These reveal to an amazingly exact degree what may be expected of any particular switching unit under everyday operating conditions.

No new part or change in construction finds its way into the Strowger product until it has "made good" to the complete satisfaction of engineers who have devoted the best years of their lives to the development and perfection of Strowger Automatic telephone equipment.

More Than 3,500000 Strowger Automatic Telephones in Service or on Order Throughout the World

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STROWGER AUTOMATIC

The
Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising Committee - - - J. STUART JONES. W. D. SHARP. J. F. STIRLING. W. A. VALENTINE. J. W. WISSENDEN.

Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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THE TWO VOICES.

IT would be obviously improper for us at the present juncture to offer any comment on the Hardman-Lever Report on the telegraphs. We will confine ourselves to remarking that it was naturally received with unchastened delight by that section of the Press which is the untiring and uninspiring critic of all non-commercial undertakings. The comments of our critics, however, are not always as luminous as their satisfaction. The *Daily Express*, for instance, has two successive articles on electrical services in the same issue. One, entitled "Our Out-of-date Post Office," declares that "archaic organisation must go" and enlarges on the evils of State management, which is "forced to violate the most elementary of commercial maxims," and so forth. The following article sympathises with the victims of electrical supply companies, "unique for their combination of extortion and inefficiency." The reader can, of course, take his choice as to the system for which he shall reserve his severest indignation. He may, poor man, swayed by the conflicting voices of his guides, wonder whether, after all, he would not prefer to suffer the "archaisms" of State service rather than the "extortions" of private enterprise.

CASCADES OF NONSENSE.

A *feuilletonist* in one of the lighter daily journals deems the task of telephoning overseas "wearing" and "exhausting." In witness whereof, he describes how a lady friend attempted to make a telephone call to a friend staying at a hotel in Berlin. The call was answered by a hotel official, we are told, *in a torrent of German*! That a German official should speak his own language in a German city hardly seems to us a reproach to the telephone service, although irksome to a uni-linguist in London. The lady, however, equal to the occasion, exclaimed: "For the love of Mike, talk English." Good Catholics assure us that the saints still work miracles; and this impassioned, if somewhat disrespectful, appeal to the patron saint of Germany apparently had the desired effect. Thereafter, we gather, all went tolerably well.

This frail anecdote would hardly be worth notice except that it is typical of some of the girding at the telephone (we do not complain of reasoned criticism) which recurs fitfully here and there. Torrents of English, French, German, Dutch, Danish and Swedish and other European idioms continue to flow, notwithstanding, in increasing volume through the overseas telephone channels, to the furthering of a better understanding, we confidently hope, of the nations thus in closer and more intimate communion than ever before. It is the constant task of the administrations concerned to provide additional circuits for the ever-increasing demands on the service.

RECOVERING THE WASTE.

PRIZE COMPETITION.

IN an article which we print in another column, Mr. E. J. Johnson points out the marked effect of the elimination of waste on the profitableness or otherwise of an undertaking, and demonstrates the good results obtained in Glasgow by concentrated effort on the improvement of the service in the direction of reducing loss of time and effort occasioned by ineffective calls due to "Number engaged," "No reply," "Wrong number," &c. The gain in time and money on the calls for one day (to say nothing of the increased satisfaction of subscribers and the general improvement of the service), which he shows as resulting from an increased percentage of effective calls of 1.5% on a traffic of 200,000 calls alone, is substantial and exemplifies in a striking manner the effect which a small variation in percentages can have on large figures.

As Mr. Johnson says, there are doubtless other phases of waste deserving of consideration which will occur to readers of the *Journal*. There are, indeed, still many problems in connexion with co-operation between subscribers and the telephone staff, and between exchange and exchange, which admit of useful discussion, and on which it is very desirable to pool experience from all parts of the country, or to obtain fresh suggestions from those in actual touch with the subject. The Editing Committee has therefore decided to offer prizes for articles by telephone men and women on elimination of waste in connexion with the service and not necessarily confined to the factors referred to by Mr. Johnson.

The articles should not exceed 2,000 words in length and should be submitted by June 15 next.

The following prizes are offered :—

	£	s.	d.
Men :			
First prize	4	4	0
Second prize	2	2	0
Women :			
First prize	4	4	0
Second prize	2	2	0

The merits of the articles will be adjudged by the Editing Committee, whose decision will be final. The Committee will reserve the right of publishing if they desire articles of sufficient interest which do not gain a prize or to summarise the whole of the suggestions received.

HIC ET UBIQUE.

THE Transatlantic telephone service was extended on Mar. 8 to the towns in Canada shown below, in addition to those to which it is already open (viz. : Ottawa, Quebec, Montreal, Toronto and Hamilton, Ont.) : St. John (N. Brunswick) (minimum charge for the first 3 minutes £9 12*s*.), Halifax (N. Scotia) (£9 12*s*.), Winnipeg (£10 4*s*.), Calgary (£10 16*s*.), Vancouver (£11 8*s*.).

Telephone service between America and Europe was further extended on Mar. 28, when communication was opened between the United States and Paris. The charge for a 3-minute call between Paris and New York is £9 15*s*.

An additional " through " telephone circuit was provided at the beginning of March between this country and Switzerland, bringing the number of Anglo-Swiss lines up to three.

The new circuit is of modern type and is carried in cables throughout its length between London and Geneva.

A telephone service between this country and the Grand Duchy of Luxemburg was opened on Mar. 15. Communication is available from all parts of Great Britain, but will be restricted initially, in the Grand Duchy, to Luxemburg City.

The charges for a day call of three minutes' duration between the First British Zone and Luxemburg is 8*s*. 6*d*.

A provincial newspaper, under the caption " Where Telegraphs Pay," proceeds to quote as a shining example the profits made by the American Telephone & Telegraph Company of New York apparently oblivious of the fact that this company deals with telephone service alone.

We quote two testimonials to the efficacy of the Anglo-Continental and Transatlantic Telephone Services respectively. The first, addressed to the *Motor Cycle* by a firm of motor-cycle manufacturers, is as follows :—

Very few people realise the great extension of Continental telephone facilities which has taken place recently. A call can be put through to practically any town in Europe with very little delay and at a very low cost, nad in our experience conversation is always perfectly clear.

Our Continental agents are now ordering urgent machines by telephone in the same way as the home agents, and we have just booked an order for six 600 P. & M. " Panthers " for urgent delivery to Vienna, full details of the order being given on the telephone.

The other is from an American visitor to the Controller of the London Telephone Service on the eve of his return to New York :—

Just before sailing back to my home in New York City, I feel that I owe it to you to thank you for the wonderfully efficient service you have given me—and I am sure do to others—in the matter of the overseas telephoning. I have had occasion to use this service four times—once from Berlin and 3 times from London—and each time have found everything perfect ; was never kept waiting, marvellous connexions ; and, in fact, everything was done to give me—at least—my money's worth. I think when the public realises what a great job you are doing it will be more appreciated.

We are informed by the High Commissioner for Canada that the Canadian National Railways Telegraph Department is installing, at a cost of $2,500,000, a new modern high-speed telegraph system between Vancouver and Montreal, which is expected to be in operation within three months. Mr. R. W. Ball, General Manager of the western region, states that the carrier current system which is being used, and which is practically the application of the wireless audio-frequency system to telegraph service, will make it possible to transmit 84 messages simultaneously, using the human voice in both directions. The new system uses two wires, whereas the old system used one wire over which eight messages could be sent simultaneously. The new service will therefore result in speeding up communication ten-fold. Installation of the new equipment between Montreal and Winnipeg has already been completed.

The introduction of automatic working at Leicester was successfully accomplished on 18 Feb., when a portion of the equipment which is eventually to serve the whole of Leicester was brought into use. An interesting descriptive article on the subject is unavoidably held over till next month.

Other important articles, including a further instalment of Mr. Sellars' Chronology of Telegraphs, &c., are crowded out owing to pressure on our space.

DETERMINATION AND DISTRIBUTION OF TIME.

SUCH was the somewhat formidable title of a lecture to members of the Post Office Telephone & Telegraph Society of London, given on the 19th ult., at the Institution of Electrical Engineers, Victoria Embankment, by F. Addey Esq., B.Sc., F.R.A.S., M.I.E.E., of the Wireless Section, Secretary's Office, G.P.O.

However formidable the title may have appeared to many, and however difficult a subject of this kind must be, one would have thought, to handle, Mr. Addey made the listeners' task a light one by his clear enunciation, and generally facile delivery of a subject, the fundamental basis of which is astronomic.

The lantern slides were beautifully clear, and although it was necessary to follow the lecturer very attentively and closely, the steady logical step-by-step process from " the earth as fundamental timepiece " through " Sidereal," " Solar " and " mean " times, then via the study of the mechanical and electrical devices for maintaining sufficiently accurate time-recording instruments, &c., which Mr. Addey adopted, right on to the necessity for super-accuracy of Time-measurements for the use of modern Navigation, and lastly the most modern means of the world-wide distribution of accurate time from Greenwich via Rugby Wireless Station—all these progressive stages, and Mr. Addey's masterly manner in dealing with them, could not but make a lasting impression upon an attentive audience who were simply held for 80 minutes or more by one whose scientific enthusiasm and thoroughness are proverbial.

In the unavoidable absence of Mr. L Simon, Mr. A. J. Stubbs, M.I.C.E., M.I.E.E., very kindly took the Chair.

Mr. Addey expressed his gratitude to Sir Frank Dyson (Astronomer Royal) for permission to make full and detailed enquiries into the time apparatus at Greenwich Observatory ; to Mr. Hope Jones for detailed information about the synchronome clock and the free pendulum system ; and to Colonel Booth and Mr. Gibbon for information about the chronopher system.

THE WORKING OF THE INTERNATIONAL TELEPHONE SERVICES.*

BY H. G. TRAYFOOT.

(*Continued from page* 136.)

A brief reference to the language question as it affects the working of the Anglo-Continental circuits seems desirable. The Réglement provides that "for the preparation, establishment, and disconnexion of calls the French language should be used except in cases where special arrangements can be made for the use of other languages."

The French language is employed for operating purposes on the Anglo-French, Anglo-Belgian, and Anglo-Swiss circuits, but on the other routes a considerable amount of English and German is employed. Of the 6 Assistant Supervisors employed on the Anglo-Continental work in the London Trunk Exchange, 4 can speak French and 2 German, while of the operating staff 39 can speak French and 10 German.

The opening of so many new services within such a short period has added very greatly to the responsibilities of those who direct the Continental traffic in the London Telephone Service, more particularly in view of the language complications, and it would not be out of place to take this opportunity of paying a tribute to the highly successful manner in which the difficulties have been overcome.

Since the International Telegraph Conference of 1925, the C.C.I. has adopted the Telegraph Réglement as the basis of its operations, and has set vigorously to work to amplify its provisions by fixing standards and by preparing sets of working instructions in connexion with the various special services and classes of traffic. A considerable number of studies have also been undertaken in connexion with various aspects of the working.

The C.C.I. has, for example, tackled the question of the provision of a "stable and rapid service." It considers that uniformity is desirable in this as in other aspects of the work, and it has accordingly passed a resolution to the effect that however desirable it may be that there should be a sufficient number of circuits to ensure a "no delay" service on the international routes, there are serious economic obstacles to the realisation of such an ideal. It is, however, desirable to reduce delay to the lowest possible point consistent with the necessity for covering the annual charges.

The resolution goes on to state that the following standards of service ought generally to meet this condition :—

> For circuits less than 500 kilometres (roughly 300 miles) in length, the delay should not normally exceed 30 minutes.
>
> For circuits between 500 and 1,000 kilometres in length, the delay should not normally exceed one hour.
>
> For circuits over 1,000 kilometres in length, the delay should not normally exceed 1½ hours.

Such standards as these may not be regarded as ensuring a particularly rapid service, but it has to be borne in mind that in the past delays in excess of 1½ hours have been the rule rather than the exception on many circuits not as much as 1,000 kilometres in length.

It should also be stated that on many of the international routes the normal delays are much below these standards. On the Anglo-Dutch lines the delays reach about 40 minutes during the morning, but there is little or no delay at other times. On the Anglo-Belgian routes there is little delay at any time.

One of the most difficult problems has been, and still is, the adoption of a uniform basis for fixing international telephone rates.

The C.C.I., after examining the annual charges incurred in connexion with the international service has made some proposals as to the figures which might be taken to cover operating and maintenance costs, interest on capital, depreciation, &c., but there seems to be no prospect of the general adoption of these figures. One of the most difficult points to be determined is the multiplying factor to be employed in respect of wires carried in submarine cables. The British Administration is inclined to the view that in the present stage of technical development it is useless to attempt to fix standard figures to govern international charges.

Among other matters recently dealt with by the C.C.I. the following may be specially mentioned :—

(1) Rules have been prepared for handling calls at international centres which act as "transit" or intermediate stations in the completion of calls.

(2) Instructions have been drawn up to regulate the preparation of calls in advance by the use of telegraph circuits superposed on international telephone lines.

(3) Rules for handling *préavis* calls have been prepared.

(4) A special study has been made of the methods adopted in connexion with the training of staff in international work.

(5) Special efforts are being directed to the simplification of the international accounting methods.

(6) A uniform method of designating international circuits has been decided on.

(7) A list of standard operating expressions in the different European languages is in course of preparation.

(8) A travelling Committee is investigating the conditions under which the traffic to and from financial and commercial exchanges (which at present forms the bulk of the international traffic in Europe) is handled at the various European centres.

It is necessary to emphasise the fact that the decisions of the C.C.I. have no binding force until adopted at an International Telegraph Conference, but in practice they are being generally accepted and incorporated in the working arrangements.

The C.C.I. has devoted an enormous amount of time to the consideration of engineering problems, but they cannot, for obvious reasons, be dealt with in this paper. Mention should however be made of the epic struggle on the question of the adoption of an international transmission unit. The American Telephone & Telegraph Company sent delegates to Paris to assist in the deliberations on this important question. The value of the contact thus established between the American Company and the C.C.I. will be apparent to all interested in the development of international telephony.

Another highly important matter in which the American Telephone & Telegraph Company co-operated, was the question of establishing a Standard Reference System for the purpose of enabling the European Administrations to standardise their apparatus in accordance with agreed data. The American Company actually presented to the C.C.I. the necessary apparatus and it has been installed in Paris under the supervision of a special Committee, the Chairman of which is a British Post Office Engineer.

The C.C.I. has also established contact with the International Union of Wireless Telephony.

The present organisation of the C.C.I. is of a comparatively simple character. There is a President who is elected annually. There is a General Secretary, with Assistants more or less specialised on various aspects of the work, who has his Headquarters in Paris.

The C.C.I. meets once a year at a centre determined at the preceding Conference. At each Conference subjects for special study are selected and the work of discussing them is confided to a number of Committees of Rapporteurs, each of which appoints a Principal Rapporteur to act as Convener and Chairman. The reports of these Committees are circulated to all administrations connected with the C.C.I., and form the basis of the discussions at the Annual Conferences.

The accounts are audited annually by selected delegates and the expenses are divided between the various countries in accordance with population. For this purpose the countries are divided into 6 classes, those in the first class each paying 25 units and those in the sixth class 3 units.

It is doubtless realised that over and above the value of the technical and other work accomplished by the C.C.I., consideration must be taken of the value of the personal relations established between the administrative technical, and traffic staffs in the various countries in Europe.

At the 1925 Telegraph Conference one of the American delegates told Mr. John Lee that he had previously no idea of the complexity and difficulties in the way of establishing a long-distance telephone service in Europe. The progress made during the past few years must be attributed largely to the bond of fellowship and the spirit of co-operation established at the meetings of the C.C.I.

A considerable measure of the success attained must be attributed to the enthusiasm of Monsieur Valensi, the Secretary-General.

TRANSATLANTIC SERVICE.

But there is still another international telephone service in which the British Post Office is concerned, viz., the service with America.

After the demonstration of speech from New York to London by the American Telephone & Telegraph Company in 1923, the technical experts were convinced that the establishment of a both-way service across the Atlantic was only a matter of time. As a matter of fact, two-way conversation first took place in February, 1926, and a month later a successful demonstration of this great achievement was given to Press representatives in London and New York. The public service was opened on Jan. 7, 1927, after a preliminary trial for a month or so by officials of the British Post Office and the American Telephone & Telegraph Company respectively.

Notwithstanding the publicity given to the enormous developments in scientific matters generally during recent years, few events have so much excited the interest of the public as did the opening of this service and the efforts of subscribers on both sides of the Atlantic to obtain the first call caused the authorities a certain amount of embarrassment.

* Paper read before the Post Office Telephone and Telegraph Society of London.

From the official standpoint the opening of the service had an interest of an exceptional character inasmuch as it involved the establishment of working relations between the British Administration and the American Telephone & Telegraph Company.

The Agreement relative to this service between the Postmaster-General and the American Company is of a comparatively simple character.

It provides for calls of a minimum paid duration of 3 minutes and a maximum duration of 12 minutes, but calls of longer duration may be permitted if the exigencies of the traffic allow.

For the purpose of fixing charges, the United States are divided into 5 Zones but Great Britain and Northern Ireland constitute one Zone for charge purposes.

The service is a full " person to person " service, under which a particular person at a telephone station on either side may designate the actual person (or a substitute) to whom he wishes to speak at a particular telephone station on the other side. The call is not timed to commence until both the persons specified are ready to speak.

The total amount of the charges (apart from the additional charges for calls to distant Zones) are divided equally between the British Post Office and the American Telephone & Telegraph Company. The Zone charges are retained by (or credited to) the American Company.

The service was extended to Cuba some months back and to 5 of the Canadian Cities (Ottawa, Quebec, Montreal, Toronto, and Hamilton) on Oct. 3.

It will be extended to various European countries in the immediate future.

In view of the high charges for calls quite exceptional measures are adopted for the control of the traffic, and three operators are engaged simultaneously in this work at each end of the circuit. One is an engineer who controls apparatus which enables him to adjust the volume of speech to meet the conditions of individual calls. The other operators are telephonists, one of whom, known as the control telephonist, establishes communication between subscribers, times the calls, advises each calling subscriber of the expiration of each period of 3 minutes, and keeps a record of the quality of speech during each 20-second period of connexion. The other telephonist, known as the advance calling telephonist, obtains the particular persons required, holds them in readiness and keeps them informed of reports received from the other side.

The circuit is at present open from 12.30 to 11 p.m. (British time) 7.30 a.m. to 6 p.m. (New York time).

The accompanying diagram D shows the volume of traffic (represented in chargeable minutes) week by week since the opening of the service. About 50% of the traffic is of a social character and during the tourist season the percentage of such traffic was about 65%.

The call of longest duration was for a period of 44 minutes.

The circuit has been used by the British press for reporting special events as, for example, Major Seagrave's motor speed trials in Florida.

During December there were 25 calls between Great Britain and Canada.

On Christmas Day no less than 44 calls were dealt with, 16 outgoing from this country and 28 from America. The number of chargeable minutes

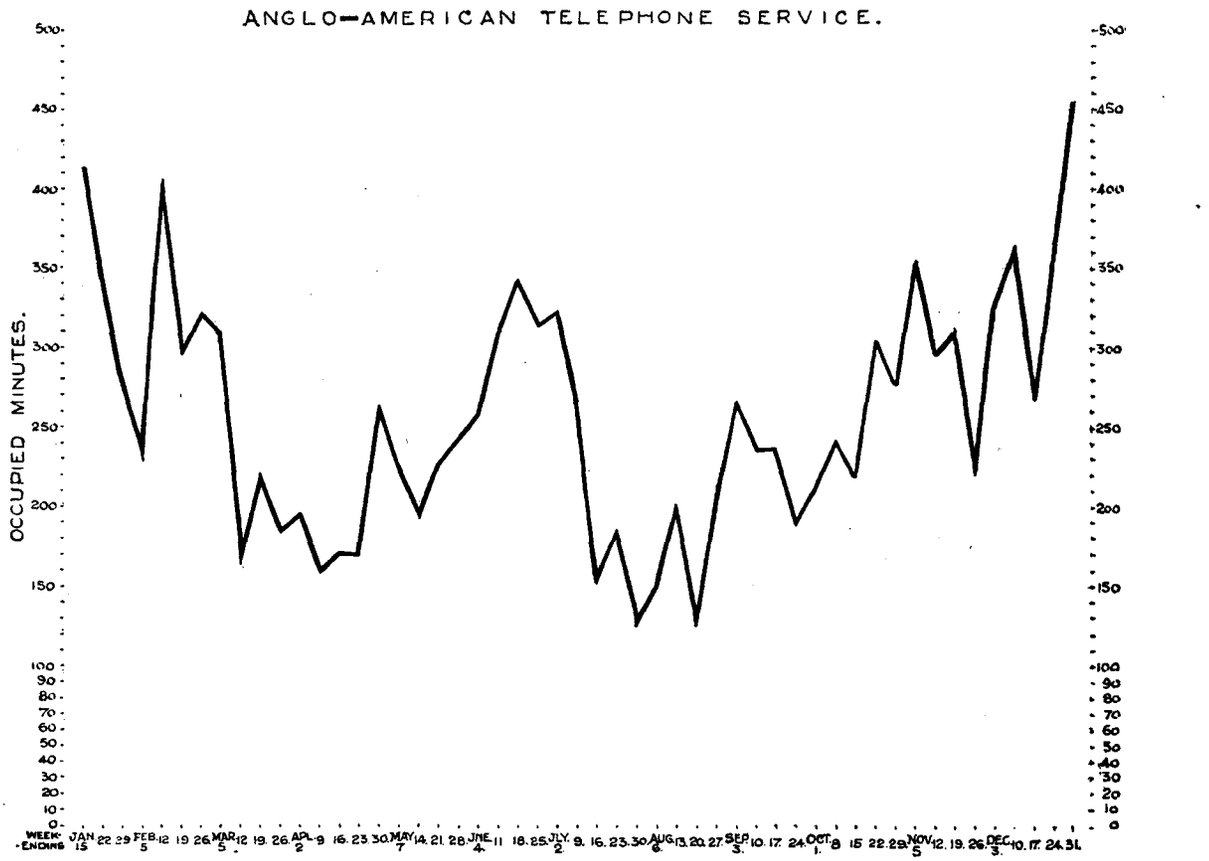


DIAGRAM D.

was 273 and the revenue £1,250. Among the calls successfully handled were the following :—

Wilmington	to	Walton-on-Thames.
San Francisco	„	Twigworth (Glos.).
Charleston	„	Luddendenfoot (Halifax).
Philadelphia	„	Radcliffe (Lancashire).
Uxbridge	„	Toronto.
Littlewick Green	„	Cleveland.
„ „	„	Montreal.

It is a pity in view of the general excellence of the technical arrangements that the channel is not more used by the commercial community but one ought not to despair, because it is understood that the traffic compares very favourably with that handled on the Transcontinental circuit in America in its early days and the charge for a unit call between New York and San Francisco is but 14 dollars as compared with the 75 dollars for a call between New York and London.

It is certain that in the immediate future further important extensions of the international telephone service will be made by means of wireless channels, and perhaps as our French colleagues are optimistic enough to think by means of submarine telephone cables of very much greater length than those which already exist. There appears to be no limit whatever to the possibilities, and the complete success which has attended the opening of the new services during recent years makes it certain that the responsible officials will not be found wanting, whatever may be the line of development.

THE DETERMINATION AND DISTRIBUTION OF TIME.*

BY F. ADDEY, B.Sc., F.R.A.S., M.I.E.E.

THE smooth running of the complex modern world in which we live depends very largely on the keeping of correct time. But although it forms such an essential part of our daily lives there are probably few who have any idea how correct time is supplied. We set our watches by Big Ben, taking its accuracy for granted, and seldom give a thought to the organisation behind the clock by which that accuracy is obtained.

In the following article an attempt is made to throw a little light behind the scenes and to show how correct time is first determined and then distributed to the community.

In order to measure the passage of time we make use of some body in steady motion, and we determine equal intervals of time by equal distances moved through by the body.

The earth rotating on its axis is the most steadily moving body which is easily available to us for this purpose, and it is accordingly adopted as our fundamental timepiece.

The period of time taken by the earth to make one complete rotation, or the period of time which elapses between the instant when a star is due south at a place, and the instant when the same star is next due south at the same place, is taken as the fundamental unit of time, and is called a "sidereal day."

The sidereal day would, however, not be suitable as a unit of time for everyday life, because we have to regulate our lives by the sun. If at the beginning of the year, say, we agreed to start reckoning our sidereal days from a star which happened then to be in line with the sun (so that sidereal noon and solar noon coincided), six months later we should find that sidereal noon coincided with solar midnight, because, the earth, having passed over half of its annual journey round the sun, would now have the star and sun on opposite sides of it instead of their being in the same line.

In one year the earth makes 366¼ complete rotations on its axis, that is, there are in a year 366¼ sidereal days. These are measured by the apparent movement of a selected star round the earth from east to west.

Owing to the motion of the earth round the sun, the sun appears in a year to make one revolution round the earth from west to east. Thus, the total number of times the sun appears to move round the earth from east to west, due to the rotation of the earth on its axis, is one less than the corresponding number for a star, or the number of solar days in a year is 365¼.

For our daily life the period which elapses between two successive southings of the sun, called a "solar day," is used as the basis of our system of time reckoning.

The solar day is longer than the sidereal day, the difference being a little less than four minutes. The solar day is the longer because the earth is moving round the sun as well as rotating on its axis. If at a given instant the sun and a star are, for some place on the earth's surface, both due south, the star will again be due south at the same place when the earth has completed exactly one revolution. The star is so far away that the motion of the earth in its orbit while it is making the one rotation on its axis makes no difference to the apparent position of the star. But because the earth has moved forward a certain distance in its orbit while it has been making the rotation on its axis it will have to turn a little more than one complete rotation in order to bring the sun once more due south at the place considered.

Another way of looking at the matter is as follows. Because of the movement of the earth round the sun, the sun appears to move round the earth, from west to east. Therefore, if on a certain day the sun and a star happen to be due south together, the next day the star will be south before the sun, because the sun will have apparently moved a little to the eastward of the star during the preceding day.

The difference between sidereal days and solar days is not, however, constant throughout the year. As has just been explained, this difference is due to the displacement of the earth in its orbit, or the apparent eastward displacement of the sun among the stars. But the speed of the orbital motion of the earth is not uniform. The shape of the orbit is an ellipse with the sun at one of the foci. When the earth is in the part of its orbit near the sun it moves more quickly than it does when it is in the more distant portion of its orbit. Owing to this varying speed of the earth in its orbit the amount which the earth moves forward in a day, or the amount by which the sun apparently moves round the earth from west to east, also varies, and consequently the extra amount which the earth has to turn on its axis beyond one complete rotation in order to present the same place to the sun varies correspondingly. Thus the length of the solar day is not constant.

But even if the earth's orbit were circular, so that its speed round the sun were uniform, the length of the solar day would still not be constant. The axis of the earth is inclined to the plane of its orbit, so that as the earth goes round the sun, the sun does not appear to go round the earth along the line above the earth's equator, the so-called "celestial equator," but to follow a path which is inclined to the equator, being north of the equator from April to September, and south of the equator from October to March. It can be shown by simple spherical geometry that the motion of the sun in this inclined path would make successive solar days vary in length, even if the apparent speed of the sun round the earth were uniform.

The combined result of the two causes mentioned above is to make solar days sometimes longer and sometimes shorter than the average. The length of the average solar day is the time unit which is used for everyday life. Time reckoned on this basis is called "mean solar time," and if the place on the earth's surface which we have in mind when we are considering the successive southings of the sun happens to be Greenwich, then the time so determined is known as "Greenwich Mean Time."

The difference on any particular day, between solar time and mean time, is called the "equation of time." The value of the equation of time is given in almanacs, and is sometimes marked on sun-dials, so that the time shown by a sundial, which is the solar time at the place, can be converted into the local mean time.

For fundamental time determinations, as mentioned above, the sideral day is used. This is because a star can be observed more accurately than the sun, observations can be made on many stars and so one observation can be checked against another, and the complications due to the varying length of the solar day are avoided. It is, of course, necessary to select some star or its equivalent which, when it is due south, shall indicate the commencement of the sidereal day.

There is no particular star chosen for this purpose. Instead, that point on the sky is used when the apparent path of the sun during the year crosses the celestial equator from south to north, that is, the point where the sun is situated on March 21. The position of any star with reference to this point can always be determined, so that the sidereal time at which any particular star will be due south, reckoning zero time as the time of southing of the standard point mentioned above, is known. Thus, by observing the stars the true sidereal time can be determined, and so the error of the observatory clock, the amount by which it is fast or slow, can be found.

The observations are made by a telescope mounted so that it can be moved up or down, but cannot deviate from the north-south direction, that is, from the plane of the meridian. The eye-piece of this telescope is provided with a number of vertical cross wires. The telecope is set to the correct elevation for the particular star to be observed, and then, as the star passes across the field of the telescope due to its apparent diurnal motion from east to west, the times shown by the observatory clock when the star crosses each of the cross wires are noted. The correct sidereal time of crossing each wire is known by calculation, and so the clock error is determined.

Up to a few years ago the method used for carrying out this comparison between the clock and the stars was for the observer to signal to a recording instrument called a chronograph by pressing a key at the instant of transit across each wire. The chronograph consists of a slowly rotating drum covered with paper. As the drum turns, a pen, pressing on its surface, is slowly moved along its length by means of a screw, so that a spiral line is traced on the paper. This pen is moved sideways by an electro-magnet when the observer presses the key, so that the transits are recorded by displacement of the line. The observatory clock is also connected to the same electro-magnet, and records its seconds in the same way. A special signal, sent by the clock at the exact minutes, enables the clock time corresponding to any particular second mark to be determined. Thus, by examining the chronograph record afterwards the clock signals can be very accurately compared with the star signals.

This method has, however, the serious defect that different observers differ in their judgment as to the exact instant when a transit occurs. Some observers always signal a little too soon, others always a little too late. To eliminate the difficulties introduced by this "personal equation," as it is called, the "impersonal micrometer" was devised, and is now used at all important observatories.

In this instrument only a single vertical wire is used. This wire is not fixed but can be moved from one side to the other of the field of the telescope by means of a screw. As soon as the star comes into the field the observer brings the cross wire into coincidence with it, and by turning the screw keeps the wire in coincidence with the star during its passge through the field.

A wheel, carrying certain electrical contacts, is geared to the screw by which the wire is moved, and a spring pressing on the edge of this wheel touches one or other of the contacts when the cross wire reaches known positions in the field, the positions in which the fixed cross wires would have been situated in the earlier arrangement. Thus, the closing of these contacts corresponds to the signalling by the key of the transits of the star across the fixed cross wires previously used, but the contacts are made automatically, in fact, the observer is not aware when a contact is made. The contacts signal to the chronograph and cause the ink line to be displaced as already described:

By the impersonal micrometer the errors due to the varying personal equations of different observers are almost entirely eliminated.

The determination of the error of the observatory clock at the time when the observations are made would be of little use if the clock itself did not run regularly. By star observations made at different times the rate at which the clock is gaining or losing can be determined. If this rate remains steady the correct time at any instant can be obtained by applying the necessary correction to the time actually shown by the clock. The utmost

* Précis of a lecture given to the Post Office Telephone and Telegraph Society of London.

ingenuity of clockmakers has accordingly been exerted to produce a clock of which the rate will be constant. There is no need for the clock to keep exact time, in fact, no clock ever does so, but the amount it gains or loses per day must be as uniform as possible.

The standard sidereal clock at Greenwich observatory is one of the "free pendulum" clocks devised by Mr. Shortt and manufactured by the Synchronome Company. This clock is a development of the Synchronome electric clock invented by Mr. Hope-Jones. In the Synchronome clock a weighed arm is released at each half-minute. In falling, this arm first gives an impulse to the pendulum, which keeps it swinging for the next half-minute, and then closes a contact which energises an electro-magnet by which the arm is automatically restored to its original position. This arrangement is called a "remontoir."

The pendulum, as it swings, has to actuate certain mechanism, which brings about the periodic release of the remontoir, and also has to close any necessary contacts for signalling the time to indicating dials, &c. This work prevents the pendulum swinging absolutely freely, and so interferes with its exact time-keeping functions.

To overcome this drawback, Mr. Shortt conceived the idea of separating the time-keeping duties from those of driving any necessary mechanisms. He provides two pendulums instead of a single one. One of these pendulums, known as the "master" pendulum, has no work whatever to do, except to continue swinging as regularly as possible. It receives an impulse each half-minute from a remontoir, but it does not release this remontoir itself. A second pendulum, known as the "slave" pendulum, performs all the functions of working the necessary remontoir and signalling mechanisms. At each half-minute the slave pendulum releases its own remontoir, and also the remontoir of the master pendulum. The latter remontoir does not drop, however, until the master pendulum is at the middle point of its swing. When it does drop, the contact which it closes to bring about its restoration to its position of rest, as described above, is also utilised to signal back to the slave pendulum and to work a device associated with that pendulum which automatically corrects it. The slave pendulum is arranged to lose slightly, and the correcting device accelerates it sufficiently to keep it in step with the master pendulum.

In order to make its motion as free as possible, the master pendulum is enclosed in an air-tight cylinder from which most of the air has been removed.

At Greenwich Observatory, the master pendulum is placed in an underground chamber, a relic of the old castle which previously occupied the site, and the temperature of this chamber is maintained as uniform as possible.

The rate of this free pendulum clock is so constant that, whereas with the sidereal clock previously in use it would have been unsafe to go more than a week without checking the clock with the stars, it would now be possible to go for two or three months without a check, and still to know the correct time. Of course, the clock is never allowed to go unchecked for such a long period. A number of star observations are made every clear night, but cloudy weather may sometimes last for several successive days, and it is then that the advantages become manifest of having a clock which can be relied on to run steadily over a considerable period.

As already explained, the time used in everyday life is not sidereal time but *mean solar time—in this country Greenwich mean time. The sidereal* clock can be any amount wrong, its error is constantly determined and allowed for, but the mean time supplied from Greenwich must be accurate. It would not be practicable in everyday life to apply a correction to the times shown by the clocks which are maintained at Greenwich time.

It is necessary, therefore, not only at frequent intervals to determine the error of the standard mean time clock at Greenwich, but also to have some means of correcting this error, so that the clock shall show correct time.

The error is determined by comparing the standard mean time clock with the standard sidereal clock. It has already been explained that the *number of sidereal days in a year is one more than the number of solar days.* The sidereal clock thus gains on the solar clock 1 day in 365¼ solar days, or 1 second in 365¼ seconds. This is approximately 1 second in 360 seconds, or 6 minutes. Hence every 6 minutes the sidereal and solar clocks get into step with one another, and tick together, while half-way between these periods of coincidence they are half a second out of step.

The comparison between the two clocks is made by noting the times which they indicate when they are in step. They then differ by an exact number of seconds, so that fractions of a second do not have to be estimated.

It is therefore known that a certain indication of the mean time clock *corresponds with a certain indication of the sidereal clock. The error of* the latter is calculated from the star observations and the known rate of the clock. Thus, the true sidereal time corresponding to the observed indication of the mean time clock is known. It is an easy calculation to convert the true sidereal time into true mean time. When this is done the true mean time corresponding to the observed indication of the mean time clock is known, and the amount by which this clock is in error is accordingly determined.

Fixed to the pendulum of the mean time clock is a magnet, the poles of which move over the ends of two coils of wire. By sending a current of electricity through these coils in one direction or the other the force exerted on the moving magnet can be either added to or subtracted from the force of gravity. In the former case the pendulum is accelerated and in the latter case it is retarded.

The length of time during which a current of given strength has to be sent through the coils to produce any desired correction in the time indicated by the clock is known. Thus, when its error has been determined the clock can at once be adjusted to show correct mean time. This correction is carried out before the transmission of every important time signal.

The mean time clock at Greenwich controls several electrical circuits. It drives the large 24-hour public clock placed in the Observatory wall by the main entrance. It sends a time signal once an hour to the Central Telegraph Office. This is used to synchronise clocks and to ring time gongs both inside the office and at the premises of subscribers to the time service. It also sends signals to the British Broadcasting Corporation on the last six second beats of each hour and half-hour. These signals are used by the B.B.C. for the six time signals which it radiates usually at 6.30 p.m. and 9 p.m., but which could, if necessary, be sent out at any other hour or half-hour as well.

At 10 a.m. a more extended service of time signals comes into operation. By means of automatic switches, controlled by clocks synchronised by the *time signals, certain telegraph lines from the Central Telegraph Office to* provincial towns, and certain lines from these towns to out offices, are, just before 10 a.m., disconnected from their telegraph instruments and joined to relays which are connected through to Greenwich. At the out offices the lines are extended through relays to indicating apparatus at the premises of subscribers to the time service. The 10 a.m. signal from the Greenwich mean time clock is thus distributed over the country.

The B.B.C. wireless time signals have already been mentioned. These perform a very important service in maintaining correct time throughout the community. But the most important service which is rendered by wireless time signals is in communicating exact time to mariners, by whom it is used for ascertaining their position at sea.

To determine the position of a ship it is necessary to know its latitude and its longitude. The determination of the lattitude is a comparatively easy matter, it may be done roughly with very crude appliances indeed, and more accurate determinations do not differ as regards the principle employed, but only as regards the greater refinement of the instruments and the tables used for the observations and calculations.

On the earth's equator, in latitude 0°, the celestial equator is exactly overhead, or it passes through the zenith. If we move through 10° northwards to latitude 10° N., the celestial equator moves in the opposite direction 10° southwards from the zenith. If we go to the north pole, latitude 90° N., the celestial equator is now on the horizon, or it has moved southwards 90° from the zenith. Similar changes take place if we move towards the south instead of towards the north. Thus, the latitude of any place can be determined by measuring how many degrees the celestial equator is displaced from the zenith, or as it is called, by measuring the "meridian zenith distance" of the celestial equator.

We cannot see the celestial equator on the sky, but the distances of the various stars, and of the sun, moon and planets, to the north or south of the celestial equator are known, and are published in the various nautical almanacs. Hence we have only to measure the meridian zenith distance of a suitable heavenly body, look up how far it is north or south of the celestial equator, and the addition or subtraction of this amount gives us the zenith distance of the equator. Actually, in practice, the angle of elevation of the body above the horizon is measured, the difference between this angle and a right angle is obviously the zenith distance desired.

The determination of longitude is a far more difficult matter. Longitude, or the angular distance at which a place is situated east or west of the meridian through a standard place, usually Greenwich, is determined by ascertaining the difference between the local time and the time at the same instant at the standard place. If noon occurs at New York about five hours after it occurs at Greenwich, it means that the earth has to turn for five hours after Greenwich has been brought opposite to the sun before New York is opposite to the sun. Since the earth makes a complete rotation, or turns through 360°, in 24 hours, it turns in 1 hour through 15°, or in 5 hours through 75°. Thus, the difference in longitude between London and New York is about 75°.

It is easy, by comparatively simple observation to determine the local time at a place. The real problem is to find out what is the corresponding local time at the standard place. This problem is so difficult that up to about three hundred years ago it was, for navigational purposes, considered as impossible of solution. Galileo, soon after his discovery in 1610 of the eclipses of the satellites of Jupiter, suggested that the standard times at which these would take place should be calculated beforehand and published, so that the satellites could be used by mariners as a clock. Although this method is practicable, though not very accurate, for use on land, it proved to be useless at sea, owing to the difficulty of making the observations from a moving ship. Later on the suggestion was made that the moon should be used as the hand of a gigantic clock, of which the figures on the dial were the stars, and that the standard time should be determined by observing the position of the moon among the stars as it moves in its monthly journey round the earth. This method also proved impracticable at first, owing to the absence of sufficiently accurate tables of the moon's motion. It was to supply this information that Greenwich Observatory was built by Charles II in 1676. The method of determining the standard time in this manner, known as the method of "lunar distances," is not very accurate, and it involves somewhat intricate calculations, for owing to the nearness of the moon to the earth her apparent position among the stars at any instant is different according to the position of the observer, and before the observations can be compared

with the tables they must be reduced to give the position of the moon as it would appear to an observer situated at the centre of the earth.

The method of lunar distances continued, however, to be employed as an auxiliary to more improved methods up to a few years ago.

The most obvious solution of the longitude problem is, of course, to provide a clock which will give true Greenwich time, after the necessary corrections for error and rate have been applied. Unfortunately, however, this is by no means an easy thing to do.

In 1713 the British Government offered a prize of £20,000 for anyone who could construct a clock suitable for use at sea which would determine the longitude within 30 miles.

A clockmaker named John Harrison, who was the son of a Yorkshire carpenter, and who commenced by working at his father's trade, succeeded in making a chronometer in 1761 which, after it had been taken on a voyage to Jamaica and back, determined the longitude of Portsmouth within 18 miles, and so won the prize. Since then the marine chronometer has been still further improved, and to-day it is an instrument of truly marvellous accuracy.

But although the chronometer has been so highly developed it cannot, of course, be depended on to keep an absolutely steady rate and every opportunity has to be taken when in port to check its indications from the time signals, such as time balls or time guns, provided by astronomical observatories. As a guard against the danger which would result if a chronometer went wrong at sea and the error were undiscovered, it is usual for all important ships to carry three chronometers which are compared one with the other.

The advent of wireless telegraphy has immensely simplified the problem of the determination of longitude. Observatory standard time signals are now sent out at different times of the day from many high-power wireless stations, so that a ship can keep her chronometers under constant check. In fact, with the facilities made available by wireless telegraphy for ascertaining standard time at frequent intervals, a good watch will now serve for determining longitude where formerly an expensive chronometer was necessary.

The clock installation at Greenwich for supplying the time signal which is broadcast from Rugby at 10 a.m. and 6 p.m. consists of a Shortt free pendulum master clock and slave, adjusted to keep mean solar time. These clocks can be compared with the standard sidereal clock, and their error corrected by an electro-magnetic device exactly as already described for the ordinary mean time clock. The signal sent out from Rugby consists of a series of dots lasting from 9.55 a.m. till 10 a.m. and from 5.55 p.m. till 6 p.m., the intervals between the beginnings of the dots being 60/61 seconds in length, with half-second dashes instead of dots at the exact minutes.

By having the dots spaced at less than a second interval the wireless signals periodically come into step with the beats of the chronometer which is being checked. By noting the time shown by the chronometer and the number of the dot at which coincidence occurs it is possible by an easy calculation or from tables to ascertain the error of the chronometer to an accuracy of one-sixty-first of a second.

These signals are sent from Greenwich by a special pendulum, also supplied by the Synchronome Company, which is controlled by the free pendulum mean time clock and which is corrected electro-magnetically at the same time as the correction is applied to the free pendulum clock. The mechanical and electrical devices necessary to send the combination of dashes and dots described above are very complicated, and Mr. Hope-Jones is to be congratulated on the ingenious manner in which he has met the requirements which the signalling clock has to fulfil.

The commencement of the Rugby time signal at the end of last year marks the latest step forward in the methods used for the distribution of time. The hope has recently been expressed by a leading astronomer and geographer that at no distant day Rugby may broadcast a time signal every hour instead of only twice a day, and that ultimately, from a special wireless station, the beats of the pendulum of the Greenwich mean time clock may be broadcast continuously, day and night, so that at any time and at any place an observer will be able to compare his clock with the standard clock at Greenwich and so ascertain correct Greenwich time.

THE REPORT ON INLAND TELEGRAPHS.

THE Hardman-Lever Report on the Inland Telegraph Service, which was signed on Jan 12 last, was presented to Parliament by the Postmaster-General on March 19, as Command Paper 3058.

The following is a summary of the recommendations of the Committee :—

"(1) The extensive rights of appeal at present allowed to the staff should be restricted.

"(2) Closer control should be kept over the authorised establishment and revisions of staff effected at shorter intervals.

"(3) A reduction in the number of supervising officers is necessary.

"(4) Much of the work should be down-graded.

"(5) The present rotation of duties is excessive and should be curtailed.

"(6) Careful and detailed enquiry is desirable into the "walk" system of delivery. If it is retained there should be frequent and systematic studies for the revision of "walks" at regular intervals.

"(7) A first class engineer with administrative experience should be added to the staff of the Engineering Department.

"(8) A freer use of the Telephone Trunk System should be made for the transmission of telegrams during the less busy hours, the Telegraph Service being debited only with the operating charges where existing Trunk circuits can carry the traffic without serious inconvenience.

"(9) The possibilities of overcoming the maintenance difficulties of start-stop apparatus should be carefully examined.

"(10) A speeding-up of the abolition of Morse working would be advantageous.

"(11) The Post Office should concentrate on fewer types of apparatus.

"(12) Studies of the concentration of traffic should be steadily pursued.

"(13) Real attempts should be made to stop the decline in traffic by making the service more speedy and attractive, by withdrawing irritating restrictions, by extending its scope and by increased publicity.

"(14) The effect of any increase in tariff should be carefully considered. If an increase is decided upon, the most suitable tariff for ordinary inland telegrams appears to be a fixed charge of 1*s.* 1*d.* plus ½*d.* per word, with a rebate of 3*d.* on each telegram handed in between the hours of 2 p.m. and 9 a.m.

"(15) The abolition of the inland rate for telegrams between Great Britain and the Irish Free State should be considered.

"(16) The copy rate for Press telegrams should be confined to messages for addresses in the same town. The tariff for Press night wires should be substantially increased, and the ordinary Press tariff raised from 1*s.* to 1*s.* 4*d.*

"(17) Studies should be made of Imperial and Foreign methods. Personal visits for this purpose of the administrative heads together with technical officers should be encouraged."

PROMOTION OF MR. A. L. BARCLAY.

THE Traffic Office of the North-Western Telephone District, District Manager's Office at Preston, presented a gay scene on Friday evening, Feb. 24, when over 100 members of the telephone staff, including Supervisors and Telephonists from most of the larger exchanges in the district, together with representatives from other branches of the Post Office, assembled to bid farewell to Mr. A. L. Barclay, late Traffic Superintendent, Class I, and to congratulate him on his promotion to the position of District Manager, North Wales District.

The Surveyor, Mr. Randal Bell, who attended at some personal inconvenience, was unable to remain during the whole of the proceedings, but he extended his best wishes to Mr. Barclay personally, and expressed the hope that all present would spend a happy evening.

After a daintily-served tea had been disposed of, the subsequent proceedings were presided over by Mr. Morgan, Traffic Superintendent, Class II, in the unavoidable absence of Mr. Allen, the District Manager. Letters of apology for non-attendance from the Postmasters of Blackpool and Ormskirk, were read by the Chairman. Amongst the guests present were Messrs. Shackleton (Superintending Engineer), Terras (Assistant Superintending Engineer) and Upton (Sectional Engineer), whilst the Postmasters of the District were represented by Messrs. Vity (Preston), Sunley (Bolton), Elliott (Burnley) and Rankin (Chorley). Mr. Whitelaw, District Manager, Manchester, also put in a welcome appearance and was given a hearty reception by his late staff.

In a happy little speech, Mr. Morgan presented to Mr. Barclay a handsome Wireless Set, complete in every detail, which had been subscribed for by the staff as a tangible token of their esteem, and complimentary references to Mr. Barclay's sterling qualities, both officially and socially, were afterwards made by Mr. Allen (via Morgan), Messrs. Vity, Shackleton, Whitelaw, Upton and McLarty (Staff Officer on behalf of office staff).

Mr. Barclay, in responding, thanked the staff for their tangible espression of esteem and said how much he appreciated the kind words which had been spoken. He paid a tribute to the loyalty and support he had received from the Traffic Staff and all other sections of the Service, and said that he considered that his success was a recognition of the work performed as a whole by the North-Western Section.

Dancing interspersed with songs by Miss Priestley (Assistant Supervisor, Southport), Miss Walsh and Miss Cross (District Office), was afterwards indulged in, and a delightful evening terminated with the signing of "Auld Lang Syne."

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations working at Jan. 31, 1928, was 1,605,154, or 6,980 more than at the end of the previous month. Gross new stations added during January numbered 20,852, and ceased stations 13,872.

The growth for the month is summarised below :—

	London.	Provinces.
Telephone Stations—		
Total at Jan. 31	568,716	1,036,438
Net increase for month	3,126	3,854
Residence Rate Subscribers—		
Total	129,063	206,942
Net increase	1,342	1,736
Call Office Stations—		
Total	5,111	18,521
Net increase	42	87
Kiosks—		
Total	772	3,552
Net increase	39	89
Rural Party Line Stations—		
Total	—	10,148
Net increase	—	—
Rural Railway Stations connected with Exchange System—		
Total	—	856
Net increase	—	2

The number of inland trunk calls made during December,1927 was 8,649,082, bringing the total number for the year up to 99,978,429 ; this figure represents an increase of 7,318,534, or 7.9% on the total for the year ended December, 1926. Outgoing international calls made during December, 1927 numbered 27,592, and during the year ended December, 1927 320,586, an increase of 55,537, or 21.0% on the previous year's total.

Further progress was made during the month of February with the development of the local exchange system. New exchanges opened included the following :—

LONDON—

PROVINCES—Leek, Leicester, Oxted (automatic), Syston, Western Park, Wigston (automatic sub-exchanges).

and among the more important exchanges extended were :—

LONDON—Hendon, Hounslow.

PROVINCES—Dorking, Gatley, Herne Bay, Heswall, Leigh-on-Sea, Mansfield, Oldbury, Ramsgate, Rockferry, Sevenoaks, Tonbridge, Whitchurch, Whitehaven.

During the month the following additions to the main underground systems were completed and brought into use :—

Brighton—Lewes (Section of Brighton—Hastings cable).
Bradford—Shipley } (Sections of Bradford—Airedale cable).
Bradford—Keighley }
London—Uxbridge.
Manchester—Rochdale No. 3.

while 61 new overhead trunk circuits were completed, and 80 additional circuits were provided by means of spare wires in underground cables.

MAYFAIR.

MAYFAIR is doomed.

Such was the expression used by Barling after we had completed our inspection of the kiosks in the streets of Mayfair. Barling, as you would gather from the references to him in the article on Bloomsbury, is not given to exaggeration of statement. At the moment I cannot, indeed, recall any subject on which he shows positive animation or anything approaching to it. On official matters he is invariably cool, clear, and concise, which is, of course, as it should be. On architecture, his principal hobby, he will talk interestingly, but not enthusiastically. Golf, his sole outdoor recreation —a game which lends itself to more picturesque phraseology than any other, which will at one moment drive a man down to the lowest depths of despair, and the next raise him to the highest heights of optimism—he plays, and talks about, unemotionally. The other day, I remember, when we were playing to the fifth hole, he started with a badly sliced drive, followed with a couple of unimpressive iron shots which landed him well into the rough on the right of the fairway, extricated himself with his mashie in a manner which would have done credit to Vardon, only to fail badly on the green with a simple 2-ft. putt. In all these operations—and this is what I want to bring out—he preserved the same impassive demeanour. Not a sound escaped his lips, not a twitch of the eyelids, not a tremour of the lips indicated that he was undergoing experiences calculated to try the strongest character. It will readily be admitted that, when a man with such command over his emotions gives vent to a strong and sweeping statement, his utterance merits more than superficial examination.

Barling's statement, of course, was called forth by the serious, and, to a mind such as his, distressing alterations in character and architecture which have recently taken, and are still taking, place in the district. Not so many years ago, Mayfair, by which I mean the clear-cut parallelogram between Regent Street, Piccadilly, Park Lane, and Oxford Street, was practically unaffected by the wave for modernity which was sweeping over other neighbourhoods. Its noble squares, of which Grosvenor and Berkely Squares are the best known, impressed with their air of aristocratic dignity and charm. Its western boundary, Park Lane, was untouched by the hand of the modern builder. Regent Street, on the east, was definitely Georgian. In between were quiet streets with queer corners, and Queen Anne and Georgian houses with irregular roof lines, all having an atmosphere redolent of a century and more ago.

The definite crumbling of Mayfair began, I should say, with the falling in of the leases in Regent Street, its eastern boundary, which now, with its high new buildings of concrete and plate glass, has lost its old charm and grace, and bears the factory look and expression of a second Kingsway. Then followed the demolition of Devonshire House on the South, and the erection, on the vacant site and on the extensive grounds, of aggressively modern buildings accommodating some half-a-dozen motor show-rooms, with flats above them, and—a little way up the widened Berkeley Street, and within a stone's throw of what was, perhaps, the most exclusive square in London—a large modern hotel. The commercialising process of this south-eastern corner of Mayfair was powerfully assisted by the shifting of the motor industry, which, starting in Long Acre, moved westwards to Great Portland Street and is now firmly entrenched in Albemarle Street and Piccadilly. On the west, Park Lane is being savagely attacked. Grosvenor House, formerly the residence of the Duke of Westminster, bought, but, I think, never occupied, by the late Lord Leverhulme, which, with its grounds, occupied the whole section of Park Lane between Mount Street and Upper Grosvenor Street, has gone, and Dorchester House, a beautiful mansion in the Italian style, a little further south, is in the market, where, I am told, the rest of the Park Lane mansions will be very shortly. On the Grosvenor House site a huge new building, in which a *pied-à-terre* of one room may be had for a rental of £200 a year and a flat of eight rooms for £2,200 a year, has been erected. The demolition of the old historic mansion, and the erection of flats and shops on the site, has been referred to in the Press as the greatest innovation in two centuries of Mayfair history.

It seems that the whole of Park Lane is destined in a few years' time to be a street of shops and flats. I have been shown a picture of the new Park Lane. Aesthetically and architecturally the change will be definitely for the worse. The new buildings will be huge skyscraper structures with little pretence to architecture, and their rigid perpendicular lines will take away appreciably from the look and amenities of the Lane. One sees frequently in architectural and other journals references to what is termed the "zoning" system of building, each storey being terraced back from the one below. It is a system, it appears, which has been adopted with advantage in towns where space is so restricted and valuable that high buildings must be erected, but where it is desired at the same time to preserve to the eye the width of the road and to give the maximum of light and air. Here in Park Lane, it seems to me, was an excellent opportunity of introducing some such system.*

* Mr. Howard Robertson, Principal of the Architectural Association School of Architecture, in a recent work, states that schemes of "zoning" have within recent years been adopted in New York, high buildings being put back in successive stages, an arrangement, he says, which permits of a variety of powerful and even dramatic effects.

In the centre of Mayfair the same commercialising tendencies are in evidence. Shops and offices have sprung up at the eastern end of Bruton Street, the aristocratic thoroughfare leading from the middle of Bond Street to the east side of Berkeley Square. Brook Street, where the small but famous and exclusive Symonds Hotel, the home from time to time of foreign potentates and royal visitors, is destined soon to be converted into a business house of offices, shops, and show rooms, is taking part heftily in the game. Shops are extending along Mount Street, which runs into the centre of Mayfair from Park Lane. Streets such as South Audley Street and Duke Street, running south from Oxford Street to Grosvenor Square, are now almost entirely occupied by tradesmen. Shops, I am told, will shortly be seen in Grosvenor Square itself.

All this is very distressing. There are, however, other points of view than the sentimental one. There is the point of view of the man who sees in the erection of palatial shops and show rooms a sign of commercial progress. There is the point of view of the man who believes that the day of individualist dwellings is over, and who sees in the spread of service flats and hotels a sign that we are rapidly and rightly approaching the time when we shall live in the community style. There is the point of view, to come nearer home, of the telephone development man. I spoke to a colleague responsible for the forecasts of telephone development in Mayfair. He told me that it was a distinctly *improving* area. He added that the Department would do well out of it. I looked at his forecasts. They showed high figures, figures which reflected—very properly—the changes taking place and contemplated. There seemed no doubt that the Department would do well out of the new Mayfair.

It is right to say, before leaving the subject of these building changes and developments, that here and there a change has been made which might be regarded as for the better, here and there a building has been erected which might be regarded architecturally as an improvement on the structure which it has replaced. Generally, I think it will be admitted, the new type of office and shop, the type common in Kingsway, the type which has sprung up in Piccadilly and Berkeley Street, and which is springing up elsewhere in Mayfair, fails to please the eye, although frequently it is not easy—for the laymen in architecture—to say exactly why a building displeases, or fails to satisfy, or stimulate. Students of architecture will tell you that the chief defect of the modern commercial building is the large amount of space given to windows on the lower floors, the "voids," in the shape of windows and doors, dominating the "solids," or stone surfaces, and so conveying an an impression of inadequate basic support, an impression of instability and insecurity. Another criticism heard is that seldom is there any attempt at functional design, seldom is an effort made to express architecturally the function or purpose of the building, to indicate externally what is going on inside.

A pleasing exception is to be found in the structure which has recently been erected at the corner of Old Bond Street and Burlington Gardens for a well-known and old-established perfumery firm. Here the ground-floor facade provides ample window space for the display of the merchandise of the business, while at the same time giving a suggestion of adequate support to the building, and there is a praiseworthy attempt at functional expression, the antiquity of the art of compounding perfumes and essences being conveyed by the mediaeval character of the bay projections, the Gothic arch on the Bond Street front, and the employment of gilded masonry on an abundant scale.

Another satisfactory expression of function is to be found in the building which accommodates the City of Westminster Public Library in South Audley Street, which, I may say, is the quietest and most pleasant institution of its kind in London. It has no newspaper room, but an adequate reference room, where you can dip into the history and geography of this and other neighbourhoods to your mind's content. If you should ever pay it a visit, ask the Librarian to let you see the old map showing Mayfair as it was two centuries ago—in 1725, to be exact. The map, we are told, was designed by one John Mackay, Mathematicians (the significance of the final "s" escapes me), of Saint James, Westminster. The main streets running north and south and east and west, with the two big squares, appear much as they are now. There are some changes in spelling and names. Park Lane is called "Hyde Park Lane." Audley Street does not appear, but a gap across the map is marked "Awdley," a spelling mistake, it would appear, on the part of the delineator, as the street, according to Wheatley and Cunningham, and other authorities, was called after Hugh Audley, a notorious money lender of the Inner Temple, who died "infinitely rich" in 1662. Two large mansions, marked "Earl of Burlington's" and "Earl of Sunderland's" are shown as occupying the space where the Royal Academy building stands to-day. The western part of Oxford Street, from about the top of New Bond Street to the Marble Arch, is called Worcester Road, and open fields stretched north of this road, extending over the ground now occupied by the Maison Lyons, Selfridge's, and other big Oxford Street shops.

It is necessary for men on the commercial side of the Telephone Service to take note of the changes which have taken place, which are taking place, and which may be expected to take place, in neighbourhoods served or to be served by telephone exchanges. In devoting attention to these features in connexion with Mayfair, I find I have left myself little space—within the imposed limits—to deal with those other new buildings, those small cast-iron buildings on concrete foundations, which the Post Office has erected in Mayfair during the past few years for the purpose of meeting the telephone needs of the public. These buildings are not many—seven in all. The number is few because, in this matter of kiosks, no district is so difficult to deal with as the high-class residential neighbourhood. A few years ago Mayfair was practically a barred area so far as kiosks were concerned. Now the Department is meeting with less difficulty. The commercialising of the neighbourhood has created a different atmosphere. It is safe to predict that, within the next few years, there will be an appreciable increase in the number of street kiosks in Mayfair.

The first of the Mayfair kiosks, starting from the east, is the one outside the Royal Academy, which, as everybody knows, has its entrance in Piccadilly. It has the distinction of being the best hidden kiosk in London. It stands behind one of the massive stone pillars at the gateway of Burlington House, and a foot passenger in Piccadilly might, in the day-time, pass and re-pass within a yard of it without becoming aware of its existence, though at night-time, when it is lit up, he could not fail to notice it. The Department would have preferred a site in Piccadilly itself, somewhere near the entrance to Burlington Arcade, but, as this was impossible to obtain, it accepted the present position as one which would cater—as indeed it does, very effectively—for Academy visitors. A point of interest is that, the site being a sheltered one and not subject weather stress, the Department was able to utilise here one of the original wooden models of the now familiar Gilbert Scott kiosk. Another point which I may mention before leaving it is that, according to strict Departmental definition, the structure is not classed as a kiosk at all, as it does not give a twenty-four hour service, the gates of Burlington House being closed at 11 o'clock at night.

A small strip of territory on the north side of Oxford Street, extending to Portman Square and Wigmore Street, is sometimes claimed to be included in Mayfair, and if this claim be admitted—Mayfair has no parochial or official recognition, and, therefore, no defined boundaries—mention must be made of two kiosks which have been erected in Vere Street, next door to St. Peter's Chapel, and opposite Marshall & Snelgrove's premises, which run back from Oxford Street along Vere Street. The position is an excellent one and the facilities afforded by the kiosk are in strong demand.

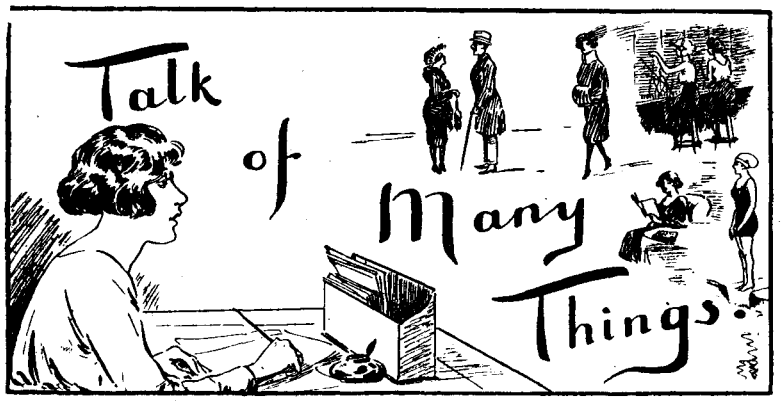
Grosvenor Square is at the moment barred to kiosks, but three have been provided in the vicinity, one in a by-way off North Audley Street, north of the Square, and two in Mount Street, south of it. Berkeley Square is also barred, but the changes on its south side bring it within the list of possible areas.

The situation and surroundings of the seventh and last kiosk of the series deserve more than passing mention. It stands in Shepherd's Market, the oldest and quaintest part of Mayfair, reached from Curzon Street and other surrounding streets by a number of curious irregular alleys. This is the spot where was held the old May Fair, the ancient fair which took place in the month of May, which dates from the time of James II, and which, "leading to evil ways," as an old record quaintly expresses it, was eventually suppressed. It is a delightful old-world spot, with the aroma of "Merrie England" still permeating it. The names over the old inns—"Laura Lee," "Ye Grapes," and "The King's Arms"—take you back into the times of the Stuarts. "Nell Gwynn" is painted over a little shop as you enter on the western side, and there are doors and gables and window sills in green and blue and red. The direct way to reach this hidden corner of London is by way of Piccadilly and White Horse Street, a narrow winding street turning off Piccadilly, a door or two past the Naval and Military Club. A more interesting way, and one which will impress you with the changes taking place on this side of Mayfair, is to turn up Berkeley Street, at the foot of which Devonshire House formerly stood. In the new and widened Berkeley Street you will inhale the Kingsway or modern commercial atmosphere. After passing the recently erected Mayfair Hotel, turn along Lansdowne Passage, a stone alley cut through the gardens of Lansdowne House, a palatial and historic mansion now occupied by the head of a famous Oxford Street store. At the other end of Lansdowne Passage you will emerge into the Georgian atmosphere of Curzon Street, and a little way along you will enter Shepherd's Market, with its pronouncedly Stuart atmosphere. The stately mansion—alas, poor Yorick ! for sale at the moment of writing—at the north-west corner of the market, with its front in Curzon Street, is Sunderland House, built by the Duke of Marlborough, and a little way along on the other side is Chesterfield House, built in 1749 by the author of the celebrated "Letters," and now a royal residence.

In the Bloomsbury article I mentioned the total number of kiosks then existing in the whole of London. The number is now 780. That is the number shown by the records as existing on Jan. 31, 1928. On Jan 31. 1927, the number was 430, so that substantial progress in this particular branch of telephone work was made during the year and credit is due to the District Contract Managers, on whose shoulders falls the work of finding sites and of conducting the subsequent negotiations with local authorities, frontagers, subsoil owners, private property owners, the Minister of Transport, and various other persons, bodies, and Corporations who take an interest in things pertaining to the nature of street encroachments.

C. W. M.

WE TELEPHONISTS



That Odontoglossum.

I HAVE had quite a large post this month, all because of that odontoglossum, and I have been surprised to find how many people know what it is and what it is not. I have heard from both institutions and individuals and they all write to the same effect—that the odontoglossum is not a mental state but a plant. Well of course, I knew that—I looked it up first; how else do you suppose I should have been able to spell it? Incidentally, have you ever noticed what wily birds botanists are? First they invent a most fearsome name for quite an ordinary plant and then, having spelt it out in full for you once, any further reference they make to it is by initial only. Thus they write about the Thalictrum glaucum, but when they want to refer to other members of the family do they write Thalictrum in full again? No! they do not; they merely write T. andiantifolium and T. aquilegifolium. It is either sheer laziness or orthographical weakness on their part, but in any case they have only themselves to blame. To adapt the words of the Duchess, "They only do it to annoy, because they know it teases."

But to return to the O. repercuss. and to my correspondents—I have heard from the Society of Pure Verbalists; the Prehistoric Order of Broth-blowers; the Raspberry Depipulators' Institute (with which is incorporated the Jam Pip Makers' Brotherhood, Ltd.), as well as from Anxious Mother, Pro Bono Publico, Paterfamilias, and Disgusted Reader. The brief answer to all these dear people is that I never said that I was suffering from O. repercuss., but that I was under the impression that this was how a friend diagnosed my condition. Still, it was nice to hear from them all and I hope they'll write again at Christmas and send me cards with robins and snow and the old, old wish.

Their letters, however, have caused me to reconsider my position and I am now quite sure that what I was suffering can only be adequately described by some such word. When repeated it seems to come bouncing by and to recede in gradually reducing billows until it fades into silence. It sounds like the rumble of remote thunder and reminds one of the appearance of waves on the seashore. It has a complete and all-embracing air of sufficiency and is the sort of word that brooks no contradiction. Having uttered it, one has expressed finality, and no more remains to be said. It is not soothing like the word Mesopotamia, but it is a lovely word and I shall regard it as the name of my recent affliction—whatever that was, and I can't just remember. Further protest, therefore, is useless. I am following the excellent example set by the late lamented friend of my childhood—Mr. H. Dumpty—as distinguished a philosopher as ever sat upon a wall and one held in high esteem by royalty and the army. I well remember the illustrated interview which he gave to Alice when she was on tour in Looking-Glass Land. He then said: "When *I* use a word it means just what I choose it to mean—nothing more or less." And again: "When I make a word do a lot of work—I pay it extra." Fortunately, in these more enlightened days, it is possible so to arrange duties that they can be included in the normal working week and extra duty payment is thus avoided.

So let the repercussive odontoglossum stand. PERCY FLAGE.

Telephone Staff Hospital Collections.

The Annual General Meeting in connexion with the Hospital Saturday Fund was held on Feb. 15, 1928. The meeting was well attended. Mr. Valentine was in the Chair, and he spoke with much appreciation of the good results shown by the yearly report. The collections for the year —£2,384—again constituted a record, showing an increase of £120 on the previous year's collections. This magnificent results can only have been achieved by much hard work and self-sacrifice; and, in view of the fallen bonus, it is particularly deserving of praise.

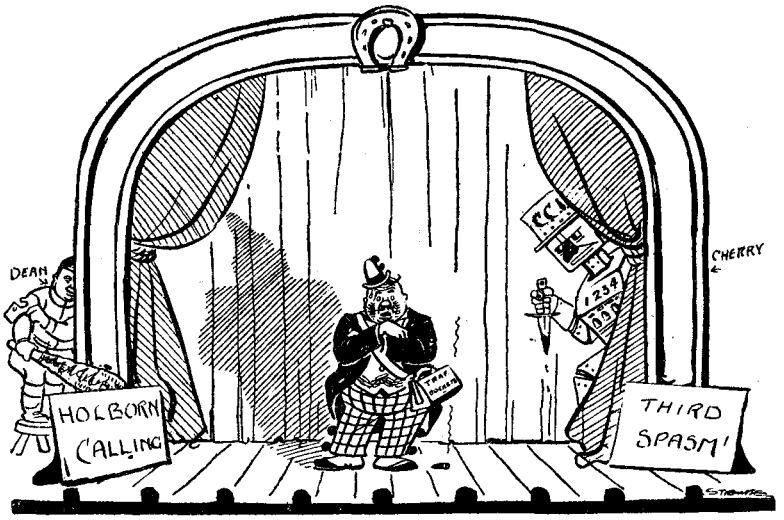
Mr. Valentine thanked the collectors for the good and faithful work done by them. Mr. Wakely, the Chairman of the Council, Mr. Caparn, the ex-Chairman, and Mr. Reed, the Secretary of the Fund, were also present, and they, too, expressed their thanks for and appreciation of the work done, which gives proof of the splendid spirit that permeates the staff of the London Telephone Service.

Miss Cox had a special word for the exchange staff, thanking them for their help in bringing the collections up to £2,000 and over.

Mr. Valentine was unanimously re-elected Chairman, and Mr. Page, Honorary Treasurer.

The Misses Reekie and Wormald were re-elected Honorary Secretaries, an election which every year becomes more popular, not only with those who put these two indefatigable workers in office, with wild acclamation, but with the two themselves. It is always refreshing and inspiring to witness their delight at being again chosen for what are, after all, very arduous duties. It is their enthusiasm, and that of kindred spirits, that crowns the efforts made with success.

Let us work on, then, with renewed courage—our slogan being: "£2,500 this year!"



[*Adapted, with apologies, from "The Daily Express."*

A SCENE FROM MISS MCMILLAN'S "HOLBORN CALLING," *vide p.* 168.

Paddington Exchange Tea and Entertainment.

Saturday, Jan. 21, 1928, seems a long way off now, but all the same the date will be joyfully remembered by a throng of nearly 300 boys and girls of the Capland Road L.C.C. School, who found themselves the favoured guests of the Paddington Exchange staff for the afternoon. The Paddington Exchange Tea and Entertainment is one of those recurring events which take their place in the Calendar with the Oxford and Cambridge Boat Race, the Eton and Harrow Cricket Match, Derby Day, &c., and time does not wither nor custom stale its infinite variety.

With lavish entertainment and a keen brigade of workers on the one hand, and a host of appreciative children on the other, success is assured from the moment the signal is given to "fall to."

The Tea itself was a triumph of the caterer's art and this year an additional touch of "home" was provided by tea being made fresh for each guest instead of the usual continuous stream from the urn.

The Rover Scouts, Christ Church, Fulham, who made such a decided hit at last year's entertainment, scored another well-merited success in their high-class turns with popular choruses, all of which received the full-throated support of the children, a complete "entente" having been rapidly established and sustained.

Mr. Beaumont, an artist in Wizardry, then took the audience into his confidence and in a humourous and easy vein did marvels in white magic and brilliant sleight-of-hand, the only trick which he failed to bring off being to get to the end of his inexhaustible stock of mysteries in the time allotted to him.

The finale having been reached long before it was welcome, the children were dismissed with suitable gifts dispensed by the ladies, who showed a quick eye for discrimination in handing out the goods, a super touch being added in the shape of new pennies and fruit.

The warm interest shown by many friends, far and wide, in this yearly effort is deeply appreciated by the Committee and this belated notice must serve as a grateful acknowledgment of so much kindness and generosity which makes the Paddington Tea such a real success. With this appreciation is coupled a hearty vote of thanks from all the children concerned.

A. R.

Sydenham Exchange.

A very successful Dance and Whist Drive was held at the Dartmouth Hall, Forest Hill, on Feb. 7, 1928. It was the last social affair of the season, and was organised by the combined Tennis and Swimming Clubs.

Mr. Perkins kindly acted as M.C. for the dancing in the unavoidable absence of Mr. Townsend.

The Whist Drive, which was an experiment, justified its existence, and Miss Bowley presented the prizes to the lucky winners.

A bouquet was presented to Miss Arnott as a mark of appreciation for her splendid work. In reply to prolonged cries of "Speech!" Miss Arnott said that she was very pleased to have worked for Sydenham, and hoped to do more. The speech, like the speaker, was short and to the point, but nevertheless gave great pleasure to the staff, for it is this unassuming, self-sacrificing labour which is the foundation of all social work.

G. M. T.

Mountview Exchange.

On Saturday, Jan. 21, the staff at Mountview entertained 80 children from the Local Council Schools to a tea and entertainment at the Campsbourne School Hall.

In spite of heavy rain the visitors all arrived punctually; in fact, many were about an hour too soon, arriving about three o'clock.

The depressing weather had no effect on the spirits, and these early arrivals lustily sang choruses until tea was ready. Full justice was done to an excellent tea during which the arrival of Father Christmas was greeted with great applause.

After tea all settled down to be entertained by a conjurer and ventriloquist and by some pretty and clever dancing by little Miss Betty Bruce, a small sister of one of our telephonists.

Later in the evening Father Christmas distributed toys from a giant Christmas Tree, heavily laden and beautifully lighted with small coloured electric lights, towards which many hopeful glances had wandered during the evening. Many of the youngsters appeared to get the very toy—doll or book—for which which they had been longing.

On leaving, each child was also presented with a bag of sweets, an orange and apple. Everyone enjoyed the evening, the helpers perhaps quite as well as the children.

The thanks of all are given to Mr. Spiers (Father Christmas) and Mr. Haines, both of the Engineering Staff, for their ready and valuable assistance.

D. A. P.

Concert at Benenden.

The third concert organised by Miss M. M. Worth was given with great success on Saturday, March 3, to the patients at the National Sanatorium, Benenden, by the staff of the London Telephone Service.

Everyone enjoyed the singing and selection of songs rendered by Miss Nora Smith and Miss Phillis Pidgeon, Sopranos, Miss Ethel Williams, Contralto, and Mr. Hugh Williams, Tenor. Miss Winifred Shaw, Elocutionist, afforded much merriment with amusing monologues.

Trumpet solos exceptionally well rendered by Mr. H. A. Warton were received with much applause, and much hilarity was heard during the Scottish Character Humour given by Mr. Bob Douglas. Mr. A. C. Vincent at the piano added to the enjoyment with lively syncopation.

After the Concert, which concluded with community singing, Doctor Spurrier passed a vote of thanks to Miss Worth and to the Artists. He said this was the third concert given by the London Telephone Service and each one seemed better than the last, and were much enjoyed by the patients, who all wished to have the pleasure again.

Miss Worth, in reply, said it was owing to the generosity of her colleagues in the London Telephone Service that she had been able to arrange the concerts and wished to thank the artists for their willing support, especially Mr. A. C. Vincent, who had obliged each time.

The artists were entertained to supper, the Matron presiding. Mr. Hugh Williams, on behalf of the artists, thanked the Matron for the kind hospitality they had received.

F. D. B.

A contributor at Tottenham Exchange sends an interesting note to this column. She says: "If the Telephone Directories issued last year were placed flat one upon another they would reach to a height of 365 times that of St. Paul's Cathedral, and if placed end to end would extend for 143 miles—that is, from London to Birmingham and 23 miles beyond."

In these days of heavy traffic, we are amazed that our correspondent was able to get the books in position. What were the police doing?

On referring the matter to Mons. Flage, he expressed the opinion that if all the subscribers whose names appear in the Directory were piled in alphabetical order one on top of the other, the gentleman underneath would probably lose his breath!

Central Exchange.

At the Central swimming social
That was held at Carter Lane,
Came a crowd of men and maidens
To enjoy themselves again.

Our Miss Millbank was the mover,
Organised the whole affair,
And they came from all exchanges
Just to meet their old friends there.

Midst the dancing and the frolic
"T. A. B." in accents clear,
Called aloud to all and sundry
"Now the artistes will appear."

Then a visitor, Miss Fordham,
Sang to us a sweet refrain,
But they would not rest contented
'Till she sang just once again.

After this the room was silent
'Till Miss Smith of concert fame,
Played a piece with skill and pathos
And "Finlandia" was its name.

Then Miss Morris and a star caste
Acted in a sketch "Mere man";
This the audience applauded
As a Central audience can.

There's no space to hymn their talent
But these few words I must say,
Everyone of these fair maidens
Gave a very good display.

Our best thanks to all the helpers
Volunteers from staff at C.
They all made the swimming social
Move along quite swimmingly.

D. D.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), London, E.C.1.

GLASGOW TELEPHONE NOTES.

THERE are occasions when words fail adequately to express one's thoughts. In this particular case it is impossible to convey to the readers just that exceptional atmosphere which prevailed at the valedictory meeting associated with the retiral of Mr. James Robertson, Traffic Superintendent Class II. There was a rare assemblage of personal and official friends from the Glasgow and Scotland West Districts at Reid's Cafe on Feb. 22, to do honour to the guest of the evening, and to present him and his good lady with some tangible tokens of esteem. Despite the "fly in the amber." as meant by one more official parting with an old and trusted colleague, the prevailing spirit was one of light and cheer. Perhaps this was to cloak the more serious thoughts that would persist in obtruding; be that as it may, we had all determined to be on our best behaviour and to come "Smilin' thro'." The proceedings consisted of a concert which was interrupted for the event of the evening—to wit, the presentation to Mr. Robertson of a grandmother clock and to Mrs. Robertson of a handbag and umbrella. Refreshments were then served and afterwards we resumed the concert. The quality of each item was of the best, and each was moreover rendered in delightful manner, the lapse of time alone prevented the encores demanded. Two of the best items were "Mr. Robertson" by Miss M. L. Tulloch, and "Cohen Calls the Contracts," a monologue by Mr. D. Reid. Members of the staff provided the full programme. The Chair was taken by the District Manager (Mr. A. E. Coombs), who also made the presentations. Messrs. Johnson, Lane, and Harvie, of the Traffic Branch, and Miss Cameron, of the Central Exchange, also spoke. Our guest, who was received on rising with musical honours, responded with characteristic modesty. He stated that he failed to recognise himself in the flattering portrait which the speakers had drawn of him. In rounded and well-chosen phrase, he returned thanks to the staff for their great generosity in making him such a handsome present, and also for the most acceptable gifts to Mrs. Robertson. There would be about 160 present, numbers being limited only by the accommodation. Miss McCallum and Mr. Harvie, of the Traffic Office, were responsible for the arrangements and right well were these carried out. Truly a red-letter night in the history of the Glasgow Telephones and one that was well worth while.

* * * *

Mr. Robertson.

Who is this lad so fine and tall,
That in his stride outstrips them all,
Who always runs at duty's call?
Boy James!

Who is this new telegraphist
Who "dots-and-dashes" with his fist?
Not one small item has he missed.
Why Jimmy!

Who is it now as overseer
Walks up and down? All feel him near,
But spite of that they have no fear.
Still "Jimmy!"

Who changed his course and steered for 'phones,
About his tactics made no bones?
'Tis better for him now, he owns.
Mr. Robertson!

Who after five years was promoted,
For being to his work devoted,
Whose ruling on most things was quoted?
"J.R.!"

Who came to see us day-by-day,
Who listened to us "say-our-say,"
Who helped and cheered us on our way?
Mr. Robertson!

Who leaves us now, his task completed,
To whom is now some leisure meted,
To take up golf? (language deleted!)
"The War Horse!"

Who are here met to wish him well,
Who on his virtues long could dwell,
But who instead, must say "Farewell"?
Each one of us!

M. L. Tulloch.

* * * *

The second, and probably the last, Exchange Staff's dance of the current season took place in the Waldorf, on March 5, when we all spent a most enjoyable evening, thanks to the energy and organising ability of Miss H.B. Mowat and her committee. If all is well, it is hoped to hold more of these events during the season 1928-29.

* * * *

Mr. J. G. Mackay, Assistant Traffic Superintendent, who has been on sick leave since July 1926 is, we are glad to say, making good progress, and we hope soon to have the pleasure of extending a welcome to him in a personal and official sense. John does not like forced inactivity and no one will be more pleased than himself when he gets back into harness.

* * * *

Mr. J. J. O'Rourke is the latest addition to the ranks of our young Traffic experts. He brings his native smile with him and we hope he will find many reflections of this during his stay with us, and that he will spend many happy official and unofficial hours with his Glasgow colleagues.

* * * *

Glasgow Post Office War Hospitals' Entertainment Committee.

On Tuesday, March 13, an entertainment consisting of tea, song, and music, was given to the Bellahouston Boys, by the Trunk Exchange staff. A feature of the musical programme was the spontaneous and hearty efforts, made in community singing, which the company seemed to enjoy. Our thanks are due to the following artistes, who ably contributed to make the evening a crowning success:—Miss Fullarton, L.R.A.M., was untiring in her efforts to satisfy the repeated calls made by the delighted company. Miss Richardson again charmed us with her violin; Miss J. Green, with her songs; Messrs. Hunter, Hamilton, and McClure, maintained their usual high standard of entertainment, while Miss Cree ably played the accompaniments. We have specially to thank Miss Kay for so gracefully presiding. The presence of our Supervisor (Miss Cemeron, Supervisor, Central, was also present), and other members of the Telephone staff is, in itself, an encouragement which tends to make "the carrying on of the good work" a greater joy and pleasure.

* * * *

Trunk Exchange, Glasgow.

Jean R. Scott, one of our most popular girls left the service on Friday, March 16, to go to Sydney. Jean was given a good "send off" that evening by some of her office friends, 25 of whom entertained her to tea in the Grosvenor Restaurant, where her virtues were extolled and our good wishes for her future expressed. After the singing of "She's a jolly good fellow" and "Auld Lang Syne," the party proceeded to the Alhambra Theatre, where an enjoyable evening was spent at the appropriately named "That's a Good Girl."

The staff presented Jean with a silver brush, comb, and mirror, and she also received many individual gifts. The committee of the Glasgow branch of the P.O.R.F., of which she was Acting Secretary, presented her with a handsome Vanderhilt bag. Jean served in France during the War with the W.A.A.C's. (Signals) and her ex-service friends throughout the Telephone Service will share our regret at her departure from this country, and she will carry with her to Australia their, as well as our, very best wishes for her future happiness and prosperity.

* * * *

Whoever was responsible for saying that the Scot takes his pleasure more sadly than the Englishman would surely alter his opinion if he had been present on Friday evening, March 16, at the whist drive and concert, promoted by the Douglas Exchange staff, and held in the dining room of that exchange

by the kind permission of Colonel Westbury. Not to be outdone by the staffs of other exchanges, Miss Mortimer and her band of capable and willing assistants entertained a company of about 170 to an excellent programme, consisting of whist, tea, music and recitations. The guests included representatives from all sections of the Glasgow Post Office and Engineering staffs, and friends, among those present being Colonel and Mrs. Westbury; Mr. and Mrs. Coombs; Miss Kelly, of the Hope St. Post Office; Mr. Thomson, of the Survey branch (to whom we offer our heartiest congratulations upon his recent well-earned promotion), and Mrs. Thomson; Miss Cameron, of the Central Exchange, Miss Kay of the Trunk Exchange, Miss Fleming (Bell), Miss Wallace (Central), etc.

Colonel Westbury, in a short address, complimented the staffs concerned on the satisfactory result of the amalgamation of the Charing and Douglas Exchanges. Mrs. Westbury distributed the prizes for whist, the prize-winners being:—Ladies: Miss J. A. Brough, 1st prize; Miss Stirling, 2nd prize; Miss P. Parkinson, booby prize. Gentlemen: Mr. Gilchrist, 1st prize; Mr. Shearer, 2nd prize; Mr. Brunton, Booby prize.

The artistes were the Misses G. Glenny, A. B. Miller, and B. M. Taylor; and Messrs. G. C. Dewar and D. Reid, with Mr. A. M. Mellish as accompanist. Right well did they perform their respective parts in song or recitation, and so contributed to the enjoyment of a perfect evening. Mr. Coombs occupied the Chair.

"J.L."

LONDON TELEPHONE SERVICE NOTES.

Contract Branch News.

THE amount of business done by the Contract Branch during the month of February was as follows:—

	Stations.
New business obtained	9,654
Ceasements	3,391
Net gain ...	6,263

The net gain figure is a record—the previous highest figure being 6,200—obtained in October last year. The net gain for January last amounted to 5,590 and that for February, 1927, to 4,874. This year's record includes an order for a P.B.X. of 1,000 stations, which is one of the largest, if not the largest, P.B.X. order ever taken in this country. This is being installed in a new building which is being erected for a big industrial undertaking and it is thought that the ultimate requirements may be in the neighbourhood of 1,800 stations.

A total of 154 exchange lines were provided for the exhibitors at the Ideal Home Exhibition this year as compared with 133 lines last year.

An item of special interest to telephone people at this Exhibition is the stand of the Telephone Development Association, where two Contract Branch representatives attend daily to deal with telephone enquiries. Although the Exhibition has only run about half its allotted span when these notes are written, orders have already been taken for about 100 stations, and a large number of enquiries for lines both in London and the Provinces have been referred to the various Districts to be followed up.

* * * *

"Holborn Calling—and Other Trifles."

This alluring title, the possibilities it presents for the exercise of Miss McMillan's whimsical humour, and the certainty—based on past experience—that these possibilities would be fully realised, drew large and enthusiastic audiences to King George's Hall, Caroline Street, Tottenham Court Road, on March 1 and 2 last, when the telephone musical play with the title referred to, was given under the direction of Mr. Pounds.

As the title suggests, the play is a topical burlesque, in which the author, with charming impartiality, pokes good-humoured fun at all and sundry—traffic men, engineers, day staff, night staff and even the charwoman—in which rôle Miss Lilian Jones, known to most as a graceful and accomplished dancer, revealed a real gift for comedy.

From the topical standpoint, the automatic system, as exemplified at Holborn is the central idea of the play. Shrieks of laughter greeted the demonstration by a Traffic and Engineering Officer of the C.C.I. position, a veritable thinking-machine which advances and retires at the word of command; and on which, heralded by rattle of switches, hoot of motor-horn and ringing of bells, the wrong number always appears, until, in despair, the Traffic Officer suggests dialling the number last displayed. Then—with that almost human intelligence for which it is famous—the C.C.I. apparatus obligingly gives the number originally wanted!

> "And oh! for the pow'r that the Engineer can sway,
> And oh! for the Traffic man who makes us glad and gay,
> For the staff are so happy as these officers they scan,
> They admire the Engineer, the clever Engineer,
> And also the resourceful Traffic man!"

The crowded audience was convulsed with merriment at this and other similar "hits" at the more mirth-provoking joints in the Service armour.

Of course, there is love-interest. The principal telephonist (Miss Street), who is in love with the Traffic man (Mr. Hemsley), has run away from home to escape betrothal to a certain Dean (Mr. Beale), but discovers when the Dean visits the exchange that she was intended for his nephew (Mr. Whiffen), who in the meantime has conveniently fallen in love with another telephonist (Miss Lattimer), leaving the principal telephonist to the man of her choice. The Dean appropriately falls in love with the Supervisor (Miss Price), and even the Engineer (Mr. Williams), after his tragic realisation that the automatic system substitutes switches for girls, finds consolation in a charming incarnation of the Automatic Idea. All are thus mated, in accordance with the best traditions of musical comedy.

Excellent singing by principals and chorus was a feature of the production. Miss Street, as the principal girl, sang like the finished artist that she is. Mr. Hemsley, too, used his fine voice to great advantage; while his infectious humour and evident enjoyment of his rôle of the Traffic Officer with the "large Novello eyes" greatly contributed to the success of the performances. Mr. Williams, as the Engineer, also sang delightfully. as also did Mr. Whiffen as the Dean's nephew. Mr. Beale gave a finished rendering of the part of the Dean, while Miss Price impersonated the Supervisor with her unfailing ability and humour. A special word of praise must be given to Messrs. Cherry and Dean for their admirable switchboard background and for the irresistibly comic C.C.I. position, which will help to enable those who saw it to view through the kindly mists of humour the bewildering achievements of its Service counterpart.

There was some excellent dancing under the direction of Miss Jones, whose extremely graceful solo work formed a striking feature of the play. The accompaniments were in the able hands of Miss Garvey; and the charming costumes of the cast were, as usual, under the always artistic supervision of Miss Clayton.

Throughout the play applause and laughter were long and loud; and at the conclusion of each performance there were enthusiastic calls for the author, to whom floral tributes of appreciation were presented.

In response to a widespread demand, the play is to be repeated on April 10 next, at King George's Hall.

* * * *

Cricket and Football.

Since the last notes appeared under this heading 3 matches have been played, all of which have been won, and two of them were decided on opponents' grounds.

This excellent progress has raised the team within reach of the leaders, and seeing that the remainder of the programme includes matches with the leaders of the league, much depends on the results of these games. If the team can rise to the occasion they have more than an outside chance of heading the League and this would be a very creditable achievement for a club in its first year.

It was a good performance to visit Dollis Hill and win 2-1, but the match with the War Office, which at one time seemed likely to result in an easy victory, nearly ended in disaster, due to over confidence when enjoying a lead of 3 goals.

Although interest at the moment is centred on football, the prospects for the Cricket season have been under consideration and it is intended to continue the inter-branch games between the Contract, Traffic and Accounts branches, and dates have been fixed for the contests to be decided at Chiswick.

An invitation has been extended to the London Telephone Service from the Brighton Telephone Staff to send a cricket team to Brighton on Saturday, June 9 next.

The invitation has been accepted and those who wish to be included in the party are invited to get in touch with Mr. H. G. T. Adams, Traffic Branch, Ref. T/MD.2a, 32, St. Bride Street, E.C.4.

It is proposed to travel by train from London Bridge and accommodation will be reserved for the party. The return fare is 6*s.* 5*d.*

It is hoped a large number will come, men and women, and make the outing a big success.

* * * *

Netball Competition.

The first round results for the trophy presented by Miss J. Liddiard were:—

Kensington	27	Central	4
AR3	12	AR2	2
AR6	23	Riverside	11
Thornton Heath ...	11	Croydon	10
Clerkenwell	20	AR1	8
Rodney (A), walk-over.			
AR7	13	Rodney (B)	11
AN and Address ...	16	Trunks	5

In the second round Kensington beat Clerkenwell 27 to 13, and the following matches have yet to be played:—

AR3 *v.* AN and Address.
AR7 *v.* Rodney (A).
AR6 *v.* Thornton Heath.

Arrangements have been made for the Final to be played at the Civil Service Sports Ground at Chiswick on Saturday, April 21.

The Civil Service Championship will be played the same afternoon.

Those wishing to be present may obtain tickets, price 6*d.*, from Miss Sanders, Controller's Office, Reference A/N.

THE

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CONTENTS.

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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

LII.

LT.-COL. A. G. LEE, O.B.E., M.C.

LT.-COL. A. G. LEE, Staff Engineer, whose portrait we give this month, was born in 1879 "in the purple," so to speak, for we believe his father was a Post Office Engineer. He entered the Civil Service as a Second Division Clerk in 1898, but we may assume that, even at the beginning of his career, he had his father's old Department as his objective, and after three years spent in the outer wilderness of West End Offices and the Post Office Savings Bank he achieved his ambition. He entered the Engineer-in-Chief's Office in November, 1911, as a Third Class Clerk, but his appointment was merely a stepping stone to the technical side, and in a little over a year he became a Second Class Engineer. Thereafter the fine scientific knowledge with which he had equipped himself, combined with his high personal qualities, took him rapidly up the official ladder. He became a Staff Engineer in 1925, and it is not likely that this will be the final rung.

[*Copyright, Press Portrait Bureau.*

Lt.-Col. Lee, who served in the Royal Engineers Signal Service during the War, occupies a high position in the world of radio engineering. He is Chairman of the Wireless Section of the Institution of Electrical Engineers and also of the sub-committee of the Radio Research Board on "Atmospherics."

BUSY-TONE RECORDS.

AMONG the activities of Contract Branches which are apt to be lost sight of by the uninitiated is one, which in view of its importance from a service point of view, is worthy of more serious attention. Busy lines, blocked to incoming calls, cause much inconvenience both to subscribers and to the Administration. So much is this the case that it is found necessary to include a clause in contract forms giving the Postmaster-General power to determine the agreement when a subscriber refuses to hire such additional exchange lines as are deemed necessary to meet the traffic requirements. Such course is followed in any case where over a period of 6 consecutive working days the number of calls to the subscriber when the circuit is found to be engaged is more than 25% of the completed incoming calls.

This power, of course, has never been used arbitrarily. Argument, persuasion and adjustment are tried in the first instance and the utmost patience is exercised, and only when it is obvious that all these have failed is the subscriber reminded of the terms of his agreement. If even this fails to produce the desired effect, then notice to determine the existing agreement may be necessary.

While the power to terminate the agreement has without doubt enabled us to relieve overloaded installations, it is of interest to note that in London during the past year, in no instance has it been necessary to resort to actual disconnexion of a subscriber's line to produce the desired result.

Lines to theatres and railway stations and goods yards are a prolific source of busy-tones and are most difficult to deal with. When a play is booming telephone booking is said to be a nuisance and is not wanted, so insufficient lines are provided to carry the traffic and busy-tones pile up. Often by the time the case has been worked up the play has ceased or moved on and the engaged calls have slumped. When a play is having a thin time and telephone booking would be welcomed, the small number of circuits provided is sometimes more than sufficient for the enquiries. We have considered various suggestions to cope with the difficulty, from having a central telephone booking establishment for all theatres where the heavy and light bookings would balance each other, and where a smaller number of lines than that rented at present would carry all the traffic, to putting an entry in the Directory to the effect that seats are not booked by telephone. The trouble has been reduced in certain cases but is still with us in others. I have hopes that a fair and reasonable solution will be found some day which will be to the advantage of the theatres, the public, and ourselves. America, I believe, is still seeking an answer to the same problem. Certain railway companies do not favour telephone enquiries apparently and leave to the Department the unprofitable task of turning away their customers for them. To show the remarkable pressure our telephonists have to deal with in this way on one railway installation during *one hour* on each of the six days prior to Christmas, no fewer than 2,157 busy-tone calls were recorded, and in one hour on one of these days the uncompleted calls reached the astonishing figure of 841. Does the railway company mind? Not a bit, for is it not safely sheltered behind the skirts (pre-War ones to be effective) of the London Telephone Service? Here again, a solution will be found, but it is a slow business and one likely to keep us busy for a long time to come.

It may be recalled that there are three types of busy-tone records taken by the Traffic Branch and passed forward to the Contract Branch for the subscriber to be approached:—

(1) A preliminary record.

(2) A one-day filter record.

(3) A six consecutive working day filter record to conform with the clause on the subscriber's agreement.

With regard to the preliminary records, a very large number of these are taken and, as would be expected, many fall on barren ground and produce no fruit. The most suitable dates for them and the exchanges where they should be taken are arranged between the Contract and Traffic Branches in order to prevent congestion and to assure that records are not taken in exchanges where there are exceptional plant difficulties, or at times when conditions are abnormal. The periods round Christmas, Easter, Whitsuntide, and the summer holiday season are generally avoided for obvious reasons. Where this preliminary record shows results suggesting that the number of incoming calls failing through the subscriber's line or lines being engaged exceeds 25% of those completed, a 6-day record is at once put in hand.

The one-day record is taken at the request of the Contract Branch or the subscriber who may require fuller particulars of the conditions existing on his circuit.

The number of six-day records is not large when compared with the other two, and this is well as the labour involved in taking it is considerable.

In London 5,959 records of all classes were passed forward to the Contract Branch in 1927 and 687 orders for additional lines and 212 extensions were obtained as a result of our labours.

A simple extension or change of number to enable auxiliary working to be arranged on existing lines is often sufficient to reduce the engaged line trouble to normal proportions.

The percentages of ineffective incoming calls for the past eight years were:—

1920	1921	1922	1923	1924	1925	1926	1927
17.0	14.5	13.0	13.3	13.0	12.0	11.8	11.1

The figure was as high as 18.6% during the first half of 1912 and we have just touched the lowest figure yet attained, viz., 10.9, in the last half of the year just finished. The abolition of the flat rate charge for telephone service, of course, had a share in this result. The reduction in the percentage varies, as is to be expected, and a little set-back at times serves the useful purpose of inciting us to further efforts.

It is estimated that a reduction of 1% results in a saving in operating costs of no less than £3,500 each year, and while the work involved in taking the records and obtaining the orders is heavy, it will be obvious that our labours are well worth while. We have dreams in our sanguine moments of a percentage in the neighbourhood of six or seven, but we have a long row to hoe before we reach that figure. The progress that is being made is encouraging, however, and subscribers no doubt appreciate the improvement in the service although their memories are proverbially short. W. F. T.

"HOLBORN CALLING."

THE popularity of Miss McMillan's musical burlesque was evidenced by the demand for a third performance which duly took place on April 10. Continuous ripples of laughter showed how every point went home to an audience in which we imagine telephonists predominated, and continuous applause marked the hearers' appreciation of the singers' and actors' efforts. The play was reviewed at some length in our last issue, and it only need here be said that Miss McMillan's verse was, as we have learned to expect of her, extremely finished and skilful, and her dialogue witty and full of happy allusions. We feel sure that larger audiences still and further repetitions would be required if everyone in the Service knew of the excellent quality of these performances. The fine singing of Miss Street, Miss Latimer, Mr. Hemsley, Mr. Whiffen, and Mr. Beale calls for special commendation, as does that of an attractive and well trained chorus. Mr. Hemsley and Mr. Beale, excellent comedians as they are, never suffered the humorous passages to flag, while the facial play of Miss Price was something to be remembered. Miss Lilian Jones filled a protean part, excelling both in comedy and dancing. W. H. G.

INTERNATIONAL TELEPHONE SERVICES.

BY H. W. CAMP (*Continental Traffic Superintendent, London Trunk Exchange*).

FROM the day when Bell spoke from one room to another in the same house, the range of speech has continuously extended so that to-day there is theoretically no limit.

The development of the science of telephony is well known to all of us. First of all, came the local exchange where subscribers talked to each other within a very limited area, to be quickly followed by short-distance speech confined to the same town. It was not long before widely separated towns were linked up, and side by side with this extension international telephony was developed, first of all to centres near the frontiers and then between the capitals of countries. It is my purpose in this paper to tell you something of this special development of telephone science and of its problems, as they affect the traffic side.

The mainland of Europe is our nearest neighbour and it is only natural that the traffic demand should be to European countries. Indeed, until 1927 the public had nothing other than the continental services to use, as no extra European international system existed until the opening of the Transatlantic Wireless telephone service in January, 1927.

Historical Survey.—The first Anglo-Continental circuits were opened in the year 1891 between London and Paris by means of a submarine cable providing two speech channels connected to overhead lines from London to St. Margarets Bay and from Sangatte to Paris.

Six years later (in 1897) two more submarine cables were laid which provided two additional speech channels to Paris and one to Lille. Two telegraph circuits were also provided by these cables.

The Anglo-French service was extended to the provinces and by 1904, Birmingham, Bristol, Cardiff, and towns in Lancashire and Yorkshire were admitted to the service, while on the French side, the towns of Boulogne, Calais, Le Havre, Rouen, Orleans, Nantes, Marseilles, Lyons, and Bordeaux were brought within the orbit of the Anglo-French service.

A further cable was laid in 1910 and another in 1912 providing four more circuits to Paris.

On the outbreak of war in 1914 we had 9 circuits to France of which 8 were to Paris and one to Lille. Our military commitments in France made imperative an increase in the number of circuits between London and Paris, and during the 1914-18 period 15 additional cross-channel circuits were brought into use.

In 1921 there were 12 Anglo-French circuits in use for public service, and as a result of the surrender of circuits by the military and naval authorities, the suppression of circuits not justified on traffic grounds and the provision of phantom circuits, the number was increased in 1926 to 23 of which 18 were to Paris and one each to Lille, Calais and Boulogne. A new cable has recently been laid providing 14 physical circuits and 7 phantoms. The utilisation of these circuits will greatly improve the Anglo-French service and provide spares for extensions beyond France to Italy and Spain.

In 1913 a service between London and Switzerland was opened and calls were switched at Paris. This condition of affairs continued until the inauguration of a direct service to Switzerland in 1927. Three London-Paris circuits have been linked up with three Franco-Swiss underground circuits and London has now direct communication with Basle, Zurich and Geneva.

The first Anglo-Belgian circuits (2) were opened between London and Brussels in the summer of 1903 and the service was extended to the provinces in the following October.

In 1911 a further cable was laid providing 3 speech channels, and in 1914 there were 5 circuits between this country and Belgium. In 1923, three additional circuits were provided and we then had 4 circuits to Brussels, 3 to Antwerp, and one to Ostend.

In 1926 a modern submarine cable was laid from Dumpton Gap, on the Kent Coast, to La Panne in Belgium. This cable provides 14 physical circuits and 7 phantom circuits. All the existing Belgian circuits were transferred to this cable and additional circuits provided so that at the present time we have six circuits to Brussels and 4 to Antwerp. This cable has spare circuits for outlets to Central Europe via the La Panne-Herbesthal underground cable which traverses Belgium and joins up with the German underground system.

The above survey completes the story of the pre-war international services from the point of view of the provision of circuits. It must, however, be admitted that progress for the first 30 years was slow, and although large areas were open to these services, communication was practically limited to London, Paris, the North of France, Brussels, and Antwerp. During the war the Engineers were continually experimenting in order to extend the range of speech, and the invention of the valve amplifier, commonly known as the Repeater, has to a very great extent solved the problem of long-distance telephony. It is mainly owing to this invention that the remarkable progress of recent years has been possible.

I will now continue the historical survey of the post-war services.

In 1922 the first Anglo-Dutch cable was laid and on Aug. 15, one circuit to Amsterdam and one to Rotterdam were opened for service. These circuits were heavily overloaded from the outset and in 1924 a second cable was laid providing 8 physical and 4 phantom circuits. This was the longest submarine cable of this particular design up to date. Additional circuits were opened giving London 5 circuits to Amsterdam, 4 to Rotterdam, and one to the Hague. After the laying of the third submarine cable an additional circuit to Amsterdam and Rotterdam was provided so that we now have 6 to Amsterdam, 5 to Rotterdam, and one to the Hague.

In March, 1926, it was found possible to open a partial service to Berlin, Hamburg, Cologne, Bremen, and Frankfurt by the extension of some of the Dutch circuits, and on April 19 communication was provided to these places from 5 p.m. to 8 a.m. daily and over the week-ends.

During the summer a third Anglo-Dutch cable was laid to provide 12 circuits to Germany, and on July 1 continuous service with Berlin was opened with one circuit. On Sept. 7 a direct circuit was opened to Hamburg. After exhaustive engineering tests the full service was opened on Jan. 3, 1927, the distribution of the circuits being 4 to Berlin, 4 to Hamburg, and one each to Frankfurt Main, Bremen, Cologne and Düsseldorf. During the year a service to Danzig was opened with Berlin as the switching centre.

Three submarine cables provide 27 speech channels of which 25 are utilised and all are underground throughout the land line length with the exception of the Stockholm circuit which has a short overhead length.

In June, 1927, the Anglo-Swedish service was inaugurated by the provision of a direct service between London-Stockholm to be shortly followed by the extension of the service to Gothenburg. In view of the unsuitability of the circuits between Stockholm and Gothenburg, it was decided to give a half-hourly service to each locality, the switching over from one town to another to be carried out at Malmö.

The service has recently been extended to cover the whole of Sweden and the whole of the provinces in Great Britain. The London-Stockholm circuit is the longest international circuit between Great Britain and the Continent. Its overall length is 1,547 miles, while its electrical length is only 10 miles. It has 23 Repeaters and 2 echo suppressors, two lengths of submarine cable, one across the North Sea from Aldborough to Domburg and the other across the Baltic from Stralsund on the German coast to Malmö in Sweden. It is underground from London to the coast and from the Dutch coast to Stralsund and overhead from Malmö to Norr Köping about 500 miles from Stockholm, where it again goes underground to its termination.

In July, 1927, a service to Denmark was opened limited to London and Copenhagen. Calls were at first switched at Hamburg, but a through circuit between London and Copenhagen has recently been provided and the service extended to the British provinces.

On Oct. 1 a service to Norway again limited to London and Oslo was opened and in this case also no direct circuit has been provided. Calls are connected via Gothenburg during the half-hour period that the Anglo-Swedish circuit is terminated at that point.

It will, no doubt, have been realised that the progress made since 1921 has been far in advance of anything that was accomplished in the previous 30 years, and as I pointed out earlier, the main factor in the extension of the speech range has been the employment of the valve amplifier. The main factor in the increase in the number of circuits between Great Britain and the Continent has been the improvement in the design of submarine cables. You will have noticed that prior to the war, cables were laid which provided 2 physical circuits and one phantom circuit, but as a result of engineering experiments, cables of a far greater capacity were designed and brought into use. These modern cables provide from 12 to 21 or more speech channels.

All the new international circuits have an electrical length of 10 miles and all are underground for the greater part of their length.

Fees and Method of Charging.—The day-rate charges for calls are based on a zone system and vary according to the distance from the country of origin. In Great Britain there are three zones, the first of which is south of a line drawn from the Humber to the Bristol Channel but excluding the counties of Devon and Cornwall; the second zone comprises the remaining counties of England and the whole of Wales; while the third takes in Scotland and Northern Ireland.

In France there are also three zones dividing the country from east to west. Paris is in the first zone.

In Germany there are 12 zones, the first is nearest the Dutch frontier, while the twelfth comprises a small area on the eastern extremity of East Prussia, Cologne is in the second zone, Frankfurt in the third, Hamburg in the fourth, Berlin in the fifth zone, Dresden in the sixth, Liegnitz in the seventh, Breslau in the eighth. Sweden is divided into four zones, Malmo being in the first and Stockholm and Gothenburg in the second. Belgium, Holland, and Switzerland each comprise one zone.

The day-rate fees to the Continent vary from 6*s.* to 24*s.* for a three-minute day call, and the night rate is always, approximately, three-fifths of the day rate. The rate for calls on a contract basis during the night hours is half the day rate. The fees in the terminal countries vary according to the zone system, but the transit rate, i.e. the rate for the country through which a circuit runs but does not end, is a fixed amount. There are only two charging periods, Day and Night, the day rate commencing at 8 a.m. and ending in some cases at 7 p.m. or 7.30 p.m. and in others at 9 p.m.

The method of charging is minute by minute after the first three minutes, and the minute charge is one-third of the unit charge. Calls commencing at day rate and running over into the night rate are charged as day rate calls, while those commencing at the night rate and carrying over to the day period are charged at the night rate.

The calls on a contract basis mentioned above are known as subscription or abonnement calls. The minimum duration is either three or six minutes nightly for one month. The agreement is automatically renewed month by month until terminated by the subscriber.

The Traffic Aspect of our International Services.—Method of Operating: The operating procedure on all circuits is that known as the preparation in advance. By this method one number is demanded for immediate connexion with another number to follow so that the called and calling subscribers are rung before the call actually connected is finished. One weakness of the operating procedure is that when calls reach the distant exchange they are subject to the treatment accorded inland calls of the country of destination. For example, the interruption procedure is not in force in France and Belgium, and is therefore not applied to calls originating in other countries, whereas the interruption is common to the Dutch, German, and Sewdish systems. The challenge at the termination of the 3-minute periods is not in force in any Continental country. except Czecho-Slovakia.

Other points of procedure are (1) No reply calls are treated as cancelled, and the originating exchange must renew the demand; (2) A call refused by the calling or called subscriber is charged for at the normal unit rate if the called subscriber is waiting. Now that the minute by minute charging is in force telephonists no longer ask subscribers if they require another 3 minutes. They say instead "Do you wish to continue?" At the termination of each call the controlling telephonist advises the distant telephonist of the number of minutes charged.

Pink tickets are prepared for all incoming calls and timed on and off as for an outgoing call.

Two tickets are prepared for calls originating in the provinces, one white out-district and a blue-zone ticket. The white ticket shows the duration and is used for revenue purposes, while the blue ticket shows the duration and all relative notes. This ticket is retained in London so that in the event of any enquiry it is not necessary to ask the provincial District Manager to return the white ticket to London.

Provincial calls to and from the Continent are normally connected via the London Repeater Position. The Continental Home position telephonist prepares the connexion by getting into touch with the calling and called subscriber. The connexion is then handed over to the Repeater position telephonist, who picks up the Trunk circuits specified, brings in the Repeater and controls in the usual manner.

The Foreign Division of the London Trunk Exchange known as the CX Division comprises 32 positions of which 30 are operating and 2 are observation positions. These positions are accommodated on the 3rd and 1st floors of the G.P.O. South building. On the 3rd floor (Main Trunk Exchange) are the French, Belgian, Swiss, American, Repeater and Observation positions, and on the 1st floor (Trunk Record Room) are the German, Dutch and Swedish positions.

There are 57 international circuits accommodated on 29 positions, and in addition, one of the Repeater positions is staffed by a Foreign Section telephonist.

The staff directly associated with the service comprises 6 Assistant Supervisors, Class II, of whom 4 are French and 2 German speakers. There are 31 French and 7 German speaking telephonists. Three telephonists without language qualifications are employed on the American service. Two telephonists are employed for the Enquiry duty and 3 are utilised for clerical work, ticket pricing, preparation of the international accounts and other returns.

The Anglo-French Service.—We have 4 French routes, London-Paris with 18 circuits and one circuit each to Lille, Calais and Boulogne, accommodated on 8 positions.

As may be imagined, the Anglo-French service is the largest of our international services, both on account of the number of circuits and the volume of traffic.

The day hours of service are from 8 a.m. to 7.30 p.m., and night hours from 7.30 p.m. to 8 a.m. The fee is 6*s.* for 3 minutes during the day period, and 3*s.* 7*d.* during the night period.

We have direct communication with the Paris Bourse from noon until 3.30 p.m. daily, and 4 circuits are allocated for general Bourse traffic. Satisfactory communication can be given to all the important centres in France and to most of the exchanges in the first and second zones. The business day commences about 9.45 a.m. and continues until about 6 p.m.

The traffic to and from the Lille area is fairly heavy, particularly during the wool sales and when the cotton market is active. At such periods there is considerable community of interest between Liverpool and Bradford and Roubaix. Lille is the switching centre for all places in the North of France.

The Calais and Boulogne circuits serve limited areas and cannot be used as switching centres, as no suitable Repeater equipment is available in these exchanges. These circuits are very lightly loaded, particularly during the winter period.

Now that the underground route between Paris and Boulogne has been completed, and the new submarine cable is ready, resulting in a much improved service from the standpoints of transmission and stability of circuits.

Detailed statistics of Anglo-French traffic are not available prior to 1921, but yearly figures of total effected traffic are available from 1904.

These figures show that in 1904, 69,000 unit calls were effected, by 1909 the figure had risen to 78,000, and in 1914 to 150,000. Development ceased during the war years, but in 1922 the figure was 362,000, and in 1926, 526,000. It should be realised that in 1904 there was 4 Anglo-French circuits, and in 1926 there were 21.

The above figures, however, only show the number of calls effected and are directly related to the number of circuits working. The incoming effected traffic is slightly higher than the outgoing. The outgoing day and night demand is, I think, of greater interest, as it shows the real growth of the public demand.

In 1921 the average monthly bookings were 7,000, in 1922, 8,600; in 1923 the figure increased to 9,600; and in 1924, to 10,000. The increase in 1925 was only about 200 calls per month, but the 1926 figure shows a monthly average of 11,000 demands. The 1927 figure is somewhat lower as the new night rate period commenced at 7.30 p.m. instead of at 9 p.m., as in 1926, but even with this shortening of the day rate period, the demand still fluctuates between 10 and 11,000 per month. The night demand curve follows that of the day, although the volume is naturally not as great. The night demand rose from about 1,000 per month in 1921 to 1,200 in 1922. During the following years up to 1927 the demand remained stationary around 1500. The drop in day demand just mentioned was compensated for by a corresponding rise in the night demand, the figure for 1927 being around 2,400 bookings monthly.

Anglo-Belgian Service.—At the present time there are 10 circuits to Belgium, 6 of which are to Brussels, 4 to Antwerp. Until the summer of last year the service to Antwerp could not be called satisfactory owing to the very poor transmission value of the circuits. When the new cable was ready for use the whole of the Belgian circuits were transferred thereto, and we are now able to give a satisfactory service to any part of Belgium. A very successful demonstration call from Dundee to Ghent was recently effected, the speech volume of which was excellent. It is doubtful if such a connexion could have been effected with the old circuits.

The delay to Belgium does not normally exceed 30 minutes between 10 a.m. and noon. The day fee, 8 a.m.-7 p.m. is 7*s.* 3*d.* The curve of Anglo-Belgian traffic shows how various services can react one on the other, and there has been a definite fall in traffic since 1923. The explanation is as follows. Most of the international day traffic is in connexion with finance, and while communication was limited to the Paris, Brussels and Antwerp markets, the public were content to talk to Brussels and Antwerp. These towns, however, are not of themselves important financial centres, and when communication became available to the Amsterdam market the traffic was diverted to that centre. Hence, we lost a great proportion of the financial traffic and we have not made the loss good by a corresponding increase in ordinary commercial traffic.

Another factor is the entire elimination of outgoing night newspaper traffic to Brussels. These calls were re-transmitted from Brussels to Holland and Germany, but with the opening of the latter services, the calls were transferred to the Amsterdam and Berlin routes.

Before the circuits were put underground and transferred to the new cable, 13% of the calls were ineffective, but the percentage at the present time is only 7. Until May, 1927, there was no reduced fee at night, and the rate was 8*s.* for 3 minutes. A night rate fee (7 p.m.-8 a.m.) 4*s.* 4*d.* for 3 minutes is now in force, but the night traffic remains very light.

Anglo-Swiss Service.—The service was opened in 1913 on a switched basis via Paris. During the European currency crisis the bookings became very heavy, and there was intense competition among users for connexion with any Swiss town.

We now have 3 direct circuits, one to Basle, one to Geneva, and one to Zurich. The service is available to the whole of Switzerland.

The day 8 a.m.-9 p.m. fee from London 8*s.* for 3 minutes.

The Swiss traffic is almost 100% financial. There is no ordinary commercial traffic and very little social traffic. Despite the fact that Switzerland is a great tourist centre, both in summer and winter, the night traffic to Switzerland did not average more than a dozen calls monthly between 1921 and 1926. The 1927 figures show some improvement, the demand being about 40 calls monthly.

Anglo-Dutch Service.—The first new post-war service was that to Holland. We opened in 1922 with 3 circuits, and at the present time we have 12—6 to Amsterdam, 4 to Rotterdam and 1 to The Hague. The circuits are underground throughout the landline lengths, and are of high transmission efficiency. The whole of the British Isles and the whole of Holland are open to the service. The day fee from London is 8*s.* for 3 minutes between 8 a.m. and 7 p.m. The day demand has steadily increased since the opening of the service. The year 1922 showed a monthly demand of 3,000 bookings, 1923 was just below 5,000 and 1924 just above. In 1925 the demand was around 5,400. In 1926 the coal strike gave an added impetus to the demand and the monthly figure rose to 6,200. The 1927 monthly demand is approximately 6,000.

The night demand increased satisfactorily up to the opening of the German service. Our night newspaper traffic grew from 120 calls monthly in 1923, to 250 in 1925, but as these calls were re-transmitted to Germany, the opening

of the direct service to that country caused the diversion of nearly the whole of this traffic, and the figure since March 1927, has been in the region of approximately 50 calls per month.

The total night demand (ordinary and newspaper) during 1926 was about 625 bookings per month, but despite the fall mentioned above, the 1927 monthly figure is around 500 calls.

Anglo-German Service.—An important extension of the international services took place when communication was established with Germany. Up to that time the service was limited to countries far less industrialised than our own, and apart from Holland, to countries less developed, from the telephone standpoint than Great Britain. In the case of Germany, it meant that we were in touch with a great industrial country, possessing up-to-date telephone equipment and with the largest underground system in Europe.

The full service was opened on Jan. 3, 1927, with direct circuits to Berlin, Hamburg, Frankfurt Main, Cologne, Düsseldorf, and Bremen. Continuous service had previously been inaugurated with one circuit to Berlin on July 1, and with one circuit to Hamburg in September. From the outset the demand was heavy and it has risen continually. Service is available from any part of Great Britain to any part of Germany, and the transmission on all circuits is excellent.

The charges for calls range from 9*s.* 3*d.* to 20*s.* 3*d.* for 3 minutes, the Berlin charge being 12*s.* and Hamburg 11*s.* 3*d.* The day rate hours are 8 a.m. to 7 p.m.

The outgoing day demand was 3,300 in January, and in October was 5,800, and except for a slight drop in July and August the increase has been continuous.

The busiest routes are Berlin, Hamburg and Frankfort, and traffic over the Cologne and Düsseldorf routes is increasing.

The night demand (7 p.m.-8 a.m.) has also increased, but not as rapidly as that for the day period. The January demand was 1,150, while that for October was 1,650.

Anglo-Swedish Service.—The latest direct service to open was the service between London and Stockholm in June of this year. Only one circuit is at present available. Communication is available to the whole of Gt. Britain. Satisfactory speech trials have been carried out between London and Lulea in the extreme north of Sweden. The traffic is increasing and it is anticipated than when service is available to the ports on the western coast of Sweden there will be a large increase in demand for communication.

Anglo-Danish and Anglo-Norwegian Service.—An Anglo-Danish service was opened via Hamburg in July, limited to London and Copenhagen. The provinces in Great Britain can now communicate with Copenhagen, and a "through" circuit between London and Copenhagen has recently been provided.

The day demand to Copenhagen was 140 bookings in August and 227 in October.

The London-Oslo service was opened on Oct. 1 via Gothenburg, in Sweden. The demand during October was 174 calls.

Maintenance of International Circuits.—The percentage of lost time depends to a great extent on whether the lines are overhead or underground. In the former case they are affected by bad weather. The underground circuits are far more complex and, although seldom affected by the weather, they require continuous attention at repeater stations.

Latest Development.—Services to Vienna via Frankfurt were opened on Dec. 1, 1927, and to Prague and Budapest on Jan. 1, and subsequently extended to the whole of Austria and Hungary. Services to Poland and Spain are under consideration.

There is a certain community of interest between shipping people here and on the Continent, and outside London, Liverpool is the largest provincial user of the service. The textile industries (wool and cotton) use the service particularly to Roubaix, and we have recently had a demand from the woollen industries around Bradford for communication with Lodz, in Poland, which is a centre for this trade.

Our endeavour must be to awaken interest in overseas telephone communication and give a type of service which business people will prefer to use rather than any other means of communication. It is true we have been handicapped in the past, owing to insufficient transmission and delay, and other factors, but this condition of affairs does not exist to-day. In this connexion a great deal is being done by the canvassing campaign now in force throughout the country, and by the provision of the booklet containing details of the service. Now a would-be user of the service can see at a glance what are the conditions and the fees for calls.

The International Committee.—The growth of international telephony in Europe has necessitated the formation of a body of officials to co-ordinate as far as possible the regulations governing international telephone services. Practically all the European administrations send delegates and the Committee itself is subdivided into various sub-committees to study technical, traffic and other problems. Mr. Trayfoot, of the Secretary's Office, Traffic Section, is a member of the Traffic Sub-Committee. The Committee has recently issued a code of rules for international traffic covering the main points of general procedure. The administrations are expected to carry out the regulations, but there are many important matters left to their discretion. However, a great step forward has been made and in international affairs one must hasten slowly.

Notes on International Services in other Countries.—I have been able to obtain some interesting figures in connexion with the development of international traffic in Europe generally. The largest single group of international circuits is that between London and Paris, with 18 circuits. This is closely followed by the Paris-Brussels route, with 14 circuits.

France.—The first international route was opened in 1887, between Paris and Brussels. At the present time there are about 300 international circuits between France and other countries. There are 71 main-line circuits terminated in the Paris Trunk Exchange, and there is direct communication with Madrid, Vienna and Prague. No traffic figures are available, but some indication of the growth may be gathered from the revenue figures which were 1,400,000 fcs. in 1906 and 50 million fcs. in 1926.

Belgium.—Belgium possesses approximately 155 international circuits. Forty international circuits terminate in the Antwerp Trunk Exchange and 48 in Brussels, while the remainder are short circuits between points near the frontier. There are 9 Antwerp-Rotterdam and 7 Antwerp-Amsterdam circuits. Brussels has direct communication with Vienna.

The total number of effected units in 1906 was 395,000 and in 1926 2,900,000. The Anglo-Belgian total takes fifth place after France, Holland, Germany and Luxemburg.

Switzerland.—The first international routes were opened in 1892 to frontier points in Austria, France and Germany. In view of the geographical position of Switzerland, it is not astonishing that the international traffic has grown. Forty-three Swiss towns possess international circuits, there are 132 routes and 219 circuits. Sixty-two circuits terminate in Bâle, 40 in Zurich and 30 in Geneva.

In 1906 the traffic outgoing from Switzerland was 145,714 effected units, and 1,554,000 in 1926.

Holland.—The first international service was opened between Rotterdam and Antwerp in 1895. Holland possesses 146 international circuits, of which 92 are to Germany and 37 to Belgium. Switched services are provided to Denmark via Hamburg, Hungary and Austria via Frankfort, Italy via Bâle and Czecho-Slovakia via Berlin. The total effected traffic was 204,500 units in 1906 and 1,537,000 in 1926.

Germany.—There are about 200 main routes from the chief towns in Germany to the chief towns in Europe. Fifty-six international circuits are terminated in Berlin and, in addition to direct communication with towns in Western Europe, there are direct circuits to Warsaw, Stockholm, Copenhagen, Vienna and Budapest.

The first services opened from Berlin were to Vienna and Budapest.

It has not been possible to obtain any traffic figures for the whole of Germany, but the Berlin statistics for 1926 give a total of 814,000 effected calls. The figures for 1927 will probably be in the region of 1,200,000.

Anglo-American Service.—The Transatlantic Wireless Telephone Service was opened on Jan. 7, 1927. After many months of experimenting one of the finest feats of electrical engineering was accomplished, and the old world and the new were brought into touch as never before.

At the outset the service was limited to London and New York, but by Feb. 26 the whole of the U.S.A. had been admitted. The service extended to Cuba a few weeks later and to the five Canadian towns, Ottawa, Montreal, Quebec, Toronto and Hamilton, on Oct. 3. This service is unique from the technical point of view in that the radio circuit is voice-controlled, and unique from the traffic standpoint in that we have adopted the full person-to-person system in force in America.

Perhaps a few notes on the person-to-person service may be of interest. The main idea of the system is to put Mr. A in communication with Mr. B, and the telephone service undertakes to do so before a fee is raised on the call. This means, of course, that if the called party is not at the telephone designated he must be sought for. There is no limit to the search unless the operator is told that he is not expected or a similar report indicating that a search is useless. Moreover, the calling party may be absent when the call matures and he in his turn must be looked for, the call being meanwhile held up. The system is greatly appreciated by subscribers, but you will realise that its greatest weakness is the loss in circuit time.

In connexion with the Transatlantic service the charge varies from £9 to £11 8*s.* for 3 minutes. The U.S.A. are divided into five zones and there is a difference of 12*s.* for each zone. Calls to Havana (Cuba) are charged at the 5th zone rate—£11 8*s.*, while a 3-minute call to any other part of the island costs £12. A special fee, known as the "Report charge," of £1 is levied in cases where the called telephone having been reached, the person required cannot be found, either at his own telephone or elsewhere.

The timing arrangements include the calculagraph impression, a record of each 20-second period of conversation and the duration details of the observation telephonist.

The position officers are known as the Advances Calling Telephonist and the Control Telephonist.

The first named is responsible for the preparation of the call prior to setting up the connexion to the radio channel. This means getting into touch with the subscriber in this country and advising him of the reports on his call which have been made by the New York operator.

The control telephonist makes the connexion to the radio channel, times the call on and off, advises the calling party at the end of each 3 minutes of the lapse of time, and keeps the 20-second timing record mentioned above.

An important point of procedure is that at the end of the 3-minute periods the control telephonist does not ask the caller if he wants another 3 minutes or even if he wishes to continue. She simply announces the passing of the 3-minute periods by saying 3 minutes, 6 minutes, &c., and the caller himself decides whether he will or will not continue. Conversations must be limited to 12 minutes if two or more calls are awaiting connexion.

New York has direct circuits to the following Canadian cities: Montreal, Toronto, Quebec, and there are about 370 circuits crossing the frontier throughout its 3,500 miles. Chicago has a direct circuit to Winnepeg and Seattle to Victoria and Vancouver in British Columbia. The service to Cuba was opened early in 1921 and the line passes through to Philadelphia, Baltimore, Miami to Key West and thence through a submarine cable to Havana.

Service has lately been opened between the United States and Mexico by a direct circuit from New York to Mexico City via Chicago, St. Louis, San Antonio, Monterey and San Luis Potosi.

Development in Wireless Telephony.—The Transatlantic service was extended to Canada in October last, and to the Continent of Europe in the early part of 1928—to Belgium and Holland in January, to Germany and Sweden in February, and to France in March. Further developments are in contemplation.

There is the possibility of utilising the Beam systems for telephone purposes and thereby giving telephonic communication with Canada, South Africa, and India. The Germans are experimenting with a service to Buenos Aires and the Dutch with a service to the Dutch East Indies.

I cannot bring this paper to an end without a word of congratulation to our Engineers who have done so much to improve and perfect our overseas telephone communications, and if the future of these services depends upon the co-operation of the engineering and traffic staff, then success is assured.

I also offer my best thanks to my colleagues in London, New York, and on the Continent who have so kindly furnished me with information for this paper, and also for their co-operation at all times in making our overseas telephone service run smoothly.

THE GLOOM ABOUT TELEGRAMS.

(FROM THE *Manchester Guardian*, MARCH 24.)

THE dismal report of the Committee on the Inland Telegraph Service has at least provided a useful target that can be shot at from all sides. The Post Office worker not unnaturally resents the suggestion that a growing "inertia" on his part is one factor in the decline of the service, and will not easily lie down under the suggestion that his abilities as an operator decline after the age of thirty-five. The layman will view with some suspicion the constant suggestion that crops up in the report that under "Civil Service methods" reform is impossible, and that if the methods of big business could be applied to the service all would be well. That argument, produced at regular intervals in the half-century since the State was compelled by popular demand to take the telegraph service out of private hands, is very properly discounted as representing an attitude of mind to which all forms of nationalisation are abhorrent. It is strange to hear it seriously put forward to-day, the more so when it is remembered that in the United States, one of the few remaining countries where the telegraph is still privately owned, its cost to the public is greater than here, and its efficiency no higher. The plain fact is that the Committee had a singularly unhopeful task to perform. They had to consider what steps can be taken to reduce the deficit on a service that never has paid and that is now declining in public utility. Were a deficit on telegraphs a new feature in our national accountancy they might have approached their work with some hope of discovering causes and remedies for a temporary malady. But none who surveys the history of the service can be buoyed up with expectations of making a financial success of a Department that has never shown a profit—and least of all at a stage in its history when it is faced with more severe competition than at any time before.

A loss on telegraphs is not, of course, a peculiarly British complaint. The Governments of France, of Belgium, and of Switzerland, for instance, have, like our own, put the need of efficient national communication before even the certainty of profit. And viewed by that test the State telegraph has in its day served Britain well. When the Government took it over at the price—strongly criticised for long afterwards as excessive—of some £8,000,000, and spent nearly another £2,000,000 on extending it, some 6½ million telegrams were sent per year. After five years of State management that number had risen to 20 millions. Ten years later, after a stiff fight, the advocates of still further easing communication gained their way in the Commons and the sixpenny telegram took the place in the national life that it held for 30 years. Under this stimulus the telegrams sent rose quickly to over 50 millions a year, and just before the war had nearly touched 90 millions. It is noteworthy that the deficit on the service then was considerably less than it is to-day, when the cost of a twelve-word telegram is a shilling. As a record of public utility that is something to set off even against a persistently adverse balance-sheet. But there can be no doubt that that utility is declining, nor that the chief cause, more cogent than the "inertia" of telegraphists or even the unbusiness-like methods of the Civil Service, is the popularity of the telephone. The report gets to the root of the matter when it admits that "the competition of the telephone service tends to kill the short-distance telegraph traffic." In the last five years the number of trunk telephone calls has nearly doubled, and stands now in the region of 100 millions. There is nothing here for tears, for clearly what the State is losing on the swings it is making on the roundabouts. By all means let us do what can be done to enable the inland telegram to play its remaining part more efficiently, but it is surely needless to propound theories about the inherent viciousness of State management or the growing lethargy of civil servants when the root cause of the telegraph's decline is patent.

Some of the reforms which the Committee suggest seem on the face of them reasonable if trifling. If it is indeed the case that the service is so constituted that its lack of opportunities for promotion deter the young man of ability from entering it there is room here for departmental reform. Again, many who have observed the telegraph boy in the course of his official "walk" of delivery will no doubt agree that "careful and detailed inquiry" into the "walk" system would be justified if it slightly accelerated him. There will even be found supporters for the revolutionary proposal that after all these years we may at last be absolved of the necessity of licking our own stamps when dispatching a message. But the other bids for popular favour are not so happy. The notion that a waning affection for the telegram will be revived by the fact of having to pay 1*s.* 1*d.* for the mere privilege, as it were, of entering the post office and before inditing a word seems an odd one. Still more curious is the hope that a nation accustomed to think in such simple and straightforward terms as "twelve words for a shilling" will be reconciled to a higher tariff by the knowledge that a 3*d.* rebate on 1*s.* 1*d.* is available at 2.1 p.m. which is not available at 1.55. Again, the Committee appear to think it possible that since under the proposed new rate a telegram of 26 words, or over would actually be cheaper than at present we may be tempted to a needless exuberance on the wire in order to make sure that we get value for our money. But that, surely, is a mentality seldom met with outside the jokes that pertain peculiarly to the city of Aberdeen. Frankly, one does not see in this report much renewed hope for the telegraph service. Nor, since the telegraph as we have known it may any time, in the extraordinary fertility of electrical invention in which we live, be displaced by some such device, for instance, as the transmission of the actual image of a written message, does the failure of this Committee to improve on the ideas of its numerous predecessors seem very greatly to matter.

EAST TO WEST.

BY J. H. RAMSAY (*Glasgow*).

CONGRATULATIONS to the two German airmen and their Irish companion who succeeded in the remarkable, but decidedly lucky feat, of flying the Atlantic from East to West. Following this partial success, we may be sure that several attempts will be made this summer, but certainly with disastrous results.

The "Bremen" type of machine is undoubtedly one of the best, and the pilots navigating it were of exceptional experience, yet, having taken the air with petrol to last forty-two hours, they were forced to land, after flying for thirty-eight hours, with one-third of the intended distance still to be flown, and 400 miles north of their intended landfall!!!

Knowing something of the vagaries and inclement conditions existing in the North Atlantic, I am convinced that our present heavier-than-air machines are not suitable for Atlantic flights; moreover, Aerial navigation is distinctly primitive, and pilots flying over wide expanses of water have to trust even more to luck than their compass. In attempting to cross the Atlantic, when well clear of land, and out of touch with shipping, the airman has no means of checking his "drift" or exact position, and being unable to do so, we find that the compass error is bound to be great, and the nearer the approach to the coast of Labrador, the greater the error becomes, as you near the North Magnetic Pole, which is situated in latitude 70° N., longitude 97° W.

Variation (the angle between the True and Magnetic meridians) changes very quickly, and Magnetic storms are prevalent which magnify errors and render the compass useless. The vibration and highly magnetic type of engine of an aircraft, are also contributory causes of compass-error.

Meteorological reports cannot be expected to be fully reliable when they embrace the whole of the North Atlantic. Machines may leave the west coast of Ireland, in what are considered to be "favourable flying conditions" and reports from Nova Scotia may also be favourable, but what are the actual conditions, say 900 miles W.N.W. of Ireland?

The safest Atlantic route is at present, unquestionably, via the Azores, and the best type of machine would be a multi-engined flying-boat, capable of keeping the air for seventy hours—other efforts will be suicidal.

TELEGRAPHIC MEMORABILIA.

ALGERIA.—*The Times* reports that communication between Paris and Algiers by means of short-wave beam wireless telephony was opened on March 19, when M. Bokanowski, the French Minister of Commerce, spoke to M. Bordes, the Governor of Algeria. M. Bordes could not reply, as communication is at present unidirectional.

AUSTRALIA.—An emphatic declaration that the Postal Department intends to insist upon the improvement and co-ordination of Australian broadcasting services, says the *Electrical Review*, was made recently by the Postmaster-General (Mr. Gibson), who said that existing licences would expire in about 17 months, but it was not the intention of the Department to wait so long for improvements in services. He was not concerned with the private affairs and financial relations of the companies. According to the *Sydney Morning Herald*, adds the same authority, the amalgamation of four or two companies, or of four in groups of two, would not satisfy him. His view was that there should be close contact between broadcasting companies in all States. It should be possible without difficulty to arrange for the control of all stations by the one authority, whether or not each station kept its finances separately. If the one authority could be obtained it could make financial provision to cover the working of the stations in the smaller States. Merely because of a difference in population, stations in the eastern States were enabled to make good profits, while those elsewhere were in difficulties. It would not be possible to introduce differential licence fees to control the earnings of companies, and it was proper to expect that large earnings in one State should balance necessarily smaller earnings in the others. While efforts to co-ordinate services were proceeding, it was unlikely that additional licences would be issued in cities in which stations were absorbed. It had been found necessary to refuse several applications by existing "A"-class stations for the right to broadcast in Tasmania and Western Australia. Some of the stations had offered to undertake the work without any operating fee, but it had been felt that injustice would be done to stations in those States and South Australia if the applications were granted. Mr. Gibson added that the resolutions of the Washington Conference had been received, and the re-allocation of wavelengths to Australian stations would be undertaken shortly.

The following is the satisfactory sequel, apparently: "The directors of the two Sydney stations reviewed the New South Wales position after the Premier's hint, and negotiations between 2FC, Ltd., and Broadcasters (Sydney), Ltd., (2BL), which have since been proceeding with the object of taking the first step towards meeting the Government's wishes."

According to the *Board of Trade Journal*, the amendments in a Commonwealth Legislature Act recently passed include the fixing of the following new rates of the Australian tariff viz.: British preferential 35% *ad valorem*, intermediate 50%, and general 55%, in duties on "wireless sets and headphones.

BELGIUM.—The British Department of Overseas Trade in its report on the economic situation in Belgium in 1927 by the British Commercial Secretary in Brussels makes the following interesting remarks on matters specially relevant to these columns. "It is considered," says the report, "that the slow development in the Radio industry in Belgium is due to the inadequate broadcasting service in Brussels and Antwerp. One concern holds all the Marconi licences, which it re-issues to local manufacturers on a six-months' contract basis. Importers are placed on the same basis as manufacturers. There are many important Belgian firms with a large output, and a number of small firms turn out a few sets per month. The period of cheap wireless supplies has now passed, and retailers can command almost their own price, subject to competition. Owing to the development of flat-residence, receiving sets with frame aerials are in good demand, as are also portable sets. The majority of the better-known French sets are on the market at competitive prices. American and British sets are sold regularly, but as a rule the sets of British origin (with the exception of portable sets, which are selling well) are still about 50% higher than the competing products, and are often not suitable for local conditions, for anything less than a four-valve set cannot take the stations on which Belgian listeners greatly rely. Loudspeakers, however, and certain component parts of British origin have very successful sales."

On the telegraph side, it is stated that the placing of telegraph lines underground proceeded throughout the whole of 1927, which is very good news for international telegraphy. The report goes on to speak of the inauguration of its long-distance international "Belradio" station last October and which, it may be added, now appears to be working satisfactorily to the Congo, Dutch East Indies, Japan, Australia, North America and the Philippines.

At the receiving station, Liedekerke, a low-power, short-wave transmitting set is in course of construction and assembly.

CANADA.—In 1927 a net profit of 463,967 dollars (£80,793) was made by the telegraph service operated by the Canadian National Railways. In 1920 there was a loss of £20,498. Rates vary according to distance and time of dispatch. The High Commissioner for Canada in London announces that this same company is now installing, at a cost of $2,500,000, a modern high-speed telegraph system between Vancouver and Montreal, which is expected to be in operation within three months. Mr. R. W. Ball, general manager of the western region, states that the carrier current system which is being used, which is the application of audio-frequency to telegraph service, will make it possible to transmit 84 messages simultaneously, using the human voice in both directions. The new system uses two wires, whereas the old system used one wire over which eight messages could be sent simultaneously; the new service will therefore result in speeding up communication tenfold. Installation of the new equipment between Montreal and Winnipeg has already been completed.

Canada's claim to more exclusive wavelengths is likely to be postponed in the event of the United States Federal Radio Commission's not receiving a further lease of life. Legally the Commission's authority expired on March 15, and Congress appears disinclined to grant a renewal of that authority, says *World Radio*. The Commission expects to get a special mandate from Mr. Herbert Hoover, Secretary of Commerce, to carry on its work until the transfer of its activities is made to the Department of Commerce. The most important Canadian claim now pending is that for an additional exclusive band for the use of the Manitoba Provincial Government's station; the Canadian authorities reminded the United States that Canada's claim stands for at least a dozen exclusive bands instead of the present six, and an increase in the number of shared wavelengths was also suggested.

The London *Daily Telegraph* states that direction-finding stations are to be constructed in the Hudson Straits to aid vessels proceeding to Fort Churchill following the completion of the Hudson Bay railway to that port. Two of these stations will be erected this summer and two more in the summer of 1929.

The four stations will be ready, adds the *Electrical Review*, for whatever traffic results from the completion of the Hudson's Bay railway terminal at Fort Churchill in 1930.

It is understood by *World Radio* that the estimates brought forward in the House of Commons at Ottawa include a grant of £38,000, which is to be allocated for the purpose of providing funds to go towards the improvement of broadcast reception conditions in Canada for listeners.

Canada's new high-power station (CKGW), which was officially opened on March 5, operates on a wavelength of 312.3 metres, and has been temporarily listed under the experimental classification with the call 9GW, says *World Radio*. Condenser microphones are used, such as have hitherto been employed exclusively by the (WGY) Schenectady station, but the National Broadcasting Co. is also to install similar instruments at the WEAF station. Two telephone lines, one for control, each 47 miles in length, connect the studios at Toronto with the transmitter at Bowmanville, where the aerial is supported by two steel towers 165 ft. above the ground and 255 ft. above the near-by lake. The four-wire loop antenna is 80 ft. long, divided into two sections by the down-lead, of the British Admiralty pattern. Water-cooled valves are employed at 15,000 V. anode voltage, and the frequency is crystal controlled. The station's equipment includes a sensitive receiver which will be kept tuned to shipping wavelengths, so that whenever distress signals are heard the broadcasting plant will be shut down. American regulations require all high-power stations to use such a receiver, and, though no similar law is in force in Canada, CKGW has conformed to the requirement.

Advices received in financial circles in the City of London from Canada, says a correspondent of the London *Daily News* "reveal much interest in the Dominion in the statement by Mr. F. G. Kellaway that American telegraph organisations are steadily increasing their hold over the communication systems of North America." Meanwhile the only commercial wireless company operating in Canada is the Canadian Marconi Company, which has a non-exclusive licence issued for one year, and, adds the newspaper's informant: "It is controlled by another Company known as the Canmar Company, in which the largest shareholder is the Radio Corporation of the United States, but their shares do not carry any voting rights. The control of the voting shares in the Canmar Company, which is the actual control, rests with an English banking house; so British control is secured.

"A new factor is the application by the Canadian Pacific Railway to the Canadian Government for permission to enter the wireless business on its own account.

"While the rest of the Empire is thus busy merging, Canada is setting up competitive companies, but it is considered improbable that the Canadian Government will take any steps in the matter until the Imperial Wireless and Cables Conference reports."

CZECHO-SLOVAKIA.—The Ministry of Posts of Czecho-Slovakia has sanctioned the inclusion of the Siemens and Halske Company, which is represented by the Siemens Company, Prague, as a member of the Czecho-Slovak Distant Cable Construction Company of Prague. The participants in the latter have hitherto been the Krizik Company, the Pressburg Cable Works, the Kablo Company and the International Standard Electric Corporation, and its object is to extend the cable communication network in Czecho-Slovakia. The patents concerned are held by the Standard Electric Corporation and the Siemens Company.

DENMARK.—The combined enterprise of the two Danish journals, the *Radiolytteren* and *Popular Radio* have resulted in the opening of a new short-wave broadcasting station in Copenhagen. Its call sign is 7RL and it operates on a wavelength of 42.12 metres, or 7,122 kcs.

The directors of the Great Northern Telegraph Co. Ltd. (of Denmark) propose to distribute a total dividend and bonus of 20%, including the 5% already paid, for the year 1927, and to transfer £30,556 to the reserve and renewal fund, while £37,500 has been allotted to the pension fund. £219,308 is to be carried forward.

DUTCH EAST INDIES.—The Java Sugar Employers' Union, it is stated by the *Electrical Review*, has applied to the Dutch East Indies Government for permission to use wireless intercommunication between various factories and the Union's offices. The Government has appointed a commission to inquire into the subject.

FRANCE.—The Paris correspondent of the *Daily News* informed its readers that " A kind of dictaphone, which, adjusted to an ordinary telephone, will record phonographically any desired conversation and reproduce it faithfully afterwards, is being issued to French telephone subscribers through the Ministry of Posts and Telegraphs. The apparatus is simple in design and inexpensive and can be installed without affecting the ordinary use of the telephone. It is expected to prove serviceable to business men wishing to preserve records of important calls.

GERMANY.—The exact amount of the deficit for 1927 of the German Inland Telegraphs has not yet been decided upon, but the Ministry of Communications apparently admits a minimum loss of 30,000,000 gold marks (£1,500,000).

The technicians of the German Post Office are working assiduously on direct telephonic and telegraphic communication with the U.S.A. and even further afield.

Readers of these columns are fully aware of the development of telephotography in Germany and could not have been surprised by the *Exchange Telegraph* agency message from Berlin which suggested that machines will be installed shortly in the Central Telegraph Office, London, to enable experiments to be made in the transmission of telegraphic pictures between Berlin and London.

Reports of German Private Companies.—The German Telephone and cable Industry Co., Berlin, reports that favourable activity took place in 1926-27, but sale prices in all branches were insufficient. The decline in telephone deliveries to the Post Office was compensated for by an increase in private telephone work. In the cable department the turnover was higher than in the previous year, and the present stock of orders is satisfactory. Including the balance forward, the net profits amount to 593,000 marks, against 509,000 marks in 1925-26, and the dividend is raised from 6 to 7%.

The Transradio Company for Wireless Oversea Traffic Co., Berlin, states that the existing direct wireless communications were further developed in 1927, these applying to North and South America, the Dutch East Indies, China and Japan. Direct communication with the Philippines was opened last August and working to Siam, Chile and Mexico is in prospect. The net profit was 1,387,000 marks, as compared with 1,388,000 marks in 1926, and the dividend remains at 8%.

The German-Atlantic Telegraph Co., Berlin, states that traffic has increased since the bringing into operation of the cable to the Azores, and the receipts have fulfilled expectations. It is proposed to pay a dividend of 7% for 1927, against nil for 1926.

The North German Cable Works Co., Berlin, recommends the payment of a dividend of 8% for 1927, as in the preceding year. It is also proposed to increase the share capital by the issue of new shares for 2,500,000 marks to provide more working capital to deal with the larger turnover.

A German correspondent states that the wireless section of the Leipzig Spring Fair had grown to so great an extent this year, the number of exhibitors reaching 151, that the radio stalls had to be scattered about among other exhibits of a heavier and quite dissimilar nature, thus the great need in future exhibitions is evidently the provision of a separate hall for wireless exhibits. It appears that this crowding of wireless exhibits is not a new complaint at Leipzig, while the close proximity of working dynamos, motors, high-frequency apparatus, &c., has made it quite impossible for demonstrations to be made. Naturally all radio exhibits were allocated to the Electrical Hall—but !

GREAT BRITAIN.—On April 3 last, eight minutes after a photograph had been taken in London of Queen Souriya at Queen Charlotte's Hospital, it had been transmitted to Manchester by telephotographic apparatus over the underground cable lines between the two cities and appeared in the Manchester *Evening Chronicle*. This may be looked upon as the actual inauguration date, of a daily service of this system between these two important newspaper centres.

It is understood that the Home Secretary, Sir W. Joynson-Hicks took the opportunity, being in Manchester at the time, of seeing the apparatus in operation and congratulated the newspaper proprietors upon their enterprise.

Parliamentary Queries.—These are particularly numerous this month, and have accordingly been somewhat abridged in those cases where this could be done without possible misinterpretation.

On March 20 Sir R. Thomas asked the President of the Board of Trade if he would state what developments had taken place up to the present in the installation of wireless beacons round our coast; and how the costs of establishment and upkeep compared with those of lighthouses.

Sir P. CUNLIFFE-LISTER said that two wireless beacons were now in operation, at Round Island, Scilly, and at Skerries, off the coast of Anglesea, while three, at Caskets, Lundy, and Start, were in course of erection and were expected to be in operation in a few months' time. Several more were projected. He was informed by Trinity House that the first cost of a wireless beacon installation at an existing lighthouse was from £3,500 to £4,500, depending on local conditions, and the estimated cost of maintenance £300 per annum. If a wireless beacon were installed at a place where there was not already a lighthouse, the cost of establishment would be much greater, and the cost of maintenance would be increased to approximately £1,000 per annum.

On March 22, in reply to a number of questions, Mr. Baldwin, the Prime Minister, said that the Government and the Imperial Wireless and Cable Conference had no previous knowledge of the details of and had no responsibility for any financial arrangements for the merging of the Eastern Telegraph and Associated Companies and the Marconi Company. He could make no statement in advance of reports from the Imperial Conference, which, only on March 19, received a proposal from the companies concerned. But, since members had specifically inquired as to the attitude of the Government, he thought it right to say that the Government, while it was prepared to join in discussing measures for a working arrangement, was not committed even in principle, and reserved freedom of action with regard to any proposals for transfer of the operation and control of the Imperial wireless services at present administered by the Government.

On March 26, Mr. Day asked the Secretary for Air whether he would consider the introduction of legislation making it compulsory for all aeroplanes leaving Great Britain for any distance exceeding 1,000 miles to be equipped with wireless equipment and life-saving apparatus.

Sir S. Hoare replied that while in the case of aircraft carrying passengers for hire a reasonable degree of control was clearly required, the policy hitherto pursued as regarded other aircraft had been to leave the activities of pilots unrestricted except in so far as might be necessary in the interestes of persons and property in the vicinity flown over. He considered that it would be undesirable to exercise a more far-reaching and elaborate control over such aircraft.

On March 27 Sir P. Cunliffe-Lister, President of the Board of Trade, in reply to Sir R. Thomas, said that the rotating loop direction-finding system had been developed by the Air Ministry as an aid to navigation. The system had been investigated by the Department of Scientific and Industrial Research, and preliminary trials had been carried out in connexion with marine navigation. The Board of Trade had considered the results of that investigation and were now examining, in conjunction with the Air Ministry and the Trinity House, the question of establishing an experimental station of that type in a position where its utility, as an aid to shipping, could be fully explored. It was hoped to reach a decision on that question very shortly.

On March 27 Sir W. Mitchell-Thomson, Postmaster-General, in reply to Mr. W. Baker, said he understood that no effective remedy had yet been found either in this country or in Germany for interference with broadcasting caused by trams working on the roller-trolley system. Tramway authorities in various parts of the country, notably at Birmingham, Blackpool and Glasgow, were experimenting with various devices, but the experiments were not yet completed. The engineers of the British Broadcasting Corporation and of the Post Office were co-operating with the tramway authorities in an endeavour to find a remedy.

On March 27 Sir H. Brittain asked the Postmaster-General whether his Department had made a close study of the working of the telegraph service in countries where that system was carried out under private enterprise with satisfactory financial results, and whether he would consider introducing certain of those business methods into this country.

Sir W. Mitchell-Thomson said his hon. friend presumably referred to the United States of America. He hopes to arrange shortly for another visit to be made by officers of the Post Office with a view to a close study of the American telegraph service, but it could not be assumed that all the methods in force in the United States would be found suitable for adoption in this country.

On March 27 Sir W. Mitchell-Thomson, in reply to Mr. Wells, said that some of the proposals recommended by the Committee on the Inland Telegraph Service were in fact carried out before the report was received, and arrangements were now in progress for giving effect to others. The remaining proposals affected various interests both external and internal, and a good deal of time would be required for their consideration both by the Government and by the interests affected.

On March 27 Sir W. Mitchell-Thomson, in reply to Sir H. Cowan, said he was aware that the Anglo-Australian beam service, in common with other wireless services, had been criticised on the ground that it was liable to illicit interception. In practice, however, the beam services were worked at so high a speed that interception would only be possible by means of complicated and expensive receiving apparatus requiring expert operating staff. Therefore the risk of illegal interception was negligible.

On March 27 Mr. Pilcher asked the Postmaster-General if he would state whether, and, if so, what, reductions in cost of cable messages to India and South Africa had been conceded since the introduction of beam competition during the past year.

Sir W. Mitchell-Thomson said that a year ago the cable rates to India and South Africa were 1*s.* 8*d.* a word and 2*s.* a word respectively. The present rates to India were 1*s.* 5*d.* by cable and 1*s.* 1*d.* by beam; and the rates to South Africa were 1*s.* 8*d.* by cable and 1*s.* 4*d.* by beam. Corresponding reductions had been made in the rates for deferred telegrams and letter telegrams. No statement could be made concerning future rates until the report of the Imperial Wireless and Cable Conference had been received and considered.

On March 27 Sir W. Mitchell-Thomson informed Mr. Everard that the British Broadcasting Corporation was authorised last September to undertake experiments in broadcasting on a short wavelength. Those experiments were still in progress, and the results had not yet been reported.

On March 27 Captain Carro-Jones asked whether steps were being taken towards establishing a broadcasting service receivable on sets of moderate cost in such places as West Africa and East and Central African Colonies, where thousands of British citizens were in remote and lonely stations.

Mr. Penny said that the difficulty in providing such a service lay not in the transmission but in the reception. The British Broadcasting Corporation had been conducting almost daily transmissions from its short-wave station, 5SW, ever since Dec. 12 last, and those programmes had been heard from time to time throughout Africa and elsewhere. He understood from the Corporation, however, that prolonged experiments under varying conditions were likely to be required before suitable receiving machinery could be evolved. The Government could obviously give little help in that matter, but the Colonial Governments were co-operating by forwarding reports on local reception.

On March 29 Mr. W. Baker asked the Prime Minister what guarantees existed to prevent the transfer of privately-owned cable and wireless companies, which formed integral parts of the system of imperial communications here and in the Dominions and elsewhere, to foreign ownership or control; and whether he was satisfied that the terms of the existing licences and agreements were sufficient to safeguard the national interest.

Mr. Baldwin said he could not answer as regarded the position of the other Governments concerned, but all licences for cable or wireless services granted by the British Government contained a provision that the licensed company should not assign or dispose of the licence or of any benefit arising from it without the consent of the Government. The question whether any further safeguards were necessary would be considered when the report of the Imperial Wireless and Cable Conference had been received.

On March 29 Lord Wolmer, the Assistant Postmaster-General, informed Mr. MacKenzie Livingstone that candidates for the Post Office certificate of proficiency in wireless telegraphy required by all wireless operators on British merchant ships, were trained at specially licensed schools and were examined by the Post Office. So far as he was aware, there was no scarcity of students or of successful candidates. Operators for coast wireless stations or for other Post Office wireless services were trained by the Post Office, which had a large staff of telegraphists to draw upon.

On April 3 Sir Robert Thomas asked the Postmaster-General whether, in view of the fact that messages sent by wireless telephony between Western Canada and Great Britain were at present relayed through the United States, he could state when it was intended to establish an all-Canada route.

Sir W. Mitchell-Thomson said that the use of the "beam" system for telephonic transmission was still in the experimental stage, and he could not therefore say when a direct service might be practicable.

Altogether, one would wish to add that Members of Parliament have been taking the keenest interest in matters telegraphic lately and especially on the radio side!

Broadcasting the Grand National.—The following interesting particulars regarding this unique effort of the B.B.C., may not be without interest to our many radio enthusiasts, and have been usefully condensed by our contemporary the *Electrical Review*..

"For broadcasting a running commentary on the Grand National horse race at Aintree six microphones were utilised. Three of them were specially constructed, measuring only 2 by 1½ in., and could be accommodated comfortably in the palm of the hand; but as the commentator required both hands free to use his field-glasses, the microphones were clamped to and iron rail and spaced over a distance of about 2½ feet, so that the commentator turned his head to follow the horses one or other was within 6 in. of his mouth. These diminutive instruments are not as sensitive as the normal type, but the quality is declared to be as good as any that has hitherto been obtainable by wireless, and the use of "insensitive" microphones was intended to enable the crowd effect to be more carefully controlled, so that the speech would not be drowned by the incidental noises of the course. It must be remembered that the commentator spoke in the midst of a noisy and enthusiastic crowd. A separate microphone was used for preliminary announcements, and two others were placed in front of the stand to pick up crowd noises and to be in reserve for the commentators if required."

The *Daily Telegraph* states that during the 12 months ending March next the Post Office expects to be in a position to make a bigger grant to the British Broadcasting Corporation. It will amount to £880,000, and it exceeds the figure for the current financial year by £75,000. From the revenue which the Post Office receives from wireless licences it first deducts 12½% for the cost of collection, and it then pays over to the broadcasting authorities 90% of the balance as regards the first million licences, 80% as regards the second million, and 70% as regards the third million.

The net profit of *The Direct Spanish Telegraph Co. Ltd.* for the year ended Dec. 31, 1927, was £10,548 (including £900 brought forward). The usual dividend of 10%, free of tax, is paid on the ordinary shares and £1,083 is carried forward.

The directors of *The Indo-European Telegraph Co., Ltd.* recommend a final dividend of £1 2*s.* 6*d.* per share, making 7% for the year, together with a bonus of 15*s.* per share, making the total distribution for the past year 10%, all free of tax, as for the preceding year.

British Private Companies.—Mr. F. G. Kellaway presided at the annual meeting of the Marconi International Marine Communication Co., Ltd., on March 30, and in the course of his speech said that the absence of Senatore Marconi was due to ill-health. Dealing with the accounts, the Chairman pointed out that the Company had no prior charges, debentures or bank loan, and had £600,000 invested in Government securities. There had been important technical developments during the year, one of which was the decision of the Government to make the fitting of an auto-alarm device compulsory on all ships carrying between 50 and 200 passengers.

Referring to the cable-wireless merger, Mr. Kellaway said that it was imperative that the external communications of the United Kingdom should be operated as one unit, and he mentioned what was being done in the way of co-ordination in the United States. In conclusion, he said that the company's net profit during the past three years had steadily progressed; in 1925 it was £118,979, in 1926 £126,132 and in 1927 £179,730. There were good grounds for believing that the progress would continue. The report itself makes reference to the appointment of Sir Wm. Slingo to the Board of Directors.

The report of the Anglo-Portuguese Telephone Co., Ltd., for 1927 shows a net profit of £31,412, as compared with £32,773 in 1926. A final ordinary dividend of 5% is recommended, making 8% for the year (against 7%), and £57,801 is to be carried forward. At the beginning of the current year the company received a new 40-year concession from the Portuguese Government, and provision is made for an extension of 25 years. Meeting, April 3.

Sir Alexander Roger (Chairman), presiding at the annual meeting of the Cable Telephone and General Trust, Ltd., on March 26, said that the issued capital at the end of 1927 was £446,442, the whole of which had been invested. The net revenue for the year was £12,250, and after paying the dividends on the preference shares a balance of £985 was carried forward. Less than one-tenth of the Trust's investments were in foreign concerns. During the year Mr. John Lee, C.B.E., and Mr. H. S. Bennett, A.M.I.E.E., had joined the board.

At an extraordinary meeting on March 29 of the Telegraph Construction and Maintenance Co., Ltd., a resolution adopting the new articles of association was passed. The Chairman (the Earl of Selbourne) mentioned that since the annual meeting on March 1 the company had received an order for the construction and laying of a new Transatlantic cable of a special loaded type for the Western Union Telegraph Co.

(See also under U.S.A.)

HOLLAND.—Reuter's Agency reports that a recent demonstration of radio-telephone communication between The Hague and Batavia took place and is reported to have been most successful; conversations were carried on with perfect audibility in both directions, and voices could be readily recognised. Among those who attended the demonstration were Mynheer Plemp van Duiveland, of the Netherlands Foreign Office, and Mynheer M. M. Damme, Director-General of Posts and Telegraphs.

ITALY.—Reuter's Agency informs us from Rome that a Royal Decree has been published at Rome putting into execution the British-Italian Telegraph Convention which was signed in Paris on Oct. 21, 1925.

NEW ZEALAND.—According to the *Auckland Weekly News*, Mr. H. H. Hammond, K.C., Chairman of the Federal Royal Commission on Wireless, recently stated that Amalgamated Wireless, Ltd., of Australia, was investigating the validity of the use of certain patented devices by various broadcasting companies in Australia and New Zealand, and it was feared that unless some arrangement were reached litigation would have to be resorted to. It was claimed by the company that no efficient broadcasting station could operate without utilising some patent of which it was the owner. Litigation was already in progress in Australia with regard to the use of patented devices, and it was understood that legal action was threatened in New Zealand. If the Amalgamated Wireless was correct in its contention, the operations of the New Zealand Broadcasting Company would be questioned. If it were true that patented devices were being used some equitable arrangement would have to be made. The company's demands were being disputed vigorously in Australia and there was no doubt the same opposition would be met in New Zealand if action were taken there. The company previously received 12*s.* 6*d* on each valve-holder in every receiving set, but as an outcome of the Royal Commission's report nothing was to be received for five years. In the meantime the validity of the patent was to be decided.

PERSIA.—We learn, upon high technical authority, that a new set of thermionic valves having been installed, the Teheran wireless station is again in working order and in communication with Beirut, Angora, and Kabul.

SWITZERLAND.—The Communications and Transit Commission of the League of Nations has completed its report on the proposal to establish at Geneva a radio-telegraph station powerful enough to enable the League to keep in touch with practically all its member States in times of crisis. It is estimated that the station would cost £50,000 to construct and £8,000 a year to maintain.

SWEDEN. From the *Swedish Economic Review* we learn that telephone and telegraph apparatus to the value of 9,819,000 kr. was exported during the year ended December, 1927, as against 7,434,000 kr. in 1926.

U.S.A.—A new loaded telegraph cable is to be laid between Newfoundland and the Azores by the Western Union Telegraph Co. of America. It has been specially designed for duplex working at high speed..

(See also under GREAT BRITAIN.)

Reuter's Trade Service informs us from Chicago that new methods of wrapping cables, which make it possible to hear sounds from under water by induction, were demonstrated at Chicago by Mr. Charles R. Withers, an electrician. The inventor said the Navy Department had agreed to test the device, which is called the Inductaphone. At a demonstration of the invention for the United States Coast Guard, Mr. Withers submerged a cable to which were attached automatic sending and receiving sets; another cable dragged through the water over the submerged one, picked up messages from the set by induction."

One wonders whether future developments of this idea may not some day render possible the tapping even of deep sea telegraph cables by means of high amplification.

Personal and other items.—It is reassuring to note from time to time mention of the renewed activities of the late Controller of the C.T.O., evidence, it is most sincerely hoped, of a complete return to normal health and strength, thus: "The staff of the Automatic Telephone Manufacturing Co., Ltd., held their fifth annual dinner on March 23, at the Exchange Hotel, Liverpool. The Chair was occupied by Mr J. Lee, C.B.E., late Controller of the Central Telegraph Office, London. The toast of "The Company" was proposed by Sir Max Muspratt, Bt., Mr. John Lee responding. "Our Guests," proposed by Mr. G. W. Moore, and acknowledged by Mr. Powell-Jones, Secretary of the Telephone Development Association, completed the toasts. A musical programme followed.

The following changes have taken place in the administration of the International Telephone and Telegraph Corporation, according to the *Electrical Review*, and while felicitating all concerned, it is towards the modest Mr. F. Gill that many Post Office folk will first direct their bouquets:—

Mr. F. Gill has been elected a vice-president in the International Telephone and Telegraph Corporation. He retains his position on the board of Standard Telephones and Cables, Ltd. Mr. G. Deakin has been appointed first assistant chief engineer in the International Corporation, but he retains his position on the board of *Le Matériel Téléphonique*, Paris. Mr. G. H. Nash, C.B.E., has been appointed European chief engineer in the International Standard Electric Corporation, and he retains his position on the board of Standard Telephones & Cables, Ltd. Mr. P. E. Erikson has been appointed assistant vice-president in the International Standard Electric Corporation, and Mr. E. S. Byng has been appointed European Director of Installation in the same Corporation.

The kindest of kind thoughts will surely follow "Chris" Jenner, Asst. Supt., Cable Room, into his well-earned retirement. A "white" man through and through, and than whom the Department never had a more faithful servant, or the staff a real friend.

The *Electrician*, in a leaderette, recently directed attention to the part now played by electricity in the gramophone industry and specially by devices and apparatus so intimately associated with radio science. "To-day," says our contemporary, "we find electrical principles behind the greatest improvements in recording, and we also find some elements playing no small part in the reproduction of records by means of audio-frequency amplifiers and loudspeakers." . . . "Similar equipment," continues the journal, "is being used by cinemas to amplify organ music throughout various parts of of the buildings. The electrical 'pick-up' is also popular with the rapidly-growing proportion of the public in possession of wireless receivers and for gramophones, for by its means simple experiments are possible. Such experiments appeal to those wireless enthusiasts who have hitherto ignored the gramophone on account of its purely mechanical operation."'

No. 2 of *Television* is equally good with that of the first issue, and contains a photograph of the Engineer-in-Chief of the General Post Office, Col. T. F. Purves, M.I.E.E., who unstintedly wishes success to the enterprise. It also very favourably reviews "Practical Television," by Mr. E. T. Larner, A.M.I.E.E., also of the Engineering Department, G.P.O. Not least among the interesting matter is an article by Dr. E. F. W. Alexanderson, Chief Consulting Engineer to the General Electric Company, on "The G.E.C.'s Recent Television Experiments in America.

It is also pleasing to note the frank and chivalrous admissions by prominent newspapers of the pioneer work done by Mr. J. L. Baird. Says the New York *Herald-Tribune* of Feb. 12: "When engineers in New York successfully demonstrated television on a telephone line about 200 miles long between New York and Washington, Baird showed he could do the same thing by screening pictures in Glasgow of persons in London, a distance of 400 miles. It is said that probably one thousand engineers and laboratory men were involved in the American tests. Only a dozen worked with Baird."

In commenting on "Cinema Pictures by Wire" and the fact that a moving picture film was sent over a telephone wire from Chicago to New York and there developed ready for use exactly an hour and 35 minutes after it had been "shot" in a Chicago studio, the *Electrician* writes: "The electrical engineer devised a means of sending pictures by telephone overland," &c. Why "by telephone"?

Advice to Radio Amateurs.—I consider that the most fertile fields of radio for the amateur experimenter and young engineer just out of college are short waves, directive transmission and television. I believe television is finally emerging from the laboratories. It will be seen in homes throughout the land, but I do not know how soon.—Senatore G. Marconi.

J. J. T.

A BRIEF CHRONOLOGY FOR STUDENTS OF TELEGRAPHS, TELEPHONES AND POSTS.

BY HARRY G. SELLARS.

(*Continued from page* 130.)

1838, July ... John Bethell introduced and patented the process of creosoting timber.

(J. H. Kyan used mercuric chloride for preserving telegraph poles. Sir William Burnett utilised a solution of zinc chloride. J. J. Lloyd Marjary and Dr. Boucherie made use of sulphate of copper.)

C. G. Page, of Salem, U.S.A., and MacGauley, of Dublin, devised self-acting current interrupters.

Page observed that a magnet emitted sounds during magnetisation.

Morse suggested a telegraph system composed of five recording pens connected to five lines. He was refused a patent in England owing to the existence of similar ideas.

1838, Sept. ... Travelling Post Office established between London and Bletchley. Extended to Preston in October.

Committee of the House of Commons appointed to enquire into the suggested telegraph cable between England and France. Experiments carried out at Brussels Observatory proved unsatisfactory.

Major-Gen. Sir G. W. Pasley carried out experiments with electrical signalling under water in the river Medway at Chatham.

Jacobi calculated the wastage of zinc in a battery. He, like Lenz, thought the magnetism of an electro-magnet was proportional to the current and the number of turns in the coil.

Jacobi tried magnetic propulsion and, assisted by Klein, introduced the electro-deposition of iron.

Simple semaphores adopted for railway signalling.

1838, Dec. 6 ... Postmaster-General took over the Money Order Offices, Messrs. Watts and Lees being granted compensation amounting to over £400 and £500 per annum respectively. Rates of commission ranged from 6*d.* for £2 to 1*s.* 6*d.* for £5.

1839, March ... Spring Rice, Chancellor of the Exchequer, paved the way for Penny Postage in his Budget, and estimated the loss at about £700,000.

Postage varied from 4*d.* to 13*d.*, according to distance. Twopenny post to places within 3 miles of General Post Office, threepenny post to places within 12 miles. Number of letters passing through post, 82,000,000.

Charge for redirection of "unfranked" letters was that normally charged for the second journey.

Special Indian Mail Service commenced via Calais and Marseilles in the charge of a British officer, coaches being used through France.

1839, May 4 ... Samuel Cunard contracted to carry mails between England and America by steamships, the Admiralty undertaking to pay a subsidy of £55,000.

1839, June ... Scheme of registration of letters arranged to come into force on this date abandoned, owing to proposed reductions in postage.

Cooke and Wheatstone used a telegraph apparatus consisting of two needles only.

Araga explained Morse's telegraph apparatus to members of the French Academy of Sciences.

J. P. Wagner and Neef invented a self-acting current maker and breaker.

Sir W. Grove produced a battery composed of platinum electrodes surrounded with hydrogen and oxygen gas respectively, and another made up of platinum, zinc, nitric acid and sulphuric acid.

1839, July 12 ... Mr. Goulbourn's motion for the postponement of the Penny Postage Bill defeated in the House of Commons by 213 votes to 113.

1839, July 29 ... Postage Bill passed by House of Commons.

1839, Aug. 8 ... Postage Bill passed by House of Lords.

1839, Aug. 17 ... Penny Postage Bill signed.

Dr. O'Shaughnessy (afterwards Sir William Brooke O'Shaughnessy) succeeded in passing a current through a wire covered with pitch and tarred hemp across the river Hoogly, a distance of 1½ miles. (He designed the first telegraph apparatus used in India, consisting of a horizontal galvanometer and an upright mirror in which the movements of the galvanometer needle were reflected.)

Telegraph cables laid in iron piping on the Great Western Railway, and Paddington-West Drayton telegraph line extended to Slough.

Jacobi propelled a boat along the Neva at 2¼ miles an hour with an electro-motor of about one horse-power actuated by a battery of 64 Grove cells.

Jacobi, of St. Petersburg, Spencer, of Liverpool, and Jordan, of London, working independently, and following de la Rue's discovery, obtained impressions of various articles by the electrolysis of copper. Murray used moulds of plaster coated with plumbago on which to obtain the deposit. Jacobi coined the expression "galvano-plastic" to describe the process, but ultimately the term "electrotyping" was adopted.

1839, Dec. 5 ... Postage by weight came into force at rates which worked out at 4*d.* for each of the first two half-ounces and 8*d.* for each additional ounce. Limit 16 oz.

Entry of letters containing coin or jewellery on letter bills ceased.

Charles Goodyear, of U.S.A., invented a method of vulcanising india-rubber. (Hooper used it for submarine and underground cables.)

188,000 Money Orders were issued.

1840, Jan. 10 ... Postage rate reduced from 4*d.* to 1*d.* Number of letters passing through post, 169,000,000.

1840, May 1 ... Mulready postage envelope issued.

Messrs. Elkington commercialised electro-plating processes devised by Wollaston and Brugnatelli.

Wheatstone suggested to a Select Committee of the House of Commons on Railways the construction of a Dover-Calais submarine telegraph, and drew up details for making a tarred and pitched submarine cable. He invented his A.B.C. telegraph apparatus and an electro-magnetic telegraph clock.

Cooke and Wheatstone devised ring insulators for telegraph wires.

E. A. Cooper constructed a writing telegraph instrument, but it was not suitable for practical use.

J. P. Joule made electro-magnets capable of lifting heavy weights.

Lamont (and Frolich) showed that the strength of an electro-magnet depends upon the form, quality and quantity of the iron, and the number of ampere-turns.

1840 ... ... Smee constructed a platinum and zinc battery.

Baron Schilling, Russian attachè at Munich, introduced a magnetised needle telegraph apparatus, working on a metallic circuit, the sending key of which sent negative or positive currents to line. The movements of the needle exposed a white or black disc, the operator writing W or B as the case may be, combinations of these two making up an alphabet, *e.g.*, BW = A, B = E, BB = I, BWB = O, WWB = U, &c.

Armstrong discovered, and Faraday explained the electrical effects produced by high-pressure steam. Hydro-electrical machine constructed.

1840, Nov. ... Commission on Money Orders reduced to a scale of 3*d.* for £2 to 6*d.* for £5.

Redirection charged for at the ordinary postage rate.

"Franking" abolished. Cost had reached £80,000 per annum.

587,000 Money Orders were issued.

Joseph Henry produced high-frequency oscillations by the discharge of a condenser and demonstrated the great distance at which the inductive effect of a discharge of electricity could be felt.

(Cailletet discovered that compressed air resists the passage of an electric spark.

Kinnersley devised an electric thermometer for illustrating the repulsive power of electricity as exerted on air.)

1841, Jan. 1 ... Envelopes embossed with stamps introduced.

1841, Jan. 6 ... Registered letters accepted at a fee of one shilling but liability of Post Office not admitted.

1841, Aug. 13 Treasury decided that the number of Post Offices should be "somewhat in proportion of the amount of population and extent of service combined." The Postmaster-General did not support this view in its entirety.

F. de Moleyns invented an electric glow-lamp with platinum filament.

Poggendorff devised the potentiometer.

J. P. Joule showed that the heat produced electrically in a conductor is proportional to the square of the current strength and produced a calorimeter.

(Ernst Siemens proposed that the electric unit of heat should be called a "Joule.")

Lenz also investigated the development of heat by an electric current.

Joule found that an iron bar increased in length when magnetised.

Wheatstone patented his A.B.C., or step-by-step, telegraph, composed of two dials marked with the alphabet and punctuations, and furnished with indicating needles. By depressing keys corresponding to the required letters, and turning at the same time the handle of a magneto generator, currents were sent which actuated the pointer at the distant end and spelled out the words.

Gustave Froment, of Paris, introduced a telegraph apparatus similar to Wheatstone's A.B.C., but with a piano keyboard. Froment also devised a recording telegraph in which a needle, responding to movements of a sending wheel, produced marks on paper tape similar to those of the syphon recorder.

Ernst Siemens telegraph apparatus, which was similar to Wheatstone's A.B.C. was brought into use on the German State railways.

(W. S. Steljes improved Wheatstone's A.B.C. system by substituting a typewheel printing receiver for the receiving dial. In the Rebesi system the A.B.C. commutator was replaced by a typewriter keyboard.)

Wheatstone proposed an arrangement for the division of line time, or multiplex telegraph working.

Alexander Bain, of Edinburgh, took out a patent for a typewriting telegraph system.

Post Office proposed compulsory registration of letters found in the post containing coin or jewellery. Sir Rowland Hill (then at the Treasury) made a counter-proposal to reduce registration to 6*d.* and ultimately to 2*d.*

1841, Dec. 31 Sixty registered letters sent from London daily, and 1,170 delivered in London weekly.

1,500,000 Money Orders were issued.

1842 ... ... Morse, in New York, attempted to send signals through a submerged conductor.

Watson erected a semaphore station near London Bridge for the purpose of communicating with Deal.

Jeffrey patented the marine glue which is used to coat the inner lining of a Daniell battery.

Dr. Montgomery, of the Indian Medical Service, introduced gutterpercha.

Bunsen devised a battery made up of carbon, zinc, nitric acid and sulphuric acid.

Sir Rowland Hill left the Treasury.

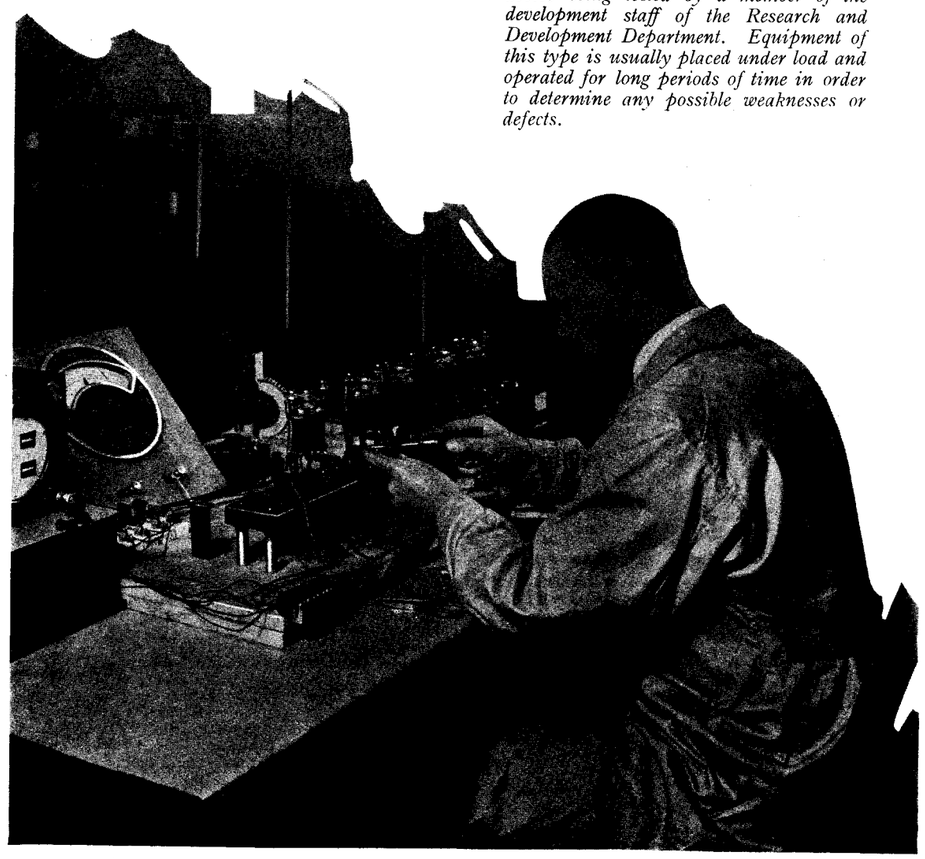
Henry and Reiss pointed out that the discharge of a Leyden jar was not a sudden and complete levelling up of the difference of potential between the coatings of the jar, but rather partook of the nature of a principal discharge in one direction and then a series of surgings backwards and forwards until equilibrium was attained.

(Feddersen, Lodge and Paalzow, in 1876, proved the existence of these waves during discharge and showed that, as the resistance of the circuit increased, the number of these alternating discharges decreased, but, at the same time, their duration was greater.)

(*To be continued.*)

Where Strowger Automatic Leadership Begins—

The Development Laboratory



Here is shown a multi-frequency ringing device being tested by a member of the development staff of the Research and Development Department. Equipment of this type is usually placed under load and operated for long periods of time in order to determine any possible weaknesses or defects.

NEW ideas in the field of automatic telephony are never incorporated in Strowger design until tested for their usefulness and worked out in practical details by experts thoroughly acquainted with every operating phase of telephone practice. The personnel of the development branch of the Research and Development Department of Automatic Electric Inc. consists of men who have had long experience in meeting everyday operating problems and who refuse to consider an improvement worthy of adoption until it has demonstrated its practicability under everyday operating conditions.

From the very beginnings of the Strowger Automatic system, the development branch has been an important factor in its progress and success. Its activities insure the purchaser of Strowger Automatic equipment of getting apparatus which has been perfected far beyond the experimental stage to the point where it has been tested by exhaustive trial and proven by actual operation to be thoroughly practicable and worthy to bear the Strowger trademark.

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STROWGER AUTOMATIC

The
Telegraph and Telephone Journal.

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Editing and Organising Committee - - - J. STUART JONES. W. D. SHARP. J. F. STIRLING. W. A. VALENTINE. J. W. WISSENDEN.

Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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DEVELOPMENT STUDIES.

IN the prediction of the future development of telephony the lost art of prophecy would be an undoubted boon. But it is necessary to prescribe that such prophecy would have to be of a more precise and documented nature than those oracles of antiquity which require armies of learned expositors and reams of exegesis to expound their true import. It would be necessary, for instance, to make sure whether the Valley of Potsherds signified Flacton, or Mudbury or Great Bagford, and whether the ten horns of any given apocalyptic beast meant ten score or ten thousand lines in 20 years' time. Failing the authentic prophetic method, we have to resort to forecasts founded on such facts as diligence can glean, and corrected and amplified by that "courage, logic and foresight" to which Mr. MACLURE refers in the interesting paper which we reprint elsewhere.

The necessity of furnishing accurate forecasts of future development, in view of the costly extensions of buildings and plant necessary to provide for it, is self-evident; but the task is one of surpassing difficulty and, as Mr. MACLURE says, the result "can never under the best of circumstances represent more than an intelligent guess." Incalculable factors, as he demonstrates, are met with at every turn. The transfer of large properties from lethargic to energetic hands, the building of a new bridge over the river which will facilitate the creation of a new suburb on the other side, the construction of a new arterial road which will bring fresh life to a sleepy town, the establishment of a new industry which, on the one hand, may convert a village into an industrial centre, or, on the other, depreciate the residential value of a district for which development had been planned on a residential basis, any of these factors, which may well arise within a period of 11 or 21 years in a certain proportion of cases, will tend to upset the best-laid schemes. It is the aim of the officer engaged on the survey to "get wind" of such coming events, but this is not and cannot be always possible. Fortunately, the more revolutionary developments do not frequently take place, and the "intelligent guess" based on the careful collection of facts, serves its useful purpose in the majority of cases.

There is, however, one incalculable factor, peculiar, we think, to this problem, to which the paper in question does not refer. We believe that in the telephone development of all countries there comes a stage when the public, realising that some 60 or 70% of their acquaintances are "on the telephone," feel a strong and insistent need to join the majority. All business people nowadays have a telephone installed as a matter of course. It is a recognised economic necessity. But a large number of the residential population, under the erroneous impression that they cannot afford it, consider the telephone a luxury. A period will come when, learning that the majority of their neighbours can afford the telephone and find it indispensable, the residue will also believe it to be as much a necessity as gas, electric light, or water. Not all the arguments of persuasive advertisements or contract officers will appeal to them so strongly as this belief, and then—at an unpredictable moment—telephone development will suddenly increase at the rate of 20 or 30% each year, and all development studies will have to be reconsidered. This theory is, of course, difficult to prove, but it may be mentioned in illustration that in 1907 the Bell system in the United States increased from 3.1 to 3.8 million stations (having risen from 2 million to 3.1 million during the previous two years) and was more than doubled in the five succeeding years. In other words, it was precisely when American telephone development began to reach a high degree of density that there was the greatest rush to be connected with the system.

HIC ET UBIQUE.

A "THROUGH" circuit has now been provided between London and Copenhagen and the charge for a three minutes' day call between those places reduced to 13*s.* 3*d.*

According to the Department of Overseas Trade report on Belgium, the automatic exchange system has made great progress. There are now four exchanges opened in Brussels, whilst a fifth is almost completed. The entire Brussels system will be automatic by 1929. There will then be eight exchanges, each with a capacity of 10,000 lines.

At Antwerp the automatic system is also being extended to the whole area. There will be five exchanges. The system is likewise to be applied to the large towns, such as Liége, Ghent and Charleroi, and for the sake of experience to a certain number of secondary exchanges. Three of these latter have already been opened.

The transatlantic service was extended last month to several additional towns in Ontario and Quebec. It was also extended to St. John (New Brunswick), Halifax (Nova Scotia), charge for three-minute call £9 12*s.*; to Winnipeg (Manitoba) £10 4*s.*; to Calgary and Edmonton (Alberta) £10 16*s.*; to Regina (Saskatchewan) £10 16*s.*; and to Vancouver, B.C., £11 8*s.*

The transatlantic telephone service between Belgium, France, Germany, Holland and Sweden on the one hand, and United States of America and Cuba on the other, has now been extended to all the above-mentioned places in the Dominion of Canada.

We have received the first three numbers of *Sino Azul*, a journal published under the auspices of the Companhia Telephonica Brasileira, Rio de Janeiro. It deals with the activities of the company, with the progress of telephony generally, and

with the doings of the company's staff. We reproduce the cover of the February issue, a Carnival number, from which it will be seen that our new contemporary is artistic as well as informative.

"Entertainments at which we have never assisted." The Postmaster-General giving the first wrong number at the opening of a new exchange.—(*Punch*, April 18.) "There are now 6,748 subscribers in ——; we expect this is a wrong number."—"A new telephone exchange has been opened at ——; what a storehouse of wrong numbers!"—"The new telephone directory is just out. We wonder how many wrong numbers it contains!"—(Any paper, any date.)

OBSESSION. A GHAZAL.
Humorist loquitur.

Wrong numbers always by exchanges *must* be given.
Shall not to that fond legend all my trust be given
Since I at least one joke a week obtain
Which may in comic papers with such gust be given
That careless readers cut and come again,
Rejoiced to meet old friends? If a shrewd thrust be given
At telephones (State-owned), who shall complain?
If blame alike to the unjust and just be given,
Why, 'tis a world which I did not ordain,
And that no crumb of praise but only crust be given
I care not, but shall sing the old refrain
Till to the earth my body, dust to dust, be given.

W. H. G.

TELEPHONE DEVELOPMENT STUDIES.*

BY H. J. MACLURE, M.B.E.

THERE can be few commercial undertakings in connexion with which it is necessary to look so far ahead as is required where telephone service is concerned, and to add to the difficulties involved it may be claimed that from the past there is less to be learned than is the case in probably any other branch of trade or public service. What has gone before may, in fact, if allowed too much weight, engender false impressions. In other words, our telephone past is too limited to be of much use in the matter of guiding our telephone future and, like other pasts, may have disadvantages.

May I remark at the outset that a telephone development forecast can never, even under the best of circumstances, represent more than an intelligent guess. But that guess should have its foundations resting on solid facts and it is only by the careful collection of facts and a reasoned use of them in the light of common sense and with the aid of courage, logic and foresight that anything in the nature of a satisfactory forecast can be arrived at.

One of the advantages of addressing the Telephone and Telegraph Society of London is that one can, within reasonable limits, express one's personal views—rather a favourite habit of mine—and I am quite prepared to believe as regards this paper that some people—those, for example, who hold the official purse strings—may not see eye to eye with me at the moment in some of my personal opinions, although—this is a forecast—they will be brought to my way of thinking in the end.

There was a time in the very early days when scant attention was paid to anything in the nature of the provision of plant for future growth. Enough apparatus was made available for the time being and it was added to as occasion required. Then, when switchboards became larger, some rough guess was made in the office as to future growth, but there was nothing more in it than that. The next step in the march of progress, when an estimate of future growth was required, was to go out and view the ground and make another guess—a very elementary method. Later on, when underground ducts and cables came more and more into the scheme of things, it was found necessary to look 8 and 15 years ahead, and the first system of making block surveys was evolved; but those who supplied the resulting forecasts were not asked to be too exact in respect of the 15-year figure.

Things were not taken too seriously in those days. I remember the laying of the first length, some 50 yards, of lead-covered dry-core cable. The careful and thoughtful engineer who wished to make sure of the actual length had the cable uncoiled from the drum and laid flat in the street prior to making a start to draw it into the pipe. The cable lay out just long enough for a Colman's Mustard cart—well loaded up—to run over it, with unhappy results. The Reading District also once lost a length of cable. That, too, was laid out—in a field—to enable the conscientious foreman to check its length by the aid of a two-foot rule. Whether he went to dinner and subsequently failed to re-locate the field, or got sacked for some cause, history does not state; but in the end the grass grew, covered the cable, and it was lost and not found until the farmer was cutting his hay, when he wrote to the company to remove its "gaspiping." All this, however, by the way.

As I have said, at one time 15 years was the forecast limit. Then came the time we were asked to cover 20 years. This limit stood for quite a long time, but later 21 years became the general standard, with 26 years in particular cases. Now a 36-year forecast is frequently called for, and a few weeks ago I was asked in all seriousness for a forecast in a particular case covering 42 years ahead.

The early Block Surveys were made in the following manner. A Contract Officer, not always the man whose canvassing area was concerned, was given a set of maps—usually 6-in. scale—on which the exchange area was supposed to be marked—I say "supposed" because I have known a good many instances when the information was omitted, this, of course, being quite wrong—and on which were marked the approximate positions of the various D.P.'s.† These were indicated by a domino divided into three parts. In the top space was shown the number of existing circuits and the Contract Officer was required to fill in in the two blank spaces below the numbers of circuits he calculated would exist at the 8 and 15 years periods. He was supposed to make all enquiry possible as to the future trend of events and to form his opinions accordingly.

Taking into account the haphazard methods of the early days, some of the forecasts produced were, as events turned out, surprisingly accurate. On the other hand many were wholly misleading. Needless to say, the individual efforts of some of the Contract Officers produced weird results. I remember one Contract Officer whose canvassing results had for some time been falling off. Then Headquarters asked for a number of areas to be block-surveyed, and Brown, as we will call him, asked to be put on one of the studies. I was not very enthusiastic in the matter because, while Brown had always been somewhat different in his ways from the ordinary run of Contract Officers, it seemed to me that for some time his views had been getting even more unusual than before, and his references

* Paper read before the Post Office Telephone and Telegraph Society of London.

† Distributing poles.

to the Scriptures—at all times pretty frequent—a little too marked. However, I thought I would try him, and for reasons of caution I selected an area of which I had intimate knowledge. In due course Brown handed in his forecast. In a moment I saw it was hopeless. On examining his maps I saw that he had shown a development of 36 lines in a cemetery, and none for a locality where there were a number of good houses. I asked Brown about this, and he explained that he must have passed the houses without noticing them when thinking of higher things, and that thoughts of the Day of Judgment engendered by sitting in the cemetery during lunch accounted for the 36 lines. I saw to it that he got a week's pay and left that day.

As late as the first quarter in 1924 districts were accorded permission to dispense, in certain circumstances, with block surveys when furnishing a development forecast. I opposed this ruling to the last fence but was defeated.

It was not until the latter part of 1924 that Field Officers were given a real guide as to future intentions in the matter of the development of the Service. Up to then, although I had for a long time used every means in my power to secure this lead, the only instructions available tended to encourage the submission of depressed forecasts.

In June, 1925, the method of making block surveys was standardised by the introduction of the "tenancy" system of compiling them, but until about June, 1926, when Development Officers were first appointed, it was still the practice to require canvassing Contract Officers to carry out the actual field work of any block survey arising within their own canvassing areas. This practice—rendered necessary in the first instance by the system of commission payment in connexion with new orders—resulted in men being required, in some instances, at least, to deal with work for which they were wholly unsuited. The assumption, of course, was that the man on the ground should be the best judge of its future prospects, but the important fact was lost sight of that the qualities which go to make a salesman are of little or no value in estimating what is going to happen in the case of existing buildings under short leases and undeveloped land.

Thus, with forecasts in some instances—

(1) not based on a block survey of any sort;
(2) even when based on a block survey, the work carried out by an officer unsuited for the duty;
(3) however formulated, those concerned with the work encouraged to avoid the least optimism and at the same time deprived of any general lead as regards the future;

can it be wondered at that many forecasts have proved fallacious?

Presumably all here present know how a "Tenancy" survey is staged, but in case there is anyone who does not or would like a reminder I will just touch on the main points.

The officer who (London excepted) nowadays carries out a block survey is a Contract Officer, Class II; he carries a development allowance and may not canvass for orders or receive commission under any circumstances during the period of his employment as a Development Officer.

He is supplied with—

(1) a copy of the map or maps covering the ground which he is to survey;
(2) a copy of a classification schedule; and
(3) a special note-book in which to record in detail the results of the survey.

The map or maps show the exchange area boundary line and the number of exchange lines existing in each D.P. area. The classification schedule tells the Contract Officer the value, expressed by means of a multiplying factor, he is to allow at 6, 11 and 21 years in respect of each class of tenancy he calculates will exist in each D.P. area at each of the three periods. Thus, as a very simple illustration, let us suppose that in some small town a solicitor's office is graded as O.1 (i.e., as a first-class office) and has at present one line; also let us suppose that the classification schedule shows for O.1—

2.0 at 6 years,
3.0 „ 11 „ and
4.0 „ 21 „

Then this solicitor's office would appear as a unit in the forecast as having—

1 line now,
2 lines at the 6-year periods,
3 „ „ „ 11- „ „ and
4 „ „ „ 21 „ „

The duty of compiling the schedule falls on the Contract Manager, and before the survey is started it is his duty to point out to the Field Officer the principal characteristics of the area to be surveyed, its relation to adjacent areas, to go over the maps with him in detail and to visit the area with him to give practical examples of the application of the schedule.

The Field Officer is also armed with a copy of "Telephone Service Instruction No. 3/26 Development Studies—Block Surveys" and a copy of the little book, "Instructions for Officers Engaged on Field Work," by the aid of which—if he has the bent—he should be able to make success of his study work.

All the same, this work is far more difficult than is appreciated by anyone, no matter whom, who has not had the actual experience. In great cities the task is a stupendous one—in London, and I will deal later with the metropolitan ares, it is appalling—and even in scattered rural areas the difficulties are never small ones.

Let us take a few examples of areas which must be studied.

1. A certain pretty seaside place, with ancient associations, within 70 miles of London, easy run by car, some telephone development but no trains on Sunday. Sea-front owned for the most part by the railway company, small part privately and some part by the Crown. Dead hands of Railway Company and Crown Authorities have stifled the town's progress for years. Some signs in last few years of more progress. Will the now more go-ahead Southern Railway Company recognize what a gold mine the place could become, and will the use to which the Crown put its land prior to the war again change, as it has once already changed, or will the Crown now sell some or all of the ground? If so, when will these changes come. In any case, what will be the extent of the present building in progress?

2. That somewhat sleepy place up the river which has now become very accessible along the new road. Will that building now starting make the place a second Maidenhead or will it be a case of only a few new houses and will the old conditions continue? No local information of any value can be secured from any one.

3. That provincial town which once throve and now has starved for years on a trade connected with horses. Do those two prosperous works now turning out motor-car accessories mean that the old prosperity and more will return so that heavy telephone development will result?

4. That other provincial town. Will that bridge over the river be built after all these years of talk? If so, it will clear away that quarter-mile of slums, thus extending River Road and Watling Street and in the one small section transform 12 lines into 300 at least? Will good residences develop on all that open land to the west of Town Gates, or will Long Easton (in the Newtonhayes Exchange area) still attract from a residential point of view? Will the new bridge mean that Smiths will move their factory (they took over Brown's old building, which has never suited them) to North Side and so secure river frontage? If so, that means an end to North Side as far as residences are concerned. Will, when the new bridge is started, the railway extend by that loop at Hylton Junction? The extension was in the original scheme. If so, it will not be unreasonable to expect that the town will double in size, but to what extent will the 6- and 11-year periods be affected.?

Those are all building problems which, in the main, the Field Officer himself must settle, but the Contract Manager also has his difficulties when making up the classification schedule, e.g., the multiplying factors for the town referred to at 4 above would represent a hard nut to crack. Then, again, to what extent and how quickly will the telephone habit progress in Sleepy Slocum as compared with go-ahead Gumpton, 100 miles away—both much the same size? Will prosperity return to the potteries at Claybank? Will shipbuilding again become brisk at Stoneside? There were 50 slips there before the war and now there are only two 2,000-ton steamers building. Prosperity, of course, would mean higher factors.

Given a town of fair size the Field Officer (or Officers) on the survey may have a dozen or a hundred such problems as those referred to at 1 to 4 above to settle. And in this connexion the Tenancy system of making surveys has an outstanding advantage. In the old days, assuming that there was no question of any change in the existing class of property in a certain street, and assuming also that two Field Officers were engaged upon the study, the one taking the north side of the street might allow an average of one line per tenancy, whereas his colleague working on the south side, and with a less hopeful nature, might allow only 50% of lines to tenancies. Thus, two different values were often given to property of the same class in one street. Under present methods such a disaster is avoided.

I have already hinted that the development study arrangements in London are not quite on all fours with those in the Provinces. The three main differences are:—

(1) The L.T.S. has a special section of the Contract Branch, which deals with development studies only;
(2) The Field Officers are recruited from the clerical force; and
(3) While the telephone values of premises are assessed on well-defined lines, no classification schedule as known in the provinces is made use of.

All problems are the same, only more complex, and I will cite one such case only.

A development study has to be made, say, for the neighbourhood of Charing Cross. Now, will or will there not be a new Thames bridge in this locality, thus eliminating Charing Cross South-Eastern Railway Station and changing the face of the area? If so, when and what changes exactly will result? Meanwhile, the study has to be got on with and is expected to result in a reliable forecast May I say, "Some problem"?

And now let us hark back to the general subject.

Even when a direct-line forecast has been evolved, in many instances the work is still not complete. In all automatic cases the total figures require to be split up into several special headings, e.g.:—

Single direct lines.
Auxiliary lines.
Subscribers' coin box circuits.
Call office circuits (three classes).
Two-party lines.
Rural party lines.

I think it will be admitted that the three grades of officers concerned in block survey work, viz., the Contract Manager, the Class I Officer who supervises the study, and the Class II Contract Officer (i.e., the Field Officer) have their work cut out.

We have, however, now reached a stage—satisfactory as far as it goes—where:—

(*a*) A standard, and I think sound, method of making development studies has been evolved.
(*b*) Those concerned now have well-defined rules available whereon they base their outlook.
(*c*) A special class of officer is available for the field work.

But are we sure that under present conditions every officer now engaged on Field duties is wholly qualified for his job and is the best man obtainable. I am more than doubtful on the point. It is true that many of the present field officers are all that one could desire, but I also fear that there are others and it seems to me that there should be no uncertainty here.

First let us remember that the result of a development study forms the ground work on which the Department commits itself to hundreds and often thousands of pounds of expenditure in connexion with land, buildings, and plant of all kinds. It appears, therefore, to me that this is a situation which requires that there should be no penny-wise-and-pound-foolish methods. Of these we have had enough in the past, when schemes costing huge sums have been launched on forecasts which later on were found to be wholly fallacious because, from motives of false economy staff unsuited to the requirements of the work were employed on the survey or perhaps someone had boggled at the cost of a proper block survey and so it was dispensed with.

Block surveys, I am glad to say, are to-day no longer dispensed with, but it is my view that the remuneration of Field Officers should be such as to attract in all circumstances the best men in the Class II Contract Officer grade. This is not so at present. Some men who would make excellent Field Officers prefer to remain on canvassing duties, as, with commission, they can make more money than the Field Officer can, even with the development allowance which is accorded to him. I am also of opinion that, even as there are operating schools so there should be a school—possibly an itinerant one—for Field Officers, presided over by a special officer of marked experience and ability.

In conclusion, just a word on the Headquarters work of examining and approving forecasts. We can, of course, only examine the figures (1) as to their face value and (2) in relation to other somewhat similar areas and criticise, amend or secure amendment of the forecast when necessary before we "O.K." it. While it is some time now since I made a test, when I last did so the result showed that the Headquarters criticism had resulted in 10% of the original forecasts being amended—and in an upward direction in most instances.

REVIEWS.

"*Electrical Engineering Economics.*" *By D. J. Bolton, B.Sc., A.M.I.E.E.* (*Published by Messrs. Chapman & Hall, Ltd. Price* 21*s. net.*)

This book, which is lucidly written, is intended to give to electrical engineers and students, first an account of elementary economics in connexion with capital and annual charges, sinking funds, &c., together with their application to certain engineering problems, and secondly, the solution of problems of economic choice of cables, motors, transformers, &c. This develops into a general consideration of the economic efficiencies of machines, both as regards competing makes, and the advantages to be gained by using larger machines than necessary, in spite of their higher cost, owing to their higher efficiency even at partial loads. The question of economically under-running such machines is followed by a discussion of the feasibility of making economies by the under- or over-running of electrical lamps, the altered efficiency being compared against initial costs and prices of current. The psychological effect of the altered brilliance of the filament must here be borne in mind.

The last portion of the book deals with electricity supply problems, tariffs and their adjustment for load, power and diversity factors.

Formulæ for dealing with the various problems indicated are developed, solutions are worked out in detail and in many cases illustrated by graphs.

It is necessary to bear in mind that quoted efficiencies are not always obtained, and that it is sometimes necessary to incur a higher running cost due to lower efficiency owing to difficulties in obtaining capital, but apart from these limitations the arguments advanced by the author appear sound, and are applicable to a larger field than dealt with here, so that the book should be welcome to engineers of all classes and not only to electrical engineers.

T. Mc.G.

"*Principles of Electric Power Transmission by Alternating Currents.*" *By H. Waddicor.* (*Chapman & Hall. Price* 21*s. net.*)

This book is primarily intended to supply the needs of students of engineering colleges. The practical side of the problem has, however, been kept well in view and it should therefore have a much wider sphere of usefulness. The earlier part of the book is devoted to the electrical characteristics of transmission lines and the mathematical treatment of transmission problems. Numerical examples are given in illustration.

The properties of materials used in overhead line construction are briefly reviewed, but there is little that deals with actual construction. Underground cables are dealt with in a similar manner and here again more attention is given to operating conditions than to construction.

The remainder of the book deals with protective devices for the prevention of dangerous currents and voltages, and a chapter is devoted to factors which produce pressure rises and the question of lightning strokes.

The book should serve as a useful introduction to the subject, but the student will need to supplement his reading largely in respect of practical detail.

H. C.

"*Automatic Telephony Simplified.*" *By C. W. Brown, A.M.I.E.E.* (*Sir Isaac Pitman & Sons, Ltd.* 168 *pp.* 6*s. net.*)

This work, which is described on the title page as "a book for telephone engineering officers, traffic officers and students who wish to acquire a sound knowledge of the principles and practice of automatic telephony as adopted by the British Post Office," admirably fulfils its purpose. It will need no recommendation to our readers, as its contents which appeared in a series of articles in our columns were so well appreciated that many of the issues containing them speedily ran out of print. The little book, which is fully illustrated, deals in successive chapters with the elements of switching, diagrams and circuits, auxiliary lines, multi-exchange working, and the arrangement of large exchange areas. Mr. Brown has a gift for imparting his information in lucid manner and we are sure our readers will welcome the publication of the articles in this cheap and handy form. As many of our readers are aware, Mr. Brown is a member of the Engineer-in-Chief's staff and is largely responsible for the special courses in Automatic Telephony which the Post Office has set up.

BROADCASTING THE GRAND NATIONAL IN AMERICA.

IN connexion with the Grand National Race on Mar. 30 this year a very interesting event from a telephone point of view took place. For the first time in the history of racing a running commentary on a race has been telephoned from this Country to America.

The Department at the request of the United Press of America made the necessary arrangements for establishing a telephone service from the roof of the Grand Stand at Aintree from which a representative of the United Press telephoned the race as it progressed direct to the office of the *Sun* newspaper at Baltimore, U.S.A., from whose office it was broadcast to the public, and the result of the race was actually known in America in advance of many people actually viewing the race.

The Americans expressed very decidedly their appreciation of the efficiency of the British Telephone Service and of the arrangements made and stated the experiment was a huge success.

The Liverpool staff were congratulated on the way the whole thing was carried through.

The conditions were by no means ideal. The installation at this end was more or less open. A breastplate transmitter and two head receivers were used by the transmitting officer sitting on the steps of the roof of the stand, and in order to exclude as far as possible the external noise (and with thousands of excited people around this was considerable) a rug was thrown over him, while a second person sat beside him holding up one corner and furnishing the other with the details of the race as it proceeded.

It was an achievement of which the Service may feel proud and puts the hall mark on the efficiency of the Transatlantic Telephone Service.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations working at Feb. 29, 1928 was 1,617,563, an increase of 12,409 on the previous month's total. Gross new stations added during February numbered 21,368 and gross ceased stations 8,959.

The growth for the month is summarised below :—

	London.	Provinces.
Telephone Stations—		
Total at Feb. 29	573,231	1,044,332
Net increase for month	4,515	7,894
Residence Rate Subscribers—		
Total	131,080	209,456
Net increase	2,017	2,514
Call Office Stations (including Kiosks)—		
Total	5,151	18,664
Net increase	40*	143
Kiosks—		
Total	818	3,660
Net increase	46	108
Rural Party Line Stations—		
Total	—	10,189
Net increase	—	41
Rural Railway Stations connected with Exchange System—		
Total	—	865
Net increase	—	9

The number of inland trunk calls dealt with during January—the latest statistics available—was 8,355,868, an increase of 640,002, or 8.3% over the total for the corresponding month of the previous year. Outgoing international calls in January numbered 29,430 or 3,992 (15.7%) more than in January 1927.

Further progress was made during the month of March with the development of the local exchange system. New exchanges opened included the following :—

LONDON—Bishopsgate (automatic), Edgware, Ingrebourne, Terminus.

PROVINCES—Armley (automatic), Colchester (relief exchange), Windermere, Chatham (automatic); sub-exchanges, Gillingham, Rainham, Snodland, Strood,

and among the more important exchanges extended were :—

LONDON—East.

PROVINCES—Ainsdale, Anfield, Broadstairs, Burton-on-Trent, Cambuslang, Canterbury, Chapeltown (automatic), Deal, Dover, Dumbarton, Edgbaston, Egham, Grimsby (automatic), Heaton Moor, Kendal, Loughborough, Queen's Park (Glasgow), Wednesbury, Weybridge.

During the month the following additions to the main underground system were completed and brought into use :—

Wakefield—Sheffield.

Brighton—Uckfield } (Sections of the Brighton—Hastings
Brighton—Seaford } cable.)

while 99 new overhead trunk circuits were completed, and 119 additional circuits were provided by means of spare wires in underground cables.

*After allowing for closing of 27 call offices.

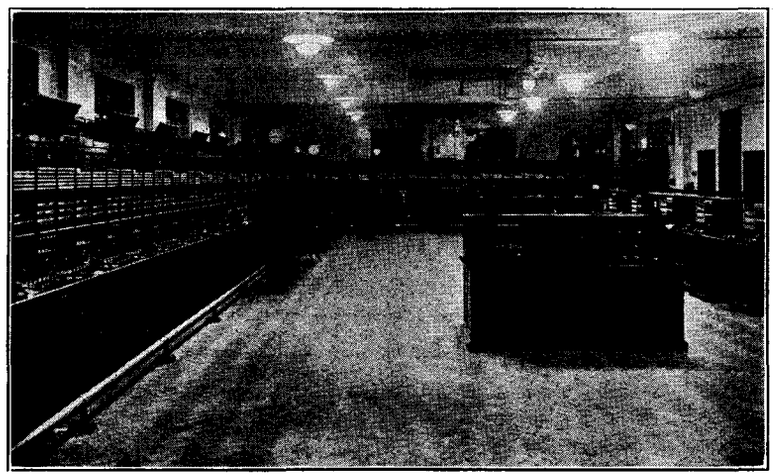
LEICESTER AUTOMATIC SCHEME.

A GLANCE at the prevailing feminine fashions suggests that Leicester, a city whose quarter of a million inhabitants are engaged largely in the manufacture of boots, shoes, hosiery and piece goods, ought to be a very prosperous town, and, if the demand for telephones can be taken as a reliable index, such is, indeed, the case.

Feb.10, 1928, is, therefore, likely to be regarded as a red-letter day in the history of that city—as soon as its misfortune in the fifth round of the "Cup" on that day is forgotten—for on that day Leicester was introduced to automatic telephony. The introduction was, however, only partial on the part of the automatic telephones, but as this was traceable to the prosperous state of trade in the city, and as the Post Office is hastening to complete the introduction, there is no doubt as to the cordiality of the ultimate relationship.

It is not proposed, however, in this article to describe the actual transfer of the Leicester exchanges to automatic working, but to give a brief resumé of the history of the Leicester scheme, which is, perhaps, a good example of the power of changing conditions, and the difficulties which must be surmounted before a completed scheme can be placed at the disposal of the public as a *fait accompli*.

In Leicester, the principal exchange was "Central," an old magneto exchange, rapidly approaching exhaustion in respect of both traffic and physical capacity and useful life, and therefore due for replacement. After



MANUAL SWITCHROOM, LEICESTER EXCHANGE.

an examination of the traffic characteristics, it was found that, owing to its high percentage of local and unit fee area traffic, the Leicester area was suitable for automatic working, and it was therefore decided to introduce this type of working in the new exchange. A survey of the area showed that considerable economy in line plant could be realised after 1931 by serving the south-eastern (Stoneygate) portion of the Central area by a satellite exchange. In addition, it was proposed to introduce automatic working at the exchanges lying within the local fee area; Syston, Western Park and Wigston being converted to automatic working simultaneously with Central, whilst Anstey, Aylestone, Birstall, Kirby Muxloe, Oadby and Thurnby are to be included in the scheme at various dates (up to 1938) as the full traffic capacity of the various exchanges is reached.

The number of lines originally anticipated in this area is given in the following table.

	(*Original Scheme.*) *Number of Lines to be Catered for.**		
	(1) *Initially.*		(2) *Ultimately.*
Leicester	7,400	8,600	14,500
Stoneygate	1,200		2,300
Anstey	—		300
Aylestone	—		600
Birstall	—		300
Kirby Muxloe	—		200
Oadby	—		400
Syston	200		300
Thurnby	—		300
Western Park	200		400
Wigston	300		500

The numbering scheme was therefore designed to cater for this number of lines, as large a number of lines as possible being provided for on a four-figure basis in order to minimise the difficulty which many subscribers find

* Including allowance for unavailable spares.

in accommodating themselves to a five-figure system. The agreed numbering scheme was as follows :—

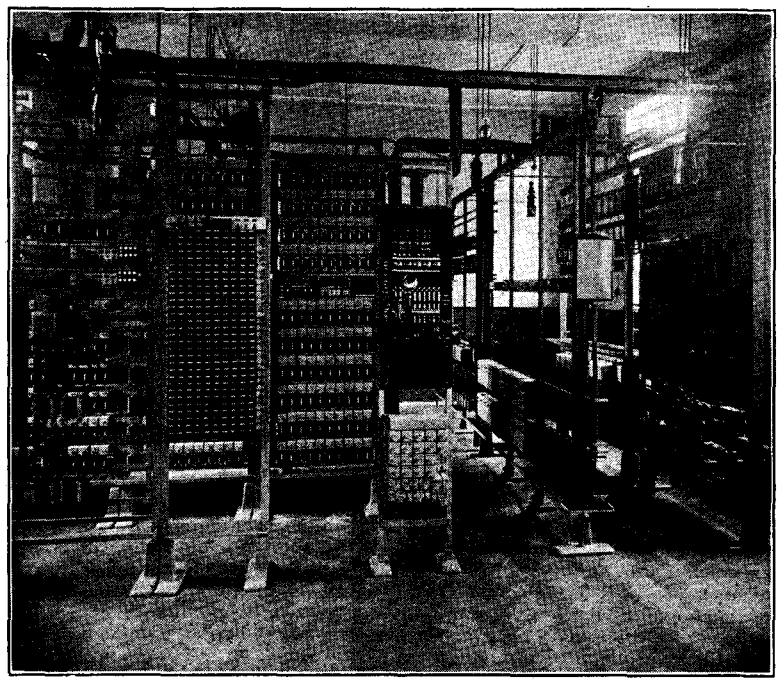
Multiple Numbers. 1,000's.		Exchange.	Initial Requirements.	Ultimate Requirements.	Maximum Numbers Available.
0	—	Manual Board.			
1	—	Spare (N.U.T.).			
2		Leicester.			
3		„			
4		„			
5	000–799	„			
58		„			
59		„			
60		„			
61	000–599	„	7,400		
61	600–999	„			
62		„			
63		„			
64		„			
65		„			
66		„			
67		„			
68	000–699	„		14,500	
68	700–999	„			
69		„			15,800
7	100–699	Stoneygate.			
77	000–599	„	1,200		
77	600–999	„			
78	000–699	„		2,300	
78	700–999	„			2,600
79		Oadby	—	400	1,000
80		Spare.			1,000
81		„			1,000
82		Anstey	—	300	1,000
83		Aylestone	—	600	1,000
84		Birstall	—	300	1,000
85		Kirby Muxloe	—	200	1,000
86		Syston	200	300	1,000
87		Thurnby	—	300	1,000
88		Western Park	200	400	1,000
89		Wigston	300	500	1,000
90	—	Phonograms.			
91	—	Enquiries.			
92	—	Service P.B.X.			
93	—	Rural Party Lines.			
94	—	Trunk Records.			
95	—	Telephone-Telegrams.			
96	—	Reversed Coin Box Calls.			
97	—	Spare.			
98	—	„			
99	—	Test Desk.			
		Totals ...	9,300	20,100	29,400

It will be seen that the margin for unexpected growth varies from 16% in the case of Leicester (assuming that one of the two spare levels—80 or 81—is appropriated) to 400% in the case of Kirby Muxloe.

The switching plant was then installed on the basis of this numbering scheme, but when it was approaching completion, it was found that the actual development was exceeding the estimate (doubtless due to the favourable trade conditions), and it became necessary to re-survey the forecasts for the whole of the automatic area. When this work was completed, it was found that development some 20% in excess of that anticipated initially and 40% ultimately, must now be catered for. This increase in the forecast in respect of the existing Central area was due, very largely, to increased growth anticipated in the outlying semi-residential portions of the area, and, as a consequence, it was found that considerable economies in line plant costs could be secured by opening additional satellite exchanges to serve the Belgrave, Evington and Humberstone portions of the area at various dates after the exhaustion of the plant already installed, but prior to 1938. The revised layout of the area is shown in figure 1 and the number of lines now to be catered for is given in the following table. Column 1 in this case shows the distribution of the lines between the various areas when the total number of lines for which the plant at Leicester itself was provided, is reached. The date at which this is expected to occur is now some two and a half years earlier than was previously anticipated.

	(*Revised Scheme.*) *Number of Lines to be Catered for.**	
	(1) *Initially.*	(2) *Ultimately.*
Leicester	8,600	6,100
Belgrave		500
Evington		400
Humberstone		500
Stoneygate		1,100
Anstey		—
Aylestone		—
Birstall		—
Kirby Muxloe		—
Oadby		—
Syston	300	
Thurnby		—
Western Park	300	
Wigston	300	
Total ...	9,500	33,400

* Including unavailable spares.

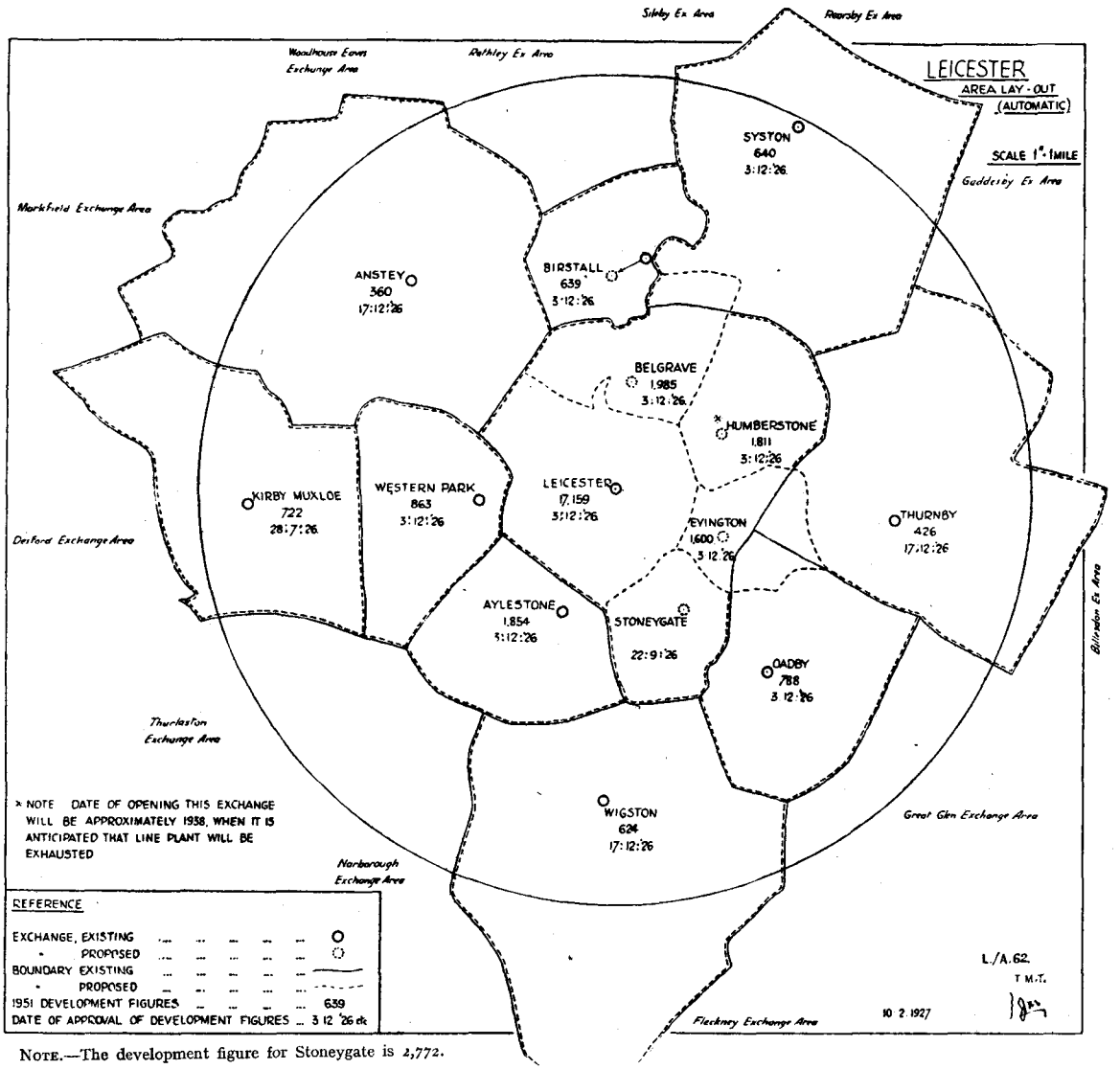


GENERAL VIEW OF SWITCHROOM, WESTERN PARK EXCHANGE, LEICESTER.

When this new forecast became available, it was apparent that the existing numbering scheme was inadequate for the revised ultimate requirements, which necessitate the provision of 37-1,000 line levels as against 30 (29,400 numbers) available. (The number of lines to be catered for does not, of course, form the sole basis upon which a numbering scheme is designed, since the allocation of numbers to any particular exchange is limited by the trunking requirements. For example, it would not be a practical proposition to allocate, say, 700 numbers on a particular level to Syston, 700 on another level to Wigston, and then allocate the balance on these two levels to Thurnby.) It was, therefore, clear that the numbering scheme would have to be recast and a review of the case indicated that the introduction of a complete five-figure numbering scheme (70 levels—70,000 numbers) was desirable. This would, however, entail extensive modifications to the existing plant at some stage or other, and three schemes for carrying out this work presented themselves, viz. :—

(1) Postpone opening the Leicester exchange until the plant could be rearranged.
(2) Proceed with the original scheme, and rearrange the numbers and plant afterwards.
(3) Open as early as possible with such plant as would be undisturbed by the rearrangement, and convert the rest of plant afterwards.

As regards No. 1, the amount of work involved in rearranging the plant was clearly considerable and would probably delay the opening date of the new exchange about six months. What effect would this delay have upon the public service ? Every possible means of extending the capacity of the existing Central Exchange had already been explored (including the



NOTE.—The development figure for Stoneygate is 2,772.

LEICESTER AREA LAY-OUT (AUTOMATIC).

feasibility of a relief exchange), but it had been found impossible to secure any increase upon the 6,400 lines already catered for in that exchange. In addition, canvassing in the Central area had been suspended since October, 1925, but despite this precaution new orders were being received at the rate of 300 per annum, which meant that 6,400 lines would be working some nine months or so before the modified plant could be made available. In the circumstances, therefore, to close the area against all development for a period of probably nine months was entirely out of the question.

No. 2. Now, if the numbering scheme were modified after the opening date, even with the most favourable trunking scheme (which did not provide for such a large margin at the ultimate date as was deemed desirable), it would be necessary to change the number of nearly 3,000 subscribers during the initial 10 years. Of these, 600 would have to change their number twice within 5 years and 1,000 twice within ten years, i.e., upon their transfer to the automatic exchange in the first place and, again, either when the four-figure numbers were converted to five, or, in the case of subscribers proper to the new exchange areas, upon the opening of the satellite exchanges.

In these circumstances, it was clearly desirable to modify the trunking, prior to the opening date, to a five-figure scheme which would permit of the opening of the new satellite exchanges without involving any subscribers in a change of number. The desirability of this course was emphasized by the fact that about 80% of the number changes involved would be changes from four to five figures, a condition which means that a caller, dialling the discarded four-figure number, would be left stranded at an intermediate switching point in such a position that his call could not be intercepted or diverted to the manual board, or the appropriate tone signal passed to him.

No. 3 alternative was therefore adopted and was actually introduced on Feb. 18. last. This scheme involves the opening of that portion of the plant which had already been installed on a five-figure basis (i.e., numbers 58,000-61,499) as a relief exchange to Central, whilst the rest of the plant is being modified to suit the revised requirements. In the breathing space thus obtained, it is possible to introduce a better numbering scheme than would be possible if alternative No. 2 were adopted, and it is now proposed to meet these new requirements by a complete five-figure numbering scheme (except for a few numbers on the 5 and 7 levels, which cannot easily be re-wired) providing for 56,400 lines on 57 levels at the ultimate date, so arranged that, although Belgrave, Evington, Humberstone and Stoneygate will not come into service as separate entities for several years, no number changes need be involved when this does take place, provided subscribers in those areas are allocated numbers within the correct range at the outset.

About 1,100 subscribers were converted to automatic working at the advance transfer and the broad principles governing the choice of these lines are worthy of closer explanation. First, as regards their location; since, with the new numbering scheme, it is proposed to serve some of the Leicester area, and the whole of the Belgrave area, from numbers in the range 58,000 to 61,499, it is clear that the subscribers transferred on advance must be restricted to those in these two areas. Secondly, as regards the total number; here there are certain general considerations, more or less common to all relief exchange schemes, to be considered first. The opening of a relief exchange has the effect of increasing the value of the originating traffic at the relieved exchange in respect of calls which were previously completed in the multiple, but which now have to be passed over a junction to the relief exchange, and of increasing the incoming traffic by virtue of the fact that certain calls which were previously local calls are now originated at the relief exchange and are completed over incoming junctions from the latter. If the number of lines on the relief exchange is very small, it has to depend upon the relieved exchange for all incoming and outgoing junction traffic, which means that there is no decrease in the incoming traffic from other exchanges to the latter (certain traffic simply becoming "through" instead of "terminating"), whilst there is an increase in the total incoming traffic by an amount equal to the originating junction and trunk traffic at the relief exchange, which is either terminated at or circulated via the relieved exchange. Thus the traffic capacity of this exchange is reduced every time a line is connected to the relief exchange.

It is, therefore, necessary to transfer a fairly large number of subscribers from a relieved to a relief exchange in order to relieve the former of a margin of traffic sufficient to counter-balance the incoming traffic from the latter, and, at the same time, to justify as many direct routes to the latter as possible.

This, of course, means relieving the "A" positions at the expense of the "B," so far as the relieved exchange is concerned, and it is fairly obvious that one limit to the number of lines that can be transferred to the relief exchange is determined by the number of "B" positions that are available for handling the inter-exchange traffic.

In the case under review, two keysender order wire " B " positions were installed in the automatic exchange as part of the original equipment, and as they are not otherwise required during the transition period, they are available for the accommodation of the transfer circuits from Central. In addition, two jack-ended " B " positions are available for the same purpose. At Central, the similarity of the cord circuits on the " A " and J.E. " B " positions means that any positions not required as " A " positions can be used as J.E. " B " positions, if necessary.

Thus, the limit in this respect is clearly fixed ; any increase in the number of the positions on the auto-manual board solely for the comparatively short period before the main transfer is not considered permissible. Owing to its heavy expense, dialling out to or dialling in from Central is also out of the question.

But, there is yet another limiting factor to the number of subscribers that can be served from the relief exchange in the special circumstances at Leicester, since the average number of subscribers and traffic units per preselector group and final selector unit of the plant brought into use at the advance transfer must not exceed the average figure per group or unit for the whole exchange when the transfer is complete. In the Leicester case, this particular feature is the limiting factor to the number of lines which can be served from the relief exchange, although the limit imposed by the traffic-carrying capacity of the " B " positions on the auto-manual board is only slightly in excess of this factor.

On this basis, about 1,000 working subscribers were found to fulfil the necessary requirements as regards locality whilst, at the same time, keeping the traffic, &c., within the limits indicated, and this number, together with about 100 new lines accepted between the agreement of the scheme and the advance transfer, were transferred to the relief exchange upon its opening. Further growth will have to be met on Central, as the limiting number of subscribers on the relief exchange has now been reached.

The opening of a relief exchange in Leicester was considerably facilitated by several favourable factors. In the first place numbers in the range 5,000 to 6,499 at central have no multiple appearance over the "A" positions, and those in the range 5,500 to 6,499 do not appear over the " B " positions, access to subscribers with these numbers being obtained via order wires to local transfer positions. Therefore, it is clear that if as large a proportion as possible of the subscribers transferred to the relief exchange are taken from among those to whom the " A " telephonist had previously to gain access over a junction, the increase in the originating junction traffic at Central would be reduced to a minimum, and as this traffic can still be completed over an order wire (to the keysender B positions at the auto-manual board) the increase in the call value on the " A " positions at Central would also be reduced to a minimum. In actual practice, it was found possible to restrict the subscribers who were transferred from Central to the automatic plant to those with a partial multiple appearance and thus, one of the main objections to the opening of a relief exchange was automatically overcome. Further, owing to the fact that a through call completed via a signal junction has a smaller call value than one completed via an order wire junction, it had been possible to secure a saving on the " B " positions at Central. This has been achieved by completing the incoming traffic routed through Central to the subscribers transferred in advance over a signal junction, instead of an order wire as obtained when these lines were working on Central. A separate group of circuits to a jack-ended "B" position on the auto-manual board has been provided for this purpose.

The necessity for providing direct routes to a relief exchange so far as possible has already been demonstrated, but this is not a very easy matter in an exchange with only about 1,000 subscribers whose predominating community of interest is purely local. But here the position was helped very considerably by the decision to close the old (Post Office) Trunk Exchange simultaneously with the advance transfer of the automatic exchange and to bring the trunk positions on the auto-manual board into use at the outset. Leicester, as a subsidiary zone centre in the Birmingham zone, is the trunk centre for some 60 exchanges, and, as a consequence, it was possible to justify direct circuits (common to both the trunk and local sides of the automatic exchange) on a number of routes by routing both the trunk and junction traffic over them.

As a result, the net reduction in the traffic capacity of Central is very much less than is normally the case when a relief exchange is opened, despite the conversion of two or three routes from a delay basis to a no-delay basis upon the closing of the old Trunk Exchange, the traffic on these routes now being controlled by the " A " telephonists, instead of in the Trunk Exchange.

Yet another factor favouring the scheme was the fact that about 700 of the 1,000 subscribers involved in the proposed advance transfer were already served by cables which were led through the main frame on the new exchange, thus assuring an adequate supply of cable pairs between the two exchanges for the transfer junctions, &c.

From the subscriber's point of view, the arrangements are simple. The main automatic exchange is to be known as Leicester, subscribers working on Belgrave, Evington, Humberstone and Stoneygate taking the name, index numbers and trunk charges of the main exchange, whilst subscribers on the other sub-exchanges retain the name of their manual exchange. Since the existing main exchange is known as Leicester Central (or simply Central so far as the surrounding district is concerned), there is no need to differentiate further between the two exchanges so far as the public is concerned. Possible clashing between the two exchanges is further guarded against by virtue of the fact that the working Leicester numbers are all five-digit numbers, whilst those on Central are four-digit. For this reason, the few four-digit numbers on the five-level which are not to be changed and which have a counterpart on Central, are excluded from the portion of the automatic plant which is being used as a relief exchange. And as a further precaution, all Central subscribers bearing numbers coinciding with the Service Codes used by the public (i.e., 90, 91, 92, &c.) have had their numbers changed to ones which will not suffer a further change (i.e., in the 5,000 range) or have been included in the advance transfer.

Thus, the remaining Central subscribers simply ask for Leicester . . . to obtain a number on the automatic exchange, whilst in the case of traffic in the reverse direction, the automatic subscribers dial " 0 " for Central (as for all other exchanges obtained via the manual board on a junction basis) whence they are extended to Central.

The transfer itself is of comparatively minor interest. The three sub-exchanges to be included in the scheme at the outset (viz. : Syston, Western Park and Wigston) were brought into service simultaneously with the opening of the main exchange. The only special arrangements in connexion with these exchanges necessitated by the partial transfer of the main exchange, were the provision of additional lines to and from the manual board for the higher percentage of manual board traffic which must be catered for *until* such time as automatic working is extended to the whole of the area. For this purpose, it was also necessary to equip a spare jack-ended " B " position on the auto-manual board two or three years earlier than would otherwise have been necessary, the signal junctions outgoing from Central to these exchanges under manual conditions being diverted from their distant terminations to this position, whence incoming calls are dialled in. Subscribers in Leicester, Syston, Western Park and Wigston can dial each other direct, and since these exchanges were dependent upon Central when working manually, their conversion to automatic working did not have any appreciable effect on the traffic capacity of that exchange.

The pre-transfer work consisted primarily of the following :—

(1) Segregation of the subscribers to be included in the advance transfer on change over strips at the two exchanges.
(2) Segregation of the junctions from Central to Syston, Western Park and Wigston.
(3) The concentration of subscribers to be included in the advance transfer on the four " A " positions which were scheduled for conversion to " B " after the transfer and the provision of jack-ended junction equipments on them.

In the automatic exchange, the only changes required specifically for the advance transfer were the equipment of the spare jack-ended " B " position (already indicated) and an increase in the number of " 0 " lines to cater for the higher percentage of manual board traffic which is to be expected during the transition period between the advance and the main transfers.

One incidental difficulty arose out of the prosperous state of trade in Leicester, viz. : the difficulty in obtaining locally the additional telephonists required to cater for the additional manually handled traffic during the transition period, and it was found necessary to transfer redundant temporary telephonists from Nottingham (which had just been converted to automatic working) for this purpose.

The actual transfer took place with clockwork-like precision.

During the week preceding the transfer, the various trunk circuits were transferred from the old Trunk Exchange to the new trunk suite, a certain number of circuits being transferred each day together with a corresponding proportion of the lines used for the completion of calls to or via Central. At midweek, Trunk Records was transferred to its new home, and by Saturday mid-day, the whole of the trunk circuits, trunk junction circuits and trunk record circuits were withdrawn from the old Trunk Exchange, the circuits to Coventry, Rugby, Burton-on-Trent and Nuneaton being transferred to Central and a full no-delay service introduced on these routes.

As soon as the busy hour on Saturday was passed and the traffic had assumed its Saturday afternoon slackness, the diversion of the local transfer circuits to the " B " positions at the auto-manual board, the diversion of the outgoing circuits to the three sub-exchanges, and the provision of the circuits from the auto-manual board to Central was commenced. A nucleus of circuits was thus available when the transfer was completed at midnight, the remainder being brought into use on Sunday, so that the whole of the new arrangements were ready for the busy hour on Monday.

As the zero hour on Saturday approached, all connexions on the lines to be transferred were cleared down and at midnight the change-over plugs were inserted, and the lines to be transferred, which were already routed via the automatic exchange, were cut at the latter point. On the pairs thus thrown spare, the lines to be transferred, which were already routed via Central, were extended to the automatic exchange, the relative exchange equipment at Central being disconnected by the withdrawal of the heat coils. The wooden wedges in the protector springs on the main frame at the automatic exchanges were then withdrawn, and the subscribers' lines were " through."

Now the way is clear for the modification of the four-figure portion of the plant without interfering with the public service, whilst the additional capacity secured at Central will be ample for some two years' growth at the present rate of development.

G. P.
W. K. M.

NOTE.—The photographs are published through the courtesy of Mr. Grinsted, of Messrs. Siemens, Ltd. (the firm responsible for the installation, which is of their well-known No. 16 type). The photograph of the Western Park Exchange gives a good idea of a modern, self-contained automatic satellite exchange.

CORRESPONDENCE.

ADVERTISING THE TELEPHONE SERVICE.

TO THE EDITOR OF "THE TELEGRAPH AND TELEPHONE JOURNAL."

Sir,—With reference to advertising the Telephone Service, the following points may be of interest:—

The advertising matter now issued practically all relates to the utility and cost of the Service. The public are only told what the Service is to them, but not how it is provided. I think the time has now arrived when the public can be profitably educated as to what is done to provide the Service.

For instance, a desiccator at work in the streets is quite a common sight; but what is generally known about it? What it is, what it is doing and why. Publication of this information would make every desiccator a real live advertisement because pedestrians would take an interest in it, and think about it as they pass along.

The common sight, too, of a jointer's tent on the pavement could be made equally fascinating if the passers by knew what the engineers are doing inside.

Even telephone poles could be brought into the scheme. Where they come from. How chemically treated, &c.

What a wealth of interesting matter, too, could be issued regarding the best frames, dynamos, accumulators and switchboards.

Our engineers tell me that the apparatus now installed for the automatic service is so fascinating even to them, and uncanny, that one is almost led to imagine that it thinks for itself. How much more so, then, could the public be enchanted by the issue of advertising media relating to this latest development in telephony.

My suggestion is that a series of brochures should be issued setting out these matters in a clear comprehensible manner, and put in such a way as to make it very interesting reading to an intelligent mind.

They could be numbered 1, 2, 3 and so on, and a note put at the end of each stating that a further pamphlet will follow shortly on such and such a subject.

The idea of such a scheme is to lead the public up to a point where they will say "Yes" on their own account, when they realise the huge amount of work, material, thought and technical intelligence required and brought to bear at the other end of the wire.

I should also like to see a clause inserted in the general conditions of the agreement making it imperative upon all new subscribers to take the earliest opportunity to make an appointment with a view to visiting their own exchange. I feel that a great number of subscribers complaints are due to this lack of knowledge.

I also think that it would be a huge benefit all round if a subject, "How to use the telephone, and what happens" could be introduced into the elementary schools of the country and to be taught to those about to leave. This, I think, will be quite necessary when the automatic service is in full swing.

In conclusion, why not bring the residents in suburban areas into our confidence and show them the "layout" of the development schemes. Tell them what is being done and will be done on their behalf. I feel that if this is done many at least would feel it incumbent upon themselves to do their best in making this huge business a success by becoming subscribers.

F. T. HOOD,
Contract Officer.

RETIREMENT OF MR. BEAK.

A LARGE and representative gathering assembled in the Dining Room of the Holloway Factory (Post Office Stores Department) on the evening of Mar. 30 to bid farewell to Mr. F. G. Beak, Staff Officer, upon his retirement.

A musical entertainment and tea were held in honour of the occasion and Mrs. Beak was present as the guest of the staff. Mr. C. E. Fenton, M.B.E., Senior Staff Officer, presided, and in his opening remarks paid a glowing tribute to the ability and zeal of his departing colleague. The presentation, which took the form of a Westminster Chime Clock, was made by Mr. H. Sparkes, C.B.E., Controller of the Department, who also handed to Mrs. Beak a Waltham Wristlet Watch and Bangle, coupling his action with an extremely interesting survey of Mr. Beak's official career.

Mr. Beak has been closely connected with the Telephones and Telegraphs for many years, his association with the Factories Section of the Post Office dating back to 1885, and the esteem in which he has been held was clearly manifested in the eloquent testimony paid by speakers from the various Departments.

In reply Mr. Beak thanked all those concerned for the loyal assistance given over a long period, and assured the gathering that the evening's event had surrounded his departure with an atmosphere of lasting joy.

A. M.

RETIREMENT OF MR. A. C. HALEY.

THE Telephone Service lost another old and valued official on March 31, 1928, when Mr. A. C. Haley, District Manager of the North Midland District, retired after 44 years' service. Mr. Haley commenced his service with the National Telephone Company at Bradford in 1884, as an Inspector. He was promoted to District Manager of the West London District in 1896. He took control of the newly-formed North Midland District in August, 1925.

A Whist Drive and Dance was held at the Welbeck Hotel, Nottingham, on March 27, 1928, in order to provide a suitable setting for the leave taking and presentation to Mr. Haley.

Amongst the guests present were: the Surveyor, Mr. E. J. Gayes; the Assistant Surveyor, Mr. R. J. I. Measham; and the Head Postmaster of Nottingham, Mr. G. P. Cooper. The presentation ceremony took place at the end of the Whist Drive, the Chair being occupied by Mr. J. L. Magrath, Contract Manager, who gave a very interesting resumé of Mr. Haley's career and voiced the sincere regret with which the Supervising Staff viewed the departure of Mr. Haley. Mr. Magrath stated that the intention had been for the gift to be a dual one to both Mr. and Mrs. Haley. This object had been achieved by the present selected, viz.: several articles of antique furniture, with which Mr. and Mrs. Haley were equally charmed.

Mr. Fitzpatrick, Clerical Officer, paid tribute to the kindly courtesy with which Mr. Haley had always received staff representations, and mentioned the happy relations which existed between all grades in the North Midland Telephone District. Mr. Cooper, the Head Postmaster of Nottingham, speaking on behalf of the Head Postmasters and Postmasters throughout the District, referred to the universal esteem in which Mr. Haley was held by the Postmasters. He read several eulogistic letters from Head Postmasters and Postmasters unable to be present.

Mr. Gayes, the Surveyor, in a delightful speech, paid tribute to the untiring zeal with which Mr. Haley had worked for the good of the Telephone Service, and expressed satisfaction at the excellent relations which existed between the District Manager and every section of the staff. Miss Lees, Higher Clerical Officer, in a happily-phrased speech, made the presentation, which took the form of a cheque to cover the cost of the selected articles. Mr. Haley was deeply affected by the tributes paid to him and the feeling of enthusiastic goodwill manifested. In a few well-chosen words he thanked all concerned.

After the ceremony, in the words of the genial Chairman, the slogan was "On with the Dance." It was voted by all to be one of the most successful and enjoyable function held in the District. Mr. F. E. Collins (Staff Officer) undertook the duties of Host with the assistance of a representative committee comprising Messrs. Carter, Magrath, Breward, Fitzpatrick, Robinson and Miss Scriven.

PRESENTATIONS AT YORK.

ON the occasion of his transfer to the North Midland District on April 2, Mr. D. J. Barnes, who has been District Manager of the York District for the past eight years, was presented by the York staff with a handsome mahogany card table and oriental brass bowl and stand. At the same time, Mr. A. Kemp, Assistant Traffic Superintendent, who has been transferred to Manchester, was made the recipient of a Rolex wristlet watch suitably inscribed and a leather tennis racket case. Both officers were held in high esteem by their colleagues and they carry with them to their new spheres the good wishes of all.

PRESENTATION TO MR. GEO. EDWARD.

AT Reading Traffic Office, Saturday, March 31, 1928, on the eve of his departure from Reading to take up duties as District Manager of York District, Mr. Geo. Edward, recently promoted from the rank of Traffic Superintendent, Class I, was the recipient of a handsome cabinet gramophone, with records and a pair of antique vases, the former being subscribed for by his colleagues and staff of the Reading Exchange, the latter by a few friends on the postal side. The presentation on behalf of the staff was made by Mr. C. F. Moorhouse, District Manager, who referred in warm appreciative terms of Mr. Edward's good work in the Reading District. Similar expressions of goodwill were tendered on behalf of the respective staffs by Messrs. Young, Parsons and Frame, which were aptly and feelingly responded to by Mr. Edward. He left Reading District on March 31, 1928, to take up his new duties at York on April 2, 1928. His numerous friends and colleagues in the Reading District wish him every success in the new sphere of his activities.

GLASGOW TELEPHONE NOTES.

MR. A. E. COOMBS, District Manager, Mr. E. J. Johnson, Traffic Supt., Miss A. L. Wood and Miss J. S. Drennan, Supervisors (Class II), with the assistance of several members of the Traffic and Exchange staffs, have just finished a remarkably busy winter season. Not satisfied with the work involved in connexion with the Exchange staffs, these ladies and gentlemen carried through a series of public official lectures on "The Service from Within."

With the aid of a working model switchboard, loaned by Headquarters, meetings have been held in different parts of the District. The principles of the Service, including a short description of the general organisation of the Post Office, were first outlined by Mr. Coombs or Mr. Johnson, after which the operation of local, junction and trunk calls, as between calling and called subscriber via the telephonists, was demonstrated by actual transactions, telephones being fitted in different parts of the hall for the purpose. After the demonstration, the meeting was thrown open for questions for criticisms.

It was my pleasure and privilege to attend some of these gatherings, which included subscribers, call office users, and potential subscribers; indeed, new orders for telephones were actually signed after some of the meetings. If one may judge from the reception accorded to the lecture and demonstration, and the delightfully charming atmosphere created by the official party, then much service good should result. I am informed that over 30 of these meetings took place, and that they were attended by more than 4,000 citizens of Glasgow and environs.

No doubt further particulars will be forthcoming in due course, and I will not therefore anticipate anything which may appear later. I must, however, pass on the comment of a lady which she made at the close of one of the lectures. "That demonstration," the lady said, "carefully considered, was a study in enunciation, tense and punctuation, as well as good advice to telephone users."

On leaving the Service to go to Toronto, Mrs. I. W. Bannerman, late of the Govan Exchange, was presented with a suitcase and several personal gifts by her colleagues as a token of their esteem and best wishes for her future happiness and prosperity.

We offer our congratulations to Miss M. K. A. Lumsden on her promotion to the position of Assistant Supervisor, Class II.

The many friends of Mr. R. Kirkwood, Clerical Officer, District Manager's Office, Glasgow, will regret to hear of his retirement from the Service for health reasons. His former colleagues, to mark the occasion, took the opportunity of sending him a token of their esteem with an expression of their wishes that he might soon be restored to health. In a letter of reply Mr. Kirkwood trusted that he might soon be able to renew acquaintance with his old friends.

Correction.—It was erroneously stated in the notes for last month that Mr. A. M. Mellish was the accompanist for the concert promoted by the Douglas Exchange staffs. This should have read: "Mr. Mellish was M.C. for the Whist Drive and Miss McLeod the accompanist for the Concert." The winner of the Ladies First Prize was Miss F. A. Brough. Miss D. Muller should be included among the artistes.

Golf.—One of the happiest moments of a Scotsman's life: When, all square and one to play, the driver meets the ball with a clear, sweet kiss, and he knows he has got in a real beauty when it was really needed.

Arrangements have been made by the telephone members of the Bell Golf Club to hold their annual knock-out competition, the first round to be played by May 5.

Specialisation v. Rotation.

Specialisation.—"The power of a man increases steadily by continuance in one direction. He becomes acquainted with the resistances, and with his own tools; increases his skill and strength, and learns the favourable moments and favourable accidents."—(Emerson.)

"No man is expected to be a jack-of-all-trades, but a master of one."—(*Telegraph and Telephone Journal.*)

Rotation.—"No, no; regular rotation, as Jack Ketch said w'en he tied the men up."—(Sam Weller.)

"Rotation is the law of nature."—(Emerson again.)

As we go to press news reaches us of the promotion of Mr. J. S. Wallace, ex Third-Class Clerk, to the position of Higher Clerical Officer in the District Manager's Office, Newcastle. As time is short we are forced to limit ourselves at the moment to briefly congratulating Mr. Wallace upon his appointment and our Newcastle confrères upon the acquisition of an officer who possesses every qualification for his new post. "J. L."

Directory Call.

Subscriber with small voice: "Give me Auntie Nellie's number at Dunoon."

Operator (in helpful way): "What is your Auntie Nellie's name? I must know that to find the number."

Subscriber: "It's not my aunt! It's a garage—Antonelli, Dunoon." (Collapse of operator.)

"Disconnected."

It was reported one day that a caller in one of the kiosks had requested a reconnexion as she had been cut off and the operator did not recollect having made such a connexion as was stated. The same thing had happened on the two preceding mornings and the subscriber had been given the benefit of the doubt and the number asked: but the operator felt that further enquiry was necessary this day.

Upon investigation it was found that the caller had been asked, three mornings previous to this, to take an extension of time, which she refused, and was therefore disconnected. When the circumstances were explained she cutely answered: "It says in the front of the telephone directory, 'if you are cut off during conversation you should ask the operator for a reconnexion with the number required.'"

And her accent was not that of Aberdeen!

M. L. TULLOCH.

LIVERPOOL TELEPHONE NOTES.

WE have to record the retirement of Miss G. Johnson, Supervisor, Trunk Exchange, after 46 years' service. The Department has lost an officer of remarkable force of character, and one who held the respect of all with whom she came into contact. Miss Johnson exercised a wonderful control over her staff, and her interest in them extended far beyond their official duties.

Considerable appreciation of Miss Johnson's capabilities was expressed in the local press and numerous gifts marked the occasion of her retirement.

As was natural, the severance from a life-long occupation was not lightly borne, but knowing her great activity of both mind and muscle, we feel sure that her future moments will be as fully occupied as her past. We wish her the very best of health.

Mr. H. Lee, Clerical Officer, Contracts, has left us to take up duty in the Engineer's Office, Brighton. He was presented with a small token of remembrance by the staff, whose best wishes go with him.

A welcome is offered to Mr. G. Johnson, Asst. Traffic Superintendent, who has returned to us after a long sojourn in Manchester, and to Mr. P. Pealing, Clerical Officer, who has taken the place of Mr. H. Lee.

A District Office Social was held on April 13 at the British Legion Rooms, Post Office Branch. There was a large attendance and the manifest enjoyment of those present was a tribute to the ability of the organisers, to whom thanks are due for the work entailed in the preparation of an excellent programme and refreshments. Such functions are very helpful in bringing the staff together outside the official atmosphere. We would like to see a regular winter programme inaugurated. C. H.

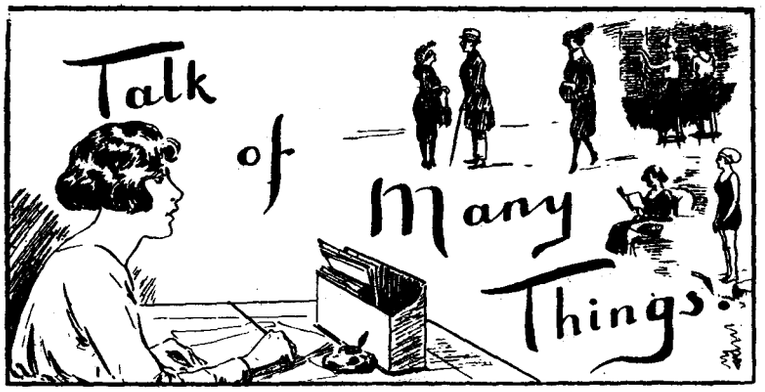
TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

AT the annual general meeting of this Society, held on April 16, prior to the reading of Mr. H. J. Maclure's paper, which we reprint in another column, Mr. L. Simon, the Chairman, subsequent to the election of officers and Committee, said when commenting on the successful and interesting session, that the Committee had been considering what steps could be taken still further to stimulate interest in the Society and its proceedings and to increase the membership. A resolution incorporating various suggestions to this end was approved.

Sir William Mitchell-Thomson, Bt., K.B.E., M.P., Postmaster-General, was re-appointed President. The Vice-Presidents were re-appointed, and Mr. E. Raven, C.B., Mr. W. T. Leech, C.B., and Mr. L. Simon were appointed additional Vice-Presidents; and Mr. J. Stuart Jones, M.B.E., was appointed Chairman for the 1928-29 Session. It is interesting to recall that the latter was Honorary Secretary of the Society from 1919 to 1923.

In recognition of the services which they had rendered to the Society, Messrs. J. J. Tyrrell, T. A. Prout, R. Greenstreet, A. W. Edwards, W. G. Wood, and W. A. Mattinson, were made Honorary Life Members.

WE TELEPHONISTS



The Busy Hour.

WE are very busy in the garden at present. When I say "we" I mean the birds, Bindle, and myself—not forgetting Simon the snail. Just what Simon does I do not know, but he takes a very long time to do it. He is now a third of the way up the garden path, having heard the rumour last spring that early in 1929 a crocus would positively appear at the top of the garden. He gave me to understand as he passed me at top speed that it would not be cricket if I moved that crocus. He had been put to considerable inconvenience and expense, he said, in undertaking the journey. He had stored the furniture and packed his wife and children off to stay with grandma, and he did not want to find after all this that he had reached a crocus that wasn't there. Moreover, he would never have embarked upon such a long journey through a garden so infested with birds had he not had a very special reason. It appears that his wife had expressed an ardent desire for a piece of that crocus and, since when she wanted anything she wanted it very badly, Simon must needs sally forth to satisfy her demand. "But, you know" he said, sadly, "by the time I get back in 1930 or 1931 she will have forgotten all about it and will nag me for stopping out late. So if you'll remove your feet I'll be getting along. G'morning." Well, after that, of course, I shall not have the heart to disturb the crocus, but won't he rampage if the thing doesn't come up next year! Will he run amok with the light of murder in his eyes? If so had I not better meet him with the plant half way, or pick him up and carry him to it? Robert, the thrush, however, has promised to settle the question for me, but he was afraid that he could not tell me whether Simon's wife would wear widow's weeds or whether there is an orphanage for fatherless snails.

But as I was saying, we are very busy in the garden at present. Henrietta, the blue tit, is pecking at the swinging cocoanut, and James, her spouse, is waiting his turn patiently. Uncle Ben, the great tit, is hovering round a piece of fat. He is a portly old gentleman and has the appearance of being "something in the City." He is bluff and hearty and is often heard to remark, "Damme, Sir—What What—the country is going to the cats." George and Eliza with a host of their sparrow friends are scrapping over the bits of bread on the lawn. They were waiting on the fence for me this morning and hopped down perkily when I appeared. They intimated that they would be obliged if I would provide mashed potato for lunch, and would I mind being more punctual with meals because *they* had plenty of work to do if *I* hadn't. A robin sniggered at their pert remarks, but Richard and Amy, the finches, were obviously embarrassed by this exhibition of bad manners. They are ever so nice, not at all proud, and it is quite a privilege to have them as tenants on the estate. Herbert and Caroline, the starlings, have just jostled into the crowd. They are a fussy pair and have a very consequential manner. They spend so much of their time talking scandal, chattering about their domestic affairs and imitating their neighbours, that I wonder they find time to eat. Compared with them William the blackbird is a model of deportment. He is standing on the lawn now, sleek and motionless, with his head on one side. He thinks he heard the early worm yawning. Yes, sure enough; a quick run, a pounce, and out comes Winnie like half a yard of spaghetti.

Thus I lounge against the fence, smoking dreamily. Bindle, the hound, is lounging at my feet and together we watch the work proceeding in the garden. Bindle is not quite sure that there ought to be so many birds about and he is a little resentful that they should be taking the hair I have combed from his coat to line their nests. He would like to chase them just for the pleasure of seeing them rise, but he answers my arresting glance with a smile in his eyes and wag of his tail. I think he is rather pleased about the fate of Winnie because he always blames the worms if he can't find the bone he has buried. Bones and their treatment form the subject of our one and only difference of opinion. I maintain that bones ought not to be buried in the garden. He maintains that a bone is no good until it has been buried, and that with all due respect he cannot understand my aversion. To clinch his argument he refers me to Mr. Chesterton's song of Quoodle.

Just then the voice of Camou floats from the house and asks Percy whether he does not think that he might tidy the front garden, and isn't it about time he cut the grass and rolled the paths, and isn't he ever going to put up that trellis and tie up the ramblers, and has he forgotten to chop the firewood, and what about that heap of rubbish to be burned, and does he know that the summer-house leaks, and when will he——

Oh yes, we are very busy in the garden at present, aren't we, Bindle!

PERCY FLAGE.

For the benefit of those of our readers who were not present at the Telephone Play, we print the following clever verses contributed by C. A. S. and used in the opening scene. Our contributor disclaims responsibility for the last four lines!

The Trumpeter.

(Revised Version.)

"Holborn Sub.—what are you dialling now?
Is it a call you're seeking?
You seem to be in a quandary—
'Tis the supervisor speaking."
"Oh, merciful powers, I've dialled for hours—
And waited in vain for my number,
But now I've got you, will you see me through?
I'm trying to call a plumber!"

"Holborn Sub.—what are you dialling now?
This is the Super speaking,"
"I can't get a call on this line at all—
Just a lot of bubbling and squeaking!
It's getting so bad it's driving me mad,
For my business is all going under—
And there isn't a doubt that my mind will give out
When I think of the charge—no wonder!"

"Holborn Sub.—what are you dialling now?"
"Is that the Super speaking?
I've smashed my disc and I'll face the risk—
'Tis revenge I now am seeking!
I'm here all alone—ochone! ochone!
I have dialled it times without number.
Now the bits lie around—face down to the ground,
And I can't get through to my plumber.
I am nearly insane through the terrible strain—
The bath's fallen through from the attic,
Oh, give me the pain of the manual again—
And be d—— to the old Automatic."

Our readers will be interested in the following selections from the Limericks submitted in connexion with the recent competition held by the London Telephonists' Society. The second won the prize:—

1. A clever young man at Reliance,
Invented a patent appliance,
A hand-set with spout,
That couldn't drop out,
They've made him a B.A. for science.
D. D.

2. These Traffic Instructions *re* Tandem,
Well, I don't think they're issued at random—
They announce each fresh route
In a manner quite cute,
But I'm bothered if I understand 'em.
E. B.

3. Said a Sub. to the night staff at Purley,
"I wish to be called very early,"
But before 3 o'clock
He received quite a shock—
I hear its a boy and a girlie!
C. A. S.

4. On a call office circuit at Royal
A caller who'd been on the oil
Said, "it'sh no use, my dear,
Puttin' pennies in here,
Cos the cistern's beginning to boil!"
C. A. S.

5. Said a Yank in a call-box at Speedwell,
"Say, Sadie, I can't see to read well,
So just put me through
To the local D.Q.—
I want an hotel where they feed well."
C. A. S.

6. A subscriber attached to Mill Hill,
Complained of the size of his bill,
He said "Calls are put down
When we're all out of town,
And pay it, I'm d——d if I will."

C. A. S.

Western Exchange.

On the occasion of her retirement, Miss A. M. Willett, Assistant Supervisor, Class II, was the recipient of many presents including a cheque for £20 subscribed by her colleagues and friends throughout the service, a gold wristlet watch from the Western Supervisors, a gold and sapphire brooch from the Western Telephonists and Engineers, and numerous personal gifts.

The presentation was made by the District Superintendent, Mr. G. Buckeridge.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), London, E.C.1.

LECTURE BY MR. F. J. BROWN.

READERS of the *Journal* are invited to a special lecture on the "Relations of Cables and Wireless" to be given in the Fyvie Hall of the Polytechnic, Regent Street, W.1, by Mr. F. J. Brown, C.B., C.B.E. (author of "The Cable and Wireless Communications of the World") on Friday, May 11, 1928, at 6.30 p.m.

Sir Geoffrey Clarke, C.S.I., Joint Managing Director of the Telegraph Construction & Maintenance Co., will take the Chair.

The Polytechnic is close to Oxford Circus Underground Station. The proceedings will terminate about 7.45 p.m.

LONDON TELEPHONE SERVICE NOTES.

Contract Branch.

The following were the results obtained by the Contract Branch during the month of March:—

Stations.

New business obtained	9,517
Ceasements	5,161
	4,356

The ceasements are heavy as usual for the last month of the quarter and the nett gain was practically the same as for the corresponding month of the preceding year.

It is gratifying to be able to place on record that the nett gain in the London Telephone Area during the financial year ended March 31 amounted—for the first time—to over 50,000 stations, 50,348 to be precise.

Further to last month's notes, with regard to the Telephone Development Association's Stand at the Ideal Home Exhibition, orders were secured for a total of 193 exchange lines and 19 extensions, a gain of 97 stations on the figures for the preceding year. In addition to the orders actually obtained, enquiries were received and are being followed up in respect of 315 cases in the London Telephone Area, and 108 in the Provinces.

It will be of interest to the readers of the *Journal* to know that there are now over 900 kiosks in the streets and open spaces in the London Telephone Area, and it is hoped that before the summer—if it comes this year—is over the four-figure mark will have been passed.

Two members of the Headquarter Staff, Contract Branch, have recently married. Mr. Bevan, an Executive Officer, was presented with a Hall Stand,

and Mr. Leslie Dawe, a Clerical Officer attached to the Development Section, was presented with a set of carvers, some spoons, and a cheque. Mr. Glenny made the presentation in the latter case, and in happy and appropriate words likened the three articles to symbols, each of which has its place in married life. Mr. Dawe acknowledged the gifts with appreciative thanks.

A postcard was recently received at one of the District Contract Offices from a non-subscriber asking for a representative to call in connexion with the Telephone Service. On a Contract Officer calling in the hope of securing an order, he found that the wireless set used by the sender of the postcard was out of order, the owner imagining that the payment of the licence fee entitled him to have it put right by the Post Office free of charge.

* * * *

Cricket and Football.

The results of recent matches with the leading teams have destroyed for this season whatever hopes we had of carrying off the championship.

Two strenuous games with teams at the head of the League were lost, both by the narrow margin of 2 goals to 1. It has to be admitted, however, that the final results just about represented the run of the games.

Recent events regarding the policy adopted by the League in connexion with games postponed are causing some uneasiness. There is a possibility of the practice of permitting clubs to postpone fixtures on the plea of not being able to turn out a team being abused, and when teams favourably situated for honours ask for deferment it seems highly desirable that such cases should be carefully investigated. As vacant Saturdays suitable to two teams are scarce, permission is frequently given, when this is possible, to allow one match to count as two games, in other words to play for four points. It is suggested that this is wrong in principle and should not be allowed, as it frequently gives the one side a distinct advantage and reacts on other teams in the league with designs on the championship. This is a matter which will no doubt receive the earnest consideration of the League Committee.

* * * *

The London Telephonists' Society.

On Friday, Mar. 16, the Sixth General Meeting of the 1927-28 Session of the London Telephonists' Society was held in the Lecture Hall of the City of London Y.M.C.A., Aldersgate Street, E.C.4.

At the commencement of the evening we had the advantage of hearing some very good music. The concert was given by members of the staff of Grosvenor Exchange. The soloist gave great pleasure. Her songs had a most appealing variety and charm. We were able, through the medium of the pianoforte duets, which were so beautifully played, to renew our acquaintance with some of the best contemporary music. The concert was concluded with a very hearty vote of thanks to the artistes.

Great amusement was caused by the Limerick Competition. The six limericks selected for final voting were read by Mr. Horace Dive, and it was found that the most popular one was that submitted by Miss E. Brereton.

The winners of the Photographic Competition were Miss I. Child and Miss S. H. Wilson, and their snapshots, together with those of other competitors, were on view during the evening.

The prize-winning papers for the current Session were read. The first, read by Miss I. Child, of Gerrard Exchange, gave one the impression of pure country air that was most refreshing. The second paper, by Miss A. G. Turner, of Thornton Heath Exchange, was of a quite different nature, but was no less interesting. The title, "Tandem and the Small Exchange," is sufficient to indicate the nature of the paper, but it is impossible to give full justice to the manner in which the subject was treated.

The first paper, with the ambiguous title of "Headquarters," was read by Mr. R. C. Atkins. The whimsicality of this paper was such that, as the reader proceeded in his own inimitable style, delighted ripples of laughter proved more clearly than words how greatly the audience enjoyed Mr. Atkins' fantasy.

The prizes were then presented by the Controller, whose speech formed such a very pleasant part of the evening's proceedings.

In rising to close the meeting, Miss James thanked Mr. Valentine and said how greatly his interest in the activities of the Society is appreciated.

E. McA.

* * * *

The Secretary has approved the following appointments :—

Mr. F. J. BUNCE, Clerical Officer to be Acting Higher Clerical Officer.

Mr. P. J. CANAVAN, Clerical Officer to be Acting Higher Clerical Officer.

THE POST-WIRE.

I AM no telegraph man, yet, do I not recall leaving the Army with a piece of paper in my hand alleging, amongst other things, that I was an expert telegraphist. I suppose they must have been right, but I felt that day as I had done previously when, doffing my kilt, I appeared as a full-blown Sapper in brand-new riding breeches in the streets of Hitchin, Herts. With one eye on my breeches and the other on a pretty girl, I nearly fainted away when asked to assist with a restive horse. Ye Gods ! Horses and Telegraphists ! Not my forte.

And the Post-Wire ? A "cross" between a postal packet and a telegram—a supplement to the Post and Telegraph Service. I wonder if it is practicable and would pay. Here, in Brighton to-day, I want to send my old pal Jones, of Bristol, a message telling him that Cissie is dropping in on them to-morrow. If I post a letter now, eleven ack emma, he will not get it until to-morrow. I'll send a Post-Wire ! Sixpence to pay for 20 words, or a shilling for a maximum of 30. On an official Post-Wire form (or any old form will do) I scribble my message to Jones, affix the appropriate stamp, place the form in an envelope addressed simply "Post-Wire," and drop it in my local pillar box. Satisfied that at a cost of sixpence Jones will get his message to-night I toddle home to help Cissie pack.

The Post-Wire message is now speaking : "I am in the pillar box along with other just ordinary letters when the postman comes along and 'bags' us. Arriving at the sorting office we are duly 'sorted out' and I am soon direct on my way to the telegraph room. Here a boy messenger withdraws me from my envelope, cancels the stamp I am wearing, and takes me to the appropriate telegraph stall for Bristol.

Now for a little time, at any rate I am at leisure, for, being of a semi-urgent nature, I have to await the 'idle moments' on the telegraph circuit. Soon my time comes, and with a prefix of 'P.W.' I am on my way rejoicing to Bristol and to Jones.

Written down on a Post-Wire form at Bristol, I am placed in a Post-Wire envelope by the receiving telegraphist, addressed and sent along direct to the sorting office for despatch with the next postal delivery.

May I ask if I, the Post-Wire message, am not worth a trial generally as a means of bringing additional revenue to the telegraphs while at the same time not detracting from the normal postal and telegraph services ?

I, a 'Post-Wire,' say as follows :—

(*a*) That I will fill the 'idle-moments' of the telegraph circuits and add to telegraph revenue.

(*b*) That I will not diminish the volume of postal or normal telegraph work. In fact, I am likely to increase it.

(*c*) For Post-Wire Service I eliminate counter staff and special delivery by boy messengers.

(*d*) I will not interfere with that somewhat expensive relation of mine, the 'Telephone-Letter.'

(*e*) I provide a simple scheme of accounting which can be outlined if I am not damned at the outset by conservative friends.

(*f*) The public will welcome the new 'semi-urgent' service and although such messages would be accepted without guarantee of specified delivery, it would be found generally that semi-urgent messages could be sent fairly expeditiously over long distances through the combination of the postal and telegraph service, the latter, as stated, at slack periods.

(*g*) My promoter bids me add : If he has 'asked for it' may his telegraph and postal friends let him have it—in the neck."

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THE

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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

LIII.—MR. DAVID MILLER.

MR. DAVID MILLER entered the Telegraph Service as a boy in the year 1880, and passed through all the grades to his present position of Chief Telegraph Superintendent at Glasgow. Throughout his career he has constantly displayed outstanding ability, and his opinion on the many telegraph traffic problems is much valued.

He was an enthusiastic Volunteer for 20 years, and in January, 1915, he offered himself for Active Service, and served overseas as a sergeant with the 6th Corps Signals.

He holds the D.C.M. and the Volunteer Long Service Medal, and if he were to don uniform again he would require to wear five decorations before he could pass muster as being "properly

When an Overseer he was selected to assist in the taking over of the Glasgow Corporation Telephones and later of the National Telephone Company. His work in this connexion was marked by great initiative and a remarkable knack in dovetailing conflicting interests.

dressed." One is not surprised, therefore, to observe that his bearing—and his manner, sometimes—reveals a tinge of the military type without being a martinet.

Mr. Miller is retiring shortly, and it is the wish of his many friends that he will long enjoy his well-earned leisure.

INSTRUCTION OF SUBSCRIBERS IN AUTOMATIC WORKING.

BY J. D. PETTIGREW

ALTHOUGH the character of many of the changes arising from the introduction in London of automatic telephony was evident long before the system became a practical issue and set up a train of advance preparations, certain features of the conversion have perforce to wait for what may be described as execution without trial, when the event was imminent. One of such matters was the instruction of subscribers, and it may be of interest to sketch the manner in which this task was performed.

The work, of course, represents quite an innovation—under manual conditions the elements of telephone knowledge on the part of subscribers, as a whole, can safely be assumed, and while one would hesitate to say that their education does not need fostering, it can be said that the subscribers' influence is limited by the intervention of the telephonist between himself and the switching plant—he stands protected from "major irregularities" and, in his own view, divorced from responsibility. The situation changes, however, when the subscriber can exercise direct control over the mechanism and his proper instruction becomes a matter of considerable importance.

The means of education adopted can be classified under four headings, viz :—

1. Notices in the Press.
2. Demonstration on the Director units (situated in the vicinity of the exchange and also at Headquarters).
3. The distribution of a special descriptive brochure to each subscriber.
4. Personal visitation of the individuals using each instrument.

Space will not permit of more than the enumeration of the first three items ; passing on to the last it should be mentioned that the explanation given is based on the relative subscribers' instruction card and is concluded by a practical demonstration. The delivery of the cards in this way (normally the supply devolves upon the Superintending Engineer) is perhaps a noteworthy point.

With regard to the second object of the visit, viz : the practical demonstration of actual calls to automatic equipment, the end was achieved without actually interfering with the Exchange plant—a consideration which has very great and obvious merits. The engineers provided and placed in the switchroom, a number of self-contained switching units which accept the dialling of pre-arranged numbers and actuate calling lamps corresponding to these numbers—the signals being answered at the unit by a telephonist who thus simulates in turn a subscriber, "Trunks," "Toll," "Enquiry," &c. Specific numbers give the respective tones.

Connexion to these units is effected over special circuits from the manual exchange. It may be remarked that, while this arrangement was comparatively simple in the case of Holborn, Bishopsgate with seven contributory exchanges presented the engineers with a harder problem ; solved by the provision of a Distribution position at which all the junctions from the contributory exchanges terminated and also the lines to the units.

Smooth demonstration has been found a great asset in impressing subscribers—it is needless to add that when defective it also has potentialities for depressing them : then the psychological effects may be serious.

To turn back to the initial considerations which arose when the field of action was surveyed—the chief point was the question of staff : good address and sound knowledge of telephone working were primary qualifications in the officers selected, and suitable men were obtained from the ranks of the night staff and supplemented by a number of telegraphists ; all of whom rendered good service. For Holborn the number of officers was estimated without the guidance of precedent, and incidentally it was gratifying to find that the basis of the forecast corresponded closely to experience, viz : an overall average of 55 visits per week per man. It will be seen that little more than half an hour (which included travelling time) was allotted for each average visit.

A special course of training in the Automatic System was arranged for the men and covered, with some modifications, the course of lectures and study adopted for the operating staff. A particular feature of the training included the description and inspection of all types of subscribers' apparatus, i.e. switchboards of standard types and simple extensions as denoted by the various plan numbers.

Preliminary to the visiting work, it was of course, necessary to create an organisation and to devise a system for controlling it. This fell functionally to the observation and Training Section (with Headquarters at Queen Victoria Street).

The system adopted was that of a card index, each subscribers name and address is shown (by the use of the addressograph) on a specially printed card, the reverse side of which consists of columns used by the visiting officer to record the various items dealt with on his visit. It was necessary to show the details of subscriber's installation, and for this purpose access was obtained to the Fault and Information Cards, by co-operation with the local engineers.

The completion of this task gave information of particular value for visiting purposes, viz : the ration of installations to lines and the actual constitution of the former. The figures for Holborn were illuminating—roughly 27% of the total installations being switchboards, 50% direct lines, and 23% "plan" extensions.

The visiting men were grouped in relation to an office staff of four telephonists. They were supplied with the cards for each day's visit, together with the relative subscriber's instructions cards, and on the following day the information entered by the visiting officer on each card was recorded and summarised.

The following types of summary were kept :—

Fault Schedules.
Lists of subscribers available for a test call after transfer.
Application for dialling tops.
" to visit Exchange.
Contract Matters.
Miscellaneous.

The Fault Schedules included discrepancies which arose from an inspection of the installation, definite faulty apparatus or defective demonstration, indicating the probability of faulty dials, &c.

The office work proved heavy—the quantity of subscribers instruction cards handled was naturally of considerable magnitude, and each card required the insertion of emergency numbers in addition to the subscriber's number—the despatch through the post of the brochures was also an item involving some labour.

It was naturally found that the visits led to many miscellaneous enquiries from subscribers, and it might be appreciated that special activity prevailed at Headquarters during the brief period when the men attended each morning for report.

At the conclusion of their training the visiting staff were given a detailed statement of all the points to be covered during the visit.

On the whole, subscribers gave the men an attentive hearing and assisted by assembling their staff for group instruction. Some subscribers had, of course, to be disabused of preconceived ideas of dialling and, for example, dissuaded from dialling the full name of the exchange, or gently reminded that City was spelt with a 'C" not an "S."

Subsequent visiting has confirmed the impression that accurate spelling is a definite factor—one P.B.X. telephonist's habit of constantly dialling " SID " for Sydenham, came to light after the opening of Holborn, as a result of a complaint that a number on this exchange had never been obtained without the assistance of " O."

For some reason the disclosure was accompanied with blushes. Confusion of another character, viz : " I " for " one " was early encountered, but Hampstead commencing with an " A," although intelligible as a phonetic lapse, was unexpected. The relegation of the " H " to a " dropped position " cannot fairly be claimed as one of the economics of automatics.

The switchboard cases presented special features. A large proportion of the smaller boards (principally of the cordless type) are not regularly staffed, and the habit of passing numbers from the extension points was, and is, prevalent under manual conditions.

It was soon found that subscribers were asking for additional dials at extension points, and the intermittent use of the night switching keys, cutting off calling signals at the board, had, of course, the potentiality for trouble. A point that needs emphasising to subscribers with cordless boards, is the fact that the control of originated calls rests with the extension point. This " through clearing " feature, is in the future, to be standard for all types of switchboards, and this fact may be worth comment.

It will, of course, meet the situation that arises on cord boards, where through dialling from extension points is specially desired while the board is staffed—this practice is, of course, regarded as irregular from an operating point of view, but the facility is present and exercised under Manual conditions.

It cannot, of course, be hoped that one brief visit will achieve 100% efficiency in instruction and create the perfect subscriber, free from error in perpetuity : there are naturally two parties to instruction, and the subscribers view point must not be overlooked—he may have difficulty in retaining all the various points which we seek to impress upon him in advance : in some cases he may even discount the whole explanation until the actual situation arises to stimulate his interest. For example, one subscriber re-visited after the transfer complained that he was unable to use his instrument owing to the " dizzy noise " every time he lifted his receiver—he was found to refer to the dialling tone !

It is clear that a degree of education by experience must follow the initiation into automatic working, and service inspection provides a useful means towards the post-education of subscribers.

The visiting duties call for much tact and knowledge of human nature ; this was evident in the first days of service inspection in the Holborn area, when in the midst of criticism and qualified statements of the quality of service, a definite commendation was specially welcome. Two experiences are quoted to show that approval may be misleading and that grounds of complacency may vary. In one, the preliminary enquiry as to service made by the inspector to a subscriber's P.B.X. telephonist, elicited an emphatic " very satisfactory," the confident request for a test call to be passed, however, met with the disconcerting reply " Sorry both my lines have been out of order for two days." It was necessary to place oneself in the speaker's position (a comfortable one by the office fire) before his point of view could be appreciated.

In a second case a different standard of satisfaction prevailed—and it was approvingly stated that the entire absence of incoming calls had allowed the subscriber and his staff to proceed with Christmas orders without being harassed for delivery.

Another factor to which visiting officers have to adapt themselves, is the difference in type of subscribers. The variety has been increased considerably in connexion with Bishopsgate, where a very keen type of business man is met with : unfortunately, English does not everywhere prevail. The nature of the language difficulty was expressed by one of the visiting staff remarking after his first day that " his arms ached with talking."

The appearance of visiting officers armed with official attaché cases has also given rise to some misapprehension—not to say misgivings—and a case is known where one of the staff had to assure an individual that he was an officer of the Post Office, not of the Police.

These lighter incidents added interest and variety to a job which was arduous enough at times ; there is, however, no doubt, that the intensive campaign of subscribers' education contributed contributed also to the experience of those engaged therein.

In conclusion, the battles of Lincoln Inn Fields and Spitalfields are now over and all are looking forward confidently to the fresh fields to conquer in the regions of Sloane and Western.

RETIREMENT OF MR. W. A. MATTINSON.

A REPRESENTATIVE gathering assembled in the Deputation Room on Tuesday, May 8, to say " Goodbye " to Mr. W. A. Mattinson, late Assistant Accountant-General, at the close of his 42 years' service in the A.G.D., most of which time had been spent in the interests of the Telegraph and Telephone Services, especially the latter. Mr. Mattinson was an outstanding figure in the telephone section of the Accountant-General's Department for many years. He possessed unrivalled knowledge not only of telephone accounting but of the staff organization of the London Telephone Service and the Provincial offices. His acquaintance with National Telephone Company goes back to the Oxford Court days and his knowledge of the Company's organization and methods gained by many years spent on royalty audits was invaluable at the time of the transfer in 1912.

His subsequent work on Telephone Staff organization led to requests for his services on similar questions both in the Department and elsewhere.

Sir Henry Bunbury, in presiding, suggested that it was difficult to realise that the time had arrived for our friend's retirement as he neither looked, acted or felt like a man of 60 years. Sir Henry recounted some of the large economies which Mr. Mattinson's proposals had effected not only at Headquarters but also in other Departments. We are reminded that Mr. Mattinson's retirement would mean the removal of a familiar figure to many in the District Managers' Offices who have been accustomed to regard his decisions as the last word in accounting matters. Mr. Stirling, of the L.T.S., paid an eloquent testimony to the thorough way in which Mr. Mattinson had mastered all the details of telephone accounting and to the cordial relations which had existed between him and the staff of the L.T.S. Mr. Kelly spoke of 30 years' experience in the Telephone Audit Branch with Mr. Mattinson, referring to his quick perception, sound judgment and generous treatment of his colleagues ; while Mr. Briggs humorously explained how greatly the reputation of the Cashier's Branch had been enhanced by his action since that branch came under his oversight.

After the formal presentation of a B.S.A. Sporting Gun and some garden furniture, Mr. Mattinson expressed his thanks in a very characteristic, witty and entertaining speech which formed an appropriate finale to an eventful career. His many friends wish him long life, health and happiness in his country home.

THE LATE ALFRED ROSLING-BENNETT, M.I.E.E.

WE regret to record the death of Mr. A. R. Bennett who was well known to the pioneers in telephony in this country. He was General Manager and Chief Engineer to the National Telephone Company for Scotland and the North of England from 1883 to 1890. Subsequently he became General Manager to the Mutual & New Telephone Companies. Later he was Chief Engineer to several Municipalities which embarked in schemes for telephone service.

Mr. Bennett wrote several books and pamphlets on Telephony, Locomotive Engineering and cognate subjects, and read papers before the " British " and other learned Associations.

Mr. Bennett passed away on Thursday, May 24, at Matlock, where he had gone to recuperate after an attack of bronchitis.

AN AUTOMATIC UNDERGROUND CABLE LAYER.

By J. J. T.

A MACHINE, said to be the only one in existence, is now on the market which simultaneously

(1) digs a trench, generally about 18 inches wide and five and a half feet deep—depending upon the adjustment of the bucket ladder;

(2) lays the telegraph, telephone, or power cable in the trench;

(3) replaces the soil in the trench; and

(4) rolls and smoothes over the latter.

A full view of the complete equipment is shown in Fig. I, and the outstanding feature is that it can be operated by one

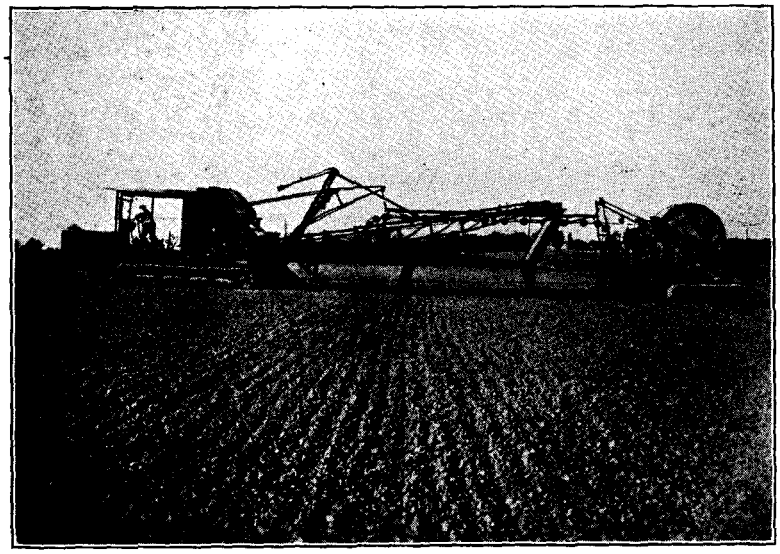

FIG. 1.

driver and three or four labourers. It can actually lay, up to 300 feet of cable per hour, performing the three other operations at the same time. The excavator, on "caterpillars," will be noted on the left of photograph, with a closer but back view in Fig. II of the same. In the latter are also shown the excavating buckets, and an adjustable cross conveyor which either heaps the excavated material alongside the trench or diverts it on to a belt conveyor which in that case passes the soil to an adjustable shute, Figs. II and III.

The truck which carries the reel of cable (seen at the rear in Fig. I, full view Fig. III) is fitted with three sets of "caterpillars," the rear caterpillars which carry the main load being fitted to the sides, while the third set is fitted centrally to the front of the truck. This set is pivoted on a vertical axle, and naturally controls the steering of the whole truck which has no separate drive being drawn by the excavator. The manipulation of the steering is done by means of a hand-wheel and worm-drive from the platform, as also seen in Fig. III.

The excavator itself is driven by a four-cylinder Diesel motor of 40/45-h.p., running on crude oil.

The writer was curious enough to make enquiries as to the limits of this ingenious time and labour saver as regards the nature of the soils that could or could not be dealt with.

FIG. 2.

In reply thereto the London agents, Messrs. Richter and Pickis, Industrial Engineers and Contractors to British and Overseas Governments, were good enough to supply a special report from the engineer of the Weserhuette A. G. Bad Oeynhausen i. W., Germany,

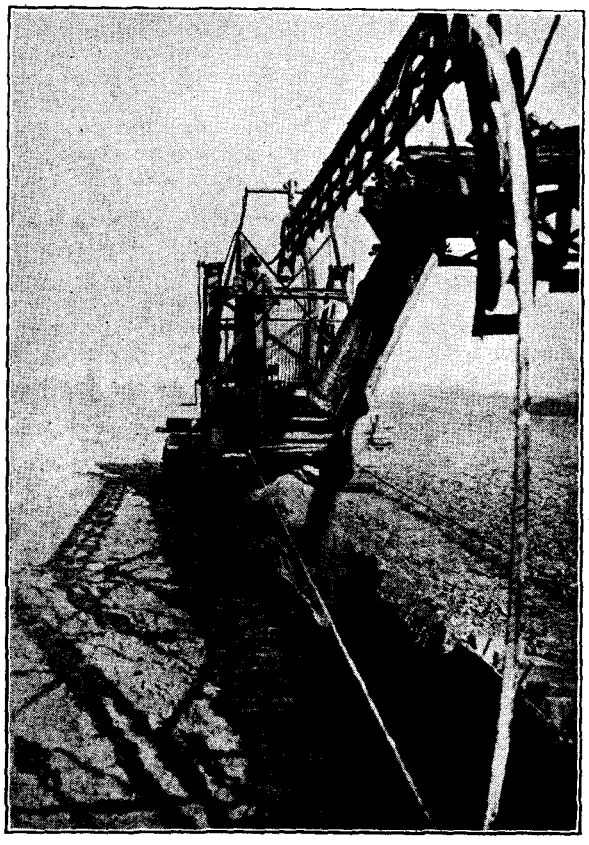

FIG. 3.

who stated that the same type of their excavator was actually working in Essex—where the soil is admittedly not difficult—but that successful tests had been made with stony soil, heavy clays, and clay and stone agglomerate, and that generally speaking all stony ground could be dealt with except where the sub-soil was actually solid rock.

The photographs were kindly supplied by the Messrs. Richter, and this brief description may prove of interest to those interested in the economics of underground cable laying in this and in other countries where electrical progress is forging ahead.

HEADQUARTERS.*

By R. C. Atkins ("Percy Flage").

Maeterlinck, as you know, wrote the "Life of the Bee," and since I read it I have often thought how refreshing it would be to read the "Life of Maeterlinck"—as written by the Bee. No doubt it would contain both honey and sting, but the Bee was apparently too busy to bother about Maeterlinck. Boswell wrote the "Life of Johnson," but Johnson did not feel impelled to return the compliment and write the "Life of Boswell." His omission leaves the world of letters poorer, but probably Boswell has reason to be grateful. But in each of these cases there was another course open—both Johnson and the Bee might have written their own life, but, with the modest indifference of the truly great, they did not. Had they done so, however, there were two possible ways in which they could have written of themselves. Johnson might have written of himself as Johnson saw him or as he thought Boswell saw him, and the Bee might have taken either the Bee's-eye-view of itself or that of Maeterlinck. So far as I can ascertain, Headquarters has not yet written "The Life of the Exchange Staff," nor has the Exchange Staff written "The Life of Headquarters," and neither has really written of itself. With these thoughts in mind, therefore, and sinking the modest indifference of the truly great, I have written of Headquarters. When I commenced my paper I did not know whether I should write from the Headquarter's point of view or from that of the Exchange Staff. It was even possible that I should write as an amused spectator, for with a contrariness which I feel is reprehensible, I have found humour in Headquarters. Many a man has been burned at the stake for less heresy.

Strictly speaking, of course, the Headquarters of the London Telephone Service is Cornwall House, Waterloo Road, but we of the Traffic Branch think rather of 32, St. Bride Street as Headquarters. There is a fundamental difference between them, for while Cornwall House is concerned in the main with the earthly business of collecting from the public, St. Bride Street, as representing the Traffic Branch, is concerned with the high and noble calling of *giving* to the public. Furthermore, and although I should not wish to say anything derogatory of Cornwall House, I find it a little difficult to conceive a love for a place to which I might be called up to-morrow on the carpet to meet my Waterloo.

Consider, too, how entirely appropriate is the name—St. Bride Street—to a service which is in the nature of a sisterhood. I am told that normally there is an annual loss in the telephonist force of about 10%—mainly, I believe, for marriage; and here, by the way, let me protest. This loss is called wastage! What a term, what a libel, what a shame! As if resignation for such a purpose could be called a waste. Marriage, then, and Bride. Why! how natural. And again Saint. The Bride is always a Saint—whatever she may have been previously, or may become afterwards. Furthermore, the building abuts on to Stonecutter Street—an obvious reference to the stones in the engagement ring. And finally, across the way is Shoe Lane—reminiscent of the old shoe which invariably figures at weddings as the emblem of good luck.

The building stands close to the site of a Plague Pit and in moments of desperation, when the patience of even a telephonist, let alone of a Job, is exhausted, one is tempted to wish that such pits were still available into which one could drop the most plaguy subscribers. Nearby is Ludgate Circus, which immediately gives rise to thoughts of King Lud—not "The King Lud"† of which, as ladies, you will have no knowledge, but the historical King Lud. According to some he is a Mrs. Harris—there "wasn't no sich person."

The St. Bride Street building has no beauty of itself, but it is Headquarters—the seat of the mighty. I don't know how you regard Headquarters. Perhaps you may think of it as the abiding place of "They who must be obeyed"—persons equally mysterious as Rider Haggard's creation but most decidedly without her comeliness of face and figure. And in this you would be right. Or you may think of it as a laboratory where scientists are engaged in fitting human souls into mathematical formulae. Possibly you think of it, without hate, as a geological museum full of fossils. In this I judge it expedient to be discreet rather than valiant. Maybe you regard it as a meeting place of interfering busybodies and in the literal sense you would be right—for they *do* interfere, they *are* busy and, at least, they *all* have bodies. Whatever your view is of Headquarters, however, it must appear remote and aloof: situated, perhaps, "Far from the madding crowd" or "Under the greenwood tree" and doubtless as obscure as "Jude" and just as incomprehensible. Certainly omnipotent, but fortunately not omnipresent. As a place it may seem cold and unresponsive. As a collection of individuals it may arouse some interest, for it may be that they are human and someone may love them—though, of course, the latter will only enter your head as a wild imagining ending in a laugh.

Let us, then, explore it and view the exhibits. Just as there are four quarters in any whole so there are four floors in the Headquarters building. Of the ground floor I will only speak in passing, and with some degree of apology. In truth it is not part of the Traffic Branch. It is devoted to the craft of the Contract Branch. In one part they lay in wait for the souls of men and persuade them to have telephones. In the other part—the Development Section—there dwell prophets and seers—young men who see visions and old men who dream dreams—they who say that 5, 10 and 15 years hence the green fields of suburbia will sprout telephones. I fear they dabble in the Black Arts and Magic and have familiar spirits. Even their signatures are like the signs of the Zodiac. In moments of abandon I have ventured into their territory thirsting for knowledge, but I have secured only a vivid description of my own character and a sure indication of my ultimate destination—5, 10 or 15 years hence.

Passing quickly to the first floor, we are safe in the precincts of the Traffic Branch, impressive with a cloistered calm so that we are impelled to speak in whispers. Here we are on the threshold both of the Traffic Branch and of a great and glorious career for one step forward takes us into the domain of the Superintendent of Female Exchange Staff. Here let me deprecate the use of the word "female." It is a cold and callous word and quite unsuited to the grace and beauty of womankind—particularly of our womankind. To proceed, it is recognised, of course, that no business can ever be commenced in a Government Office unless first of all a form has been duly filled in, completed and signed. It is here that the "Young Visitor" encounters this solemn and peculiar rite. Then the aspirant proceeds for interview and she is weighed in the balance by kindly critics. Many essay to enter but few are chosen and you who are here may therefore regard yourselves as the cream which has risen to the top. It is here, too, that the "Young Visitor" is converted into that new species of state servant, the 36-hour telephonist. How it is done I do not know, but I suspect vivisection. To all intents and purposes, however, the 36-hour telephonist looks just like an ordinary mortal.

From thence we pass up the stairs to the second floor, into the very presence of the Assistant Controller of Traffic, for it is on this floor that his office is situated. From this room he directs the affairs of traffic, plotting its course on numerous charts and ruling over the community with a slide rule. If rumour speaks true, he entertains a warm regard for Christopher Columbus, because he discovered America. The modern grace in telephone practice is "For what we are about to receive—was originated in New York." Passing from the scene of supreme authority we encounter pathos, for we are in the Service Section. No one ever utters a word of encouragement to the Service Section. No one ever says to it: "Your telephone service is the finest in the world and we positively enjoy using the telephone." Speaking metaphorically, it may be said that the Service Section is where the sins of the children are visited upon the fathers. All day long, every day, week in and week out, and year after year, the Service Section listens to complaints. My calendar says that grouse shooting begins in August, but for the Service Section grousing begins on Jan. 1 and it never stops. Their outlook on life is grey and is adequately summed up in T.I. No. 425, which states that letters of commendation should be filed with written complaints. Who can blame them for such cynicism? Think tenderly and sympathetically of them in their affliction.

Next in geographical order is the Establishment Section—a section full of loving kindness and tender mercy. Believe me or believe me not it is no uncommon thing to find the members of this section in tears, because they have found it necessary to reduce the staff of an exchange. This Section supplies vacancies, and they have a scheme in hand whereby all exchanges in future will be staffed entirely with Redundant Operating Hours. They occupy much time in putting triangles on straight lines and if you were to ask them why, they would tell you that the triangles represent the meal reliefs. It seems a curious convention to me. I have often heard of square meals, but never of triangular ones. The sadness and tears of these two sections are balanced by the wickedness of the next section—the Staff Section. This Section sets itself deliberately to encourage men to stop out late and to stay away from home all night. If this Section had unlimited powers, I should fear for the home life of England. No men would be at home at night and—what is infinitely worse for their wives—they would be at home all day. Nothing is calculated to disturb domestic harmony so much as to have a man pottering about at home during the day—so my wife tells

* A paper read before the London Telephonists' Society, March 16, 1928.
† A well-known tavern in Ludgate Circus.

me. The only redeeming feature about the Staff Section is that it deals with wages—your wages, not mine; I know them too well.

The third floor shelters the Sections which design manual and automatic exchanges and with them is associated the Statistical Section. Statistics are the life blood of the Traffic Branch and while there are some who ask for more statistics in order to avoid anaemia, there are others who favour the old-fashioned remedy of bleeding. The work of designing an automatic exchange is extremely complex and involves methods which are fearful and wonderful. The resulting exchange is wonderful and fearful. The automatic exchange is a triumph of human patience and ingenuity and the precision of its operation is uncanny. It is almost human—but only almost, and it is left to you to supply that personal touch which is so vital to the smooth working of any telephone system. That personal touch will become increasingly necessary as mechanical methods multiply. The automatic Design Sections are constantly meeting and solving new problems and imagination must run hand in hand with scientific exactitude. These Sections in the future will be staffed with bald heads and corrugated brows. The Sections dealing with Manual Working occupy the third floor back, and Jerome K. Jerome would have delighted in the characters to be found there. The staff is wholly male—spelt with a W and not an H. Once they had a lady clerk but tradition says that they smoked her out of existence. With the gradual increase of automatic exchanges they are looking forward, I understand, with pleasurable anticipation to the "Passing of the Third Floor Back." Briefly, it may be said, before leaving the third floor that their diet consists mainly of peg counts, calling rates and equating factors. As an occasional treat they have an All London Record for a dessert.

Now for the fourth floor, which, as being the top floor of the building, is nearest to Heaven. Here we find the Buildings Section. When we think of the countless millions of words which are passed over the telephone and of the several languages used we may well believe that the Section which is responsible for our exchange buildings must also have been responsible initially for the Tower of Babel. They supply furniture too—but not in the Drage Way—and their miscellaneous tasks are manifold and marvellous. They told me that during cold weather they are responsible for heating our offices and buildings, so you can see that they are a merry lot of fellows who enjoy a good joke. Last, but by no means least, we have the Dining Room, and even if you have not so far been persuaded that the staff at Headquarters is human you must now be convinced. It is a humbling thought that even the greatest amongst us shares the common necessity for feeding. You may differ from me when I say that Headquarters must eat to live, because you may see no very good reason why they should live. Whether reasonable or not, however, they have that curious desire to go on living and they do therefore feed. Though remarkable in many ways there is nothing extraordinary in the food they eat. It is just the commonplace food of the normal individual which shows again how wrong you would be if you thought of them as supermen and superwomen. One of the higher officials, indeed, has been known to eat bread and cheese, apparently with great relish, but an infinite number of the wildest subscribers should not make me reveal his identity nor divulge whether he had anything stronger than water to drink.

Before I conclude I feel that no account of Headquarters would be complete without a reference to the crane and the lift. The crane is not a bird but one of those instruments for raising things from the ground. I used to think that lifts were for the same purpose but experience of the Headquarters lift has dispelled that childish illusion. The crane is a survival of the day when the building was put to the grosser uses of commerce. Now it hangs silent and mournful, like a disengaged cab-horse and reminds one of Mr. Micawber. It could be used, of course, for suspending London's very worst subscriber by the neck as a warning to the others or it could be used similarly to create more room at the top of the seniority list, but I do not advocate its use for either purpose.

Much has already been said about the lift but nothing that could with propriety be included in this paper. I would not have you suppose that it never works. It must do that sometimes because the liftman gets his lunch from the dining room and whoever heard of a liftman walking upstairs. Neither could he fly, for although he is a very nice man he is no angel. But its periods of duty are rare, spasmodic and uncertain. Our statistical experts are now endeavouring to calculate what is the average number of lift journeys possible per officer per annum and how long it would take one man to make one journey from one floor to the next, for periods of 5, 10 and 15 years hence. The calculations, I understand, are being based upon the Theory of Improbabilities.

This, then, is or is not Headquarters, just as you prefer to regard it. On looking back through my paper, I wonder whether I have done justice to it either as a symbol or as an institution. It is not more of a joke than most of the other serious things of life and its staff are colleagues with you in the common cause of doing a certain job of work for the convenience of our neighbours. I am told that in some branches of the Service there is a very marked class conciousness between the different grades of staff.* I am glad to think that such horrible snobbery does not exist in the London Telephone Service. Half the trouble in the world arises because people do not understand each other and the other half arises when they begin to try. Happy the people who can understand without trying—and that it seems to me must be the basis of our relationship with each other.

* We think that *most* branches of the Service will protest with alacrity: "Not in our Branch!"—ED., *T. & T. Journal.*

BACK TO HANDWRITING AGAIN.

FROM "THE ECONOMIST," MAY 12.

THE announcement that the Post Office engineers are perfecting a system of telegraphing pictures or designs in facsimile raises many curious conjectures. Hitherto telegraphy has been essentially alphabetical. Whether in its form of printing telegraph or of symbolical telegraph (such as the Morse), it has been based upon the 26 letters of the alphabet, in Roman form, and the 10 digits. There have been some odd limitations against which telegraphy has always struggled. It has never been quite at ease with whole numbers and fractions, and special steps have had to be taken to distinguish between "eleven-thirty-seconds" and "one and one-thirtysecond." There have been discussions as to the allotment of symbols to accented letters, and nations have differed as to the most necessary of the marks of punctuation. There have been even greater tribulations. Certain modern kinds of telegraph apparatus, based on the precedent of the typewriter, and using permutations of five positive or negative signals, have been limited to thirty-two in all (without a shift key), so that Japan, with its much more inclusive alphabet, has not been able to use them. China is in even worse plight. Its pictorial method of writing called for the use of a dictionary at telegraph counters so that each picture was translated into a number—a device which China owes to Sir Robert Hart. Hence at the last International Telegraph Conference China appealed to be allowed to use the four figures of this dictionary to signify a word in those cases where the regulations insisted upon plain language and not code or cipher. The appeal was granted, but it brought into the foreground the fact that Eastern languages were at a disadvantage in the use of modern telegraphy. So that when a French inventor claimed as one of the advantages of his pictorial telegraphy that it would help the nations who had non-alphabetical languages he made a shrewd hit. Should the new system become general it will consign masses of regulations to the dust-heap, for the definition of what constitutes a word for purposes of telegraphy, and within what limits combinations of alphabetical letters should be allowed, has come to be an international problem.

But the new discovery seems to come at a strange moment. Throughout the telegraphic world the use of machines on the typewriter model is now in the ascendant. There are machines which can be used in multiplex with as many as eight machines on one route. There are adaptations of the same principle for use on lines which are less heavily loaded. In America the symbolical telegraph of the Morse pattern is used with a typing telegraphist. Oddly enough, as readers of the life of Samuel Morse will remember, he invented the Morse telegraph as a substitute for the Hughes printing telegraph, which was so restricted by patents that the telegraph company with which Morse was connected could not use it, and therefore had to seek another solution. If it had not been for the rivalry between these two telegraph companies probably printing telegraph of the Hughes pattern (as in Holland to-day) would have become general. But Morse set going a fierce conflict. England came down on the Morse side, with handwriting. France sought its own solution with the ingenious Baudot, the pioneer of the modern five-unit system. Wheatstone, in 1870, added to the attractions of Morse by his high-speed system, and a British inventor, Creed, turned this into a printing telegraph, while another British inventor, Donald Murray, brought the five-unit system with typing into its present position. Thus, we may say, the forces swayed. It seemed but yesterday that the print had won. Learned committees and business committees subscribed to the victory. Handwriting was at a discount. China must stick to its figure translation and Japan to such telegraphy as fits in with its alphabet. The typewriter having dominated the rest of the world, now dominated the telegraph world.

And then, it seems, someone finds out that there is an attraction in handwriting. There are instances, it is said, where the sight of certain handwriting makes the heart beat faster, in a way which would never apply to typing. Science discovers a method, at the opportune moment, whereby that which is put on paper can be reproduced by combined electrical and photo-chemical means. In fact, science has produced several methods. Let no one imagine that the apparatus will be put into the telegraph office in every village and hamlet and by-street. Rather it will be a sort of refined and superior telegraph to be used on selected routes. At the outset it is to be used on one favoured route only. There will need to be some sort of censorship, for, desire it who may, it will not be permissible to telegraph an ugly Valentine. It will not be the case that, provided you pay the appropriate rate per square inch, you can transmit anything you like. There will be, for the purposes of the new telegraphy, pictures which are proper and pictures which are improper. Yet it will bring telegraphy something nearer to the human touch. We have allowed our secretaries and our telegraphists to interpose between us. Our communications have borne the sad evidences of being machine-made. Such a very human note as the difficulty of spelling a word like "receive" altogether vanishes at the touch of a skilled typist. The new telegraphy, under the guise of telegraphing pictures or designs or writing in facsimile, will reveal us as we really are. Our misspellings will lie naked and unashamed before our correspondents. No more shall we be asked to "write legibly," for, obviously, that was for behoof of the telegraphist. We shall write humanly and warm the heart of the recipient, even if sometimes we raise his ire at the difficulty of interpretation. When all is said and done, progress has its own circles; and telegraphy, which comes back to handwriting—and to our own handwriting—is not the least significant instance. For, after all, it *is* telegraphy!

PROGRESS OF THE TELEPHONE SYSTEM.

THE following gives a brief review of the growth in the telephone system during the past financial year.

The total number of stations working in the Post Office system at Mar. 31, 1928, was 1,631,191, the net addition in stations being 122,405, the highest increase on record. This increase, together with the net addition for the years 1923-24 to 1926-27 gives a total net addition during the last 5 years of nearly 600,000 stations, the increase year by year being as follows:—

Year	1923-24	...	...	109,459
,,	1924-25	...	...	115,308
,,	1925-26	...	...	116,353
,,	1926-27	...	...	118,633
,,	1927-28	...	...	122,405
				582,158 = 55%.

The following table shows the growth for the year in London, England and Wales (excluding London), Scotland and Northern Ireland:—

TOTAL NUMBER OF STATIONS.

	At Mar. 31, 1927.	*At Mar.* 31, 1928.	*Increase.*	*Increase* %.
London	532,066	578,322	46,256	8.7
England & Wales (excluding London) ...	817,356	883,435	66,079	8.1
Scotland	140,013	148,934	8,921	6.4
Northern Ireland ...	19,351	20,500	1,149	5.9

Residence rate installations at Mar. 31, 1928 numbered 133,220 in London and 211,906 in the Provinces, the total 345,126 representing an increase of 42,065 or 13.9% for the year. The net increase in business exchange installations for the same period was 30,089 or 5.2%. Residence subscribers at Mar. 31 last represented 36.1% of the total exchange subscribers as compared with 25.2% at July 1, 1922, when the lower tariff for residence lines was introduced.

The number of Public Call Offices working at Mar. 31, 1928 was 24,054, of which 5,224 were in London and 18,830 in the Provinces. The net addition for the year was 2,120 (9.7%) a higher number than recorded any previous year. Kiosk Call Offices have contributed largely to this increased development, and the net addition during the year of 1,636 kiosks (making 4,687 in all), represents an increase of 54% on the March, 1927, total. Kiosks in the London area have increased during the year from 465 to 887 (91%) and in the Provinces from 2,586 to 3,800 (47%).

During the year ended March last, 111 new exchanges were opened under the Rural Development Scheme of 1922, bringing the total number of exchanges opened under the scheme up to 1,141.

The number of rural party line stations at Mar. 31, 1928, was 10,215, an increase of 175 for the year.

A considerable amount of progress was made during the past year in connecting railway stations in rural areas with the public telephone system, largely as the result of the arrangements agreed upon with certain of the railway companies in regard to the provision of call office circuits. At Mar. 31 last 890 railway stations in rural areas were connected with the telephone exchange system, or 145 more than at the end of the previous March. In 683 cases circuits have been provided for the railway company on rental terms and in the remaining 207 cases, Call Office circuits have been provided.

The number of effective calls originated during the year 1927-28 is estimated at 1,173 millions, or 72 millions more than the total for the year 1926-27. This total represents a 6.5% increase for the year and compares with an 8.2% increase in direct exchange lines, which at Mar. 31, 1928, numbered 1,041,543.

At the time of going to press, complete results for the year 1927-28 in respect of trunk calls were not available, but the number of inland trunk calls for the year is estimated to have been 102,350,000, an increase of 7,689,000 or 8% on the previous year's total. The number of outgoing international calls for the year was approximately 340,000, and the number of incoming international calls approximately 361,000, representing increases of 20% and 15% respectively over the figures for the year 1926-27.

Further progress was made during the month of April with the development of the local exchange system. New exchanges opened included the following:—

PROVINCES—Keighley (automatic), Macclesfield (automatic), Seaford.

and among the more important exchanges extended were:—

LONDON—New Cross.

PROVINCES—Acocks Green (Birmingham), Bilston, Camberley, Dorchester, Falmouth, Harrogate (automatic), Heaton Moor, Hitchin, Maidenhead, Oldham, Peterborough, West Bromwich, Weymouth, Windsor.

During the month the following additions to the main underground system were completed and brought into use:—

Aberdare—Junction Aberdare cable,

while 75 new overhead trunk circuits were completed, and 86 additional circuits were provided by means of spare wires in underground cables.

TELEGRAPHIC MEMORABILIA.

ARGENTINA.—*The Times Engineering Supplement* of May 5 gave some very interesting facts and figures regarding the markets for wireless apparatus in Latin America. Referring to Argentina their correspondent says: "Argentina is served by 20 transmitting stations, which operate under the general control of the Government, although private individuals may be the actual owners. Estimates give the number of radio receiving sets in Argentina as 145,000, the bulk of which are concentrated in the Buenos Aires district. While crystal-set users are in the majority, multi-valve sets have recently had a fair market—notably the three-valve model.

"There are signs that the more advanced type of receiving set is gradually obtaining a bigger sale, and the business in components for home construction is good. The competition of the United States is strong in Argentina, especially in complete sets, and both France and Germany have invaded the market, the German competition being especially strong in head-receivers.

In general there are no adverse climatic conditions and good reception can be had from Buenos Aires at the towns and townships scattered throughout the country. As might be expected, the seasonal character of radio business is as marked as in Great Britain, summer being slack and winter the peak period."

Considering the various South American States as markets, it is apparent that only four have developed broadcasting to any appreciable extent—Argentina, Brazil, Chile and Uruguay—and in all four the United States is well established, being supported by effective propaganda. However, British radio goods are always favourably regarded as quality products, especially in Argentina, and given competitive prices, supported by adequate sales literature, should be able to hold their own. Apart from the United States, Germany and France appear to be the most formidable competitors.

AUSTRALIA.—It is reported, says the *Electrical Review*, that over half the broadcast radio-telephone receiving licences issued in Australia are held in Victoria. It is estimated that approximately 300,000 licences are current throughout the country, the revenue from which must be at least £360,000 per year.

The Postmaster-General recently explained in the House of Representatives that the Government was anxious that all States should have the same facilities. In a short while it would be possible to relay one programme to the whole of the listeners in Australia, by which means alone people "outback" would receive a good service. The redistribution of "A"-class stations was necessary: one of these stations broadcasting on two wavelengths at the same time would cater for the same listeners on the same wavelengths as at present; on the second, and lower, wavelength it would serve a relay station, which would in turn supply listeners within its radius. Relay stations should be established by the companies, and close co-operation between them was the only way in which the whole of Australia could be well served. The Government would retain its control, and would govern the whole position. Therefore, no monopoly could possibly occur.

The Postmaster-General has been influenced by complaints of the unsatisfactory nature of many receiving sets sold in Australia, to suggest to the broadcasting companies and other controllers of wireless activities that they should establish a committee, whose task would be to test circuits, approve designs for sets, and grant the right to use a hall-mark, which in time would come to be regarded as a guarantee of excellence.

Australian papers state that the Deputy-Director of the P.M.G.'s Department has given them to understand that the research staff of the Post Office Department is investigating a scheme to establish a three-channel wireless service between Victoria and Tasmania. If possible, one channel will be used for telephone communication, and the other two for telegraph service.

The Sydney *Morning Herald* adds that the scheme is likely to cost about £50,000.

On April 19 Reuter's Agency reported from Melbourne that the *Argus* there had stated that: "The failure of the attempts to overcome 'fading' on the Canada-Australia beam service is regarded very seriously.

"The fading has been so serious that the contractors have found it impossible to submit stations for tests. Although it is expected that there will ultimately be an improvement, it is felt that major alterations to the beam stations may be necessary before a reliable service can be assured."

The London *Daily Telegraph*, commenting on this message at the time, added: "The phemonenon of fading is still something of a mystery to wireless experts, we are informed. Only two of the London beam services—those to Montreal and to Melbourne—are affected by it to any extent, and the immunity of the Indian and South African beams is believed to be due to the fact that they operate in a direction approximately parallel to the axis of the magnetic Pole. The Australian beam is subject to an average fading of three hours a day, round about 11 o'clock in the mornings, though the time varies according to the seasons.

Apart from the attraction of the magnetic Pole for "horizontal" beams, fading is believed to be caused by metallic areas, and by the attraction of large steel-constructed buildings. Experiments are being made to overcome the difficulty."

The Melbourne station (3LO) was granted a special licence to conduct a world broadcast on May 6 on a wavelength of 32 metres; the programme starting at 9.45 a.m., Melbourne time, and continuing at intervals until 5.45 p.m. In view of the success of recent world broadcasts, Amalgamated Wireless of Australasia, Ltd., has decided to provide a new powerful short-wave broadcasting station, probably at Sydney, to continue the service.

[From reports received from several reliable quarters reception was on that occasion below medium quality in this country.—ED., *T. & T. Jnl.*]

The Postmaster-General's report for the year ended June 30, 1927, indicates that the losses resulting from the working of the telephone and telegraph branches of his Department amounted to £339,000 and £278,000 respectively. According to the Melbourne *Argus*, a reduction representing £20,806 in the volume of telegram traffic is considered to be due in a great measure to the broadcasting of sporting results by wireless, although in Queensland the drought conditions prevailing throughout the year also affected the business considerably. An actual improvement of £38,761 in the telephone branch was converted into an apparent loss by the transfer from the telegraph branch of the responsibility of certain trunk lines used for both telephone and telegraph traffic.

According to the Australian correspondent of the *Daily Telegraph*, the cable and wireless telegraph traffic between Australia and the United Kingdom from April, 1927, to January, 1928, covering nine months after the "beam" system was started, totalled 11,740,000 words, of which the "beam's" share was 5,723,000, that of the Pacific cable 2,672,000, and of the Eastern Telegraph Company 3,345,000. The cables thus have the advantage of 294,000 words. The "beam's" percentage was 49 over all, but the traffic varied as follows in proportion in the different classes: full rate 29, deferred 40, Government 19, Press 42, deferred Press 62, week-end 63, daily letter 65. The cables thus retain the greater proportion of the more profitable commercial traffic.

AUSTRIA.—By the time this reaches our readers the new 60-kw. Rosenhügel station should be ready. *World Radio* considers that steady work will now be a feature of this station. Its wavelength is 517.2 metres and the new station has been skilfully erected without disturbing the former plant, which, it is understood, will be removed to Graz.

Negotiations are proceeding between Ravag, the Austrian broadcasting authority, and the Fultograph Company for the regular transmission of pictures during the radio year beginning in the autumn, Ravag is satisfied of the capacity of the Fultograph, says *World Radio*, but wishes to retain the utmost freedom as regards tests with other systems, at is own discretion.

BELGIUM.—A curious situation has arisen in Belgium, according to the London press, in connexion with certain long-distance wireless communications and the bi-lingual difficulties of that country.

Because Belgians are divided into two clans, Flemings and Walloons, each of which insists on its right to employ its own language, Flemish and French, the Government wireless stations dealing with long-distance commercial traffic, mainly with America, may have to close down temporarily, says the *Daily Mail*. The transmitting post is at Ruysselede, near Ghent, and the receiving station at Liederkerke, near Brussels. These villages are both in Flanders and according to the provisions of the Language Law, the wireless operators employed there must be able to speak Flemish. At the last Government examinations no Fleming was successful in obtaining his radio-telegraphist's certificate, so it was proposed to fill the vacant posts with qualified non-Flemish-speaking Walloons; but the administration could not agree because such a course would infringe the terms of the law. The director of the wireless service has therefore had to reply that the only alternative is to close the stations until Flemish specialists are available.

CANADA.—Reuter's Ottawa agency reports that it was announced in the House of Commons on April 12 that in view of the increasing complications caused by independent broadcasting the Government was considering the question of adopting national broadcasting along the lines which are in force in Great Britain.

The *Electrical Review* learns that: "Two Toronto stations will not be heard again, the Radio Branch, Department of Marine and Fisheries, having informed CJYC and its "phantom" CKCX that their licences would not be renewed during 1928-29. CJYC, the Universal Radio Company, leased its time to CKCX, the International Bible Students' Association, whose programmes were objected to by listeners, thus causing the Department to cancel all their licences from coast to coast. Their stations in Edmonton, Saskatoon, and Burnaby, B.C., will not be 'on the air' this year, unless political action is taken in their favour, says *World Radio*, which explains that the cancellation resulted in a general re-allocation of wavelengths. CFCA, the pioneer station of the Dominion, remains on its original wavelength of 356.9 metres; CNRT and CKOW, two 'phantoms,' will use station CFCA; CKCL and CKNC will occupy the 516.9-metre band, sharing time, and CHIC, a phantom of CKNC, will also be found on that wavelength; CKGW, the recently-opened 5-kw. station, will share time with CFRB on 312.3 metres. Toronto was added to the eastern chain of stations operated by the Radio Department of the Canadian National Railways on May 1, so that the chain now includes CNRQ, CNRM, CNRO and CNRT—Quebec, Montreal, Ottawa and Toronto respectively.

CHINA.—*Phototelegraphy.*—Because of the lack of symbols in telegraphy corresponding with Chinese characters, it has hitherto been necessary to code messages into figures for transmission and to decode them at the receiving end. However, now that a service of picture telegraphy (the Bélin system) is in use between Peking and Mukden, according to *World Radio*, addressees receive phototelegrams of the original messages. If anywhere in the world this system of telegraphy should come as the greatest of boons, surely it is in China.

FRANCE.—A kind of dictaphone, which, adjusted to an ordinary telephone receiver set, will record phonographically any desired conversation and reproduce it faithfully afterwards, at will, is being issued to French telephone subscribers through the Ministry of Posts and Telegraphs.

The apparatus, says the London *Daily News*, is simple in design and inexpensive and can be installed without affecting the ordinary use of the telephone. It is expected to prove serviceable to business men wishing to preserve records of important calls.

The Paris correspondent of the *Daily Telegraph*, towards the close of last month, reported that a new world's record in wireless telephony had been established by Lieutenant Jouy, of the technical branch of the Air Department, who, in order to test a new system of radio equipment for aeroplanes, made a tour of France, flying from Paris to Dijon, Lyons and Strasbourg and back to Paris without for one moment losing touch with the land stations.

Before this test the record for communication by wireless telephony between an aeroplane and a land station stood at 125 miles, but he has proved that it is possible over a distance of about 250 miles. At any time during the flight the pilot could have been given his exact position by a land station.

La Interligilo de l'P.T.T., edited in France in Esperanto, terminating with its April number has been presenting its readers with a *résumé*, in this well-known artificial language, of Lt.-Col. W. T. Brain's lecture on the London Postal Service given before the London T. and T. Society and published, it will be recalled, in Nos. 147-149 of this journal—last year. This comes as a special compliment from an international organisation representing the postal, telegraph and telephone services of so many different countries.

GERMANY.—Reuter's Coblenz Agency reports that steamboats passing up and down the river Rhine, either for commerce or pleasure, have hitherto been precluded from the use of wireless while passing through Occupied Territory. This prohibition has now been partially removed, and permission to own and operate receiving sets has been accorded ; owners must, of course, comply with the German Government regulations governing the use of wireless apparatus.

In Germany there are 248,198 fewer subscribers to the broadcasting service than in England, the respective totals at the end of March, 1928, being 2,482,930 in England and 2,234,732 in Germany ; Germany's increase since March, 1927, was 599,004.

The completion of the relay station at Flensburg will increase the number of broadcasting stations in Germany to a total of 25.

The German Cable Works Co., Berlin, which for the first time for 25 years is unable to pay any dividend, states that the hopes entertained when the capital was doubled to 10,000,000 marks, were not justified. The net profit was 30,000 marks, as compared with 381,000 marks in 1926. The unsatisfactory results are attributed to unforeseen expenses in connexion with an order for 222 km. of long-distance cable with Pupin coils. In the export market conditions were very difficult owing to keen international competition.

GREAT BRITAIN.—*Parliamentary Queries.*—On April 24 Mr. Day asked what would be the individual cost of the three wireless "beacons" which were being erected at the Caskets, Lundy and Start ; when was it expected that they would be in operation ; and whether it was proposed to erect any further wireless beacons around the coast.

Sir P. Cunliffe-Lister said he was informed by the Trinity House that the estimated cost of the wireless beacons at the Caskets and Lundy would be about £4,000 each, and at Start about £3,500, and that the signals at the Caskets and Start would be in operation in about four months, and that at Lundy in about six months from the present time. Sanction had been given to the erection during the current financial year of further beacons at South Bishop, Dungeness and Cromer in England and Wales, and at Sule Skerry and Kinnaird Head in Scotland, and it was expected that sanction would shortly be given to two others in Ireland.

On April 19 Sir W. Mitchell-Thomson informed Sir Charles Wilson that he had received no application from the British Broadcasting Corporation for permission to proceed with the erection of a regional station in the North.

On April 24 Mr. Day asked the President of the Board of Trade whether any decision had been arrived at by his Department, in conjunction with the Air Ministry and Trinity House, with reference to the question of establishing an experimental station for the purpose of investigations into the wireless loop direction-finding system.

Sir P. Cunliffe-Lister said that the question was still under consideration, but he hoped that a decision would be reached on it very shortly.

On April 30 Mr. Day asked whether the preliminary trials of the rotating loop direction-finding system investigated by the Department of Scientific and Industrial Research had proved satisfactory ; whether it had been decided by the Board of Trade, in conjunction with the Air Ministry and Trinity House, to establish an experimental station of that type ; and, if so, where that station would be established.

Mr. H. G. Williams said that as the result of the preliminary trials of the rotating loop system (a report on which, he understood, would be published shortly by the Department of Scientific and Industrial Research), it was proposed to erect an experimental station at Orfordness for air and marine navigation which could be tried under service conditions. The arrangements were not yet completed.

On May 1 Mr. Baldwin, the Prime Minister, informed Mr. W. Baker that no report had yet been submitted by the Wireless and Cable Conference. It was not, therefore, possible for him to say anything with regard to its publication. No offer had been made direct to the Government with regard to the purchase of the whole means of Imperial telegraphic communication. He understood that certain suggestions in this connexion had been laid before the Conference, and were still under consideration by that body.

On May 2 Mr. W. Baker asked the Postmaster-General whether he was aware that complaints of interference by morse from the new station at Portishead were being made in that area ; whether his engineers had conducted experiments in the endeavour to eliminate the nuisance ; whether he was aware that the adoption of the British Broadcasting Corporation's suggestion that a coupled circuit should be used had failed to give satisfactory results ; and whether he would give the matter attention so that a remedy might be found.

Lord Wolmer, Assistant Postmaster-General, said that complaints of interference with broadcast reception by transmissions from the wireless station at Portishead had been investigated by Post Office engineers, and it had been found in many cases that the use of a loosely coupled receiving circuit had practically eliminated the trouble. The use of a frame aerial was also of material assistance in this respect. It was difficult to avoid some interference with broadcast reception in the vicinity of a wireless station ; but the Post Office engineers would continue their investigations with a view to assisting listeners to adapt their apparatus so as to eliminate interference from the Portishead station.

A day or two before these pages went to the printer the following questions and answers were also exchanged between the Prime Minister and certain members of the House of Commons :—

> Replying to Mr. W. J. Baker, Mr. Baldwin said it was not possible to forecast when the report of the Imperial Conference on Cable and Wireless Services would be available. He understood that the deliberations of the Conference would not be concluded for some time, but as soon as he was able to do so he would make a statement.
>
> Mr. Snowden asked for an assurance that nothing definite would be done until the report of the Conference had been published.
>
> Mr. Baldwin : I require notice of that.
>
> Mr. Snowden : In view of the importance of the matter and the public interest taken in it, will the Prime Minister afford an opportunity for debate ?
>
> Mr. Baldwin : As soon as we get the report we will have a debate. I have always been prepared to afford opportunities for a debate, but until the report is received it will be very difficult to debate the matter.

During the second week of last month the B.B.C. experimented with a new tuning signal from 2LO as a prelude to the time signal of six "pips." The new note (the chord of C major) was produced by tuning forks and sounded continuously, "having the effect," reports one scientific weekly, "of a steamship's siren."

In the latter verdict we may be permitted to differ from that particular scientific opinion. From the writer's experience of ships' sirens, the B.B.C. note was quite sweetly musical, if somewhat unsteady at moments.

The *Daily Telegraph* publishes the following interesting suggestions put forward by Mr. H. A. Hankey, Overseas Secretary of the Wireless League, regarding the financing of Empire broadcasting. Mr. Hankey has returned from visits to South Africa and Australia.

"In Australia it was proposed to him by competent broadcasting authorities that the capital and part of the income required should be raised by an addition of 6*d.* to the Australian licence fee. Mr. Hankey suggests that a central station should be erected at Canberra, and the revenue augmented by various Imperial organisations having the use of the service for propaganda purposes daily.

"In Great Britain he advocates an addition of threepence to the receiving licence fee, which would be sufficient to provide a station. The programmes, he proposes, might be provided free by the British Broadcasting Corporation, and the revenue supplemented by the means suggested for Australia. It will be recalled that the existing Empire station at Chelmsford, 5SW, is purely experimental, and the British Broadcasting Corporation has not undertaken to maintain it indefinitely. In South Africa, where there are relatively few listeners, the cost of an Empire station would have to be borne by the Government.

"A permanent Empire broadcasting service will have to be on a reciprocal basis. That is to say that Australia will supply Britain with programmes in return for those broadcast from Britain to Australia."

Although in the Australian news, above, it was recorded in London that on May 6 the special transmission of the Melbourne 3LO was not heard any too distinctly on that date, on Sunday, April 22 the following account is vouched for by the *Daily News*, when highly successful reception was obtained.

"Several people," says our informant, "sitting in a saloon car fitted as a wireless receiving station in Lincoln's Inn Fields on Sunday night heard Melbourne City clock striking six o'clock Monday morning, just after the London clocks had chimed nine (British summer time).

"The experiment was carried out by the Australian Press Association, assisted by Mr. C. G. Allen, of Belvedere, Kent. A six-valve supersonic receiver was placed in the car, with an aerial of about 8 ft. of copper trolley wire used by electric trams rigged to the top of the car. The earth wire was connected to a grease nipple on the motor-car frame.

"Mendelssohn's 'Spring Song' and Handel's 'Largo' were heard at full loudspeaker strength, with little or no atmospheric interference, and the news announcements came through perfectly."

The Postmaster-General has sanctioned the erection of the first of the new high-power twin-wavelength stations contemplated by the British Broadcasting Corporation in its regional scheme. The new station will be in the north of London. Work will begin shortly on its construction, and it is anticipated that the station will be opened for service within from twelve to fifteen months' time. It may be added, says the *Electrical Review*, that tests have been carried out on a site on high ground between Potters Bar and Hatfield, near to Kentishlane Farm, Woodhall.

Battery Eliminators.—The extended and extending use of battery eliminators for use with wireless apparatus is causing both private and public electricity corporations some disturbance of mind. The electrical engineer of the Bangor Corporation has reported that several electricity consumers are using h.t. eliminators for wireless purposes connected to their domestic mains and the Bangor Council have decided "not to approve of the connexion of h.t. eliminators to electricity consumers' installations unless they conform to the electrical engineer's requirements in certain technical matters, and *unless the consumer using them gives a written undertaking that the Corporation will not be called upon to change d.c. types for a.c. types when the system is changed over.*"

The italicised clause, of course, refers to the coming co-ordinating electrical distributing scheme for this country, now in progress.

Upon other and more serious grounds, especially to the radio licensee, was the report of the engineer of the West Hartlepool Town Council, who said that "during a recent survey of electrical apparatus on consumers' premises he found certain designs of direct-current radio battery eliminators, 'the use of which was fraught with great danger' in the case of the employment of headphones. In his opinion the attention of the public ought to be drawn to the risk which it was running by the use of those eliminators.

The Chairman of the Committee took up the position that there were satisfactory eliminators which were perfectly safe, but the very cheap varieties used waxed paper for insulation and in other ways were not adequately protected. The Corporation had power to refuse to connect unsafe apparatus, and when it changed over its distribution system from d.c. to a.c. it would not replace, or pay compensation for, apparatus which should never have been used on the mains.

All that appears to be necessary to add to any who may be interested in utilising this means of obtaining the necessary power for wireless apparatus in the home, is that "low-priced articles are seldom really cheap" and "a word to the wise is sufficient."

Clacton-on-Sea is now to be added to the towns where the Radio Exchange system is being adopted for the distribution of wireless broadcast programmes. It is known as the Clacton-on-Sea Broadcast Relay Service, and from a central receiving station there stretches to houses all over the district a single wire, and from morn till midnight there is a programme available, and all for 1*s.* 6*d.* a week and a Post Office licence of 10*s.* a year.

The service operates under Marconi licence and conforms to the local bylaws where the wire to a house has to cross a road. Two expert engineers are being paid £500 a year each to maintain the service.

The difficulties of wireless reception, apparently unforeseen, which were at first experienced at the London Air Port, Croydon, in connexion with the new control tower in the enlarged aerodrome at Waddon where it was impossible to receive, although the transmission direction presented no difficulties, was found to be due, says Major C. C. Turner, the Aviation correspondent of the *Daily Telegraph*, to "the immense quantity of iron wire embedded in the ferro-concrete" producing at best 'unsafe' reception. It is now stated that, "after searching tests, in which aeroplanes flew round and round the vicinity, the amount of error in all circumstances was defined, and arrangements made to overcome the difficulty. The Air Ministry is satisfied that the installation is now working accurately and that information can instantly be given to aircraft."

According to the *Electrician*, at an informal meeting of the Institution of Electrical Engineers on April 16 Mr. M. Whitgift in the Chair, Mr. E. H. Shaughnessy opened a discussion on "Wireless Reception," and dealt with this subject from an unfamiliar aspect. "He spoke," says our contemporary, "from the point of view of a telegraph engineer in opposition to that of the broadcasting man and he asked for more consideration for the important and essential telegraph and telephone services from a spoilt public indulging in more or less musical and other broadcast entertainment. He frankly declared for spark transmission in preference to the interrupted continuous wave, and complained of the monopoly, by broadcasting, of the ether which has become so crowded on the long-wave system, that the G.P.O. have had to put their stations 200 cycles apart.

Mr. Shaughnessy also said the first effort in wireless reception was to try to eliminate noises, but the most highly selective apparatus yet produced seemed to diminish the quality of reception."

The National Radio Exhibition for 1928, organised by the Radio Manufacturers' Association, will again be held at Olympia, London. The date of the Exhibition is fixed from Saturday, Sept. 22 to 29, and will be closed on Sunday.

"The selling of apparatus to the public," states the *Electrician*, "will again be allowed, though, as in previous years, the actual demonstration of receivers or loudspeakers is confined to areas outside a quarter-of-a-mile radius of Olympia, London, where the exhibition will be held."

Interesting Items to Read.—"Radio Signal Fading," paper read before the Wireless Section of the I.E.E. by Prof. E. V. Appleton, F.R.S.

"Photo Electric Cells," by Dr. J. A. Fleming, F.R.S., in May issue of *Television*.

"Modern Atlantic Cable Operation," by Commander Rollo Appleyard, R.N.V.R., M.I.C.E., M.I.E.E., in the *Electrical Review*, No. 2631, April 27, 1928.

HOLLAND.—The *Electrical Review* informs us that the times of transmission of the 30-metre Dutch station (PCJJ) of Messrs. Philips Lamps, Ltd., have been modified. Until further notice it will operate on Tuesdays and Thursdays from 16.00 to 20.00; on Fridays from 23.00 to 02.00 (Saturday); and on Saturdays from 15.00 to 18.00 G.M.T.

We have also been informed that because of interference the wavelength of P.C.J.J. has been changed from 30.2 metres to 31.4 metres until further notice.

HUNGARY.—The opening of the Budapest Radio Spring Trade Fair on April 28 was chosen as the date of inaugurating the new 60-kw. station, the special identification signal of which is a chime. It is run by a private company, but is controlled in close association with the official Press Bureau.

The British Government's Commercial Secretary at Budapest informs the Department of Overseas Trade that the development of wireless in Hungary proceeded during 1927, although not very rapidly. The new station (which commenced operation on April 29) is expected to result in a considerable increase in the use of crystal receivers. At present about half the sets in use in Budapest are crystal receivers, whilst the remainder and practically all sets in use in the provinces are of the valve type. At the end of 1927 the number of receivers used in the country districts was 38,004 and in all towns 45,310, representing 54.5 sets per 10,000 inhabitants in country districts and 287.8 sets per 10,000 inhabitants in towns, the highest figures being for Budapest (40,408 instruments, 435.6 sets per 10,000 inhabitants.

IRISH FREE STATE.—In Dail Eireann on April 25 the Minister for Finance stated in his Budget statement that at the present time the maintenance of the telegraph service involved a substantial annual loss, and there was no prospect of its becoming self-supporting. On the contrary, as telephony came into more general use, telegraphy would decline. To a certain extent falling traffic would make possible reductions of staff, but on the whole the tendency would be for the difference between income and expenditure to widen. The service must be retained, and the only way of reducing the deficit, and preventing the burden on the Exchequer from growing, was by increasing the tariff. They proposed to raise the minimum rate for ordinary telegrams to 1*s.* 6*d.* each, but even then each message sent would still involve a contribution of about 6*d.* for the Exchequer. The loss to the Post Office at present, after allowance was made for services rendered by it to the other Government Departments, was about £400,000 per annum. A great proportion of the telegrams handed in were of a sporting nature, and not such as could very strongly claim a contribution from the ordinary taxpayer towards the cost of their transmission, and the increase proposed was not likely to affect appreciably the course of business in the country. It would produce £66,000 this year and £70,000 in a full year.

ISLE OF MAN.—There was a mysterious interruption of the Isle of Man cable with the mainland recently and the British Post Office engineers subsequently ascertained that a picnic party had accidently built a camp fire on the cable at the Isle of Man end of the line.

The cable had been exposed by the recent heavy tides, and was actually burned through to the core.

LAPLAND.—The extent to which long-distance telephone speech is now-a-days being extended and the one-time "insuperable" difficulties which are now overcome in connexion with wire telephone circuits, cannot be better exampled, perhaps, than by the opening of the Geneva-Kiruna, Upper Lapland (Sweden) telephone circuit on April 28, 100 miles north of the Arctic Circle. The new circuit, states the *Electrical Review*, consists of 2,530 miles of double wire, includes 1,125 miles of underground cable between Geneva and the Baltic coast at Stralsund, 100 miles of submarine cable between Stralsund and Malmö, and 1,305 miles of overhead wire between Malmö and Kiruna.

NEW ZEALAND.—The number of licensed listeners is now 40,000, compared with 21,000 at the end of June, 1927. The Broadcasting Co. is receiving at the rate of £55,000 a year.

A number of Auckland citizens have united to erect a 1-kw. station for the use of persons or societies having matter of general interest to the public to broadcast. The organisation is known as the Te Pono Radio Association, and, according to *World Radio*, it will be a non-dividend-paying concern run for the benefit of the community. The Government has granted permission for the erection of the station, and the Association announces that a large proportion of the capital is available.

NICARAGUA.—Reuter's Trade Service, Managua, reports that the President of Nicaragua has approved of a contract between the Government and the Tropical Radiotelegraph Co. (a subsidiary of the United Fruit Co., of Boston) for a regular radio-telegraph service between the interior of the Republic and the Department of Bluefields, which contains the principal port of entry on the Atlantic coast, and through which 75% of the import and export trade passes. A large transmitting station has been erected

by the Company, which has also built similar stations in several Central American countries and the West Indies.

The Company will shortly erect at San José, Costa Rica, another station to broadcast official, commercial, scientific, meteorological and other news, is the further information received from the same agency, but from their San José branch. When this station has been completed the Company will have spent nearly £800,000 on its radio building programme, including the installation of valve transmitters for both telegraphy and telephony purposes on all the ships of the United Fruit Co., enabling passengers to talk from their cabins with the shore at any time during the voyage.

POLAND.—It is stated, both by the financial and technical press in London, that the decision of Marconi's Wireless Telegraph Co., Ltd., to begin the manufacture of wireless apparatus of all types in Poland is due partly to the difficulty experienced by the Marconi works at Chelmsford in coping with the flow of orders from all parts of the world, and partly to enable the country to develop trading operations in Eastern Europe. The orders received during the first three months of 1928 for execution at the Chelmsford works exceeded the orders received during the same period of 1927 by 20%.

SOUTH AFRICA.—It is reported from Johannesburg that part of the plant for the erection of a new station has arrived in accordance with the plan formed when the African Broadcasting Corporation took over the present station. The new set will feed 15 kw. into the aerial and provide much better broadcasting for the Rand, Pretoria and the rural district. The present JB set will probably be removed to Bloemfontein.

SPAIN.—Work has recently been commenced near Madrid on the erection of a new wireless-telegraph station, which the Sociedad Argentina is establishing to provide a direct service between Spain and the South American Republics. The station is being designed for the simultaneous transmission of one telephone and two telegraph messages.

SWEDEN.—In a report by Mr. H. Kershaw, O.B.E., Commercial Secretary, at Stockholm, to the Department of Overseas Trade, among other interesting matters the following reference is made to the radio industry : "The business in radio apparatus is said to be satisfactory. The tendency to purchase parts has given place to the buying of complete sets, and there has also been a change-over from crystal to valve receivers. Most of the sets are of Swedish manufacture, but a great deal of German apparatus is imported. There is a tendency towards an increased demand for high-quality goods. British manufacturers are urged to study the Swedish market more closely and to give the greatest consideration to the reports of representatives who have visited the country."

SWITZERLAND.—The proposal to erect a radio-telegraph station for the League of Nations at Geneva, at an estimated cost of £50,000, with annual working expenses of £8,000, is to be considered by the Council and the Assembly of the League in September next. The committee believes that at least 1,200,000 words would be distributed annually from the station. The yearly receipts during the first few years are estimated at between £4,000 and £5,000.

U.S.A.—We have seen wireless sets associated with motor-cars as a source of enjoyment, well out in the country, by the wayside, but *The Times Engineering Supplement* correspondent in New York gives it as a fact that the increasing competition among motor-car companies has necessitated the introduction of new devices of salesmanship. One of the schemes which has brought hundreds of people into motor-car salesrooms is the installation of receiving sets to give the detailed reports of a big prize-fight or a much-advertised broadcasting of a dramatic or musical programme !

The Central News New York correspondent considers that it is unlikely that the American public will be overburdened with public speeches by wireless during the Presidential elections this year.

Forty-five shillings per second is the estimated cost of broadcasting a political speech *throughout* the United States of America. Minimum time of broadcast, one hour. Minimum charge, £8,000 !

On the 14th ult., according to the Exchange Telegraph Company, in the House of Representatives the American Telegraph and Telephone Co., and also the Mackay system, appeared before the Federal Radio Commission and asked for additional short-wave facilities. They outlined plans for important extensions of radio telegraph and telephone communications from the United States to Europe, South America and the Far East.

Mr. Frank B. Jewett, Vice-President of the American Telegraph & Telephone Co., asked for three more channels to Europe to take the increased radio telephone business, and also asked for one channel to South America. He explained that the company proposed to open a radio-telephone service to Argentina, from which, through land wire connexions, such service could be extended to other South American countries.

Mr. Charles E. Hughes, junior counsel for the Mackay system, told the commission that the Mackay Company plans to open a radio telegraph service from Paloalto (California) to Honolulu, Guam, the Philippines, China, Japan, Australia, Dutch East Indies and Indo-China. The first link between Paloalto and Manila is expected to be in operation by the first of the present month.

He added that the Mackay Company had acquired control of the Sayville (Long Island) wireless station, and he asked for frequencies which would permit a radio service to England, France, Holland, Spain, Portugal, Egypt, the Republic of Georgia, Colombia and Venezuela.

Representatives of the radio corporations of America told the commission that they proposed to open wireless telegraph circuits to Liberia, Cuba, Chile and Brazil, and also contemplated the establishment of a service to Japan, China, South Africa, Spain, Russia, Czechoslovakia, Switzerland, Syria, Australia and New Zealand.

Many of us have generally associated the photo-electric cell solely with the development of television systems, and undoubtedly it plays, and must continue to play, a fundamental part in that science. The Bell Telephone Laboratories, however, in their investigations into the behaviour of the magnetic materials which play so important a part in the telephone and its development, had occasion to measure the minute changes in length which occur in magnetisation, and were compelled to invent some new device which would enable them to indicate the most minute changes in length. Such an apparatus, to measure lineal changes as small as 0.000000001 inch, has actually been constructed by utilising the property of a photo-electric cell, which, as we know, gives off a current proportional to the light falling upon it.

The income account of the Western Union Telegraph Co. for the year ended Dec. 31 last, records gross operating revenues of $131,771,003 and a net income, including $2,689,814 dividends and interest, of $18,614,784. After deducting $3,584,331 bond interest, a balance of $15,030,453 is carried to surplus account. That account shows a surplus brought forward of $71,404,042, and the addition of the balance on income account (after adjustments) makes $86,509,368. Dividends absorbed $7,980,786, leaving a surplus at the end of the year of $78,528,582. The report mentions that substantial reductions were made in the rates between the United States and South American points and in Press rates between New York and Great Britain. It is considered that the development of radio communication has actually been of advantage to the cable systems, and cables are stated to be still the better method of communication. A decline of 2% in operating revenues was more than compensated for by a decrease of 2½% in the working expenses.

The gross revenue for the first quarter of the *current* year was $32,066,325 (against $32,065,195 for January-March, 1927). The total expenses rose from $27,926,636 to $28,273,920, and the net income was reduced from $3,241.093 to $2,893,254.

Personal and other items.—"Automatic Telephony Simplified," by C. W. Brown, which first appeared in the *T. & T. Journal* as a series of articles on automatic telephony, can now be obtained for the price of 6*s.* from Messrs. Pitman & Sons, Ltd., London. Perhaps those Continental correspondents who so kindly enquired regarding the possibility of obtaining a bound copy of the articles will note and communicate direct with the publishers as above.

Mr. John Gardner, the inventor of a typewriter, the first back-pedalling brake for a bicycle, and what concerns these columns more specially, the first wireless-control automobile torpedo, passed away at Bolton-le-Sands, Lancs, last month, at the age of 65 years.

One has also to record with great regret the death of the veteran Capt. Lewis Hoad, at Gibraltar, on April 15, aged 74 years. He was in command of the Telegraph Construction & Maintenance Co.'s cableship "Telconia." He joined the company as second officer of the s.s. "Calabria" in 1896, subsequently being appointed master of the "Seine" in 1904, the "Colonia" in 1905 and the "Telconia" in 1909. It is interesting to note that, at the time of Capt. Hoad's birth, less than 500 miles of submarine telegraph cable had been laid (the first cable having been laid from Dover to Calais in 1850, only four years before his birth). At the time of his death no less than 340,000 miles had been laid by the company in whose employ he was.

Towards the end of the last month I took advantage of an eighteen months' old invitation and visited the works of Messrs. Creed & Co., at Croydon, where, needless to say, I was immediately conscious of that atmosphere of kindly feeling with which the Creed brothers seem always to be surrounded. Of the visit itself, possibly more anon, but I found the elder brother sternly endeavouring to cope with the correspondence arrears of four months' absence, due to a business visit to India, plus the superintendence of the nuptials of his youngest daughter.

The relations between the Telegraph Department and the A.G.D. have always been of a most cordial nature and it is to such individuals as Mr. F. Strong, whose promotion is noted with intense pleasure by all who have had direct contact on the International Cables and Wireless side with that hard-working individual, that much of that goodwill is due. One is sure that no invidious interpretation will be placed upon these remarks, but who could refrain from expressing one's admiration for, perhaps, the only accountant who, when engaged on an official visit to a foreign country, was met at the railway station and escorted by a brass band to his hotel !

The best wishes follow an old colleague in the person of Mr. T. G. Beavis, Supt. Higher Grade, C.T.O., into retirement, though he was "*Staff*" Superintendent may he not need one upon which to lean for many a long day !

The Universities and Business Life.—Nothing will ever take the place of the placid opportunities that the life of a university affords ; to be most truly distinguished, the individual must have room for all-round growth ; an untimely rush into buying and selling blunts the finer susceptibilities, and dulls the due appreciation of the nice balance that must ever exist between the rights and the duties of every human being. If it is objected that we have written of ideals when the immediate problem is the recovery of industry, we will answer that where there is no vision, the people perish.—The *Electrical Review*.

J. J. T.

Where Strowger Automatic Leadership Begins—

The Transmitter Tests

In the transmitter testing device shown below, two transmitters are mounted on the two standards, and comparative tests are made upon them.

BY means of the transmitter comparison device illustrated, the performance characteristics of transmitters may be studied. Comparison by the sense of hearing alone is supplemented by the readings of the delicate measuring instruments, giving the investigator a clear indication of the operative qualities of the transmitter being tested. By its use, an engineer can make a detailed study which yields a better understanding of the transmitter and contributes largely to the consistency of performance of factory-made apparatus.

This is but one of the many precision devices by means of which the Research and Development Department of Automatic Electric Inc. carries on its work of testing, perfecting and developing Strowger Automatic telephone equipment. The high esteem in which this apparatus is held by telephone engineers in every part of the world is the result of many years of effort on the part of this highly skilled technical staff, whose aim has always been to give the telephone subscriber a more convenient, more rapid and accurate service at the lowest possible cost.

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STROWGER AUTOMATIC

The
Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising Committee - - - J. STUART JONES. W. D. SHARP. J. F. STIRLING. W. A. VALENTINE. J. W. WISSENDEN.

Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. XIV. JUNE, 1928. No. 159.

BEYOND THE PILLARS OF HERCULES.

AFTER many rumours and premature announcements in the Press, telephone service between this country and Spain was actually opened on May 24. This marks an extension of the Anglo-Continental service in a new direction, Spain being the first so-called Latin country outside France to obtain a regular public service with this country. Recent extensions have reached the Baltic and the Arctic circle, they have followed the Danube from Ratisbon to Vienna, and from Vienna to Buda Pest, and the Elbe from Saxony into Bohemia; but they have not crossed the Alps nor had they until last month reached the other side of the Pyrenees.

The service is afforded by means of a through circuit between London and Madrid without intermediate switching. It is carried by underground and underseas cables to Paris, and thence in the form of a carrier wave circuit on the French overhead route to the Spanish border, whence the newly constructed routes of the National Telephone Company of Spain carry it to Madrid. Our readers are aware, from the article which we recently published of the modern exchange systems and extensive trunk line networks which have been provided by that Company in Spain. These networks embrace circuits to Portugal and to Ceuta on the African shore of the Straits of Gibraltar, and it is probable that communication between this country and Spanish Northern Africa as well as Portugal and Gibraltar will be realised in the near future. Indeed, as we go to press we learn that services to Lisbon and Gibraltar will be inaugurated early in June.

There is an undoubted fascination in watching the gradual spread of the overseas telephone services from country to country. Indeed, our ambitions are no longer bounded by Europe but now extend to new continents. By the aid of the radio-link we already obtain speech with Vancouver and San Francisco on the Pacific Coast, and when we have a regular service to Ceuta, we shall have only Asia to conquer of the four continents into which the world was divided in the old geography books. In another column we make reference to a call made from London, via Amsterdam and a short-wave circuit, to Java 7,000 miles away, and though this was effected by special arrangement and does not portend the early provision of a public service between this country and Asia, it seems to point the way to the means by which the first regular communication with that continent will be obtained.

HIC ET UBIQUE.

WE offer our congratulations to Lieut.-Col. A. G. Lee, O.B.E., M.C., whose portrait, with a short biographical sketch, appeared in our last issue, on his appointment to the post of Assistant Engineer-in-Chief in place of Mr. J. Sinnott, O.B.E., retired.

The annual report of the American Telephone & Telegraph Company shows that the company's system developed as follows during 1927 :—

	No. of Telephones.	*Increase.*
Bell Companies (Manual) ...	11,175,886	334,756
„ „ (Dial) ...	2,550,170	575,048
Bell-Connecting Companies	4,639,430	—118,570
Total telephones ...	18,365,486	791,234

The number of exchanges, 6,115, shows an increase of 117. The miles of exchange-line wire total 49,279,379, and the miles of toll (i.e. trunk) wire 7,543,516. The number of companies connecting with the associated companies of the A. T. & T. Co. is 8,892.

We have received a copy of the balance sheet and statistics of the Guernsey States Telephone Department. Their telephone stations increased during 1927 by 189, to the total of 4,054, and their total subscribers' calls to 2,504,007. Their gross revenue was £18,578 and their net profit £796.

On May 16 the Anglo-Danish Telephone Service was extended to all places in Denmark. On the 24th of the same month a service was opened between Great Britain and Spain, which will probably be extended to Portugal and Gibraltar early in June.

The charge for a 3-minutes' day call between London and Madrid is 14*s.* 3*d.*, between London and Barcelona or Bilbao 12*s.*

A telephone call was successfully put through from London to Java, 7,000 miles distant, on May 10, when Mr. Ormsby-Gore, Under-Secretary for the Colonies, who is in Java, spoke from Bandoeng to the Colonial Secretary in his room at the House of Commons and to his wife, Lady Beatrice Ormsby-Gore. The Anglo-Dutch telephone circuits were employed between London and Amsterdam, whence communication was continued to Java by short-wave wireless.

The conversion of the Budapest Telephone Service to automatic working began in April, according to the *Manchester Guardian*, when 2,500 subscribers were to obtain automatic connexion. By the end of June, 25,000 telephones will have been adapted to automatic working, and the change-over of the whole of the Budapest service, it is said, will be completed in the next year or two.

According to a story from New York, retailed by the *Glasgow Herald*, apparently the telephone-user in the United States suffers from much the same grievances as in this country. The story illustrates both the trials which beset the long-distance caller and the inter-urban amenities with which we in this country are not unfamiliar. A Chicago merchant, after putting through a business deal in New York tried to get his office on the telephone, and was promised that the call would go through at once. After the first half-hour he ventured to express the hope that communication would be established without much more delay, but after the second half-hour he more or less angrily expostulated with the operator. Argument developed, in the course of which the merchant scathingly expressed his strong conviction that in his home town, Chicago, a call could be put through quicker to H——l. "Yes," came the ready answer, "but that's within city limits."

As from April 29 the Transatlantic Telephone Service has been open from 11.30 a.m. to 2 a.m. (British Summer Time) —extending the former hours of service by 2 hours.

"The language of many telephone subscribers," says the *Sunday Pictorial*, "is quite uncalled for," says an official. So are many of the numbers.

This, we may add, is the first "wrong number" joke possessing any claim to wit which we have seen.

We learn from the Australian Postmaster-General's report that the service between Melbourne and Sydney has become so popular that it is proposed to replace the present three-channel system, which permits of the transmission of five messages, telegraphic and verbal, simultaneously, to a system which will enable eight simultaneous conversations to be carried on. These facilities will probably be in operation before the end of the year. Two additional channels will shortly be provided between Sydney and Brisbane, and the line between Melbourne and Adelaide has recently been reconstructed. When all the improved facilities are in operation it is anticipated that satisfactory conversation will be possible over a distance of 3,000 miles between Adelaide and Cairns. Investigations are proceeding for the linking of Adelaide and Perth by a direct trunk-line, and progress is being made in North Queensland.

CIVIL SERVICE DRAMATIC SOCIETY.

A PROGRAMME of social events is being arranged during the forthcoming season in order to stimulate a great intimacy between members of the Society and the Civil Service generally.

These events will take the form of dinners, dances and lectures on dramatic art, and it is further hoped to institute a series of one-act plays, with the object of providing an opportunity for members of the Society to take part who are not cast for parts in the main production at the New Scala Theatre and to give trials to those whose talent might otherwise remain unexposed.

The Annual General Meeting of the Society will be held on June 11 next, at 5.30 p.m., in the Rehearsal Room, Ministry of Pensions, Sanctuary Buildings, S.W.1. All Civil Servants are cordially invited to attend.

Further particulars may be obtained on application to the Honorary Secretary, Mr. Percy W. Nash, 9, Palmers Road, East Sheen, S.W.14.

STAFF MEETINGS AND THEIR BEARING ON THE SERVICE.

BY A. E. COOMBS, GLASGOW.

IN the Autumn of 1924 it occurred to some of the officers attached to the Liverpool Traffic Branch that it might be a good thing for the service, and the staff, if a series of meetings could be held for the purpose of discussing operating problems, traffic and service instructions, and kindred matters, directly or indirectly, bearing on the efficiency of the telephone service.

It was felt that meetings such as these would :—

(*a*) tend to stimulate interest, particularly as to the basic principles underlying the supervision and manipulation of telephone traffic ;

(*b*) arouse personal as well as collective and official interest, and

(*c*) develop a wider and better understanding between supervising and supervised regarding the fundamentals of telephone administration, as expressed in the everyday operation of calls.

In the telephone service, as in everything else, to stand still, or to be self satisfied, is at once to progress backwards, therefore, efficient though our service was we were under no delusion as to its defects, nor as to where there was room for improvement. Particularly was this so in regard to the elimination of the waste effort represented by ineffective calls.

There was the further interesting point that, reading between the lines of some of the comments and criticisms which came under notice, the real purport of many official instructions seemed to have been missed, while in others the regulations concerned were being applied in mechanical manner, correctly perhaps in the letter, but not so in the spirit.

It was clear also that the need for accuracy in small matters was not always appreciated. Other reasons could be tabulated, but these would all boil down to the main thought that we should endeavour to make our service more efficient by a clear appreciation of why it should be so, rather than because it was a routine performance of a daily duty.

It remained, therefore, to interpret the idea in terms of action.

After due consideration we decided to hold the meetings between 9.30 a.m. and 12.30 p.m. and 2.0 and 4.30 p.m., Mondays to Fridays, subject to service exigencies, availability of staff, and other possible day-to-day disturbances.

It was further decided to begin the meetings as soon as the Summer Leave terminated. Winter Leave begins in November and, as a rule, the average number of officers then absent is not so high as during the Summer period. Normally, the additional force temporarily available is utilised for exchange records and clerical work—to bring these up-to-date—and, in the big Cities, to meet Christmas pressure, which generally begins in November, so far as telephone traffic is concerned.

Arrangements were made accordingly, and, by close co-ordination and the goodwill of all concerned, it was found possible to work out a margin of staff for the meetings without detriment to other essential duties. The number of staff available varied from day to day, and even during the day, but on the whole, our experience indicates that the period covered by November and early December is the best and probably the only time during which such a scheme as this can be carried out. Annual Leave arrangements are now standardised and vacancies occurring during the Winter Leave period are not normally filled until the approach of the following Summer period. The force available for special requirements is therefore a diminishing quantity from October to the following March.

After further consideration and again subject to availability of staff, the number of officers to attend each meeting was fixed at approximately ten Telephonists, one Sectional Supervisor, one or two Traffic Officers and, whenever they deemed it necessary and could get away, the Officers-in-Charge of the bigger exchanges, or the Divisional Supervisors. The meetings were also open to representatives of the staff, if they desired to attend.

It was not without a certain feeling of anxiety that we assembled for our first meeting, but this had not been in progress many minutes before we knew that our fears, whatever these may have been, were groundless, for we at once settled to the business in hand and kept on constructional and happy conversational lines throughout.

A simple explanatory opening was followed by the use of official charts to illustrate the varying standards of service efficiency achieved in the district over a number of years, while the factors contributing to improvement or deterioration were outlined. Statistics, as such, were avoided so far as that was possible, but the figures were translated into chart form so that their bearing on the service was apparent at a glance, and would probably be retained in the memory in a more practical and recognisable form than figures or percentages.

One of the greatest mistakes we make is to remember and talk about that which is wrong or displeasing, and to forget the other side. The general proceedings and the talks were therefore on informal lines. "Lecturing" was taboo. "Scolding" was avoided like the plague. The bright spots of

the service were discussed as well as those not so bright. Where appreciation was deserved it was given without reserve or qualification, and, where helpful suggestion or constructive criticism seemed necessary, this was given in similar manner.

The foregoing procedure was observed throughout the series of meetings, and resulted in a delightful and helpful atmosphere, a correct perspective, and a body of listeners ready and willing to appreciate, assimilate, and apply all we had to tell them.

When the official spokesman had finished suggestions and comments were invited on any matter that, in the opinion of the staff, was worth bringing forward for exploration as a possible means of improving the service, or the removal of what the staff considered was a hindrance to the attainment of maximum efficiency.

If evidence were needed as to the atmosphere referred to above, the response to this invitation would supply it. There was a little diffidence at first for, like ourselves, the staff probably wondered what was going to happen, but after the first step had been taken there were no more fears. Questions, criticisms, and suggestions were readily forthcoming, a particularly gratifying feature being an evident desire on the part of the staff to acquire further information regarding their work. The effect of this was apparent in the constructive character of the criticisms and the originality and reasonableness of some of the suggestions put forward. Naturally, there was duplication, but nothing like so much as expected.

On no occasion did a meeting lag in interest, rather the contrary in fact. The duration averaged 75 minutes. Altogether we held 39 meetings with a total and average attendance of 545 and 14 respectively, and we were all convinced that, if followed up in the proper spirit, much good would result.

In the Autumn of 1926 a similar scheme was tried in the Glasgow District and met with such success that it was repeated in 1927.

My remarks in respect of the Liverpool meetings apply with equal force to Glasgow. From the outset an atmosphere of goodwill and helpfulness was apparent, once again criticism and suggestion were on constructive lines, and we found the time allotted to the meetings all too short, on many occasions, to permit of every point being explored just as thoroughly as desired.

I am sure no further comment on this aspect of the case will be necessary when I say that no less than 750 questions and suggestions were put forward by the staff. These have been attended to, or are receiving attention. Over the two sessions we held 105 meetings with a total and average attendance of 1,692 and 16 respectively. The normal duration of each meeting was 90 minutes.

The experience gained at Liverpool was of much help in inaugurating the scheme at Glasgow. Arrangements that resulted in a waste of time were eliminated and the method of recording and tabulating the minutes was changed for the better. In 1927 still further improvements were effected, particularly in the sense of advancing the discussions; more ground was covered and, generally, the talks reached a higher level, due—it is thought—to the assimilation and application of the information given at the 1926 meetings. The fact that this was possible was very encouraging.

An interesting point in connexion with the Glasgow arrangements was that:—

(*a*) Representatives of the Accounts and Contract Sections were invited to, and did, attend some of the meetings and,

(*b*) Every available telephonist in the district attended at least one meeting at each of the 1926 and 1927 sessions.

The staff attached to the other branches in the Telephone Section were thus enabled to see the service from a different angle, while the officers attached to the outlying exchange staffs were afforded an opportunity of meeting with each other and with the staffs of the larger exchanges with whom they had worked for many years but whom they knew only as "Central" and so on. The opportunity was taken on these occasions moreover to show the visitors round one or more of the City exchanges, a proceeding in itself sufficient to justify their coming to "Town." The Travelling Supervisor "mothered" them and went to considerable trouble on their behalf, which it was quite evident was appreciated to the full.

It has been possible in Glasgow also to gauge the effect of the meetings; from some points of view. It is not practicable to submit figures directly connecting the scheme with service efficiency, but there is clear evidence of an appreciation in the general standard. There is also good reason for believing that each Glasgow telephonist, particularly in the City area, is handling more effective (Revenue earning) calls than ever before, due undoubtedly to a better understanding of general operating requirements, a personal appreciation of what really constitutes efficient service, and, shall I say, a more human appreciation and kindlier spirit of tolerance between supervising and supervised.

So far as the minutes were concerned, these were kept, at Liverpool, by members of the Traffic Office Clerical Staff who had been telephonists. At Glasgow they were kept by telephonists. I cannot pass this point without paying tribute to the excellence of the work at each office. It is not an easy matter, particularly to officers inexperienced in such things, to keep a faithful record of happenings at meetings packed with interesting and diverse topics, but the splendid way in which the officers concerned carried out this duty gave great pleasure and satisfaction to everyone directly connected with the working of the scheme.

When the meetings were over the minutes for each exchange were summarised and set out on a schedule in the form of question and answer, which was duly circulated to the exchanges, accompanied by an invitation to all concerned to study, and particularly to bring to notice anything that may have been overlooked.

I cannot do better perhaps than subjoin a few typical extracts from:—

(1) The Minute Books.

(2) The Schedules in respect of some of the Glasgow exchanges.

(1)

Mr. . . . . stressed the advantages of clear enunciation. A voice with a smile in it was a great asset, particularly in the Telephone Service.

Miss . . . . suggested an improvement in the date stamp used for tickets

Miss . . . . considered that the testing of head sets was a waste of time.

Miss . . . . suggested that keyless ringing should be fitted at incoming O.W. positions.

Miss . . . . said that transmission in Glasgow was bad; this was much better in America (personal experience).

Mr. . . . . said that the training of P.B.X. Operators was receiving special attention.

Miss . . . . said that . . . . exchange was challenging calls unnecessarily and that this must be very irritating to the subscribers.

(2) December, 1927.

Glasgow Telephone District.

Staff Meetings, November-December, 1927. Questions, Answers and Comments relating to the . . . . . Exchange.

Question. No.	*Book No.*	*Page No.*	*Question.*	*Answer or Comment.*
3	1	70	Difficulty is being experienced in reading bottom rows of meters. Can the present arrangements be improved?	This has been referred to Headquarters.
1	3	170	Can another Junction be given to Central Exchange?	This is being provided.
14	1 & 2	34 120 123	Can the 3rd Bell & 5th Douglas Order wires be separated?	A re-arrangement of the "B" positions is in hand which it is hoped will settle this matter too.
40	1	35	Can more Junctions be provided to the Western Exchange?	The Traffic records do not justify an increase at present.
1	3	133	Can subscribers and Sub Office Assistants be trained in the passing of Phonograms?	This is in hand to be dealt with as a general question.
16	3	149	Can the perforations of the telegrams pads be improved.	This will be attended to.

THE FINAL MEETINGS.

Another arrangement introduced at Glasgow consisted of a final meeting which was attended by representatives of the Exchange Supervising and Operating Staffs and of the Accounting, Contract and Traffic Branches, under the Chairmanship of the Postmaster-Surveyor, Lt.-Colonel F. N. Westbury. Progress reports were submitted and the work of the Sessions briefly summarised and commented upon. Colonel Westbury was unable to attend the 1927-28 meeting through unexpected, but fortunately only temporary, indisposition, and we were much indebted to Mr. D. S. Currie, our Assistant Postmaster for so ably taking the Chair at very short notice.

The following agenda will indicate the representative character of these final meetings. It would be difficult, I think, to combine, in one assembly, a body of officers more typical of the varying interests and sections that go to make up the organisation of a Provincial Telephone District, on its commercial side.

Telephones, Glasgow,
Feb. 23. 1928,

Meetings of Exchange Supervising and Operating Staffs, Glasgow District. November-December, 1927.

Arrangements for Final Meeting at the Central Exchange Retiring Room, 11 a.m., Monday, Feb. 27.

CHAIRMAN ... COL. F. N. WESTBURY, O.B.E.

Supported by—

Mr.	A. E. Coombs	District Manager.
„	E. J. Johnson	Traffic Supt.
„	F. Lucas	Contract Manager.
„	J. Law	Chief Clerk.
„	J. Thomson	Traffic Supt., Cl. II.
„	G. Lane	„ „ „

Messrs. W. Roan, D. Macdonald, J. M. Hamilton, G. Hunter, W. Palk, A. E. Higgins, E. Wilkins and J. J. O'Rourke, Assistant Traffic Supts.
Misses Cameron, Kay and Mortimer—Supervisors.
Misses Fleming and Houston, Officers-in-Charge, Bell & Western.
Mrs. W. Reid, Travelling Supervisor.
Miss A. L. Wood, Controlling Officers' Assocn. (Telephone Section).
Miss H. B. Mowat, U. P. W. (Telephone Section).
Miss Tennant (Minute Secretary).

And the following selected Telephonists :—

Misses	McMillan and Tindall	Central.
„	K. K. Mitchell and K. Park	Trunk.
„	M. A. Sinclair and E. N. McGregor	Douglas.
Miss	W. Handley	Western.
„	I. M. C. Cloud	Bell.
„	Convery	Bridgeton.
„	M. T. McLean	Paisley.
„	McPherson	Larger Suburban Exchanges.
„	Grierson	Small Exchanges.

Agenda :—

(*a*) Statements by the District Manager and Traffic Supt., also Misses Cameron, Kay, Mortimer and Mrs. Reid and Misses A. L. Wood and H. B. Mowat.
(*b*) Remarks, if required, by any other officer.
(*c*) The Chairman.

So far I have dealt principally with what has been done, but what is the conclusion of the whole matter ? Has it been worth while ?

If my experience counts for anything the answer is decidedly in the affirmative. One can sense a change in the atmosphere without being able to say precisely what has given rise to the feeling. Official tests will not provide the data on which analyses can be made. Traffic men who are interested in the service will know what I mean. A good service officer can tell almost immediately he enters an operating room whether or not the traffic is circulating smoothly, he doesn't need the confirmation of statistics.

After all, what is the final test of efficiency ? Loads ? No. Fitting of staff to requirements ? No. Correct valuation of calls ? No. Nicely written explanations of service complaints ? Heavens, No ! ! All these things, and others that need not be detailed, must play their part—and an essential part, too—in the administration and organisation of our service, but I submit that the supreme test is the quality of the service we are rendering to the public, interpreted in terms of effective calls.

How do these meetings help ? If they are conducted in the proper spirit and with the enthusiasm of the volunteer, rather than that of the conscript, they will result in improved co-operation, coupled with a clearer understanding by all concerned of view points other than their own. They also bear directly on and stimulate the spirit of goodwill, of which we hear so much in these days.

It is worse than useless to talk at people in an academic way regarding fractions of seconds and percentages of irregularities, for that sort of thing simply irritates without helping, but to indicate, as we have been trying to do, what these fractions mean when multiplied millions of times, and what a bad effect on the service minor but repeated irregularities will have, also to be ready with information on all phases of the service, is the proper way to remove hindrances to efficiency and thus to eliminate the waste due to faulty methods.

AN APPRECIATION.

I cannot conclude without expressing my thanks to all those who have helped in the arranging and working of these meetings.

As Traffic Supt., Liverpool, I received every official and personal encouragement from my late respected District Manager, Mr. E. J. Hidden, who was a great chief in every way but in none more than the way in which he was always ready to help, by word and deed, those of us who had the great good fortune to serve under him.

Then my immediate Traffic colleagues and the Officers in Charge of the bigger exchanges left no stone unturned to make the scheme a hundred per cent. effective.

I thank them one and all.

In my capacity as District Manager, Glasgow, I have been particularly favoured in having so helpful an official chief as Colonel Westbury, our Postmaster-Surveyor, who, from the first, has evinced great interest in the scheme and has translated this into terms of practical assistance and encouragement. The knowledge that such was the case has been of immense assistance to everyone associated with the Glasgow Telephone Branch.

In this case, as at Liverpool, the Traffic Staff and the Officers in Charge of the larger exchanges entered into the work with commendable zeal, for which I thank them.

There were difficulties of course in both the districts, these will arise in connexion with any new idea, but at Liverpool as at Glasgow, they were looked upon only as stepping stones to greater effort and, when we had finished what was really a strenuous time, we experienced the delightful feeling of having done something useful. If there is a better tonic than that I should like to hear about it.

Just a final thought, Mr. Editor. To those of your readers who may consider that the holding of meetings such as these is at least worth a trial, I submit the following "bovrilized" suggestions which may be applied, perhaps, to both sides of the table.

1. Be human.
2. Talk *to* not *at*.
3. Keep a sense of humour.
4. Smile, when the occasion demands, even if the laugh is on yourself.
5. Deal with the bad points of the service but don't forget the good.
6. Accept criticism in the spirit intended. If in doubt put the kindlier interpretation on it.
7. Deal with, and answer, every point raised, no matter how seemingly trivial.
8. Have the same confidence and belief in the good faith of those around you as you expect for yourself.
9. Encourage the staff to come forward *at any time* with suggestions that may bear on the efficiency of the service.

REVIEWS.

"*Intermediate Electricity and Magnetism.*" *By R. A. Houston, M.A., D.Sc., Lecturer in Natural Philosophy in the University of Glasgow.* (*Published by Longmans, Green & Co., Ltd. x + 170 pp. Price 4s. 6d.*)

As would be expected of one who is following in Lord Kelvin's footsteps, this little book is distinctly above the average for elementary textbooks of electricity and magnetism. It deals with every phase of the subject, from the fundamental facts of magnetism and electrostatics up to electrical discharge in gases, radio-activity, the constitution of the atom and electrical oscillations and waves. No knowledge of mathematics beyond the elements of algebra and the definitions of the trigonometrical ratios is assumed, but within these limits mathematical demonstrations are freely and rigidly employed. For instance, in dealing with the theory of the magnetometer the complete formulae are first deduced, and then the simplified formulae, obtained by neglecting the dimensions of the magnet under investigation, are given with the warning that for accurate results the simplified formulae cannot, in general, be employed.

Numerous exercises, with answers, are given, together with a collection of questions from recent papers set at London Matriculation and Intermediate B.Sc. examinations, and at the examinations for the Higher Certificates of the Oxford and Cambridge Schools Examination Board.

We are sure that any reader who conscientiously works through this book will have no difficulty in passing any of the examinations mentioned, while it can also be recommended to anyone who is not actually studying for any particular examination but who wishes to obtain a sound and up-to-date knowledge of the subject.

"Exponentials Made Easy." By M. E. J. Gheury de Bray. (Published by MacMillan & Co., Ltd. x + 253 pp. Price 4s. 6d.)

Many of our readers have no doubt been helped in their mathematical studies by the little volume entitled "Calculus Made Easy," by Silvanus Thompson.

The present book has been written in the same popular style, and is a most interesting and readable introduction to a portion of higher mathematics which is usually considered somewhat abstruse, and yet is of very great importance to electrical engineers, and especially to telephone engineers. Mr. de Bray has a genius for exposition, and has dealt with his subject in a remarkably clear and charming manner. The progress of the reader is facilitated by many worked examples, and there is in addition a collection of exercises (with answers) after each chapter which enable the reader to test his knowledge.

We can strongly recommend this book, not only to those whose professional duties call for an acquaintance with the particular branch of mathematics with which it deals, but to any of our readers who, having an elementary knowledge of algebra and trigonometry, would like to extend their mathematical studies into a most interesting and fascinating field.

"Wireless Principles and Practice." By L. S. Palmer, M.Sc., Ph.D. (Published by Longmans, Green & Co. xi + 504 pp. Price 18s.)

The development of the art of radio communication is now-a-days so rapid that what were the standard books a few years ago are now hopelessly out of date. The appearance of a book such as the one under review, in which the recent developments of the subject are dealt with from a serious scientific point of view, and not in the journalistic style of the average popular manual, will be welcomed by the electrical engineer who, while perhaps not actually engaged in wireless work, wishes to keep in touch with that phase of his profession, by the student, and by the amateur whose aspirations rise above the assembling of a receiving set from a wiring diagram.

The first five chapters, dealing with the principles of high-frequency currents, wave motion, high-frequency circuits and the thermionic valve, constitute an excellent summary of the physical basis of the subject. Then follow two chapters dealing with the various methods employed for producing high-frequency currents. The next chapter deals with the electromagnetic theory and the propagation of Hertzian waves. In the following two chapters are described the methods used for the detection and amplification of high-frequency currents. The next chapter deals with wireless telephony, and the final chapter with directional wireless.

Following each chapter is given a bibliography which will be found most useful to the reader who wishes to pursue further any particular phase of the work.

Mathematics are used freely when necessary throughout the book, but at the same time sufficient explanation is given of the results obtained to enable the book to be of use to the reader who may wish to experiment scientifically but who may not be in a position to follow all the steps by which the results are reached.

The book is certainly the best on the subject which is at present available for the class of reader for which it is intended.

"British Freshwater Algae." By the late G. S. West and F. E. Fritsch. (Published by the Cambridge University Press. xv + 534 pp. Price 21s.)

There are probably few professions which call for more miscellaneous knowledge than that of the present-day Post Office Engineer. Telegraphs, telephones, generating plant, electric light, electric lifts, steam and oil engines, no matter what mechanical or electrical device may be under the control of the Department, the engineer is expected to take charge of the job—and he carries it through successfully.

Among the minor troubles with which he may meet in the course of his work, if this happens to involve dealing with a water installation of any kind, is the growth in the system of some species of the minute plants known as algae. These may suddenly increase in an inexplicable manner, and cause considerable trouble before they can be removed.

In view of this possibility a knowledge of the habits and mode of growth and reproduction of these plants is desirable. Unfortunately, however, the only English text book on the subject, by G. S. West, which appeared in 1904, has long been out of print. A new edition was in preparation, but was interrupted by the death of the author. The work has now been continued and completed by Professor Fritsch, of East London College, and a serious lacuna in English scientific literature has thus at last been filled. The ground is thoroughly covered, and the reader should be able to identify, at least within generic limits, any fresh-water alga which he may meet.

The book will be welcomed, not only by engineers who may need its information professionally, but also by amateur microscopists, to whom the algal flora appeals because of the great beauty and interest of its individual members as well as on account of their economic importance.

GLASGOW TELEPHONE NOTES.

On April 30 the staff of the Glasgow Office presented Mr. J. S. Wallace with a silver tea service and other articles, together with a crocodile hand-bag for Mrs. Wallace, as a token of their esteem and good wishes on the occasion of his promotion to the position of Higher Clerical Officer in the Newcastle District Office. Mr. Wallace commenced his telephone career in 1904 in the service of the Glasgow Corporation and was transferred to the Post Office in 1906. Mr. A. E. Coombs, the District Manager, presided over a representative gathering of the staff, and, in congratulating Mr. Wallace on his promotion, expressed the hope that he was only the first of many to go on promotion from the Glasgow Clerical Staff.

We congratulate Miss M. A. Sinclair and Miss A. B. Brown on their promotion, the former to an allowance post, the latter to the chargeship of the Maryhill Exchange, which also carries an allowance.

It is a good thing sometimes to see ourselves as others see us and to look at happenings from angles other than our own. At our recent staff meetings, we appointed Minute Secretaries with a simple instruction to record, in their own way, all that transpired at the meetings. Previous experience was unnecessary. We were desirous of getting a point of view untrammelled by training, precedent, or academic ideas of correct phraseology.

We got what we wanted all right and, on occasion, in a most refreshing and original manner. A few extracts may be interesting :—

(1) Mr. —— suggested a discussion with regard to the duties of the exchange.

Not a murmur was heard !

(2) Mr. —— thought the meeting was inclined to drag so he told a story of the service to see if it would liven things up.

The oracle worked !

(3) Miss —— said that some of the chairs were very wobbly.

Mr. —— thought this might be due to the Charleston craze.

The question was referred to the Aide-de-Camp !

(4) Miss —— asked what a monitor should say in reply to such remarks as—

"Are you half wits ?"

"You are all rotten to the core."

"I would kick you all into the gutter."

The answer to this was that if you replied in similar strain, you were merely descending to the level of the person at the other end. The cases, if repeated, should be reported to the office.

Mr. —— here said that he sometimes had had worse experiences; he had been thrown out of premises but had gone back again the next morning.

A voice: "For your hat?"

(Curtain.)

Humour—conscious or otherwise—is truly the spice of life!

The Auditor.—There was something so icy and swift, so impersonal and uncompromising about this man that his very presence seemed an accusation. He looked to be a man who would never make nor overlook an error. He first seized the currency, and with a rapid, almost juggling motion, counted it by packages. Then he spun the sponge cup toward him and verified the count by bills. His thin white fingers flew like some expert musician's upon the keys of a piano. He dumped the gold upon the counter with a crash, and the coins whined and sang as they skimmed across the marble slab from the tips of his nimble digits. The air was full of fractional currency when he came to the halves and quarters. He counted the last nickle and dime. He questioned the cashier concerning each of the cash memoranda with unimpeachable courtesy, yet with something so mysteriously momentous in his frigid manner that the teller was reduced to pink cheeks and a stammering tongue, although he knew the cash was right to a cent.

O. HENRY.

Television in Anticipation.

A subscriber, long in answering the 'phone, on being advised that she was too late and that the caller in the Kiosk had gone away, promptly answered: "Oh, sorry, exchange! Do you know if it was a lady with a white hat on!"

M. L. T.

George Square, Glasgow.

SEEN FROM THE HEAD POST OFFICE WINDOWS.

George Square on a spring day—the sun high in the heavens shining brightly on the varied architecture of this unique square, each side a law unto itself, yet all blending to wonderful uniformity.

In the inner square the monuments stand out and seem to keep guard. The flower beds are rich with shrubs and spring flowers bestowing delight on the pedestrians as they cross the square. The traffic continues unheeded by the small coteries of women and children who hold sway at certain "stances."

Unnoticed, a small child has strayed from one of these to a bed of daffodils near by; the daffodils, swayed by the wind, dance in the sun and are tempting beyond resistance. There is one which seems bigger and yellower than all the others, and this wee chap is filled with "Desire"—the desire to possess. It is a high wall for his small body to clamber over—(it is nearly one and a half feet high!) and the desired thing seems a long way off. He wonders if there would be time to get it before he is missed. Courage outweighs caution—he must try! Nothing in life is of any importance at the moment except the flower that is just beyond his grasp. Up he climbs! How hard he breathes in his efforts; how his chubby hands are outstretched; how his golden curls flop about his head as he struggles; how his eyes glisten with the light of capture; how the coveted flower just evades his grasp. Ah! now he is up: he pulls it a d it comes to him. It is his at last!

He settles down to an orgy of admiration. He has attained the heights—he is no longer in George Square, but in the "Seventh Heaven." What a wealth of beauty and wonder he sees in the yellow daffodil. He loses time and space in his happiness and is frolicking with the fairies, when suddenly he is rudely snatched from his paradise with a slap and angry tones and before he realises what has come to him, he is tucked away in his mother's shawl. Ah, well! he still has his treasure and holds tightly to it. But alas! when that is espied it is torn from his grasp and lost. Life is an unendurable thing now. The side of his face has a stinging pain and he is sore and nothing matters since he has lost his thing of beauty. He whimpers a little and then his tears give place to drowsiness; his head droops on his mother's shoulder and he "slips away" quietly to dream of a land of golden daffodils.

M. L. TULLOCH.

MIDDLESBROUGH TELEPHONE DISTRICT.

To mark the occasion of his promotion to Traffic Superintendent, Class I, Reading, a presentation was made on May 4 to Mr. S. R. Vaughan, late Traffic Superintendent, Class II. The gifts, which consisted of a mahogany clock (from the District Manager's and Sectional Engineer's staffs) and a handsome mahogany writing bureau (from the Supervising and Exchange staffs) were presented by Mr. H. G. McFarlane, District Manager, who spoke with sincere appreciation of Mr. Vaughan's excellent service at Middlesbrough, and tendered hearty wishes for happiness and prosperity in his new sphere.

Various members of the staff, on behalf of their respective Departments, suitably endorsed Mr. McFarlane's remarks and good wishes.

NEWCASTLE-ON-TYNE NOTES.

Miss Graham Memorial.

A MEMORIAL to the late Miss Jessie G. Graham, Supervisor of the Newcastle-on-Tyne Central Exchange, which took the form of the naming of a cot at the Brough Childrens' Holiday Home and Orphanage, South Shields, under the auspices of the P.C.H.A., was unveiled by Mrs. Stewart, wife of the District Manager, on Jan. 28 last, in the presence of a large gathering of friends and colleagues. At the close of the unveiling ceremony, Mr. J. Gwyther, late Traffic Superintendent, handed to Mr. Brough of the P.C.H.A. on behalf of Miss Graham's many friends in the Post Office service, a cheque for £52 10*s.* as a donation to the funds of the home.

During the past Winter three very successful dances have been held by members of the Newcastle-on-Tyne Telephone Staff at the Heaton Assembly Rooms. That on Jan. 6 was a Carnival Dance, there being an attendance of over 300. Prizes for the best and most original fancy costumes were won by Misses Green and Heslop and Messrs. Henderson and Tate and presented to the winners by the Postmaster Surveyor, Mr. C. Creighton. Much credit for the huge success of these events is due to Miss L. Robinson, Supervisor of the Fees Section, Miss Kelly of the Traffic Section, Mr. J. Middlemas and members of the Committee.

A Swimming Club has been formed by the Female Telephone Staff at Exchanges in the Newcastle Postal Area and promises to be a very successful venture. Much enthusiasm has been shown by the 125 full members, and the Club, which is named the Exchange Swimming Club, appears already to be firmly established. Trophys have been obtained for competition among the members for the Club Championship, Graceful Swimming, &c., and capable instructresses have been engaged.

The opening meeting took place at the Gibson Street Baths on the 16th instant.

LIVERPOOL TELEPHONE SERVICE NOTES.

The lilt of music; shaded lights;
Soft perfumes; reminiscent nights;
Secluded corners; sidelong glance,
When winter reigns, on with the dance.

A wide expanse of green, all shorn
Of daisy flower. A velvet lawn,
The stretching nets; the swift ball's flight,
Forgotten now the winter night.

The advent of fine weather, coupled with the lighter evenings set most of us to work removing the gut preserver, and manipulating the reviver—that is most of us who are not in the happy position of being able to start the season with a new racquet. We think the bonus figure has let us down this summer.

The Post Office Tennis Club opened its season on Saturday, April 28, in perfect weather. The club, the majority of lady members of which, by the way, belong to the telephone staffs, possesses four fine courts pleasantly situated in Mossley Hill. It is affiliated to the Civil Service Sports Club, and its membership is open to the whole of the Post Office Staff and friends.

The varied duties allow of a larger membership than that of outside clubs, and as there is still room for a limited number of new entrants, an invitation is offered to all who enjoy this most popular summer recreation.

The District Office staff held a final social at the British Legion Rooms on May 4 and all sections were well represented. The District Manager was present and would no doubt appreciate his staff at play just as well as at work. Shall we whisper that his novelty hat, together with that of a well-known member of the Traffic Section, looked "chic."

The mere men of the staff are looking forward to a little jaunt on Friday, May 25. Although two "swallows" don't make a summer, high tea at the Hunts Cross Hotel, followed by a bowling main and interludes, is at least a fair start.

C. H.

LONDON TELEPHONE SERVICE NOTES.

Contract Branch.

THE results obtained by the Contract Branch during the month of April were a net gain of 4,143 stations.

The readers of the *Journal* may be interested to learn that the canvassing staff at the Contract Branch obtained orders for 74,876 stations during the last financial year, whilst the clerical force obtained orders for 21,088 stations. The tariff post card (M 135) which is placed in containers in Post Offices, to be taken by members of the public, originated 9,408 enquiries for service which resulted in orders being obtained for 7,131 stations, which are, of course, included in either of the above figures. The post cards advertising extensions issued with the April and October 1927 accounts resulted in 1,166 enquiries from which orders for 50 exchange lines and 733 extensions were obtained. The inquiries received through the medium of the literature &c. issued by the Telephone Development Association resulted in orders for 1,179 exchange lines.

* * * *

The interesting article on busy-tones by the Superintendent in the May issue of the *Journal* makes us wonder whether the time will ever come when a Contract Officer's authorised equipment will include a television set which would enable him to show the subscriber a queue of telephone callers waiting to get through to him or his staff !

* * * *

Sports Notes.

The Contract Branch Cricket Club fixtures for May and June are given below :—

May	15.	Practice Match at Battersea Park.
„	22.	„ „ „ Finsbury Park.
„	29.	Versus Traffic (League) at Chiswick.
June	5.	Versus Accounts (League) at Chiswick.
„	12.	Open date at Battersea Park.
„	26.	Versus Accounts (League) at Chiswick.

Mr. Oliver has been elected Captain and Mr. Hodgkiss Vice-Captain. The Secretary is Mr. Culley of the City Contract Office, and any player wishing to take part in the practice matches should communicate with any of the above.

Football.—The final results of the L.T.S. football team read as follows :—

Played.	Won.	Lost.	Drawn.	Goals. For	Against.	Points.
20	10	6	4	62	45	24

The team occupy the 5th position in the League table and at one period were pressing the leaders very close. On the whole the season has been much enjoyed and many excellent and closely contested games have been played. Mr. Cowdrey of the Contract Section was the most prolific goal scorer and the team was well led by Mr. Adams the Captain, who together with Mr. Evans, the Secretary, combined to make the initial season a pronounced success.

Bowls.—Considerable success attended last year's inauguration of the L.T.S. bowls section, and in addition to most of last year's players being available, several others have promised to assist. Matches will be played at Chiswick as before, and the interest in the Bunbury Cup Competition promises to be keener than ever.

The first match played on May 7 against the L.P.S. was lost by a narrow margin. The rink led by Mr. Pollard of the Contracts had, however, a convincing win by 24 points to 10. The next match is against Science Museum on May 22, followed by a Bunbury Cup Match on May 31 against A.G.D.

Netball.—The season concluded on April 21 when the final for the "Liddiard Shield" was played at Chiswick on the C.S.S.A. ground.

Twenty teams entered for the championship, four of these scratched, leaving 16 to contest for the trophy, generously given by Miss J. Liddiard, M.B.E., Lady Superintendent of the Controller's Office.

Kensington Exchange and A.R. 7 section of the Accounts Branch were the finalists. The latter team won by 15 goals to 13. The score at half-time was 7—4 in favour of the Accounts team. Shortly after resuming the score was 8—8. Kensington fought hard to keep level with their opponents but were eventually beaten by 2 goals.

Both teams with their supporters afterwards adjourned to the Pavilion for tea when Dame Maude Lawrence presented the Shield to the winners and silver medals to each member of the winning team, the former on behalf of Miss Liddiard and the medals from the L.T.S. Sports Association.

Miss Liddiard afterwards congratulated the teams upon the excellent manner the match was played.

The shield will be put up for competition each year and the L.T.S.S.A. hope to again offer medals to the winners.

Among the supporters were Miss Cox, Female Supervisor, and Mr. Hugh Williams representing the L.T.S.S.A.

The L.T.S.S.A. are anxious to form a properly constituted Netball Section and are prepared to contribute 5 guineas to the general funds of such an organisation. A meeting will be convened to further this object.

Accounts Branch C.C.—The Accounts Branch Cricket Club successfully opened their season at Battersea Park on May 4 when a friendly match was played against the Ministry of Labour and won by 30 runs.

Other matches have been arranged with the Ministry of Labour and also Pensions, War Office, Agriculture & Fisheries, London Engineers, Secretary's Traffic, Ladies Civil Service Club, and Brighton Postal Service.

In addition to these fixtures the club, who were last year's winners, have again entered the L.T.S. Cricket League and are looking forward to some further keen contests.

The officers of the club remain the same as last season, with the exception that Mr. H. B. Taylor has been elected Captain, vice Mr. C. Drabwell, who has been temporarily transferred to another Branch, but will continue to play for the Accounts Branch.

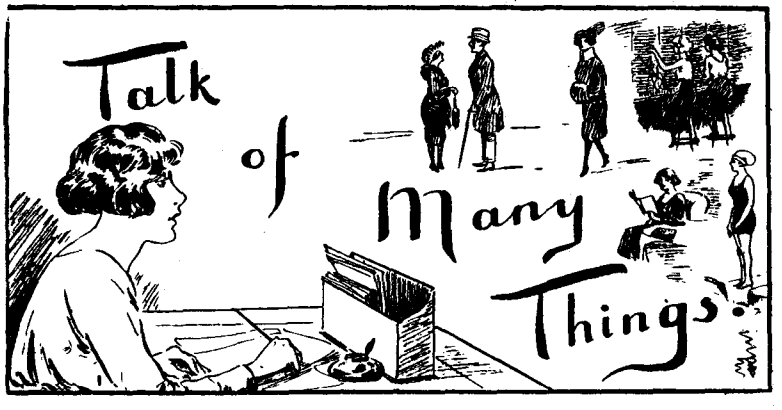
Given good weather and the hearty support of honorary members and the staff in general the club hopes to have another successful season.

* * * *

Promotions :—

Miss E. D. EVANS appointed Asst. Supr., Class I, at Avenue Exchange.
Miss B. M. BROTHERWOOD, Asst. Supr., Class I, at Clerkenwell Exchange.
Miss S. H. MULVANEY, Asst. Supr., Class I, at Trunks (Continental).
Miss A. M. GOLDSWORTHY, Asst. Supr., Class II, at Edgware Exchange.
Miss ETHEL M. WELL, Asst. Supr., Class II, at Kensington Exchange.
Miss L. M. KINGWELL, Asst. Supr., Class II, at Victoria Exchange.
Miss F. E. FOWLER, Asst. Supr., Class II, at Paddington Exchange.
Miss E. A. E. MAYLE, Asst. Supr., Class II, at Regent Exchange.
Miss E. J. NICHOL, Asst. Supr., Class II, at Mountview Exchange.
Miss P. FIRTH, Asst. Supr., Class II, at Paddington Exchange.
Miss A. A. COLE, Asst. Supr., Class II, at Clissold Exchange.
Miss M. E. GROOM, Asst Supr., Class II, at Museum Exchange.

WE TELEPHONISTS



Nelson—and Others.

I FEEL sorry for Nelson because he appears to be so much out of the public mind. It is true that he has a magnificent column all to himself in Trafalgar Square and has four lions, designed by a very famous artist, to guard him. But it does seem as though, in their endeavour to honour him, the public have only succeeded in placing him beyond human reach and ken. Once he was a hero but now he is known mainly in terms of his column. That which was to serve as the pedestal of fame has become the pinnacle and the column is greater than the man. The lions ignore the public just as the public ignore Nelson. The public surge at his feet with their eyes on the level but if they would only look upwards they would forget the column and see Nelson.

I have recently looked upwards and at the top of this column I have seen our pictorial design. I had never really noticed it before, and it reminded me somewhat of Nelson, but in a contrary way. Nelson's column, it is necessary to remind ourselves, exists because there was a Nelson, but our picture exists because there is a column. Just as it is refreshing to consider Nelson independent of his column, so I find that it is not without interest to consider the picture apart from the column. Both Nelson and the picture are ignored because the column is the thing.

There is a good deal in the picture to provoke imagination, but whether what I have read into it has any basis in fact I do not know; but romance is often of greater interest than truth. Who is the girl at the desk? I do not think she can be the Editress—she is far too beautiful. Do I mean the girl or the Editress? Ah! She is a contributor who is either talking of many things or endeavouring to balance her accounts on the eve of St. Pay Day. Her coiffure is a disgrace to modern society, and she does not use a fountain-pen or wear horn-rimmed spectacles. All the indications are that she has a bun. "Off with her head," as the Queen said. In the middle distance are a girl and a man. The girl is not a telephonist, she is a flirt. Her name is Phyllis, but that is just as it happens. I do not suppose that all girls of that name are flirts. The object in her hand is a dead rat but no one knows why. She is Naughty but Nice. Off with her head also. The man is tall and distinguished. He is much too immaculate for a Civil Servant and is, I think, an international crook. His name is John Jarvis, but that was his father's fault. He has sold both spats to buy cocaine, and he would raffle his mother-in-law for the same purpose. His influence is bad and he ought to be removed. Behind him but aloof and very proper is a supervisor, arrayed in expensive furs. She is carrying an early-Georgian muff but otherwise she is quite a good sport. She is called "The Streak," so she must be nice because nicknames are a sign of popularity. When the artist sketched her she was suffering from a sore throat. She ought to be sent to the M.O. and placed on sick leave. To her right are two South Sea Islanders—no, on closer inspection they appear to be telephonists. The dropped positions on either side of them indicate that the picture was taken in the busy hour. One of them has golden hair. It is said that she will dye happy. The person below in the chair is reading—what, I don't know. It might be a Sunday School prize, but I doubt it. She is not so demure as she looks—she stops out late on bath-night. The mermaid appears mainly to be wrapped in thought. Why does she hesitate on the brink? Can't she swim or will she shrink?

Altogether they seem a poor lot, don't they?

PERCY FLAGE.

Competition.

Our readers will rejoice with us that our pictorial heading has evoked the foregoing article from our contributor, Mr. Flage; but in view of his remarks, we feel that we can do no less than seek a new heading. We therefore offer half a guinea for the most suitable design for use at the head of our column.

The drawings should be submitted on or before July 9 next, and envelopes should be marked "Designs," and addressed as below.

Central Exchange.

(*Further Statistics.*)

Encouraged by our Tottenham contributor who in a previous issue supplied some valuable information *re* directories, we applied for and obtained "Leave by substitute and time owing" (including grace time), "Annual," "Compensatory," "Special" and U.D.D., and with all this time at our disposal we were able to make full and exhaustive enquiries into several matters that have puzzled us for a considerable period, with the result that we have emerged triumphant, laden with valuable statistics that we think should be broadcast all over the British Isles, including Ireland, as it may serve to remove the creeping depression there.

1.

If all the out-of-order sleeves used in London and Hatch End were placed end to end they would go three times round the dome of St. Paul's and once down Threadneedle Street. Considerable difficulty was experienced in obtaining these figures as Dean Inge complained of the scratching noise in the dome, no doubt caused by our boots, which have been previously used for mountain climbing. Another drawback was the infringement of T. 1,750 which distinctly states that all out-of-order cords should be capped.

2.

If all the dockets used since 1927 were placed corner to corner they would reach from here to the desert of Saharah. The difficulty in obtaining this valuable information was enormous, as the City police complained strongly that we were interfering with the one-way traffic.

3.

After many periods of careful study and deep thinking, also days spent in the British and other Museums, we find that if all the bad language used by the subscribers at the opening of the Holborn Exchange were collected together and thrown into the sea it would probably cause an earthquake in Northern Nigeria.

4.

If all the dials in London were placed face to face a great many would receive a terrible shock!

5.

Also if all the wrong numbers given in London during the year 1924 were placed end to end they would reach from London to John O' Groats (wherever that may be). After having discovered this last gem, we found that we were due back at the exchange, so shall have to leave further investigations for a future date.

D. D.

A Tribute.

(*The impressions of a supervisor loaned to T.*)

Of all the sections I have seen—
(With 'duds' and learners shot in 'em!),
The most industrious, I ween,
Is my platoon at Tottenham!

Each girl is at her post to time—
I don't waste words allottin' 'em—
And ere the matins bell doth chime,
They're hard at work at Tottenham.

The "slackers" and the chatty ones—
I'm pretty cute at spottin' 'em—
Are just as rare as "catty" ones—
They are not found at Tottenham.

No grumbling voice is ever heard—
No supervisor swattin' 'em—
For no one ever "gets the bird"—
It isn't done at Tottenham!

The answer and the clear are good,
(E'en opals with a dot in 'em!)
The supervision's understood
To be O.K. at Tottenham.

No letters of complaint arrive.
With phrases curt or hot in 'em—
Nor "off the deep end" do they dive
Re long delays at Tottenham.

The subs. seem happy and content,
And if there be a Scot in 'em,
He will not grudge the yearly rent
For telephones at Tottenham.

It took me just one afternoon,
To gauge the good they've got in 'em—
So I must get a transfer soon,
And join the ranks of Tottenham!

C. A. S.

Regent Exchange Flannel Social.

A very successful Flannel Social, under the direction of Mr. Pounds, was held in the Dining Room of the Regent Exchange on Friday, May 18 last, the proceeds of which were entirely devoted to the Elizabeth Garrett Anderson Hospital.

Members of the Traffic and Engineering Staffs partook of a very enjoyable evening. Mr. P. Keatley presided over the musical side of the programme, assisted by a saxophonist, and drummer. It was agreed that this trio made an ideal combination for dancing.

Refreshments were obtainable at nominal prices, and in passing special mention should be made of the fruit sundaes which were supplied by the senior members of the Telephonists' Staff, who are always ready to give an exhibition of their skill in this direction.

More of these Socials, it is hoped, are to be organised in the near future, and members of both Regent and Gerrard staffs are earnestly requested to give their whole-hearted support to these very enjoyable functions.

L. K. (Regent Exchange).

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), London, E.C.1.

PRESENTATION TO MR. J. H. TURNER.

AT the North-Western District Office, Preston, on March 29, a presentation of a camera was made to Mr. H. J. Turner, Assistant Traffic Superintendent, by members of the Traffic Staff on his transfer to the Southampton District Office.

Mr. R. Morgan, Traffic Superintendent, Class II, occupied the Chair, and the presentation was made by Mr. S. O. Allen, District Manager, who spoke with appreciation of the work done by Mr. Turner. Several others contributed remarks regretting the departure of Mr. Turner from the North-Western District and wishing him health and happiness in his new sphere.

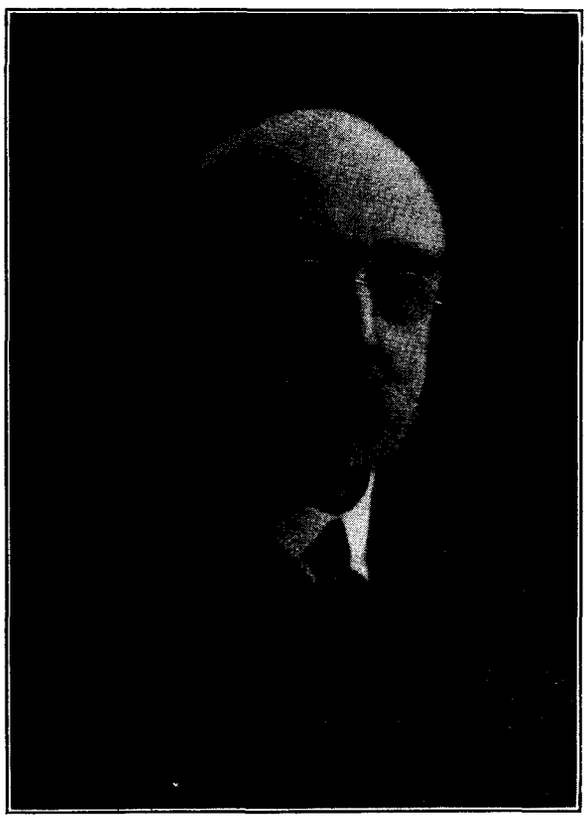
Mr. Turner suitably replied, thanking the staff for their gift and the kindly expressions of good wishes towards him.

C. B. CLAY FOOTBALL CHALLENGE CUP.

The final tie in the C. B. Clay Challenge Cup was played on the Tufnell Park Football Ground on Friday, April 20, between the Post Office Stores Department (Holborn) and Victoria Athletic (Centre Internal Section).

A good crowd of spectators turned up to see what proved to be a typical cup tie game between two very equally balanced sides. The only goal of the match was secured by Victoria Athletic about half-way through the first half. The Stores team made great efforts to equalise in the second half and many exciting incidents took place around the Victoria Athletic goal, which was, however, kept intact by the splendid goal-keeping of S. J. Joy. Victoria Athletic thus became the holders for the ensuing year.

The presentation of the cup, together with miniature cups for each member of the winning team, was then made by Col. C. B. Clay, the original



LIEUT.-COL. C. B. CLAY.

donor of the cup, whom everybody was delighted to see looking as fit and well as ever, a fact which a recent photograph of Col. Clay, here reproduced, gives ample testimony.

In thanking Col. Clay for making the presentation, Mr. Woollard drew attention to the fact that the competition was over 30 years old, the cup having been presented as far back as 1898 by Col. Clay, when Superintendent of the Metropolitan Area of the National Telephone Co., and was for competition amongst the various staffs in the Metropolitan District.

This competition is still open to all teams representing the staff of any branch or section of the following Departments:—

London Telephone Service.
Post Office Stores Department.
London Engineering District.
Office of the Engineer-in-Chief.

Entries for the competition are cordially invited and particulars can be obtained from the Hon. Secretary, Mr. C. J. Head (London Engineering District), Mr. A. E. Wild (London Telephone Service), or Mr. F. Woollard (Engineer-in-Chief's Office).

The proceeds of all matches are devoted entirely to charity and the competition has been the means of raising upwards of £200 during the past two or three years.

A BRIEF CHRONOLOGY FOR STUDENTS OF TELEGRAPHS, TELEPHONES AND POSTS.

BY HARRY G. SELLARS.

(*Continued from page* 179.)

1843 ... ... 18,500 lb. of powder fired by electricity at the South Eastern Railway works at Dover and 1,000,000 tons of chalk dislodged. Jan. 26.

United States Congress granted 30,000 dollars for the construction of the first long telegraph line—between Washington and Baltimore—working the Morse system.

Cooke devised an overhead system of telegraph wires on wooden posts in which the wires were suspended on hooks fitted with goose quills at the point of contact to provide insulation. Metal shields were placed on the posts over each wire, which was coated with anti-corrosion paint.

Cooke introduced airtight insulated telegraph cables, a detector to indicate loss of insulation, and apparatus to provide pressure of dry air.

De la Rive, of Geneva, by using long wires running through insulated coils, increased the sound effects produced by Page.

Schwabe noticed that the periods of variation of magnetic declination coincided with periods when sunspots were at their maximum.

Watson's semaphore station destroyed by fire.

Morse wrote to the American Treasury reporting his submarine trials in New York Harbour and predicting telegraphic communication across th. Atlantic.

Dr. Montgomery submitted specimens of guttapercha to the Society of Arts.

1843 ... ... Sir Robert Peel's Government decided that the number of rural posts should be based upon the number of letters for each locality, the minimum being fixed at 100 letters a week. The boundary of the "free delivery" was fixed by the P.M.G. June.

Sir Rowland Hill proposed a Colonial Money Order system.

Bain patented an indicating telegraph system, and proposed a copying telegraph system in which transmission was effected from set-up type.

Cologne and Deutz connected by a telegraph cable under the Rhine.

Stoehrer constructed an electrical machine.

Wheatstone invented instruments for measuring the constants of a voltaic series, and introduced the "Wheatstone Bridge" (invented by Christie) to the Royal Society.

51 bags made up for London Preston Travelling Post Office Down Night Mail, 44 bags for the Up Mail.

(John Ramsey, of the Missing Letter Branch, devised apparatus for exchanging mail bags *en route*.)

1844, Jan. 1 ... First criminal arrested by aid of telegraphy. Description of a man named Tawell, who had just committed a murder, was telegraphed from Slough to Paddington.

Wheatstone experimented with submarine cable in Swansea bay.

1844 ... ... Notice of arrival of Prince Albert (afterwards Prince Consort) telegraphed from Paddington to Slough and conveyed thence to Windsor by horse messenger. Apr. 15.

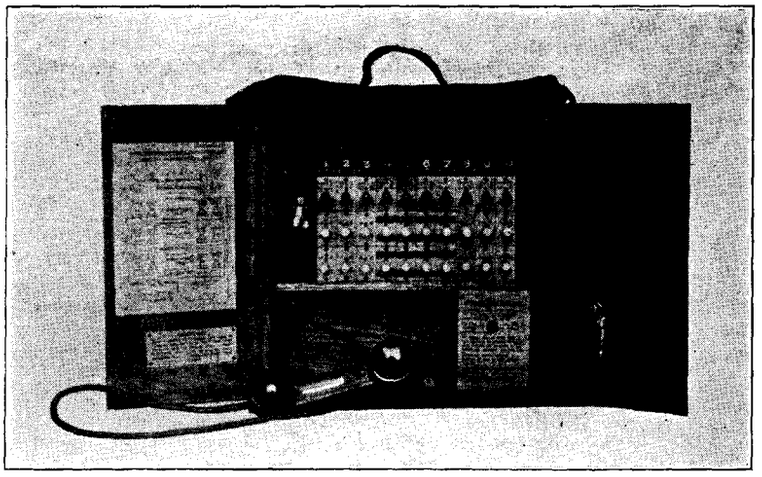
George Wilson patented machinery for manufacturing envelopes.

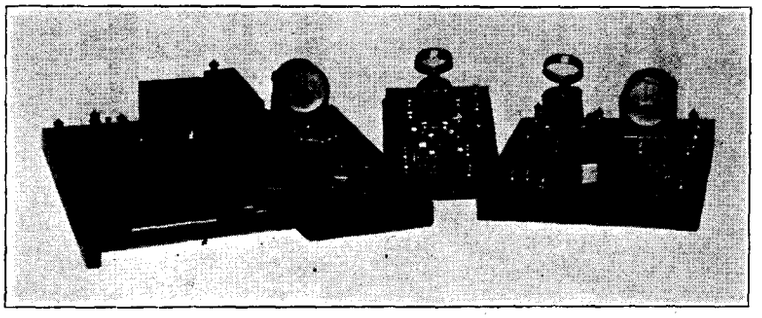
1844 ... ... Morse's telegraph apparatus put into operation between Washington and Baltimore. May.

Capt. J. N. Taylor, R.N., devised an apparatus for conveying signals at sea by passing compressed air through a trumpet containing a steel reed, the notes procured being varied by means of four keys.

Telegraph poles preserved by the Burnettising process erected between London, Southampton and Gosport.

(Spiller invented an augur-like earth borer for excavating holes for telegraph poles.





40 25-LINE P.B.X. Railway and Telephone Switchboards, complete with all accessories, Operator's Breastplate Transmitter and Headgear Receiver as illustrated. Price £25 each (cost £125). Brand new, packed in original cases, tin-lined and soldered ready for export, &c., cannot be repeated.

150 10-LINE Cordless Switchboards, portable or stationary, containing 30 Dewar Switches, Tubular lined drops, magneto receiver and transmitter, condensers, &c., as illustrated, price £5 each (cost £50).

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500 Magneto Ringing Portable Telephone Sets, as illustrated, complete with receiver and transmitter. 10*s*. each.

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"SIMPLEX" and "DUPLEX" Telegraph Sets, as illustrated—in Teak carrying cases. £5 and £7 10*s*. each respectively.

"Q AND I" Linesman Detectors in Leather Carrying cases with straps, 8*s*. each, postage 9*d*.

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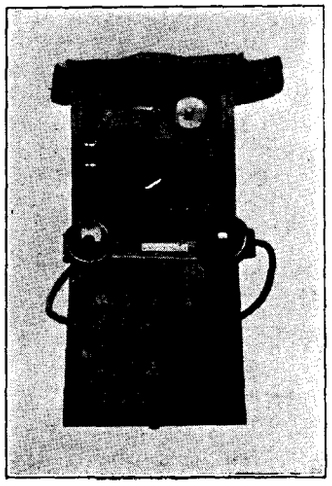

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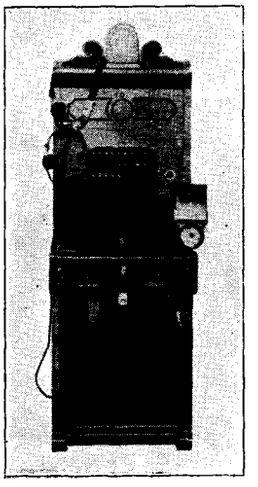

Bohlken invented a metal disc earth borer for use when erecting telegraph poles.

Oppenheimer, of Manchester, designed an iron telegraph post, the base of which took the form of an inverted pyramid and which was driven into the earth by the blows of a descending weight.

Hamilton invented an iron telegraph pole, which Colonel Mallock improved.

Harloe patented a brown earthenware single shed solid insulator for telegraph wires.)

Printing telegraph worked between Nine Elms and Wimbledon (six miles) on an underground copper wire insulated by asphalte.

Railway companies required to permit erection of telegraphs.

1844, Oct. 22... Edouard Branly born.

Hancock improved manufacture of guttapercha.

1845 ... ... Cooke and Wheatstone's electric telegraph line opened between London and Southampton.

1845, Mar. 13 John Frederick Daniell died.

1845, May ... Travelling Post Offices established between Rugby and Newcastle-on-Tyne, Exeter and Bristol, Gloucester and Tamworth.

1845, May 8 ... *Morning Chronicle* (London) published the first telegraphic newspaper report, which detailed a railway meeting at Portsmouth.

Game of chess played between London and Gosport by telegraph.

A parliamentary speech by Queen Victoria telegraphed to Portsmouth.

1845 ... ... John Watkins Brett and Jacob Brett, unaware of Wheatstone's project, registered a company to establish communication by cable between Europe and America, and between England and France. June 16.

Jacob Brett, prompted by Royal E. House and supported by John Watkins Brett, patented a typewriting telegraph apparatus in United States of America.

Bain patented an electro-chemical copying telegraph system.

Faraday drew up a list of substances which are attracted to a magnet and another list of those which are repelled. The former he called "paramagnetic" and the latter "diamagnetic." He also constructed a magneto-electrical machine consisting of a copper disc rotating between permanent steel horseshoe magnets.

(Bertsch, Carrè, Darwin, Holtz, Kienmayer, Le Roy, Thomson, Topler, Varley, Voss, Wimshurst and Winter also constructed electrical machines.)

Wheatstone and Cooke modified Farady's magnetic-electrical machine by substituting electro-magnets for permanent steel magnets.

Faraday discovered that a ray of light polarised in a certain plane can be diverted by the action of a magnet.

Lord Kelvin (William Thomson) published a work on electro-statics and carried out researches in electro-dynamics.

Faraday constructed a voltameter which measured the strength of a current by the quantity of water decomposed in a given unit of time.

Dellman and Lord Kelvin invented electrometers.

Faraday demonstrated that the two kinds of electricity are developed together and in equal quantities, and invented the term "lines of force" in connexion with magnetism. He also showed that all kinds of electricity produce the same chemical actions. He predicted that retardation would occur in submarine cables.

Kirchoff definied the electrical law that current divides between circuits in parallel in direct proportion to their respective conductances.

Double cone insulator devised for overhead telegraph lines.

1845, Aug. 4 ... William Young and Archibald McNair, of Paisley, patented a method of enclosing cotton-covered wires in lead piping and insulating them with wax, pitch, asphalt, &c.

(Reid Brothers devised a multiple-core lead-covered cable.)

1845 ... ... Jean Maurice Emile Baudot born at Magneaux, France. Sept. 11.

E. Hill and Warren de la Rue patented machinery for manufacturing envelopes.

Wheatstone experimented with guttapercha as an insulator for cables.

Cooke and Wheatstone introduced their single-needle telegraph apparatus. Schilling's method of reversing the current to convey various combinations of signals was used.

J. W. Starr, of Cincinnati, introduced an electric lamp with carbon filament in vacuum.

Ezra Cornell laid a twelve-mile cable in the River Hudson, between New York and Fort Lee. The cable consisted of two copper wires covered separately with cotton, insulated with india-rubber and enclosed in a leaden pipe. After being in use for some months the cable was severed by ice.

1845, Nov. 5 ... Faraday announced a discovery that light, heat and electricity were modifications of a great universal principle.

1846 ... ... Last of the London mail coaches arrived from Norwich and Newmarket. Jan. 6

West applied to the British and French Governments for permission to lay a cable from Dover to Calais. He experimented in Portsmouth Harbour.

E. F. Weber constructed an electrodynamometer for measuring strength of currents by means of the electro-dynamic action of one part of the circuit upon another.

Electric Telegraph Company formed.

1846 ... ... Lars Magnus Ericsson born at Norrtomta. May 5.

Greener and Staite introduced Electric Light system.

1846, June 16 Presentation of £13,000 to Sir Rowland Hill, at Blackwall, in recognition of his services in connexion with the establishment of penny postage.

1846 ... ... Sir Rowland Hill appointed Secretary to the Postmaster-General, to act as adviser in postal reforms. Dec. 9.

Bain patented an electro-chemical direct-working telegraph system in which perforated tape was used at the sending station and chemically prepared tape at the receiving end.

Bakewell, Bonelli and Caselli introduced apparatus on similar lines.

Bonelli's apparatus was worked on a submarine cable between Liverpool and Birkenhead.

Bonelli, in erecting telegraph lines between Turin and Genoa, suspended wires across valleys sometimes more than half a mile wide.

1847, Feb. 11 Thomas Alva Edison born at Milan, Ohio.

1847, Mar. 3... Alexander Graham Bell born in Edinburgh.

1847 ... ... Edmund Yates entered the service of the Post Office. Mar. 11.

Bain's electro-chemical telegraph tried in Paris before Dr. Lardner and M. Leverrier over 336 miles of aerial wire to which were added 746 miles of wire in coils. The apparatus was installed in the same year between London and Manchester.

Number of arms on semaphores reduced to two.

John Henry Cordeaux devised a double shed insulator.

Highton Brothers devised a printing telegraph with a six-key keyboard and an equal unit alphabet.

Edward Highton invited by L. & N.W. Railway to take up superintendence of their telegraph system.

Faraday suggested gutta-percha as an insulator for telegraph wires. Dr. Ernst Werner von Siemens used it for covering underground lines and constructed the first German telegraph line.

Siemens-Halske firm founded.

Brett obtained a concession from Louis Philippe, King of France, to lay a cable between England and France.

Pluecker noticed that tourmaline, which is paramagnetic, became diamagnetic when its axis was horizontal.

Bancalari observed that flames were repelled by an electro-magnet.

Joule showed that the magnetism of an electro-magnet was not simply proportional to the current.

Limitation of 16 oz. for letters repealed and power of fixing limit vested in the Treasury.

1848, Jan. 1 ... Electric Telegraph Company, founded by Sir William Fothergill Cooke and Joseph Lewis Ricardo, opened its first offices in London and large provincial towns.

Highton devised a method of selecting electrically one of a number of magnets so that the desired letter could be printed.

Mimault, of France, patented a telegraph system in which letters were printed at the receiving end. He employed the five-unit method of transmission.

Telegraph poles creosoted by John Bethell's system erected between Portsmouth and Fareham.

Lord Palmerston predicted that the day would come when telegraph communication with India would be established.

Mason invented the Induction Coil.

Armstrong experimented with a submarine cable in the River Hudson and suggested that a similar conductor should be laid between America and England. Werner Siemens exploded torpedoes by means of electric cables in Kiel Harbour.

Jacob Brett suggested that the current generated in the armature of Wheatstone and Cooke's magneto-electrical machine should be sent through a coil of wire surrounding the magneto, so as to increase their strength.

Wertheim investigated the production of sounds during magnetisation.

1848 ... ... John Henniker Heaton born. Sept. 8.

Henry and Edward Highton patented a printing telegraph system.

John Dicker, Inspector of Mail Coaches, improved the method of exchanging mail bags on Travelling Post Offices.

Registration fee for letters reduced to 6*d.*

"Book Post" established at the suggestion of Sir Rowland Hill. Rate, 6*d.* a pound.

1849, Jan. ... C. V. Walker connected two miles of gutta-percha-covered copper wire to the landlines at Folkestone and, taking the free end out to sea on the steamer "Princess Clementine," exchanged messages with London.

Louis Napoleon, President of the French Republic, granted a concession for landing a cable from England.

1849 ... ... Charles and Edward Bright devised a method of locating faults on telegraph wires from a distance. Feb.

Paris-Lille telegraph line extended to Calais.

Paul Julius Reuter established a telegraph system between Aix-la-Chapelle and Berlin.

House invented a printing telegraph with a piano keyboard and a typewheel at the receiving end by means of which letters were printed on paper tape at 30 words a minute.

Nollet invented a compound magneto machine giving an alternating current.

Foucault introduced hard gas carbon pencils to take the place of wood charcoal in Davy's electric arc lamp. Gaudin used wood charcoal treated with liquid hydrocarbon.

(J. B. L. Foucault, V. L. M. Serrin, Jasper, Lever and Lontin introduced various devices for regulating the arc.)

Company formed to lay a cable between England and France.

The New Zealand Company revived the proposal for a Colonial Money Order system. Post Office prepared a plan but various difficulties prevented its adoption.

1849, Oct. 3 ... Agreement relating to the provision of telegraphic communication signed by Austria and Prussia.

1849 ... ... John Ambrose Fleming born at Lancaster. Nov. 29.

Net revenue of Post Office, £840,787.

1850 ... ... Question of rural posts reconsidered and it was decided that a post should be established when it would pay its way.

William Sturgeon died.

1850 ... ... Single copper conductor, covered with gutta-percha, laid across the Channel, between Dover and Cape Gris Nez, and signals were exchanged, but, during the night, the wire broke. Aug. 28.

John Mirand invented the "trembling" electric bell.

Breguet developed and improved the electric bell system.

Hipp, of Neuchâtel, fitted up an electric bell system in the Chamber of Deputies, Berne.

Brett and House patented a printing telegraph which modified House's instrument patented in 1849.

Morse recorder introduced into Great Britain.

Henley introduced his quadrant electrometer and a quadrant electroscope.

Henley and Forster patented a magnetic needle telegraph composed of two deflecting needles.

Sinsteden and H. Wilde devised electric machines in which small magnetos produced the current required to energise the electromagnets of a larger machine.

Ruhmkorff devised a magneto-electric induction coil.

Walker, of South Eastern Railway, made a series of tests of speed with the two-needle apparatus. Greatest speed 20½ w.p.m., average, 16¼ w.p.m. He also devised a carbon and zinc battery.

Prussia, Austria, Baden and Saxony came to agreement as regards rates for telegrams.

Highton and colleagues formed the British Electric Telegraph Company.

Electric Telegraph Company dealt with 66,600 telegrams during the year.

Over 7,000 miles of telegraph wire were in use in England.

1851, Jan. ... Farrar, writing of the electrical reproduction of sound, said: "If the current power could be varied by some slight variation of a vibrator, to be affected by the atmosphere as the tympanum of the ear is, the supposition is that the sounds of the voice might be reproduced."

Prospectus of British Electric Telegraph Company issued and public subscriptions solicited. L. & N.W. Railway withdrew from undertaking to permit construction of telegraphs over their lines and arrangements were therefore made with the Lancashire and Yorkshire Railway.

Paul Julius Reuter started a telegraph service in London.

Lippens, of Belgium, improved the telegraph instruments in use on French and German railways.

Silvanus Philips Thompson born at York.

Hans Christian Oersted died.

Tebbets (U.S.A.) and Gisborne (Brit.) obtained concessions from the Newfoundland Government and formed the Electric Telegraph Company of Newfoundland.

Cable laid across river Tennessee.

E. F. Weber developed a definite system of electrical measurement expressed in absolute units.

Telegraph wires, insulated with gutta-percha placed underground between Liverpool and Manchester in deal troughs.

1851 ... ... Oliver Joseph Lodge born at Penkhull, Staffordshire. June 12.

Manchester telegraph wires laid underground in iron pipes, cast in halves, longitudinally.

Wurtemberg signed the Austro-German telegraph agreement of 1850.

Jacob and J. W. Brett offered to lay a cable between Holyhead and Dublin for a subsidy of £20,000—the Government to have free use of the line—but the offer was declined.

Gisborne and Smith introduced an insulator for telegraph wires.

Magnetic Company laid underground lines in troughs, and protected by tarred yarn and gutta-percha, from Dover to London and Birmingham. Dessication set in and the lines were placed on posts along the highway.

Semaphores removed from roof of the Admiralty office and substituted by electric telegraph.

Wheatstone's needle telegraph used to connect Great Exhibition Building in Hyde Park with Police Headquarters, Whitehall.

1851, Oct. ... Austro-Germanic Telegraph Union formed in Vienna. Morse code adopted.

1851, Oct. 9 ... Attempt made to lay Port Patrick-Donaghadee cable, but owing to gale it was cut and abandoned.

1851, Oct. 17 Four-conductor cable laid between Dover and Calais by the hulk "Blazer" under the supervision of Mr. Crampton, of the Submarine Telegraph Company.

1851, Nov. 13 Dover-Calais cable opened for public use. Cable composed of four copper wires, each covered with a double layer of gutta-percha, twisted together with tarred hemp, the whole being covered with tarred cord and then wound round with a ten-strand wire rope.

1852, March ... Travelling Post Office established between Chester and Holyhead.

1852, June 1 ... Holyhead-Howth cable laid.

1852, July ... System introduced for conveying Greenwich Mean Time to various parts of England by telegraph. Electric Time Signal Bell and a clock were installed at the Electric Telegraph Office at 448, Strand, London.

Sir Charles Bright patented a double roof insulator for aerial telegraph wires.

English and Irish Magnetic Telegraph Company formed. W. T. Henley's magneto electric double needle used. Underground wires laid between London, Birmingham and Manchester, and from Preston to Carlisle, Dumfries, Glasgow and Greenock. Six underground wires laid from Dumfries to Portpatrick to meet the Irish cable. In Ireland underground lines laid from Dublin to Dundalk, Newry, Belfast and Donaghadee. In towns 2½-in. cast-iron piping was used, but in the country wooden troughs with galvanised iron lids were utilised. The stability of these lines rendered the company successful and prosperous.

Bright patented a system of winding coils for obtaining a greater determination of polarity.

1852, Aug. 10 Association formed for promoting cheap Colonial and International Postage. President—Earl Granville.

Bright patented a repeater for retransmitting telegraph signals. This was adopted by the Magnetic Telegraph Company.

Cable laid between Cape Breton and Nova Scotia.

M. G. Farmer, of U.S.A., conducted some successful experiments in synchronised multiplex telegraph working.

Charles Bright patented a curb telegraph key for working long cables with alternate currents.

Paris-Baden direct telegraph communication opened.

Hanover, Holland and Mecklenburg-Schwerin signed the telegraph agreement of 1850, the contracting parties being known as *l'Austro-Germanique*.

Bright patented a metallic riband for the protection of submarine cables.

1852, Oct. 4 ... Belgium, France and Prussia signed a telegraph treaty in Paris and formed *l'Union des Pays Occidentaux*.

France and Switzerland came to agreement on telegraph rates.

Bright took out a patent embracing 24 distinct telegraphic inventions, including the insulator and shackle for aerial telegraphs, a means of locating faults on subterranean or submarine cables, coverings for submarine cables, the "Bell" telegraph instrument, automatic relays, and a standard galvanometer. (Between 1852 and 1888, he introduced no less than 119 inventions.)

Breguet devised a telegraph apparatus with two indicators giving signals similar to those of the semaphore at a speed of 40 letters a minute. Two wires were required.

1852, Nov. 1 ... European and American Electric Telegraph Company established to form a link between the two submarine companies and London and cities beyond, opened the line between Dover and London.

1852, Nov. 13 Direct telegraph communication opened between London and Paris. Breguet's apparatus unsuccessful, so Wheatstone's Double Needle used. Thanks of the Submarine Telegraph Company sent to the Prince-President.

1852, Dec. ... 24,375 miles of telegraph wire in U.S.A.

1853 ... ... J. B. Lindsay transmitted messages across the Firth of Tay without continuous wires.

1853, May 6 ... First Anglo-Belgian telegraph cable laid by ship *William Hutt*, attended and aided by H.M. ships *Lizard* and *Vivid*.

1853, May 23 Port Patrick-Dohaghadee cable laid by the ships *William Hutt*, *Conqueror* and *Wizard*. The English and Irish Magnetic Telegraph Company controlled the cable.

1853, June ... Switzerland and Sardinia came to agreement on telegraph rates.

1853, June 20 London-Brussels telegraph service opened by Chartered Submarine Telegraph Company.

(*To be continued.*)

THE

Telegraph and Telephone Journal.

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CONTENTS.

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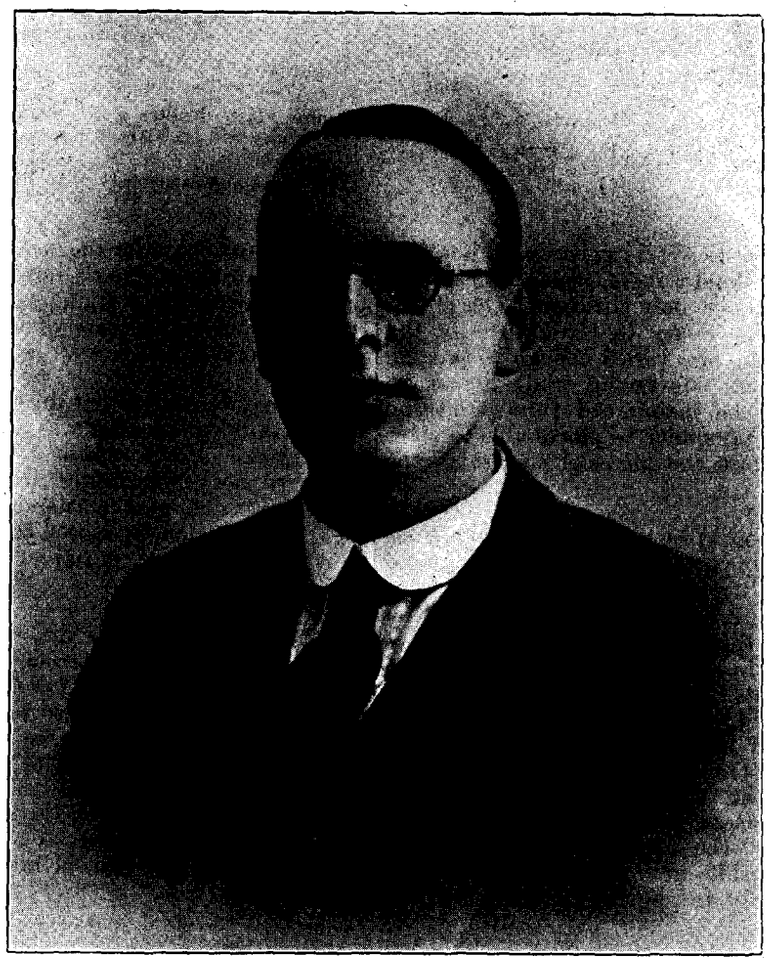
All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.4.*

TELEGRAPH AND TELEPHONE MEN AND WOMEN.

LIV.

MR. W. R. BIRCHALL.



WALTER RAYMOND BIRCHALL was born in 1888, was educated at Westminster and Trinity College, Cambridge, joined the Secretary's Office in 1911, has served in the Telegraph Branch and Foreign & Colonial Branch, and as private secretary to Mr. (now Lord) Illingworth, and is now a Principal in the Telephone Branch.

It is easiest to describe him by stating what he is not. On the one hand he is emphatically not the "born-in-the menagerie" type of Civil Servant with whom we are all familiar,—the sort of man who can hardly be imagined as other than a Civil Servant or even as performing any other function than that which he actually performs. Although most of Mr. Birchall's official career has been connected with telegraphs and telephones, the connexion seems almost fortuitous; in any other branch of the service or in any outside business or profession he would certainly have made his mark. On the other hand, he is equally far from being the dilettante amateur (a type fortunately not common at St. Martin's). For years he performed with distinction the Wayleaves Duty, an arid work that would have driven a dilettante to suicide. By reason of his freshness of outlook and his quick grasp of the essentials of a complicated problem, he is frequently chosen as the victim for any special work that requires to be done; how he succeeds in combining one of the hardest and most exacting duties in the Office (the development and accommodation of the telephone service) with half-a-dozen or so of these special jobs, and yet preserves his imperturbability, his sense of humour, and his lightness of touch, is the admiration and despair of his colleagues.

He is almost invariably accompanied by a little curved pipe; and the photographer, by omitting the pipe, fails to do him justice.

THE TOURIST TROPHY RACES.

NOT to have witnessed a Tourist Trophy race is to have missed a thrill equal to, and more sustained than, a close finish in a classical horse race, or the knock-out blow in a championship contest, and it follows that so interesting an event must offer special attractions to motor-cycle enthusiasts throughout the country.

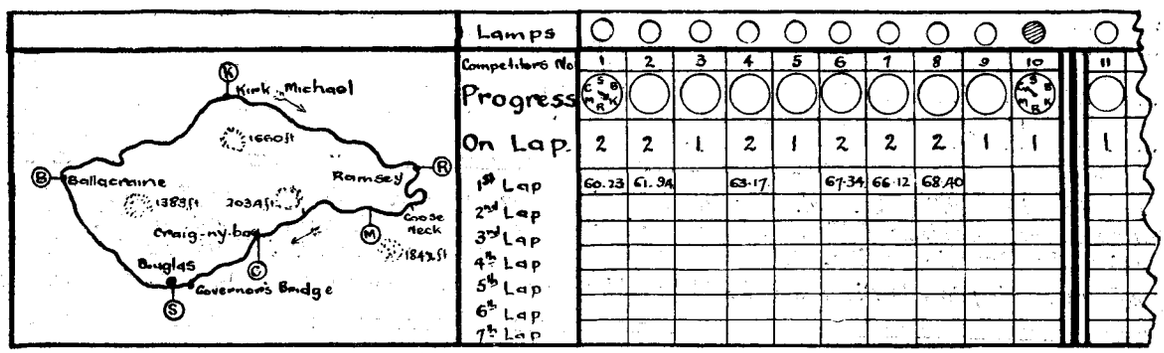
This enthusiasm is reflected at the railway termini in Liverpool during the week-end preceding the races, and the north end of the landing stage, at which point the Isle of Man steamers are berthed, presents a particularly striking scene of intense activity.

On Friday, June 1, motor-cycles of all shapes and sizes, shepherded by men, also of all shapes and sizes, together with a large crowd of passengers, were quickly embarked on four steamers, and before noon over twelve thousand people and five hundred motor-cycles were on their way to the Isle of Man.

traffic. The compactness of the Island and its insularity allows the authorities to close all the roads used for the course, both for the races and for the practice runs, and farmers and other owners of live stock are under request to ensure such stock being prevented from straying over the course.

The distance covered by the riders, 264 miles, on seven laps of the course affords a severe test to see which is well worth the sea crossing.

The Press throughout the country gives wide publicity to most of the items of interest connected with the trials; photographs of successful riders are reproduced; crash and other incidents are dwelt upon, and all occurrences calculated to afford interest and light reading are set out in the inimitable manner common to journalism, but little is mentioned of the care and forethought given by the numerous officials in order that the trials may be carried out smoothly and without hitch, so that the maximum interest may be afforded to the spectators. Perhaps this is rightly



CONTROL BOARD.

Points of Communication.

S.	The Start and Finish.			
B.	Ballacraine,	8 miles.	Ht.	207 ft.
K.	Kirk Michael,	14 „	„	130 „
R.	Ramsey,	24 „	„	60 „
M.	The Mountain Bungalow,	31 „	„	1,400 „
C.	Craig-ny-Baa,	34½ „	„	791 „

Explanation of Readings.

Competitor No. 1 has passed Kirk Michael on his 2nd lap. Speed on 1st lap 60.23 miles per hour.

Competitor No. 10. Last point on Progress Clock. Craig-ny-Baa on 1st lap.

Lamp Flash denotes signal from Governor's Bridge. Rider will pass Grand Stand within one minute of flash.

Bell rings simultaneously with flash.

There has been some loose criticism recently regarding the choice of the Isle of Man for the Trophy races, mainly due to the sea trip, but the reasons for the choice defy criticism. This choice is founded on the main factors necessary to the success of the trials. The course must be difficult and varied enough to provide the supreme test for the machines undergoing trial; its shape must allow adequate control to be maintained throughout the race, and its situation must be in proximity to places able to cater for a crowd large enough to secure the financial success of the undertaking.

Communication by telephone must be established at numerous points on the course so that the spectators on the Grand Stand at the point called "The Start" may be made fully cognisant with the progress of the riders. It has, in fact, been stated on numerous occasions that without the admirable telephone arrangements extant, the public interest in the races would be insufficient to meet the financial requirements.

The Isle of Man offers better facilities of this kind than any district in Great Britain. Douglas out of season can accommodate with ease all who desire to see the trials. The course runs close to many points having permanent telephone and telegraph communication with Douglas, and the keen interest taken in the races by the local inhabitants results in ordinary business being brought almost to a standstill, thus freeing the junctions for race

so; the public pays for the goods and is entitled to delivery without fuss. However, the more discerning of the spectators must have pondered over the working of the control board, and it is in connexion with this piece of apparatus that the telephone staffs were concerned.

It may be stated that during the period of the trials this year, the Manx telegraph staff was augmented by fourteen telegraphists from Liverpool, and representatives from the Engineering Departments of both Manchester and Liverpool, and of the Liverpool telephone traffic, were in attendance. The Inspector of Engineering for the Isle of Man, by reason of his local knowledge and experience, acted in the capacity of liaison officer between the T.T. Committee and the Post Office.

The temporary lines thrown out to points on the course were of rubber-covered wire carried on any available supports, in much the same fashion as was followed during the war, and a special separate circuit was provided to link up Governor's Bridge, a point three-quarters of a mile from The Start on the inward journey. These arrangements existed for the practice runs undertaken during the two weeks prior to the race, as well as during the race week.

The control boxes stood high above the Grand Stand, facing The Start, and the control boards were situated on the opposite side of the course.

From the diagram representing the control board, it will be seen that on the left is a map of the course; points of communication being marked by initial letters. The board is divided into sections, each section providing similar facilities for reporting progress of ten riders.

The numerals on the top of the board below the lamps correspond to the riders' numbers, and the initial letters on the progress clocks below coincide with those on the map denoting the points of communication.

Each section has two boy scouts in attendance perched above and behind it, one being in continuous telephonic communication with the control box by means of a head set, the other controlling the dial fingers of the progress clocks from behind, thus showing the progress of his riders at the various points on the course. At the front of the board two boy scouts tear off the proper leaf of the calendar-like arrangements against "On Lap" as the riders flash by, whilst another official paints the figures showing mileage per hour on the corresponding squares below.

The lamps on the top of the board acting in conjunction with a resonant bell are controlled by pushes situated in the control box, and it is in connexion with these that the circuit between Governor's Bridge and The Start is installed. As a rider passes Governor's Bridge on the inward journey, the control box is signalled, and the operator there presses the push allocated to that rider. The corresponding lamp flashes and the bell rings, thus communicating instantly to the spectators that a particular rider will pass the Grand Stand within a minute.

As each rider is sent off at half-minute intervals, it will be seen that, particularly at the commencement, the operators in the control box must work with a high degree of speed in order to maintain the supply of information to the control board which, in view of the large number of entries, is built up of many sections. Actually the control box and board were duplicated in order to provide a north control and south control, thus enabling the boards to be observed from all points on the Grand Stand.

The time-keepers were situated on the right of the control board and the checked figures were passed along an arrangement similar to the mechanical cash carriers in a large store. Any considerable delay of a rider due to crash or other incidents is, of course, observed by the spectators on the Grand Stand. For instance, considerable interest is taken in riders like Simpson, Handley or Bennett. They are signalled on the Progress clock to have passed Kirk Michael and should in ordinary course reach Ramsey in less than 10 minutes. If the indicator on the relative Progress clock is not moved in that time, something has gone wrong, and details are conveyed to the spectators on the Grand Stand by means of the new type loudspeaker megaphone, their attention being first attracted by the sounding of a klaxon horn.

In looking through the numerous descriptions of the races, the writer noticed a small paragraph paying tribute to the efficiency of the control. The following extraction from the paragraph, headed "T.T. Telephone Arrangements," may be quoted:—

> "We are apt to overlook the fact that year after year things run so smoothly at The Start and spectators on the Grand Stand are kept splendidly posted with almost every incident of note on the 37½-mile stretch. This is a wonderful achievement and reflects great credit on the Telephone Department's staff. The provision of this fine service entails considerable thought and enterprise, carried out unobtrusively, and it is seldom given a thought by the public, but it is a fine work, well done."

In conclusion, I would like to express thanks to Mr. R. A. David, Liverpool Telephone Traffic, for information received, and it might be mentioned that a visit to the Isle of Man in June provides a splendid holiday. The country is then at its best.

T.T. TRIFLES.

A lonely mountain road whose windings turn
To follow by the tumbling sparkling burn
Wherein the rainbow trout besport themselves.
The bluebelled paths step down in serried shelves;
The sheep unheeding wander through the ling;
The hawk above, poised still, on outstretched wing;
The crane, mysterious, silently alone
Seeks what he can, by crag and stream-washed stone
The heather bloom and gorse the hue of flame,
The peaceful silence, seeming nature's aim
To look upon the valley and the sea
Serene and calm: to live contentedly.

The mountain road, now crowded at each turn;
Standing behind the harebell, cowslip, fern,
A throng expectant, strained, intent for thrills,
Watch steadily the saddle, twixt the hills.
A cloud of dust, a sharp staccato shriek
Foretells approach of grim and crouching freak
All leather padded, armed against the crash
That oft-times comes when round the corners flash
Machines keyed up by latest-known device:
Mobility, immobile in a trice.
Thus industry to nature pays its due
For using nature, building things anew.

C. H. HAYCOCKS.

RETIREMENT OF MR. T. B. JOHNSON, M.I.E.E.

(Superintending Engineer, N.E. District, Leeds.)

WHEN Mr. Johnson came to Leeds, there were umpteen telephone stations, exteen miles of open line, oxteen miles of underground and one official cat, and it was indicative of his remarkable personality that within two days there were umpteen telephone stations, exteen miles of open line, oxteen miles of underground, one official cat and three kittens . . . But for Bennett of St. Martins Le Grand, a sketch of Mr. Johnson's character and career would perforce have started and continued on such lines, and the thanks of the Service are due to Bennett for his satire.

Recently, in the Press, leading men have been writing of "Who I am" and "How came I," and although I cannot give the authorised geneological tree of Mr. Johnson, I am confident of the fact that at the roots of that tree we should find on the paternal side, a King's Jester. One who, in moments of national emergency, when panic was seizing the Court, could, by a jest full of wisdom, cause the balance of judgment to be maintained irrespective of the forces on either side pulling their full weight, and the fiercer the struggle to upset the balance, the more the wisdom and subtlety concealed in the jests. Yes, there is a King's Jester amongst the roots, and the qualities of such a person are clearly shown in the branch of the tree.

On the maternal side, deep down, there must have been a heavy-jowled church dignitary, with a face of thunder, a voice of rolling drums, an April sunshine sparkle of eye, and a general attitude of preparation for the fighting of any cause which tended to lower the standard of mankind.

He would have many difficulties to settle, and in the settlement, maintain unity. He did not believe in sitting on the hedge. . . . Hedges divide. . . . He was for unity and rather than sit on a hedge and, from that position, endeavour to placate the peoples on both sides, he would cause the thunder clouds to gather, the roll of the drums to be heard, the hedge to be torn up, and the hitherto divided people would then commingle and find that they had much in common, and in that commingling the April sunshine would have its hope-reviving effect . . . and the hedge was not replaced.

The spirit of the mediator ever hovered around Mr. Johnson, and that spirit, reinforced by the spirit of the wise Jester, made up the whole of his personality. In all his actions one or the other spirit took control, with results readily imagined.

List ye to the Spirits!

The King's Jester (on receiving an endorsement from Headquarters wherein there is concealed the bite of a serpent or the sting of a wasp).

Well, that's a thick 'un! Let's put it aside till to-morrow and then, methinks, I'll draw the sting.

(On arrival of friends from the Accountant-General's Department.)

Welcome! Whilst ye know nothing of engineering, I recognise that it is not necessary to be a hen in order to decide whether an egg is satisfactorily boiled. Test the eggs. Some you will find good, and perhaps some a little fresh!

The Heavy-jowled One with the Twinkling Eye.

No man is a true leader whose impulse is selfishness. Cultivate a balancing mind: no one proposal holds all the advantages and no disadvantages.

On the example of a Supervisor depends the morale of the staff under his control. On the staff's confidence in the integrity and straightforwardness of the Supervisor depends the efficiency of the District.

Work is not an evil and leisure an unmixed good, but the wise combination of work and leisure gives joy in the performance of either.

Tact is sympathetic insight; the reading of the other man's mind, coupled with kindly consideration.

Mercy does not mean weakness. An operation is painful, but it is merciful, inasmuch as after the knife, comes ease. The weak spot—that which has let us down for months—is cleared of disease, and becomes healthy once more. Mercy many times calls for the use of the knife.

The surgeon's joy is not in the use of the knife, but in the clearing away of the disease and the alleviation of pain.

After over 44 years in a Service, governed by regulations, precedents, etc.—a service said by outsiders to make all men follow in the rut made by his predecessors, it is remarkable that a man can finish up as did Mr. Johnson. Red tape did not bind him—he used it as a decoration. Ruts could not hold him—there was no joy of life in a rut, and as he came along the Service road, finding well-worn ruts, he levelled them out and made of them pleasant pathways. He left flowers where previously there had been stones, and a well-beaten track, and in the cultivation of flowers there is much hard work, but in that he gloried, seeing the summer's glory in the winter's dark days, and the vision drew him; and when summer did come, the display amply repaid for the winter's work.

There was nothing stereotype about him. He saw things from an unusual angle. He could detect a difficulty ere it presented itself and that faculty enabled him to be fully prepared when the time came to deal with the difficulty.

No comments are necessary about his organising ability, his high efficiency, &c., as there are hundreds of similar giants in the Service, but it was his humanity, that spirit of fighting any cause which was tending to lower the standard of manhood, which gave him just that little extra height, which made him stand out from amongst the ordinary giants.

Consequently, he was an unusual character; unusual owing to the fact that, whilst he possessed all the characteristics of other Service giants, he held a "something," a secret known only to men of deep spiritual insight and purity of purpose, which placed him in a position calling forth not only the admiration of his fellow men but their love, and the love of man to man is even greater than the love of man to woman.

Officially, the list of his achievements is obviously a lengthy one, but on Nov. 11 each year he called his Headquarters staff together at 11 a.m. . . . and prayed with them . . . as those who knew him would expect him to do. The greatest action of his career.

Courage! and such courage must have given great joy to his heavy-jowled ancestor, and brought tears of happiness to the eyes of the jester.

G. H. H.

LECTURES AND DEMONSTRATIONS ON THE TELEPHONE SERVICE.

SOME UNOFFICIAL NOTES. BY A. E. COOMBS, GLASGOW.

THERE was quite a flutter at Glasgow in the early summer of 1927 when it was first known that Headquarters had it in mind to send a model operating set to the district, for use during the following autumn and winter at, or in connexion with, public lectures on the telephone service, on the assumption that a sufficient number of these could be arranged by the local staff. May I say that right from the outset we had no doubt whatever as to whether or not we *could* carry out the scheme, our energies were therefore directed to the discovery and adoption of ways and means best calculated to achieve maximum results.

GLASGOW LECTURE PARTY.

Back Row (left to right).—V. W. Grace (Telephonist); E. J. Johnson, Traffic Superintendent; J. M. Hamilton, Asst. Traffic Superintendent; J. S. Drennan, Asst. Supervisor; G. Hunter, A.T.S.; A. E. Coombs, District Manager; A. B. Miller, Telephonist; E. E. Wilkins, A.T.S.

Front Row (left to right).—A. E. Higgins, A.T.S.; A. L. Wood, Asst. Supervisor; W. Palk, A.T.S.; J. D. Weir, Telephonist; R. C. Love, Engineering Officer; C. Downie, Telephonist.

In the first place a small and representative committee was set up, which immediately got to work on essential preliminaries. To begin with, our staffs, and the Postmasters of the district, were circularised regarding the scheme so that those who were interested in literary societies, guildries, clubs and kindred organisations could make this known, or could advise us as to whom we may write. We then secured the help of the local press, who inserted short paragraphs from time to time, and last, but not least,

we sent personal communications to local public men setting out the scheme in brief and asking their help in generally broadcasting this.

Each of these methods was productive of results and a programme was gradually made up until, by the end of August, 14 lectures had been arranged, while negotiations were in hand for a number of others.

Though the demonstration had been given at other places, and the experience gained thereby was available for us (this was most helpful) we had practically to recast the scheme to suit local conditions. Even then, before we appeared in public, a full-dress rehearsal was carried out at the Operating School, which was attended by a large number of the staff, who had been asked to act the part of a critical public. I can assure my readers that the Lecture Party was put through its paces in very thorough manner. If you want a real critic, one from inside the Service would leave little to be desired !

The criticisms were relevant, constructive, and helpful, and the officers who were taking on the duty of lecturing to the public were much helped thereby.

Notwithstanding earnest study and close application, we were not without a certain measure of anxiety when the time arrived for our first public appearance. On Wednesday, Sept. 21, 1927, we made our initial bow to a gathering of 183 people, but the proceedings had not gone very far before we sensed success, while the Chairman's eulogiums at the close made us feel that we had at least made a good start.

Not so anxious perhaps, but still a trifle nervous, we set out for our second meeting on the following Friday, Sept. 23. The assembly this time numbered 121. There was again no need for worry, as our audience warmed to us from the first, and, when they had got over the shock of Public Department Officials coming to them to speak of their work, and on the aims of their Service, they were most enthusiastic.

There were many questions asked and answered at this meeting, and the proceedings terminated once again on a very happy note. Incidentally, the Chairman, who with his audience was evidently at a loss to understand why the Department was doing this, said to me in an aside :—

" This is very nice, you know, but where is the catch in it ? "

Other meetings quickly followed ; all types of organisations were covered, in the city itself and in different parts of the district. Naturally we learnt as we went along and soon found the best way of getting our audiences into step with us. Waste effort was cut out ; figures were adjusted to the simplest form possible and were used in picture phraseology rather than as mere statistics.

I made use of written notes for the first few meetings ; gradually these were reduced to headings on a small card, then even the card was abolished. It is far better to talk to an audience than to read to it ; moreover, if a lecturer must read all he has to say because he cannot trust his memory how can he expect his listeners to remember ?

Our last lecture was held on Wednesday, April 4, 1928. Including this, we had held 33 public meetings and given the lecture and demonstration to an aggregate attendance of 4,067 persons, which works out at an average of 123 per meeting. Our maximum attendance was 306 and our minimum 53.

Our experiences were varied and often humorous. At one meeting, while I was answering a question, I could not understand why the audience was so amused ; when I turned round I found the Chairman wandering round the set examining the multiple jacks to find out which were real and which were not. This same Chairman, at the end of the meeting, said that as they had Post Office people amongst them, they had better close by singing the " National Anthem." We knew what he meant but lots of people might have misunderstood.

At our last meeting, the Chairman, in closing down, said something like this :—

" Now that the Post Office people have finished, let us all sing the Doxology " !

Again, this might have been misunderstood, but we knew what the gentleman intended, so we didn't feel hurt ; rather the contrary, in fact.

The foregoing are typical of many other incidents from which we extracted a maximum of enjoyment. One case I must not miss. One of our Chairmen was inclined to be critical, in quite a friendly way, but before I had an opportunity of answering him a member of the audience got up and gave him a rare tousling, to the evident enjoyment of everyone, not excluding the Chairman himself.

At this same meeting, when dealing with the vote of thanks, I told a few stories which were apparently enjoyed. One small boy in the second seat from the front and two elderly gentlemen at the back were so tickled that it was difficult to terminate the proceedings, for, like Oliver Twist, they clamoured for more—our friendly critic, the Chairman, amongst them. So much for the inside " atmosphere." When we got outside it was blowing and snowing so much that before we reached our homes we were not unlike explorers newly arrived from the Arctic regions !

Incidents like these could be repeated in many and varied ways, but space is too limited for their reproduction here.

There were times when the weather was not too kind to us. It will be known generally that, on occasion, last winter served up extreme samples in different parts of the country. Glasgow did not escape these visitations and some of them appear to have been reserved for our lecture nights. On one occasion, in October, it was really unsafe to be walking the roads in the vicinity of roofs and chimney pots, and the rain—when it rained—made no mistake about it ; yet 66 people turned out to welcome us. On another occasion, in January, it poured for twelve hours on end immediately before the lecture and during the meeting we thought another world flood was imminent, yet we had an attendance of 145, and a gloriously happy time to boot ! The next worst time was immediately after a series of blizzards, a thaw, and the beginning of another frost. The snow was quite six inches deep and the hall at which we were speaking stood on a slight eminence ! All these handicaps notwithstanding, an audience of 125 turned up, and I don't think they regretted doing so.

Our meeting policy throughout was to get away from the obvious, or the orthodox. The unexpectedness of this intrigued our audiences and made them more ready to listen to, and to assimilate, what we had to say. I am sure that many folk had the surprise of their lives when they discovered how human we were and that we could smile with them even if the laugh was against ourselves.

This proceedure got us on common ground right away. We were " in tune " with our listeners from the first. Naturally a favourable atmosphere quickly resulted, so that, in the end, we spoke to each other just as we were thinking. There was no need to strain for diplomatic phrasing in order to ensure technical rectitude and politeness. On no occasion did we attempt to talk " at " anyone, neither was there any attempt to talk at us. At each meeting the result was a happy climax and a mutual respect that must bear good service fruit.

Perhaps a brief summary of procedure will be of interest.

The lecture was advertised generally as being on " The Telephone Service from Within." Before each meeting the Chairman and the lecturer had a few words together regarding procedure. In the meeting proper the Chairman opened the proceedings, introduced the lecturer and handed the meeting over to him for the time being. The latter then introduced the main topic of the evening by a talk in general terms regarding the Post Office Telephone Organisation. Co-operation with and by the Public. Criticism—Informed and Uninformed, Constructive and Destructive. Education—in Telephone Matters—of Post Office Staffs, Subscribers' Staffs and Subscribers. Costs, Ineffective Calls, and so on. The talks were adapted to the audience and followed broadly the same lines on each occasion, but the points concerned would be dealt with in different manner and, so far as practicable, in a way that would be best appreciated and understood by the particular gatherings concerned. The " occupied time " approximated to 30 minutes.

By the end of the talk—we called it a lecturette—the audience had usually warmed up to the proceedings and were in good mood for the demonstration, which was accompanied with step-by-step explanations of the set and of operating procedure, the connexion of calls between telephones placed in different parts of the hall, and finally, specific examples of how service and call difficulties arose and the best ways of avoiding or dealing with these.

This occupied a further 25 minutes, after which the meetings were thrown open for discussion, questions, or further explanations, when required. As a general rule, these took another 30 to 40 minutes and, as the opening and closing formalities extended to 10 or 15 minutes in addition, the average aggregate time per meeting approximated to two hours.

The lectures, or "lecturettes," were given by the Traffic Superintendent or myself. The demonstrations by one of the two Assistant Supervisors attached to the Operating School. The operating by two of four telephonists selected from the many who had volunteered for this work. The part of the subscribers was taken by two of four junior Assistant Traffic Superintendents, and the Engineering Officer in charge of the set.

A further interesting feature of the session consisted in the giving of the demonstration, at a series of meetings, to members of the Accounting and Contract Staffs, followed by specially conducted visits to the Central Exchange. These meetings were held in the Operating School during the period round about Christmas, when no public lectures were taking place.

There can be no dubiety, I think, as to the advantage of this, particularly to officers who may have had little—if any—opportunity of acquiring knowledge regarding operating procedure and who may not even have seen one of the larger exchanges under normal working conditions.

The lecture party was greatly encouraged, as the scheme was being developed and carried out, by verbal and written expressions of appreciation from the different organisations and societies and by many complimentary press and magazine references. Our reception at all times left nothing to be desired and we shall always recollect with gratitude and pleasure the hospitality and good fellowship we encountered on all sides. It is said that the North Briton is hard ; who said it I don't know, but the allegation is one which I shall feel constrained to dispute if, and when, I hear it again.

A prime factor in the case, also, was the team work of the lecture party. To be successful in a venture of this sort teaming is essential. I am convinced that the happy blending of officialism and humanity which prevailed at Glasgow, and the sincere desire of everyone concerned to make the scheme go, contributed in no small measure to the success of the lectures.

I have experienced nothing better in my official life and I must put on record my appreciation of the loyal and cordial support rendered throughout by the Traffic Superintendent and his staff, whose services were given not only freely but enthusiastically, and to whom nothing was a trial, and an adverse condition of any sort merely a difficulty to be conquered.

I am indebted also to the Engineering Staff concerned, who were equally anxious and desirous of making a big success of the effort. Particularly must I pay tribute to the officer in immediate charge of the set, who was a host in himself, and to the Engineer at Paisley, who rigged up and demonstrated on a special piece of automatic equipment for the benefit of the meeting held in a district served by an automatic exchange.

It may be that the scheme will be tried in other places. I hope it is, for, properly handled, it must react to the benefit of the Service.

As a final word may I say that it would be well to avoid heaviness and the ponderosity of platitudes and theories; it would be a mistake, also, to take up a defensive line of argument, even by implication. The average audience will take you at your own valuation and if you play the rôle of defendant, or apologist, it will quickly attack you or the system you represent. We set out from the first to state our case and to explain the service from an inside point of view. We had, and have, sufficient belief in our daily work to make us feel that we can hold our heads high in the knowledge that we are doing something that is worth while.

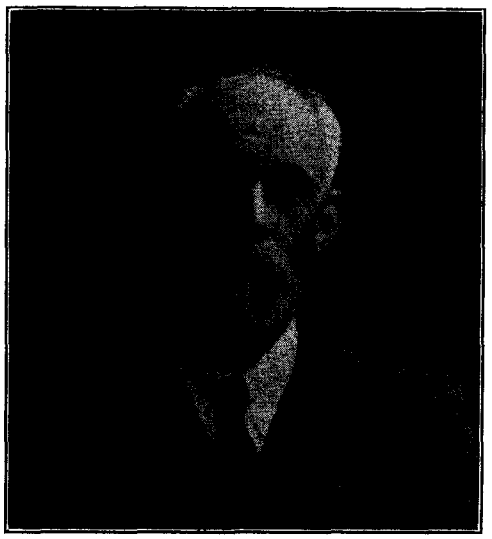
Our audiences responded to this; they studied the service with us; they sympathised with us; they laughed with us and, in the end, they very cordially agreed with us.

CREED & COMPANY'S TELEGRAPH WORKS.

IT is no exaggeration to say that the name of Creed is known throughout the world by every telegraph administration, privately or State-owned, and it was therefore with no little pleasure that the writer recently accepted a long-standing invitation to look over the offices and works of Messrs Creed & Co. Ltd., East Croydon. As will be seen from the photograph the new offices, only completed last year, are strikingly prominent and pleasantly situated at the corner of Cherry Orchard Road, and are another example of the happy and latter-day tendency of works and factories to get well outside the outer belt of the metropolis. There are excellent transport services, and the site was well chosen.

The new building has permitted the extension of the workshop space available made necessary by the steady growth of the firm, but now to the interior!

The ground and lower floors of the new building are occupied by the Administrative and Managerial departments, with the necessary clerical and auxillary services of both, while on the topmost storey is to be found the Drawing Office and accessories. The lighting of the Drawing Office, augmented as it is by special electric illumination is excellent, while all the fittings are well up to date.

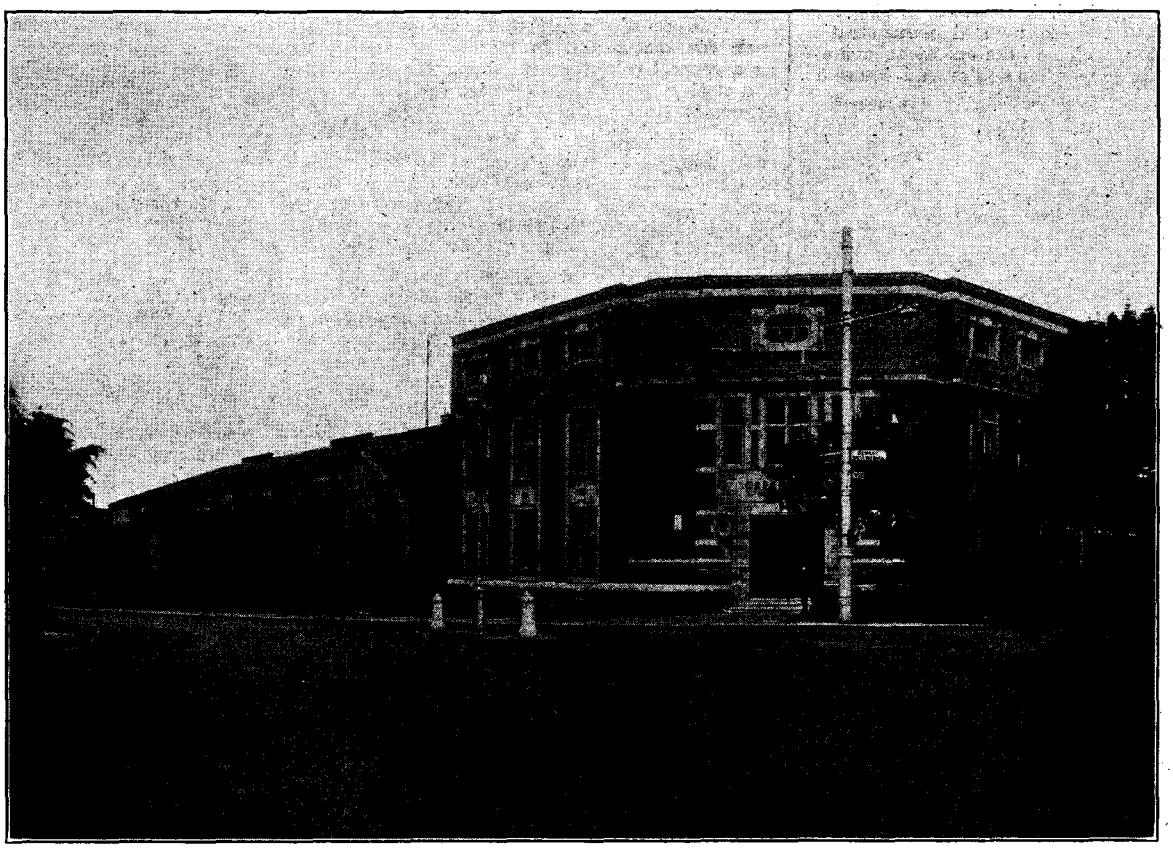


MR. F. G. CREED.

The machine shop, test-rooms, fitting shop, lacquering and electro-plating departments and joinery occupy space at the side or behind the offices and in some cases communicating directly with the latter.

A careful study is made of costs, and if no machine exists on the market for doing a particular job which could be done better and cheaper by that means than by hand, then thinking caps are donned and mechanical means are discovered for mass-production. I was shown an example of this in the case of a complicated cam-shaft (of which a large number were frequently required) the making of one of which by hand would have taken hours, turned out, while we watched the operation, in but a few minutes. This may not appear very wonderful nowadays, and in a large works where thousands are employed one would expect this to be done. The feature that appeared so striking was that a comparatively small engineering works of not more than four hundred employees should possess the organisation and the ready skill to cope with changing needs of this description.

This careful, constant, studious vigilance is a feature

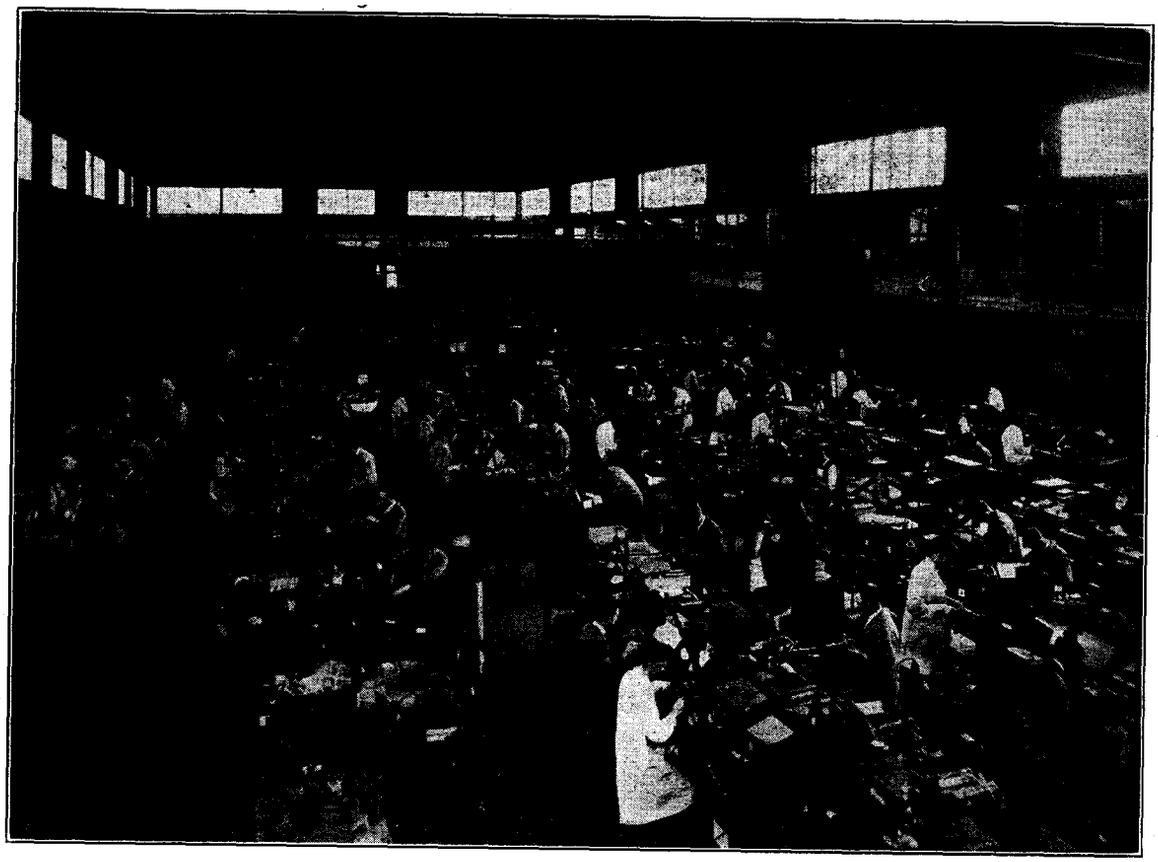


VIEW OF THE NEW OFFICES AND WORKS OF MESSRS. CREED & CO., ADDISCOMBE ROAD, EAST CROYDON.

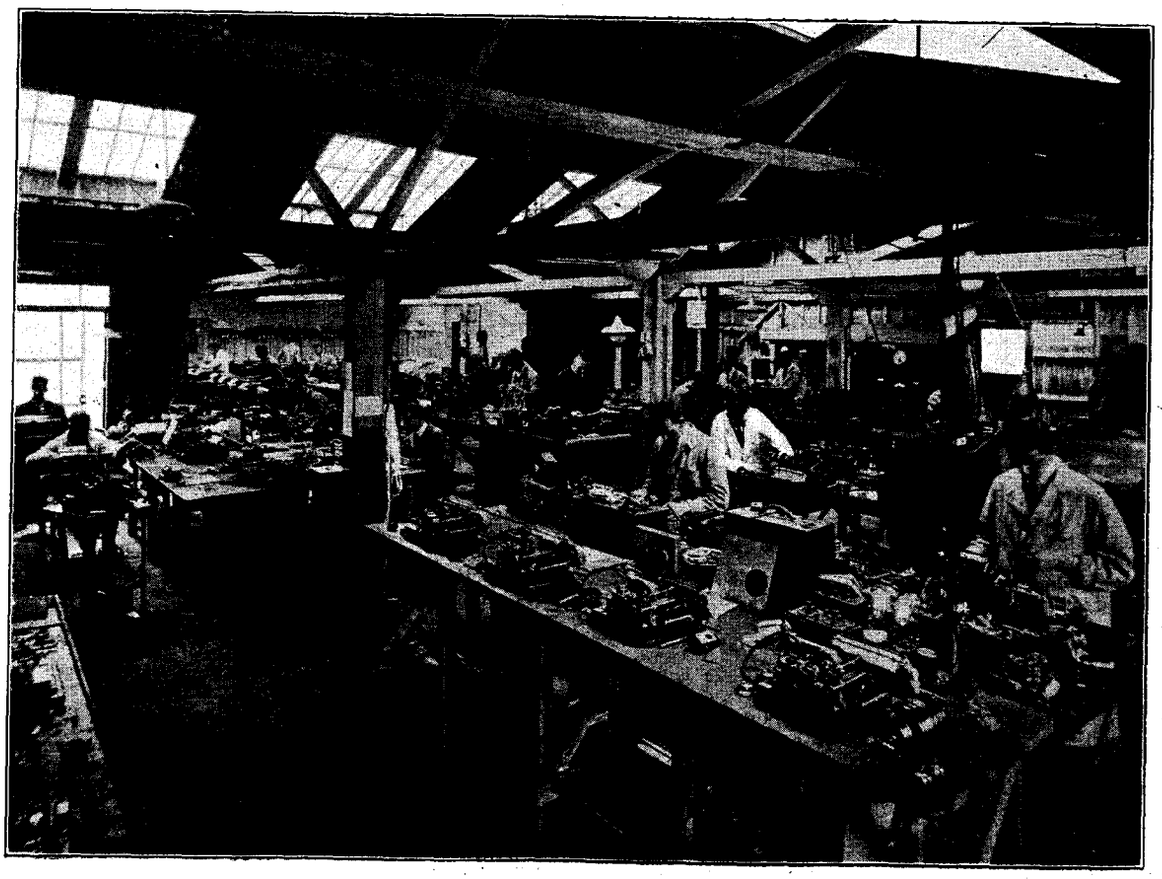
of the Creed organisation ; this close study and critical analysis of every method employed runs throughout the entire works and yet without pressure on any individual, so it would appear.

There is a "hush-hush" room here too ! Therein one can imagine the presiding genius working out new key-boards, new uses for cams and levers, new ways of doing old things and better at that. Yes, one saw one or two odd pieces of apparatus in the Research Room, the Experimental Den, call it what you will, but the writer was a guest, all that he will say is that this corner of the works only showed why the remainder of the machinery went so well. It said as loudly as mute things can speak, "If we don't *know* how or why, then we'll puzzle it out until we do."

In the final test room where apparatus is run for days and days under the most trying conditions to test-out far beyond the normal needs, one saw that these were really individual tests of apparatus not percentage tests, one here and there !



A PORTION OF THE FITTING ROOM.



A CORNER OF THE TEST ROOM.

One thousand relays ? Then one thousand relays will each be tested up to the hilt.

As is well known to most of our readers, Mr. Frederick G. Creed is the Chairman and Managing Director of the Company, while Mr. A. M. Alexander, M.I.E.E., M.Inst. C.E., M.I.N.A., is the General Manager. The latter was at one time Chief Engineer of the Thames Iron Works at the time when that company built the "Thunderer." Mr. F. O. Creed has comparatively recently joined the Company and is in charge of the Sales. The photographs were specially taken for the *T. and T. Journal* by Photographia.

J. J. T.

TELEGRAPHIC MEMORABILIA.

AFGHANISTAN.—From a French source we learn that the Government of Afghanistan is reported to have lately placed a contract with a French firm for the material for three short-wave radio-telegraph stations. A number of French experts are to be sent out to Afghanistan to establish the system.

AUSTRALIA.—At the end of February, 1928, some 4.23% of the population of the Australian Commonwealth owned 262,363 broadcast radio-telephone receiving licences, other figures announced by the Postmaster-General being as follows :—

	Licences.	*Percentage of Population.*
New South Wales	75,212	3.15
Victoria	136,410	7.86
Queensland	24,813	2.77
South Australia	19,388	3.38
Western Australia	3,820	.98
Tasmania	2,720	1.30

New Station.—Provision has been made in the current year's estimates for the erection of a wireless station on Lord Howe Island, and the preliminary work of selecting a site, &c., is at present being carried out.

CANADA.—A most important development in the use of the short-wave beam system of communication was inaugurated on the 16th of last month, when a beam service was opened between Melbourne and Montreal. This is the first direct wireless circuit between Australia and North America.

According to Reuter's agency at Washington, opportunity was taken for the Governments of the United States of America and Australia to exchange greetings by relaying the same at Montreal by means of short-wave wireless to and from Washington.

A Royal Commission is to inquire into broadcasting throughout Canada, and advise as to its future administration and control. The Government is contemplating control, based on the British system, says *The Times*, with public ownership of all broadcasting stations.

In Parliament recently the Minister of Marine referred to the numerous complaints about existing conditions and the great number of concerns seeking to utilise the limited number of radio channels. He indicated that the way out may be a national system, such as Great Britain has.

Similarly, according to *World Radio*, representatives of Canada have been invited to confer in Washington at an early date on the allocation of short wavelengths used in transoceanic and long-distance radio transmission. The United States Federal Radio Commission is engaged on the preliminary work of establishing a basis for the allocation of short wavelengths among American corporations ; before a final decision is made it wishes to come to some understanding with Canada which will prevent interference between the two countries in transoceanic wireless.

On March 31, 1928, of the 82 broadcasting licences held in Canada 11 were held by newspapers, 8 by religious associations and churches, 19 by radio and electrical firms, a number by broadcasting companies, and the remainder by private individuals, universities, financial and industrial concerns, and 11 by the Canadian National Railways.

The Canadian House of Commons has voted a sum of $250,000 (£50,000) for ship-to-shore radio-telegraph stations.

The technical and lay press in Canada and in Great Britain have made particular point of the fact that the five newly-built cargo ships of the Canadian Pacific fleet are all equipped with apparatus for wireless communication and direction finding. The main installations are 1½-kw. quenched-spark transmitters and two-valve receivers. The transmitters are sharply tuned to 600-, 706-, and 800-metre wavelengths, covering all the requirements of ship-to-ship and ship-to-shore communication over distances of 800 miles. The apparatus is supplied by Marconi. The receivers are adjustable to cover all commercial messages and news broadcast on wavelengths much higher than those normally used by ships. In addition, the equipment is completed by auto-alarms for calling attention to a distress call in the absence of the operator.

CHINA.—Through the *Chinese Economic Bulletin* we learn that the Mukden authorities have done a great deal toward improving old wireless stations as well as installing new ones. There are now 11 stations in such places as Harbin, Mukden, Changchun, Yingkow, Tsitsihar, Suifen, and Yenki. Recently a short-wave wireless station was installed at Mukden at a cost of $600,000, which is capable of sending messages to Europe and America.

When the wireless station at Harbin commenced to communicate with Europe, the Japanese authorities in Manchuria protested to the local provincial government on the ground that it was an evasion of treaty obligations.

COLOMBIA.—Reuter's Trade Service Bogota cables that the Minister of Posts and Telegraphs reports that the telegraph lines in Colombia have been considerably extended during the past financial year, their length having increased from 30,000 to 33,000 kilometres ; at the end of June, 1926, there were only 22,000 kilometres of lines. The new cable service recently established between the port of Buenaventura and Bogota has already increased its messages by 130%.

CUBA.—The report of the Cuba Telegraph Company for the year ended Dec. 31 last shows total receipts of £56,720 (against £58,603 in 1926) and expenses amounting to £33,160 (against £31,250). After providing £5,850 for cable repairs and adding £18,372 brought forward, there remains £36,083. The directors have reduced the value of the investments in the West India and Panama Telegraph Co., Ltd., to £50,000, and are paying a final dividend at the rate of 10% on the preference shares (making 10% for the year) ; a balance of £10,170 is carried forward. In 1926 an interim dividend of 2½%, free of tax, was paid on the ordinary shares.

(See also under WEST INDIES.)

To provide popular broadcast lectures at educational establishments in Cuba, says Reuter's Habana agency, from the university to the smallest school, the Department of Public Instruction is supplying complete wireless sets on loan, with the ulterior intention of presenting them to the schools for permanent use.

CZECHO-SLOVAKIA.—The Department of Overseas Trade is informed by H.M. Commercial Secretary at Prague that an inquiry was held on April 26 concerning the crisis in the wireless industry in Czecho-Slovakia. Representatives of dealers emphasised the fact that the number of listening licences had declined during March by 4,500, during which time 28 new concessions for the sale of wireless apparatus had been given. These facts were stated to be indicative of a general crisis in the industry, and the representatives demanded, as a means of alleviating the situation, that the law relating to wireless should be altered in a more liberal sense, and the broadcasting company reorganised to include representatives of the wireless dealers. On behalf of the Ministry of Posts, Dr. Kucera is reported to have said that the Government was planning an extension of the broadcasting stations. The Brunn station was to be extended in connexion with the 10 years' anniversary celebration. The Prague station was to be strengthened to 50 kw., the Bratislava station was to be strengthened to 12 kw., and a new station of 10 kw. was to be erected in Mahr. Ostrau. It was stated that to carry out the regional system in Czecho-Slovakia would require at least 20 stations, which would both exceed the allowance of stations for Czecho-Slovakia and not be a paying proposition. The following resolutions were passed : (1) The Ministry of Commerce is urged to introduce an amendment of the wireless law (this was supported by Ministerial Councillor D. Kaufmann, of the Ministry of Commerce). (2) The wireless broadcasting company should be reorganised to include representatives of the wireless dealers and amateurs. (3) No more concessions should be granted in places where competition has already become too keen.

DENMARK.—The directors' report of the Great Northern Telegraph Co., Ltd., for 1927 refers to the competition between the cable and radio services. After mentioning that the Russian traffic has diminished owing to the Soviet Government's preference for radio-telegraphy, the directors consider that given equal rates and conditions the cable companies need not fear the competition of wireless telegraphy in its present stage of development ; there is room for both if they work peacefully side by side. To meet competition in the Far Eastern traffic the company has adopted the policy of reducing rates to the level of the radio rates. Further competition is expected from Japan and China. Reference is made to the issue of bonus shares, for which sanction was sought and granted at the annual meeting in Copenhagen on May 30. The accounts show that the receipts were slightly higher, while expenses were reduced considerably. The result was a rise in the net revenue from £271,242 to £360,295. The addition of £192,624 brought forward makes available £552,920. The reserve and renewal fund receives £30,556, dividends and bonus (totalling 20%) absorb £300,000, and a balance of £219,308 is carried forward. The reserve and renewal fund now stands at £3,832,220, and the dividend equalisation fund at £1,059,686.

DUTCH EAST INDIES.—The recently-issued report of the Dutch East Indies telegraph and telephone authorities for 1926 shows that at the end of that year there were 6,777 miles of overhead telegraph lines, 7,571 miles of submarine cables, and 58 miles of underground and other cables in use in the area, the total of 14,406 miles representing 28,352 miles of wires and cables. As regards the telephone service, the number of exchanges has grown from 292 with 35,647 subscribers in 1923 to 308 and 39,355, respectively, at the end of 1926.

EAST AFRICA.—A short-wave wireless service from Great Britain to Kenya and Uganda was opened to the public on June 15. The new service is known as "Kenya Radio" ; the service in Great Britain is worked from Banbury, and in East Africa from a new station erected by the British East African Broadcasting Co., near Nairobi. The rate for deferred telegrams is 9*d.* a word, and for daily letter telegrams 4½*d.* a word with a minimum of 7*s.* 6*d.* As the hours of working are for the present restricted, ordinary (full-rate) telegrams are not yet accepted ; but it is hoped to introduce a full-rate service later.

It is also reported that the British East African Broadcasting Co. (Kenya and Uganda) is to commence broadcasting programmes locally during the present month. Kenya is the first British colony to possess a short-wave broadcasting station.

FRANCE.—The Compagnie Générale de Télégraphie Sans Fil records net profits of 9,209,000 fr. for 1927, as compared with 8,507,000 fr. in the preceding year. The dividend for 1926 was 50 fr. per share, and it is expected that the same distribution will be made for 1927.

GERMANY.—The following two paragraphs were, by an oversight, omitted from our last issue, but may be usefully read, especially the second

paragraph in connexion with the feat of Lieut. Jouy, under "France" in the June issue :—

> The German Lufthansa (Aviation) Company announces a gross profit for the past year of close on 7,000,000 marks (£350,000). The greater part of this sum is applied to settlements and depreciations, whilst the balance of £950 is placed to reserve.
>
> Germany has been divided for the purposes of aviation into 14 areas, each with a wireless station, thus enabling pilots to obtain weather information on their bearings at any time. *In the case of 'planes on regular services the pilots must communicate their location when the "frontier" between two areas is crossed, not only to the station in the area which has been entered, but also to the station in the area which has been left.* Position must also be wirelessed to the nearest station after every start and before the landing. The 'planes of the Lufthansa on 17 routes will all be equipped with wireless apparatus this summer.

Reuter's Agency, Cologne, states that under a scheme for providing poor blind persons and institutions for the blind with wireless sets, the German Post Office authorities have collected nearly £30,000, in addition to gifts of apparatus. The German State does much for the help and comfort of its blind population.

GREAT BRITAIN.—*Parliamentary Questions.*—On May 14, Mr. Baldwin informed Mr. W. Baker that it was not possible to forecast when the report of the Imperial Wireless and Cable Conference would be available. He understood that the deliberations of the Conference would not be concluded for some little time. As soon as he was in a position to do so he would make a statement.

On May 21, Mr. W. Baker raised the question of the Imperial wireless and cable services. He said that the Labour Party feared that a very dangerous situation to the nation and Empire was about to arise, if it had not already arisen. They understood that it was proposed to transfer those services to private ownership and control. His great fear was that a recommendation had been agreed to by the Imperial Wireless and Cable Conference, and that that recommendation, based on a provisional decision, had been submitted to the Dominion Governments, and that when they signified their acquiescence the House of Commons would find that the bargain had been concluded and that its hands were absolutely tied. The Prime Minister had stated that he had no previous knowledge of, and no financial responsibility for, the financial merger, which was a definite calculated attempt to force the hands of the Government. The Marconi Company knew how great were the potential profits of the Government beam service. The cable companies were frankly afraid of the success of the "beam," and they entered into the financial merger because they saw no other way of escaping from that competition. The proper course for the cable companies would have been to try to reduce their profits in order that the commercial users might get the best possible service at the lowest possible price. The country was being asked to hand over its Imperial telegraph communication to two groups, one of which had a record for mismanagement and widespread international combinations, and the other of which stated that it could not stand up against Post Office competition, and threatened to scrap its plant and cables.

In the debate which followed, Sir Hamar Greenwood said there was no doubt that the conflict between the beam system, owned by the Post Office, and the Pacific Cable Board, must lead to a certain amount of irritation. Until those systems were transferred to private enterprise there would always be irritation. Mr. Ammon also spoke.

Sir J. Gilmour, the Chairman of the Conference, replied, and dealt in detail with the work which the Conference had already carried out. He said that there had been 30 meetings of the full Conference. They had had to consider not only of how the affairs of this country would be affected, but what repercussions it was likely to have in the Dominions and elsewhere. During the sitting of the Conference the merger between the cable companies and the Marconi Company was announced. This proposed merger, for which the Government had no responsibility, was made subject to satisfactory arrangements being made with the British Government and the Governments of the Dominions and India. The possible reactions of this merger on the problem referred to the Conference had to be examined in great detail, and had necessarily been the subject of conversations between the representatives at the Conference and the companies concerned. The Conference was still in being, and it was quite impossible to say how soon it would conclude its proceedings. The Conference had power only to make recommendations to the Governments concerned, and before any definite action was taken the matter would be brought before the House of Commons.

On May 22 Sir R. Hutchison asked the Postmaster-General whether he could now make any further statement about the possibility of furnishing a high-power broadcasting station in Scotland, preferably in the Midlands, which could supply transmission to the more remote and distant parts of Scotland.

Sir W. Mitchell-Thomson said that the British Broadcasting Corporation had a scheme under which the existing broadcasting stations would be replaced by a small number of regional high-power stations. As the first stage in this scheme, a high-power station would be erected near Potters Bar, but as the scheme was still in the experimental stage, he could not give any forecast of its future development in Scotland or elsewhere.

On May 22 Mr. Malone asked the Postmaster-General whether his department had been kept informed of the progress made in the development of television; and whether, seeing that this invention must necessarily function in conjunction with the national broadcasting services, he proposed to amend the licence and agreement under which the British Broadcasting Corporation now functioned so as to permit that body to employ television.

Sir W. Mitchell-Thomson said that the answer to the first part of the question was in the affirmative. With regard to the second part, he was advised that television was still in the experimental stage, and he did not consider that the time had yet come to make arrangements for the provision of a public service.

Bristol.—A complaint from the M.P. for East Bristol regarding the interference of broadcasting reception by the overhead trolley-wheel system of electric trams in that city has been replied to by the B.B.C. to the effect that experiments are being made in other towns and it is therefore considered necessary to await the result of these trials before making any suggestions

The Wireless Correspondent of the *Daily Telegraph*, in this connexion, says that as a result a device has been discovered which promises to mitigate the nuisance. Several authorities have undertaken to test it in practice. The interference has drawn complaints from various parts of the country ever since broadcasting commenced.

The B.B.C., gaining experience from Vienna, has found a way of greatly reducing this sparking. It is hoped that the method will prove inexpensive and efficient. Exact details are being withheld until the efficacy of the plan has been demonstrated.

Edinburgh.—While a train travelling from London to Edinburgh at over 50 miles per hour, and carrying 300 Scotch Australians on a "Home" visit, in the guard's van, fitted with head-phones and a special wireless receiver, 3LO, Melbourne, was very distinctly heard to say "Greetings from the Melbourne studio to the Scottish delegation." This was succeeded by excerpts from the news of the day, musical items and a gramophone record of a Lauder song. This, said a Press representative, "in spite of every impediment, time, distance, speed, atmospherics and the rattling of the train."

It was reported from New York towards the end of last month, that the International Telephone and Telegraph Co. was in negotiation for the acquisition of the communication business of the Radio Corporation of America (that is its interests apart from manufacturing and broadcasting). Should the negotiations be successful, the Telephone and Telegraph Co. would control practically the whole of means of communication in the Western Hemisphere. The president of the Radio Corporation has emphatically denied that there have been any negotiations with the stated end in view, and points out that the United States law would require alteration before sanction could be given to a combination of radio and telegraph companies.

The B.B.C. has recently completed the latest addition to the London studios at Savoy Hill, bringing the number now in use up to nine. No. 9 studio is 22 ft. long by 19 ft. 6 in. wide; its solid brick walls are covered with four layers of hessian cloth, the layers being separated one from another by wood battens half-an-inch thick. In front of this is a framework carrying a special acoustic boarding, half of which is covered with felt half-an-inch thick, prepared to carry the decorative wall panels with which the remainder of the boarding is also treated. The concrete ceiling is partially covered with felt in such a way that its presence is unnoticed by the eye, it being broken into panels which form a pleasing effect in the general decorative scheme. Ducts emit fresh air and extract the vitiated air by artificial means. The decoration of the studio is a complete innovation: the room is painted in red, black and gold, and its walls bear a pictorial scene of Chinese character in which the phoenix forms the theme. The studio has proved to be best suited for instrumental soloists and combinations up to an octet. It will not be used for speech, and announcements will be made from the observation chamber outside the studio.

Not one, probably, in a thousand listeners-in ever give a thought to the skill, the ingenuity and the knowledge of the many branches of science necessary before a brick can be laid or even a plan placed on paper for the erection of an ordinary audition chamber, and the above presented many problems for solution before the plans could be passed with confidence.

"Beam" Developments.—It is understood, says the *Electrical Review*, that further important developments may be expected shortly, as Marconi's Wireless Telegraph Co., Ltd., is nearing the completion of experiments for the simultaneous transmission of wireless telephony and wireless telegraphy on the "beam" system. According to the daily Press, tests are taking place across the Atlantic with apparatus which it is claimed will operate two high-speed telegraph circuits simultaneously with one duplex telephone circuit, utilising the same transmitter and aerial and only one wavelength for all three circuits. It is also reported that the company is building an experimental plant at Poldhu, Cornwall, for a "swinging beam." The angle of the "beam" is reduced to eight or nine degrees, and it can be swung to serve any distant point with which communication is desired. In this way a single transmitting station can provide a "beam" service to a large number of countries. The "beam" may be "swung" in 60 seconds and the reflector, which is the important component of the "beam" transmitter, will be revolved, so that a message can be sent in any direction.

The *Daily Telegraph* supplements this by the following, which rather accentuates the "broadcasting" possibilities, thus :—

> Two series of Marconi experiments, revealed lately, have an interesting bearing on this question of Empire broadcasting. Senatore Marconi himself is about to test the possibilities of a revolving beam station, while telephony has been superimposed with great success on the existing beam telegraph service to Canada. Another possible solution of Empire broadcasting therefore presents itself. A central revolving beam station might transmit, at the most suitable hours,

to each of the Dominions in turn. The telephony tests with the beam suggest that there should be no great difficulty in using it for wireless programmes. Captain Eckersley, the chief engineer of the B.B.C., favours the use of the beam for Empire transmissions.

It is stated that Mr. J. L. Baird has now completed his new television station in Long Acre, London, and anticipates that he will be in a position to broadcast moving pictures in the early autumn. The new station, 2TV, works on 200 metres.

HAITI.—There are now 1,490 miles of telegraph and 4,608 miles of telephone wires in operation in the Republic of Haiti, as compared with only 950 and 2,860 miles, respectively, in 1924.

INDIA.—The annual report of the Indian Post and Telegraph Department for 1926-27 shows that telephony is increasing in popularity. According to the *Times*, the Department is frank about its achievements, for it states that " . . . the trunk service between Bombay and Delhi was at times satisfactory," but between Bombay and Calcutta " good commercial speech . . . was not always reliable." The former loss of Rs. 4,91,275 (£36,825) has been converted into a profit of Rs. 1,34,745 (£10,125).

As regards the Telegraph Service, the report records the passion of Burmese boys for maliciously damaging telegraph insulators, that of their elders for stealing copper wire, and the loss on this service of Rs. 12,72,332 (£95,400) against only Rs. 6,93,846 (£52,250) the previous year !

MALTA.—The special correspondent of the *Daily Telegraph* last month gave some intensely interesting particulars of the wireless-controlled manœuvres by means of which an obsolete vessel, the " Centurion " was entirely controlled by means of wireless from an attendant " destroyer." The correspondent records that : " The control system resembles automatic telephones ; turning the dials on the destroyer to 039 calls up 039 in the automatic exchange on board the Centurion, which sets the desired machinery in motion. If by any chance one figure failed to register, the desired result would not be obtained, or the vessel might go astern instead of altering course ; but the controls were wonderfully perfect here until a few days prior to the date of this report, when they failed to reduce speed after the manœuvres, and the crew had to board the vessel when going at 14 knots instead of at the usual three or four knots."

NEW ZEALAND.—The Wellington correspondent of the same London newspaper also recorded that : " Radio enthusiasts here heard the British Broadcasting Corporation's transmission of the song of the nightingale from Pangbourne most successfully on May 29. The transmission was not loud, but it was quite clear, and was audible through a loudspeaker."

NICARAGUA.—A recent report from H.M. Consul at Managua to the Department of Overseas Trade on the economic situation of the country includes the following information relative to the telegraph and telephone services, which are operated by the Government :—

Telephony.—There were 53 public telephone offices in 1926 and 1,200 km. of telephone wire ; 1,094 telephone instruments were in use. The service between Granada, Managua León, Chinanadega and Corinto, which are the principal stations on the Pacific Railway, is, on the whole, good, but telephone connexion from any of these cities to the smaller towns of the interior is poor.

Telegraphy.—In 1926 the total length of lines was 2,840 km. The service is fairly satisfactory.

Submarine-cable Telegraphy.—The All-America Cable Co. provides an efficient service.

Radio-telegraphy.—The Tropical Radio Telegraph Co., a subsidiary of the United Fruit Co., possesses a powerful station in Managua with a 20-kw. output and two small branch stations with 1-kw. outputs at Bluefields and Cabo Gracias. The Managua station transmits direct to New Orleans and Miami, and the other two have only a small radius of about 500 miles. The rates and service compare very favourably with those of the Cable Company.

PANAMA.—(See WEST INDIES.)

PERSIA.—Reuter's Teheran Agency cables that it has been decided to erect new telegraph lines where necessary and to extend existing lines to the Russian and Turkish frontiers ; about a thousand miles of new lines will be needed, and most of the material has already been purchased in Russia.

RUMANIA.—The *Electrical Review* records that " a new broadcasting transmitter is to be erected by the Marconi Company at Bucarest this year, the building of which will bring the number of countries in which such plant is being used up to 20. The Bucarest station will be operated by a recently-formed national company to which broadcasting rights in Rumania have been ceded ; its working wavelength has not yet been decided, but the transmitter has been designed to broadcast on any wavelength between 200 and 545 metres. It will have a rating of 12 kw. unmodulated energy to the aerial system, and will incorporate several new features. Before 1925 the use of private wireless sets was practically unknown in that country, but since the removal of restrictions a wide demand has grown up among amateurs and would-be listeners for a national broadcasting system ; several wireless clubs have for some time been doing experimental work."

RUSSIA.—The Moscow correspondent of Reuter's Agency states that though there are now 77 wireless stations in the Soviet Union, with a total capacity of 180 kw., the increase in the number of receiving sets, whose number in the first quarter of this year was 200,000, does not correspond with the rate of development of the network of wireless stations. Accordingly, it is proposed to reduce the number of wireless stations, increase the power of those that will be left, and cheapen the price of receiving sets, so as to encourage wider distribution. Prof. Bonch Bruyevitch has produced plans for the construction of a central super station of 1,000 kw., whose range of transmission will be between 800 and 1,000 miles. The Wireless Friends Society has a membership of some 200,000 amateurs and has 80 branches. As many as 80 wireless periodicals are published in the Soviet Union. From March, 1927, one section of the Wireless Friends Society has been engaged in receiving and transmitting on short waves.

SOUTH AFRICA.—A Cape telegraphist, writing in the staff organ of the South African Telegraphs, has recorded a very high opinion of the staff of the Beam Office in Cape Town. " Their typists are typists," he says, " and to see them at work is a real experience."

The *Electrician* reports as follows on wireless matters in South Africa : " The radio market in South Africa seems at present to be one for complete sets rather than for components. It is estimated that there are some 16,000 licensed receivers. The Union Broadcasting Co. is operating four stations, the wavelengths of which all fall within the recognised broadcasting waveband of the country. The chief demand for both sets and components is for those the wavelengths of which all fall within the recognised broadcasting waveband of British or American manufacture, while loudspeakers of the cone type are becoming increasingly popular. Battery eliminators for 200/240, 50-cycle supply are becoming commonly used. There is a good demand for relatively cheap receivers and the British sets seem to have attained extraordinary popularity over German and American designs, chiefly on the basis of simplicity of operation. The operation of only four broadcasting stations in the Union makes the finer selectivity of this country unnecessary, with the result that the cheaper British product with its few controls is favourably received, against the more complicated and unnecessarily selective American sets.

" It is the intention of the African Broadcasting Co., Ltd., to completely cover the Union with their depots, and this company is already representing British, German and American manufacturers. Although some improvement in the general demand for radio equipment may be expected in South Africa, one can not be too sanguine in contemplating immediate sales. Every effort will, it is believed, be made by the present broadcasting controlling organisation to bring about wide appreciation of radio. The progress will necessarily be slow, and any greatly pronounced sale of complete sets is dependent on its success. The key to the situation lies with the agricultural populace, and upon their demand for radio entertainment rests the immediate future of radio equipment. The completion of the new station at Johannesburg will also, it is hoped, stimulate further sales."

SWEDEN.—From Stockholm, through Reuter's Trade Service, we learn that statistics of the number of wireless receiving licences valid in Sweden in April show a fresh increase during the month to 360,059, or 59.1 per thousand of the inhabitants of the country.

SWITZERLAND.—*A League of Nations Experiment.*—The Secretariat of the League of Nations is making a series of experiments in the broadcasting of speeches to extra-European countries. A microphone at the Palais des Nations at Geneva, Switzerland, is coupled, by means of an international telephone circuit placed at the disposal of the Secretariat by the German and Swiss administrations, with the short-wave wireless telephone transmitter of the Dutch Government at Kootwijk, in Holland. Speeches in several languages were being transmitted between the hours of 3 and 4 p.m. (Greenwich time), starting May 16. The Kootwijk station has a power of 25 kw. and a wavelength of 18.4 metres, and is heard with surprising regularity in the Dutch East Indies. The Information Section of the League will welcome reports, particularly from distant parts of the world, as to the quality of the reception of the experimental transmission.

[*Reproduced by the courtesy of the* CAPE ARGUS *and the* S.A.P. and T. HERALD.]

MR. ROBERT WATSON,

a telegraphist of the South African Telegraph Service, and member of the British Astronomical Association, discoverer of Nova Pictoris. Mr. Watson is stationed at Beaufort West.

The *Daily News* recently recorded from Geneva the introduction at the International Labour Conference there of an arrangement by which each delegate was able to hear whatever speech was being delivered in his mother, instead of in the foreign, tongue of the speaker.

The following, from the *Electrical Review*, is a very lucid but slightly abridged description of the means by which this is done :—

" Around the rostrum, within sight and earshot of the speaker, sit a number of interpreters, each speaking a language different from the orator's and his neighbours ; each interpreter is provided with a light microphone encased in rubber sponge, so as to be free from unnecessary vibration, and

so "damped" that it is sensitive only to the subdued voice of its user, and not to that of the orator proper or the noises of the Conference Hall. Coupled to the microphones are amplifiers and distributing circuits leading to the various tables, where electrically-operated diaphragms feed the headpieces with a reproduction of the interpreters' voices

"The task of the interpreter is to provide a running translation of the speech being made in the language in which he specialises, and it is claimed that immediate interpretation (the translation is never more than a sentence behind the speech being translated) appears to be far less fatiguing and less prone to error than an interpretation from memory or shorthand notes. The listener at a table in the Conference Hall places over his ears stethoscopic earpieces, turns a switch until the indicator points to the language in which the listener is interested, and then, by means of a knob, controls the strength of the speech. All other manipulations are in the hands of the interpreters, and are confined to lifting the microphone from, or to, a hook which is a master switch. The headpieces are well ventilated and will be sterilised by a routine process. One can sit quite close to an orator and yet receive, without noticeable interruption, not the voice of the orator himself, but the translation of a chosen interpreter.

"At the recent Conference arrangements were made to test a combination of this system with one for making permanent records of the speeches delivered, which can be transported easily to the International Labour Office for transcription by the normal staff, and can be kept as a check in case of dispute. It is also probable that at a later meeting a short-wave telephone relay between the Conference Hall and the permanent staff at the "Palace of Labour" may be developed to save even the time which would be lost in transporting permanent speech records over a distance of about 2½ miles."

A conference of the Council of the Union Internationale de Radiophonie, under the presidency of Admiral Carpendale, and a European Conference of Broadcasting Engineers have concluded their sittings at Lausanne. The Council ratified the admission of new members to the Union as follow: Radio Stanica, Zagreb; British East African Broadcasting Company, Nairobi; Société Roumaine de Radiophonie, Bucarest. The Council recommended that the identity of broadcasting stations should be stated as clearly as possible. Some twenty European countries were represented at the Engineers' Conference, when discussions took place on the methods of eliminating interference with broadcasting by tramcars, lifts, and other electrical apparatus, and on the latest experiments in short-wave transmission. The technical conditions indispensable to the relaying of programmes over long distances by means of telephone lines and cables were also examined. The sittings concluded with the annual general assembly of the Union, when the members of the Council were re-elected, and the latter body afterwards re-elected as its president Admiral C. D. Carpendale (Great Britain) and as its two vice-presidents Herr H. Giesecke (Germany) and M. R. Tabouis (France); M. M. Rambert (Switzerland) was re-elected Council delegate. A new Commission to deal with problems affecting international relays by wire and wireless was appointed under the presidency of M. S. Chamiec (Poland).

U.S.A.—Reuter's Trade Service announces from New York that three radio beacons on Long Island Sound were put into operation in May last by the Lighthouse Service of the U.S. Department of Commerce to guide ships having the necessary equipment in foggy weather. The beacons are at Execution Rock lighthouse, east of Hell Gate Bridge at the western entrance to the Sound; at Stratford Shoals light, off Bridgeport, Conn., and at Little Gull Island light, southwest of New London, Conn. The automatic transmitting sets broadcast dots and dashes which navigators utilise to locate their exact positions; each beacon has its identifying series of code characters which ships' radio operators intercept on direction finders.

The two next following paragraphs should be read in connexion with paragraphs 4 to 8, inclusive, under "U.S.A." in the June issue.

The American Telephone & Telegraph Co. and the International Telephone & Telegraph Co., says the *Financial News*, are planning a radio-telephone link, to open in the spring or summer of 1929, between New York and Buenos Aires.

The Federal Radio Commission, according to the *Electrical Review*, has allocated 20 short wavelengths to the American Publishers Committee for the special use of the Press when transmitting news transoceanically. The Commission granted the Mackay Co. fifteen wavelengths, instead of the 19 requested, and also granted the Radio Corporation 15 channels, instead of 55.

The same authority also states that the Federal Trade Commission has issued a complaint against the Radio Corporation of America, charging it with creating a monopoly in radio valve grades and with unfair competition in entering into certain licence agreements with other radio manufacturers.

Wireless, and trains a mile in length!—Promising results are being secured by the use of radio intercommunication on long freight trains in America, as shown by tests now in progress on the Chesapeake and Ohio Railways, according to the Westinghouse Electric and Manufacturing Co. The system is in service on the James River subdivision, where it is being tried because ordinary signalling is very difficult under the conditions that obtain in that mountainous region. The line has many curves and several bridges and tunnels, and is so tortuous that engine and "caboose" are rarely in sight of each other and often on opposite sides of a mountain, so that signalling by hand or lantern is generally out of the question. Trainmen usually have to walk within signalling distance in order to enable trains to make the proper movements, and since the trains are upwards of a mile long, much time is lost by this process. Radio signalling between engine and "caboose" saves so much time in various ways that a considerable fuel saving per trip is made, not only by the train equipped with radio, but by all trains whose movements are dependent on the radio-equipped train. A transmitter and receiver, with a loudspeaker, are mounted on both the engine and the "caboose," and complete vocal intercommunication is maintained on the entire trip: clear loudspeaker volume is normally maintained, though there is a little, but not serious, fading when passing under trussed steel bridges. In tunnels, between high bridges, beside high cliffs, and in deep cuttings, fading is more pronounced, though communication is always maintained by means of headphones; it is, however, not difficult to correct this trouble at the points where it is serious. The range of the system is several miles, so that even the parting of the train does not sever communication.

According to *Science*, the Bell Telephone Laboratories, New York, have devised certain accurate electrical instruments which with psychological aids, determine a person's exact degree of hearing, and the fact is recorded here in case such apparatus should prove useful to my friends on the Telephone side in testing the hearing powers of recalcitrant complainants! A push-button measures the tone emitted for the test, which can be instantaneously applied to one or other ear or both. Should the person under test maintain that he hears nothing, and should this statement be inaccurate he would quickly be detected because the eye nearest to the ear involved would involuntarily blink slightly at each push of the button and thus unmask the deceiver!

WEST INDIES.—The receipts for the past year of the West India & Panama Telegraph Co., Ltd., totalled £56,522, and the working expenses £54,277, leaving a credit balance of £2,245. After meeting debenture interest, depreciation and renewals there is a deficit of £6,196, which, added to that brought forward, makes a total debit of £127,534.

(See also under CUBA.)

Personal and General.—The annual summer meeting of the Students' Section of the I.E.E. will be held in Holland and Western Germany. The party will leave London on July 28 for Rotterdam. Visits have been arranged to works at Rotterdam, Eindhoven and Utrecht, and a pleasure trip to the Hague. In Germany visits have been arranged to works of engineering interest at Essen, Dusseldorf and Cologne. The party will return from Cologne on Aug. 6, arriving in London on Aug. 7. If possible, a visit will be arranged to Cologne broadcasting station.

The following gentlemen have been nominated by the Wireless Section Committee of the I.E.E. to serve on the Committee from October, 1928: *Chairman*—Commander J. A. Slee; *Ordinary Members*—Mr. F. W. Davey, Lieut.-Col. A. G. Lee, Mr. E. B. Moulin, and Mr. P. K. Turner. The following gentlemen will continue to serve as members of the Committee: The President, I.E.E.; the Chairman of the Papers Committee, a nominee of the Council, a nominee of the General Purposes Committee, Major B. Binyon, Capt. P. P. Eckersley, Dr. R. V. Hansford, Mr. J. Hollingworth, Mr. S. R. Mullard, Mr. G. H. Nash, Mr. C. E. Rickard, Mr. G. Shearing, together with one representative each to be nominated by the Admiralty, Air Ministry, General Post Office and the War Office.

The I.E.E. premiums for wireless papers during the session 1926-27 were awarded to the following: Prof. E. V. Appleton, Lt.-Col. A. G. Lee, G. W. N. Cobbold and A. E. Underdown.

One most deeply regrets to note the enforced retirement of Mr. H. A. Bolton, Superintendent, Inland C.T.O., on the 4th ult., and who had only received that well-deserved promotion less than twelve months ago. His sturdy character will be missed by a host of colleagues who have known him for years as one without reproach. It is sincerely hoped that rest and freedom from official stress and strain will go far to alleviate the physical drawback which has occasioned so unfortunate a premature disappearance from G.P.O. West.

By the time these lines see print Messrs. J. A. May and Mr. G. E. Day, Asst. Supts., and Mr. F. W. T. Sillence, Overseer, will also have signed on for the last time. To all, the best of wishes for a good time.

Yet again one has to strike the regretful note, for Mr. J. L. Harris and Mr. R. J. Matthews, both old members of the Foreign Telegraphs, who have also been compelled to retire from the service owing to ill-health. The kindliest of kind wishes follow them and the sincerest hopes that at least a very sensible alleviation will be the result of this enforced rest.

Interesting Items to Read.—Report of First General Meeting of the Television Society, *Television*, June number.

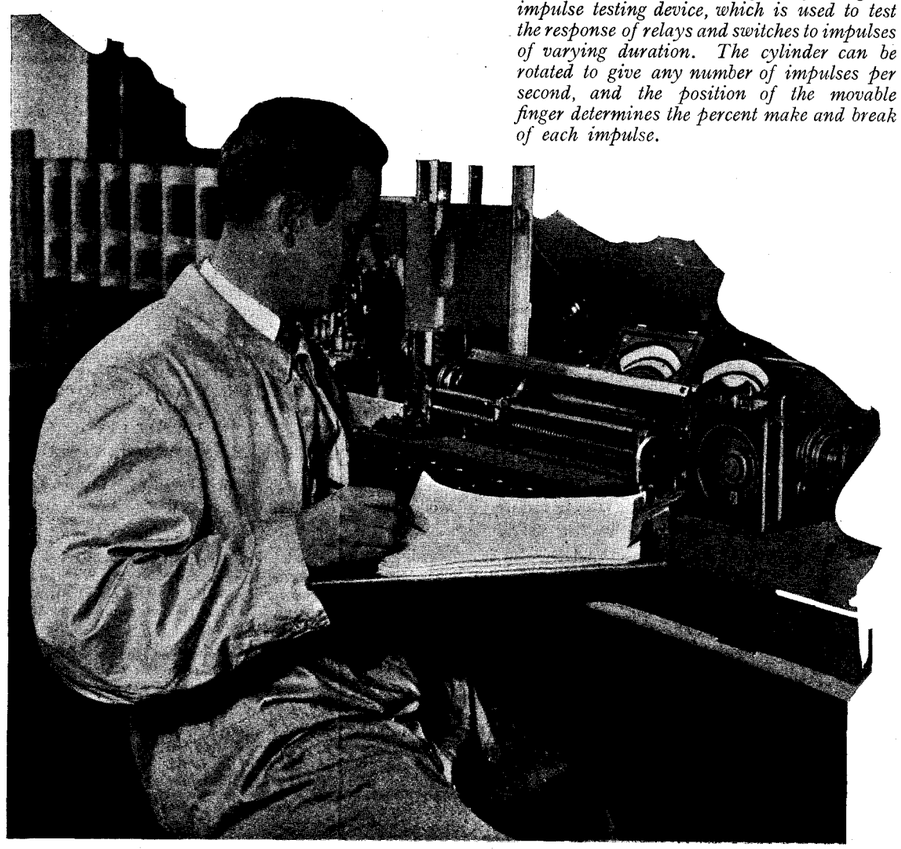
First Annual Report of the British Broadcasting Corporation. H.M. Stationery Office, price 3*d*.

Carrier-Current Telephony over Power Transmission Lines. *Electrical Review*. May 18.

The Broad View.—No one can have a firm grasp of any science by *confining* himself to it. He may, no doubt, work at the details of his subject; he may be useful in adding to its facts; he will never be able to enlarge its philosophy. The philosophy of every department of science depends on its connexion with other departments and must therefore be sought at their points of contact.—*Buckle.* J. J. T.

Where Strowger Automatic Leadership Begins—

Thirty-five Years' Experience.



The illustration shows a specially designed impulse testing device, which is used to test the response of relays and switches to impulses of varying duration. The cylinder can be rotated to give any number of impulses per second, and the position of the movable finger determines the percent make and break of each impulse.

THE Research and Development Department of Automatic Electric Inc. has been a continuous and important factor in the growth and success of the company since the very first days of its inception. Its function at first was to make practicable and workable what was then but a vague and nebulous idea; its function since that time has been to constantly improve and perfect the automatic idea, always having for its aim a more convenient, more rapid and accurate telephone service at the lowest possible cost.

As a consequence, Automatic Electric Inc. has an asset to which few other manufacturers can lay claim. This is, thirty-five years of experience in meeting and solving the problems which have faced the progress of the art of automatic telephony. Its Technical Staff, whose record of accomplishment bears convincing testimony to its ability, can be confidently relied upon to cope successfully with the problems of the future with the same ingenuity and resourcefulness that they have with those of the past.

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STROWGER AUTOMATIC

The
Telegraph and Telephone Journal.

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Editing and Organising Committee - - - J. STUART JONES. W. D. SHARP. J. F. STIRLING. W. A. VALENTINE. J. W. WISSENDEN.

Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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DOXOLOGY.

IN the interesting account of the series of lectures and demonstrations dealing with the telephone service with which he entertained and instructed Glasgow business men in the teeth of the rigours and caprices of a Scottish winter, Mr. Coombs relates that at the conclusion of one of the meetings the Chairman remarked : " Now that the Post Office people have finished, let us all sing the doxology." He observes that this expression might have been misunderstood, although the good intention of the speaker was evident. We hardly think, however, that there was any occasion for misunderstanding. When the creature is moved by piety or gratitude to his Creator to sing : " Praise God from whom all blessings flow," he usually intends to render solemn thanks for blessings received ; his doxology certainly does not express : " Thank Heaven, that's over ! "

We shall not, we hope, be accused of complacency if we suggest that telephone subscribers in these days have good reason to sing doxologies, and this not for benefits peculiar to the Post Office system—although the Post Office may well claim to be in the forefront in adopting all the succeeding improvements in the telephone art—but because of the enormous strides which have been made in technique, and the manifold developments of the usefulness of the telephone which have been achieved even in comparatively recent years. Consider the subscriber of only 20 years ago, a date at which many business men of to-day, not yet old, had had many years' experience of the telephone. In 1908 the local systems of many important towns were still carried on overhead routes : common battery exchanges were the exception and not the rule ; the limits of trunk speech were circumscribed and uncertain, and, in consequence, the range of telephonic communication was limited compared with that enjoyed by the subscriber of to-day. The subscriber of 1908 could speak to some 500,000 people in Great Britain, to some tens of thousands more in Paris, Lille, Brussels, Antwerp and a few other places in France and Belgium. The discovery of the thermionic valve and the employment of radio telephony in conjunction with the physical systems of countries on both sides of the Atlantic has changed all that. The subscriber of 1928 has a telephone at his elbow which will not only place him in rapid communication with a million and a half of his fellow countrymen, but also with upwards of 19 millions in North America and 5½ millions on the continent of Europe—an ever-extending field. And this communication is not precarious or uncertain. The main trunk routes to-day in this country and on the Continent are carried in underground cables and furnished with powerful repeater stations at regular intervals ; and the transatlantic service, despite the vagaries of atmospherics, is in general marvellously clear and reliable. Setting aside the more dramatic occasions when it is used to summon a doctor, a policeman or a fire brigade, the telephone is, even in the prosaic moments of life, an unfailing servant, a repairer of omissions, an aid in petty distresses, an indispensable point of contact with the near and distant world. That subscribers who, besides enjoying its benefits, have been initiated into the mystery of its working, and enabled to appreciate the intricacies of the daily and hourly care and study expended on it, should feel inclined to intone a doxology is, we think, no matter for wonder.

To revert to our original text, we may say that a course of lectures or demonstrations, such as those inaugurated by Mr. Coombs, must be of incalculable benefit to the subscribers and to the Service ; for with knowledge grows sympathy and understanding, and the resultant better operating at the subscriber's end conduces greatly to the improvement of the Service as a whole. We are convinced that the attitude of the majority of subscribers to the Service is friendly ; further developments on the lines indicated by Mr. Coombs would tend to make the unfriendly minority become infinitesimal.

HIC ET UBIQUE.

Among the Birthday Honours are noted the following with special interest and gratification : The C.B.E. to Mr. F. J. Adye, Secretary of the Pacific Cable Board, and to the Postmaster-Surveyor of Liverpool, Mr. Simpson ; the O.B.E. (Civil Division) to Commander F. G. Loring, R.N. (Ret.), Inspector of Wireless Telegraphy ; the M.B.E. (Civil Division) to Mr. J. D. Brown, Traffic Accountant to the P.C.B. Also the M.B.E. (Civil Division) to Mr. W. H. King, Asst. Engineer, Indian Post and Telegraph Service ; while the much-respected Mr. M. G. Simpson, Director-in-Chief of the Indo-European Telegraph Department receives the C.S.I. Mr. G. Slater, Controller, and Miss Marwood, both of the Money Order Department, receive the I.S.O. and O.B.E. respectively.

We have received a considerable number of papers from our readers on the subject of the "*Elimination of Waste.*" These papers are engaging the attention of the Editing Committee and it is hoped to announce the names of the prizewinners in the August issue.

THE telephonic development of the six largest telephone-using countries in the world at Jan. 1 last (with the exception of Japan, statistics of which are not yet to hand) was :—

	Telephones.
United States	18,523,500
Germany	2,814,996
Great Britain	1,633,802
Canada	1,265,869
France	883,406
Sweden	466,787

Japan would come between France and Sweden with upwards of 650,000 telephones.

As anticipated in our June issue, a telephone service between this country and Portugal, via Madrid, was opened last month. It is available from all parts of Great Britain, but will be restricted initially in Portugal to calls to or from Lisbon.

The charges for a 3-minute day call from London to Lisbon is 17*s.* 6*d.*

On Friday, June 8, telephone service was opened between all parts of this country and Gibraltar, via Madrid.

The charges for a 3-minute call between London and Gibraltar is 17*s.* 9*d.* (day) and 10*s.* 9*d.* night.

The Anglo-Czecho-Slovakian service, hitherto in operation between all places in this country and Prague and Aussig (Usti nad Labem) only, was extended on June 7 to the whole of Bohemia, Moravia, Silesia and the western part of Slovakia. The service will be further extended to Eastern Slovakia as soon as technical conditions permit.

As from June 4, the Transatlantic Telephone Service was open from 11.30 a.m. to 3 a.m. (British summer time)—an extension of one hour daily in the hours of service.

Telephonic communication with the Sarre District was opened on June 28. The charge for a day call between London and Saarbrücken is 7*s.* 9*d.*

International trunk communication is extending rapidly in South America. Circuits connecting Monte Video (Uruguay), Buenos Aires (Argentine) and Santiago (Chile) arranged by the International Telephone & Telegraph Corporation in co-operation with Argentine, Chile, & Monte Video Telephone Companies were opened last month.

PROGRESS OF THE TELEPHONE SYSTEM.

The total number of telephone stations working at April 30, 1928, was 1,638,567, representing an increase of 7,376 on the total at the end of the previous month.

The growth for the month is summarised below :—

	London.	Provinces.
Telephone Stations—		
Total at April 30	581,172	1,057,395
Net increase for month	2,850	4,526
Residence Rate Subscribers—		
Total	134,450	213,417
Net increase	1,230	1,511
Call Office Stations (including Kiosks)—		
Total	5,245	18,959
Net increase	21	129
Kiosks—		
Total	927	3,913
Net increase	40	113
Rural Party Line Stations—		
Total	—	10,193
Rural Railway Stations connected with Exchange System—		
Total	—	909
Net increase	—	19

Further progress was made during the month of May with the development of the local exchange system. New exchanges opened included the following :—

LONDON—Fairfield (Croydon), Temple Bar,

and among the more important exchanges extended were :—

LONDON—Ealing, Erith, Wembley.

PROVINCES—Bury St. Edmunds, Burton-on-Trent, Cheadle Hulme, Chorlton-cum-Hardy, Gerrards Cross, Margate, Middleton, Shirley, Stafford, Stoke Bishop, Southend-on-Sea, South Shields, Staines, Widnes.

During the month the following additions to the main underground system were completed and brought into use :—

Bathford—Box,
Portcawl—Junction Portcawl,
Belfast—Ligoniel,
Manchester—Macclesfield,
Maidenhead—Henley,
Leeds—Bradford,

while 73 new overhead trunk circuits were completed, and 77 additional circuits were provided by means of spare wires in underground cables.

PUBLICITY.

EVERYWHERE one goes one can see the rapid strides which are being made by tradesmen generally to give better accommodation to display their goods in an attractive manner to passers by. New forms of window dressing are being adopted, made necessary by the larger window space that is being provided. Shops are lit up until late in the evening for the display of goods to be sold. Illuminated signs decorate all our large towns advertising somebody's wares, yet with it all we in the Telephone Service are still content to obtain our business by sending out Contract Officers. Why should not we have, in the larger towns anyway, window displays showing what wares we have to sell? Publicity pays not only in regard to the actual number of new orders obtained from it, but by obtaining the good will of existing subscribers and letting them know that they are not making the best use of the telephones they rent.

It is the writer's experience from doing his little bit to dress the windows of the Telephone Service, in addressing Chambers of Commerce, Chambers of Trade, Rotary Clubs, &c., that very few of our subscribers realise the many uses to which the telephone can be put, and the questions raised after such addresses demonstrate that the persons addressed make a potential body of advertisers of the Service.

I can fully recommend any District Manager to adopt similar methods of advertising.

The good fellowship engendered by such talks, the frank explanations which can be given to questions asked, the meeting with large numbers of subscribers throughout the district all help in letting the general public know that we are not dead but very much alive to the interest of the Telephone Service.

I find that, notwithstanding all the literature that is distributed, very few people realise what the possibilities of the Continental Telephone Service are, and how cheaply this service can be obtained. If the newspapers can be induced to report on such meetings so much the better.

B. WAITE.

PERMALLOY: THE LATEST STEP IN THE EVOLUTION OF THE LOADING COIL.

[ABRIDGED FROM THE "BELL TELEPHONE QUARTERLY."]

FOR some time prior to the year 1900, it had been known to those skilled in the art of telephony that the transmission efficiency of long telephone circuits could be improved by increasing their electrical property known as the "uniformly distributed inductance." This knowledge did not, however, lead to practically beneficial results, because no one was able to suggest any feasible method of increasing this property of a telephone circuit without bringing in, at the same time, difficulties of one kind or another which were fatal. Numerous investigators sought unsuccessfully to simulate the beneficial effect of increasing the uniformly distributed inductance by introducing, into the circuit, inductance concentrated or lumped in the form of coils with cores of iron.

Professor M. I. Pupin, of Columbia University, in the City of New York, and Dr. G. A. Campbell, of the Staff of the American Telephone & Telegraph Company, independently and nearly together in point of time, proved that if inductance coils were spaced along the telephone circuit in accordance with certain rules, the lumped inductance so added would act very nearly the same as though it were spread out uniformly along the circuit. But, to attain this desirable result, it was imperative that the proper relation should exist between the number of lumped inductances (loading coils) in a given circuit and the length of the electrical waves. In other words, the proper spacing of the coils along the telephone circuit was the key to the solution and it was from failure to establish this fact that the earlier workers had failed. Priority in this mathematical-physical discovery was adjudged to Professor Pupin, and the American Company purchased his patent rights. But it was not then known how to make practical loading coils that the Associated Companies of the Bell System could employ successfully in improving the efficiency of their circuits. The problem of crystallizing the intellectual concept of loading into practical loading coils that could be used by the regular construction and maintenance forces in the operating field, was undertaken by a group of some of the most highly-trained experts of the American company's staff. A large amount of work was required to overcome electrical losses in the actual coils that otherwise would largely, if not wholly, have neutralised the expected benefits from loading. These electrical losses had to be overcome, a step at a time, by patient, exhaustive, scientific research. To make the invention practically useful it was necessary to develop coils of an efficiency much greater than any ever before made. To do this, dough-nut shaped cores were constructed, using iron of a special kind. This iron was drawn into a wire so fine that ten miles or more of it were needed to wind to a single core. And it became necessary to insulate all of this wire with a lacquer coating to prevent wasteful eddy-current losses. Fig. 2 shows the types of cores and complcted coils that came into use in 1904. On each half of one of these doughnut-shaped iron wire cores there were wound many turns of insulated copper wire. One of these latter windings was connected into one wire of the telephone circuit and the winding on the other half of the core was connected into the other wire of the telephone circuit.

While many important advances were made in the period from 1904 to 1916, one of the most noteworthy steps in loading coil improvement was consummated in the latter year. It did away with the use of fine iron wire in the core, substituting for it a core built up of a pile of quoit-shaped rings of a new material, and fortunate it was that this development was completed at this time, for the dies, consisting of diamonds in which tiny holes were drilled, through which the fine iron wire had been drawn, were produced within the war zone in Europe, and as the supply of these essential tools for drawing the wire had been cut off by military operations, the further production of loading coils was threatened with serious interruption. Fig. 3 shows one of these cores built up of a series of rings.

These rings were made by compressing insulated fine grains of iron. To obtain iron having suitable properties, it was deposited electrolytically on cathode plates suspended in tanks. After being deposited on these plates, the pure iron was stripped off, broken up into pieces about an inch square and ground to a fine dust in a mill. The individual grains of iron were insulated with an oxide coating and shellac and then pressed into rings at a pressure of one hundred tons on each square inch of their surface. So fine were the particles of iron that a core of seven rings contained no less than thirty-five billion of them. This development was undertaken primarily to produce loading coils of greater magnetic stability and more uniform impedance than the wire core coils, and while it saved the day so far as the continuous supply of coils was concerned, it also resulted in better coils and enabled a considerable saving to be made in their cost.

By the year 1924, improvements having been made in the structure of fine wire cables which rendered them suitable for loading, a type of loading coil making use of a single thick ring (later two rings) for its core was developed principally for loading interoffice trunk circuits in fine wire cables. This led to substantial savings in plant costs, not only by extending the field of use of fine-wire cables, but also by further savings in the cost of the coils themselves. At the same time, the general intelligibility of talks over the loaded trunk circuits was appreciably improved, due to the fact that the new loading system permitted the transmission of a wider frequency band, thus reducing line distortion effects.

As a result of refinements in design and economies in manufacturing methods through the employment of higher speed processes, a further saving in certain types of loading coils was realised at the beginning of the year 1926. This development was accomplished without any sacrifice in efficiency and, as it permitted a substantial reduction in the size of the coils, it assisted in overcoming a difficulty which was beginning to cause some apprehension. Loading coils are hermetically sealed in large iron cases, in order to exclude the moisture which would be fatal to their operation. (Fig. 1, illustrating some of these cases of coils placed in an underground manhole and showing the "stub" or connecting cables, by means of which the connexions are established between the loading coils in the cases and the main cable which is to be loaded, is not reproduced here.) With the growth in the telephone

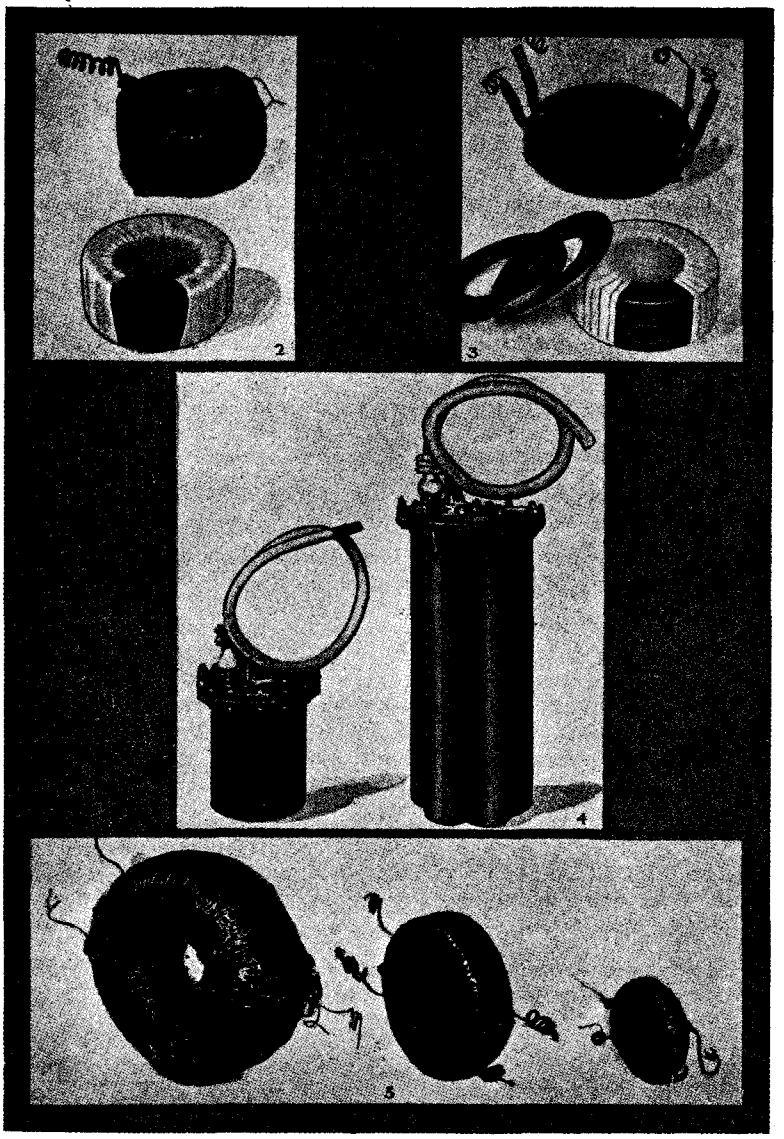


Fig. 2—Cable loading coil of type used in 1904; complete coil above; wire core below.
Fig. 3.—Cable loading coil first used in 1916. Complete coil above; iron dust core and two core rings below.
Fig. 4.—Comparison to show reduction in size of case for 200 coils due to use of permalloy core.
Fig. 5.—Left, coil with iron wire core. Centre, coil with iron dust core. Right, coil with permalloy core; diameter 2⅛ in.

plant in the larger cities, it was becoming increasingly difficult to find space in the manholes for the cases of loading coils, so that this improvement, which, by decreasing the size of the coils, permitted more of them to be placed in each case, was especially welcome, particularly in congested metropolitan areas.

The next and latest step in the design and construction of loading coils has come about as the direct result of one of those fundamental scientific discoveries emanating from the Bell Telephone Laboratories to which reference was made in the early part of this article.

"Permalloy" is the name which has been given to a new material which has magnetic properties many times greater than those of the best irons and steels hitherto available. It is an alloy of about 80% of nickel and

20% of iron, specially heat treated. Permalloy was discovered by G. W. Elmen, in the Bell Telephone Laboratories. One of its first important applications was to the continuous loading of transoceanic telegraph cables, where the high magnetic permeability which this substance affords was a prime requisite. By winding a wire or ribbon of permalloy spirally over the telegraph wire in the submarine cable, the speed of signalling has been increased so that the traffic-carrying capacity of a permalloy cable is many times greater than that of submarine telegraph cables constructed in accordance with the previously existing art. Although permalloy in the form used for telegraph cables was wholly unsuited for use in making the cores of loading coils, the intrinsically low hysteresis (that is, the lagging of magnetisation relative to the magnetising force) of this material encouraged the Staff of the Bell Telephone Laboratories to seek for some means of utilising it in loading coil construction. The technical skill of the metallurgical experts in the laboratories was focussed upon the problem of adapting permalloy so that its advantageous properties could be usefully employed in loading coils. The problem of developing the new alloy so that it would be suitable for use as a loading coil material, was a difficult one, but the solution was found after continuous experimental work extending over several years and calling for the co-ordinated efforts of groups of specialists in the fields of chemical, electrical and metallurgical science. Keeping pace with the developments in the laboratories, was the work of the manufacturing engineers of the Western Electric Company who were responsible for initiating plans for producing the new coils in large quantities as soon as the progress of the development work warranted this step. As the result of the fine co-operation of the Laboratories and the Western Electric organisations it has been possible to realise the advantages from this latest step in the evolution of the loading coil at the earliest possible date.

Fig. 5 shows, on the same scale, at the left a type of loading coil that represents the state of the art from 1904 to 1916; in the middle the type of iron-dust core coil that immediately preceded the permalloy coil; and at the right, the latest coil, having the powdered permalloy core, for use on inter-office trunk lines. The great reduction in size is apparent and the very substantial saving in cost can be appreciated when it is realised that loading coils are being manufactured and installed on local and inter-city cables in the plant of the Bell System at the rate of about 700,000 a year.

Fig. 4 shows, on the same scale, cases equipped with 200 loading coils; that on the right being a case containing 200 coils of the type immediately preceding the permalloy dust coil and that on the left containing 200 of the coils with permalloy cores. The saving in the space occupied in the underground manholes where the cases are customarily installed is extremely important, particularly in metropolitan areas. These new coils are coming into use on new construction, but they will not displace the older coils already installed or render them obsolete.

While the use of permalloy is the latest step in loading coil development, there is no reason to believe that it will be the last. It is, of course, impossible to state what the next step will be, but judging from past experience, one may look forward confidently to the time when further progress in fundamental research will bring about the production of still better coils. It is an outstanding characteristic of this loading coil development, in common with so many subjects to which the research specialists of the Bell System devote their efforts, that in reducing an original idea to practice, a vast amount or work must be done, extending into every detail and constantly pushing forward. At the present time, 27 years after the discovery of the loading coil principle, development work to improve the coils is going on as actively as at any time in the past.

The realisation that the threshold of technical development in the telephonic art was crossed within the memory of men now living, serves as an inspiration to the younger research workers in the Bell System. As they solve problem after problem they find, unfolding at their feet and challenging their best efforts, an ever-widening vista of new conquests waiting to be made. As in biology, the evolution of the telephone plant leads constantly from the simple to the complex. The Telephone Pioneers have blazed the trail; those who are following in their footsteps inherit the responsibility and the joy of extending and expanding it into myriads of avenues of commercial and social communication, ready at all times and adequate in every respect to serve the growing needs of the Nation.

FREDERICK L. RHODES.

PRESENTATION TO MR. S. F. McFADDEN, M.A.

A PLEASANT little ceremony took place at Nottingham on April 30, on the occasion of the retirement of Mr. S. F. McFadden, M.A., Traffic Superintendent, on reaching the age limit.

Mr. C. N. Carter, Traffic Superintendent, in a happy speech, referred to the esteem which Mr. McFadden had inspired during his stay in the North Midland District, and asked Mr. McFadden to accept from the Traffic Staff a wireless loudspeaker and a fruit stand, which represented sincere wishes for a happy time of retirement. Mr. McFadden, in reply, thanked his colleagues and referred to his association with both the National Telephone Company and the Post Office. Anything he had done at the rather difficult times preceding the transfer, and at any other time, to help the Staff he had been most glad to do.

Mr. McFadden will be greatly missed. With an extremely ready grasp of a subject he combined sympathy, helpfulness and patience and these qualities endeared him to all. He carries with him the hearty good wishes of the Staff.

BRIGHTON AUTOMATIC SYSTEM.

BY A. C. FRANCE.

THE opening of an Automatic Exchange has ceased to be a novelty; requests for a few notes respecting the Brighton Multi-Exchange area indicate, however, that such matters are still of interest. In response to those requests—if not too late—the following notes have been written.

The transfer to automatic was satisfactorily effected at midnight on Nov. 12 last. It is of interest to note that the actual "cut over" of some 7,350 lines occupied 7 minutes, which must be regarded as a very creditable performance.

A brief history of the development of telephones in the Brighton area may be of interest. The first exchange, which was situated in West Street, was opened in 1882 with ten subscribers. In 1891 this exchange was acquired by the late National Telephone Company, who, in 1896, transferred it to Ship Street in order to provide for development. A Magneto Multiple switchboard was installed. In 1903 the Brighton Corporation opened a competing exchange at Palace Place; its life as such was short and it was taken over by the Post Office in 1906. By this time exchanges were also operating at Hove, Preston, Kemp Town, Portslade, Southwick and Rottingdean, the magneto system or variations of it providing the needs of the area. The year 1905 saw the conversion of the Ship Street equipment to Common Battery working, Hove Exchange being similarly converted shortly afterwards. At the time of the transfer to the State in 1912 there were 4,578 working lines in the area.

Prior to the transfer to automatic the Brighton area was served by eight exchanges, at the transfer two of these (Post Brighton and Kemp Town) were abolished, leaving six. There was a considerable amount of regrouping of subscribers' lines; much of this was rendered necessary owing to the fact that the old Corporation exchange served the whole of the Brighton, Hove, Kemp Town and Preston districts during the period of competition.

The automatic system installed at Brighton is Siemens 16, and with the exception of the dial there are no novel features. The following equipment has been installed:—

Exchange.	*Pre-Selectors.*	*Final Selector Multiple.*	*Total Working Lines.*
Brighton ...	4,400	4,700	3,337
Hove	3,980	4,200	2,916
Preston ...	960	1,000	729
Portslade ...	380	400	274
Southwick ...	130	200	98
Rottingdean ...	130	200	98

From the accompanying illustration the novelty of the dial will be observed. The first digit of the numbering scheme is occupied by the name of the exchange, e.g., 2 = BR, 3 = HV, &c. It will thus be seen that in the case of a Brighton number being required instead of dialling, say, "21234" the subscriber is taught to dial "BR 1234"; or in the case of a Hove number, instead of, say, "31234," he dials "HV 1234."

One manual exchange, situated in Brighton, has been provided for the area, and the following positions have been equipped:—

1 key ended order wire carrying lines from London Toll Exchange.
1 service Private Branch Exchange.
2 jack-ended "B" positions for "dialling-in" to exchanges.
18 "A" positions for subscribers and coin box "O" levels.
6 Monitorial.

There are 27 exchanges which "dial-in" to Brighton.

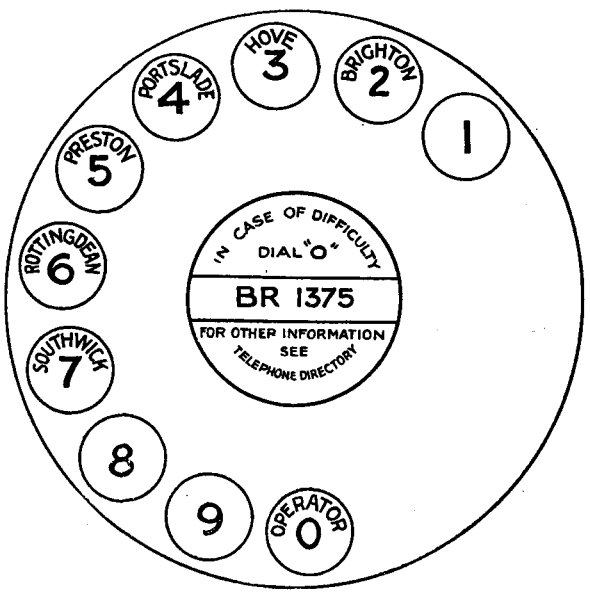
The official opening ceremony took place on Nov. 23. A large and representative gathering of prominent townspeople were present, including the mayors of Brighton and Hove, also Lady Rawson, the wife of one of the M.P.'s for the Borough.

Col. Kelly, Surveyor of the District, on behalf of the Postmaster-General extended a welcome to the company to the new exchange, where they had had an opportunity of seeing the new hand-maiden which had been provided for the benefit of Brighton. Col. Kelly added that Brighton had now a very good telephone service, and one that would compare favourably with any in the world.

Mr. Tansley, Head-Postmaster, Brighton, added his welcome on behalf of the members of the staff, and expressed appreciation for the sympathetic co-operation of the public, which had helped greatly in effecting the satisfactory transfer.

The Mayor of Brighton expressed, on behalf of himself and the Council, their pride in the new system and congratulated the staffs on the triumph achieved.

Mr. Tandy, Superintending Engineer of the District, said those who had seen the delicate equipment at the exchange would realise that where the human element was displaced extraordinary



complications were introduced. Mr. Tandy pointed out that the success of the new system would depend a great deal upon the user. Dr. Wright, Managing Director of Siemen Bros., acknowledged the splendid co-operation that had existed between the Post Office engineers and the contractors' engineers.

The Mayor of Hove referred to the grumbling which took place in the old days of the National Telephone Company, and which was continued when the system was taken over by the Post Office. He did not suppose grumbling would stop, even now, for it was an Englishman's privilege to grumble, and he would claim that privilege in any circumstances. He congratulated the Post Office on the provision of the new system.

Mr. McCormack, Executive Engineer, Brighton (South) said that the Staff were intensely pleased with the wave of appreciation shown by the Public. He paid tribute to the devotion of all who had been engaged in carrying out the successful transfer, the chief reason for that success being the close co-operation between Messrs. Siemens Bros'. Staff, the District Manager and his staff, and the Post Office Engineering staff.

Lady Rawson paid a warm tribute to the work of the Supervising and Operating staff.

Mr. Taylor, District Manager, pointed out that whereas under the manual system a subscriber was served by one operator, under the new system he had the choice of mechanical operators. Mr. Taylor added that there had been comparatively few faults, and he looked forward to the new system providing full satisfaction.

INFORMAL MEETINGS OF LONDON TRAFFIC OFFICERS.

WITH the advent of the automatic system and in view of the opening of automatic exchanges in the London telephone area, the Traffic Officers of the London Telephone Service inaugurated a series of informal meetings to discuss features of interest in automatic working.

The first of these meetings was held on Feb. 1, when Mr. W. F. Newland introduced the subject "Traffic Distribution." The discussion was very keen and the many points raised showed that Traffic Officers generally realised the importance of a close acquaintance with distribution of traffic throughout the automatic plant.

On March 7 Mr. C. W. Gerrard opened a discussion on "Coder Call Indicator Working." The difficulties experienced as a result of the opening of the Tandem and Holborn Exchanges were explained, together with the methods used to detect and obviate them. The ensuing discussion was illuminating and the opinions expressed were very varied.

At the third meeting, on April 4, Mr. R. J. Niles chose as his opening subject "Automatic Equipment Provision." The discussion dealt with the traffic aspect of exchange equipment provision and was of sustained interest throughout.

The last meeting of the Session was held on May 2, when Mr. F. W. B. Thwaites contributed a paper on the "Opening of New Automatic Exchanges." The subject was dealt with very thoroughly, and the discussion showed that the new aspects that were involved in the automatic system had received a considerable amount of thought from Traffic Officers generally, and that many theories were awaiting the result of practical experience.

The large attendances and the freedom of discussion at the meetings indicates the keen interest taken in them as well as the popularity of the subjects. Indeed, regrets were generally heard that time did not permit the subject to be dealt with more fully.

The meetings will be resumed during the coming autumn, when matters of at least equal or perhaps even greater interest will be discussed.

LIVERPOOL TELEPHONE SERVICE NOTES.

I THINK that local correspondents to the *Journal* will agree with me that the furnishing of notes of interest is a most difficult matter.

The recognition of promotions, marriages, retirements, socials, sports, &c., appears to form a sort of standby and occasionally something unusual happens in the district to provide us with a little copy, but immediately we pounce upon an item of real interest which looks like good material for half a column or more, we find that the subject has been dealt with in detail by one who has that detail at his finger-tips.

Readers will have realised by now that I have a bee in my bonnet. Well, I had quite a nice little paragraph ready for publication in this issue regarding certain winter activities which take place in the Liverpool district, but upon opening my June copy of the *Journal* I found the subject dealt with at length by the gentleman who initiated those activities. I refer to the article headed "Staff Meetings and their Bearing on the Service," by A. E. Coombs, Glasgow.

Further comment would be superfluous, and I can only add that the meetings here have lost none of their interest since the departure of Mr. Coombs from Liverpool.

In view of my very recent association with the telephone side of the house, and the fact that I have only subscribed to the *Journal* since that date, the above-mentioned coincidence has caused me to ponder, and ask myself the question: "Do any activities of the telephone interest take place in the Liverpool district which have not already been handled publicly by such able exponents as the present District Manager of Glasgow?"

Exhaustive enquiry into this question revealed the narrowness of my scope, and I would be glad to know from other local correspondents whether this condition of affairs exists throughout the country, and whether we can only hope to use the standby material.

I could, of course, ask our Editor to kindly send me a batch of back numbers, but somehow I don't think I will. However, having brought the Editor into the narrative, like Milton Hayes, I must find something for him to do, and, believing that I have actually stumbled across something interesting, telephonically interesting, of course, I have a faint hope that he will find space for its publication.

Naturally I have made careful enquiry in order to find out whether the subject has received publicity previously, and have been assured that such is not the case. I must ask the Editor to suppress any article other than mine that he may receive dealing with the Isle of Man T.T. Races. We look upon this as a peculiarly Liverpool matter.

Turning to the unofficial domestic side of our notes, the retirement of Miss S. Williams, Clerical Officer, Traffic, and Miss E. March, Typist, District Office, must be recorded. Both have left the Service to take up the more onerous duties associated with marriage, and we wish them every happiness. We quite enjoyed the informal receptions and admired the numerous gifts.

A real welcome is also offered to Mr. W. Moseley, Assistant Traffic Superintendent, who has returned to us from Leeds. C. H.

GLASGOW TELEPHONE NOTES.

"Bonnie Charlie's Noo Awa."

HAVING witnessed the retiral of many old colleagues during post-war years his own farewell arrived on the expiry of his "notice to cease" on May 31. By continuing beyond the "last quarter date" his last month in the Service was a heavy one. We write concerning Mr. Charles Ferguson, the popular Class I Contract Officer.

Charlie was a favourite. Charlie always smiled. Charlie was a bachelor! At the presentation ceremony the District Manager (Mr. A. E. Coombs), who occupied the Chair, dispelled much of the sadness of the "parting" by his humorous remarks. His references to Mr. Ferguson as the "Kiosk King" were greatly enjoyed by all. Mr. Ferguson was chiefly responsible for the rapid development (when the City Fathers permitted) of the public kiosks throughout the district. Mr. D. Reid spoke on behalf of the younger C.O.'s, making special reference to the cordiality with which Mr. Ferguson welcomed the many new recruits who have entered the Service as Contract Officers during recent years, and Mr. R. G. Forsyth supported by referring to the help and encouragement all new entrants had received at the hands of Mr. Ferguson.

Mr. Ferguson's days in the old N.T.C. were recalled by Mr. Arch. Chambers. In those days the Metaphone provided an outlet for Mr. Ferguson's energies. Other speakers preceded the Contract Manager (Mr. F. Lucas), who made the presentation, and, incidentally, the speech of the evening. With witty words and happy humour, with simple sentiment and appropriate sincerity, Mr. Lucas handed to Mr. Ferguson a Gold Waltham Watch from the staff with these good wishes:—

> On this your retiring year
> We wish you happiness, good cheer;
> In years to come we hope you may
> All debts and bills be able to pay;
> May your future paths be sweet as honey,
> Peaceful, happy, placid, and sunny.

Through the liberality of the contributors a pretty hand-bag accompanied the presentation for Miss Ferguson.

Charlie replied, or, at least, he tried to. But the social favourite, the successful bowling skip, the "life of" the Whist Club, was so touched by the appreciative remarks of the officials and the affectionate references of the staff that he could say little. His usual confidence deserted him and he said little more than "Thanks." But we know it was his heart that spoke.

Mr. J. Martin, Contract Officer, Class I, transferred from Scotland Western District, succeeds Mr. Ferguson, retired.

To Mr. Martin we extend a hearty welcome.

Our congratulations to Misses A. Wilson and J. E. Banks on their promotion to the Allowance post at the Queen's Park Exchange.

The Glasgow Telephonists are specialists in more ways than the manipulation of telephone calls. At the Scottish Civil Service Sports Meeting on May 19 a team of 4 ladies from our Exchanges won, for the third year in succession, the 440 yards Inter-Departmental Relay Race. The names of the successful competitors are Misses J. Cusick, J. W. Cunningham, D. Elener and B. Patterson.

Our thanks and congratulations to our representatives, and none the less also to Miss L. Mortimer, the Officer in Charge of the Douglas Exchange, whose masseuse work had not a little to do with the matter.

Miss Margaret Bell, telephonist, Douglas Exchange, resigned the Service on May 19 in order to take up residence in the United States of America. Before leaving the staff presented Miss Bell with a handsome travelling rug and a leathern valise as a token of their esteem and good wishes. Miss Bell preferred to "slip away quietly," and at her request a staff Social which it was proposed to hold did not take place. Miss Bell was a most capable and conscientious officer and her departure is regretted by the whole staff.

J. L.

"THE ROAD TO THE—OFFICE."

Did you feel it to-day when you started out? The "thing" in the air—the freshness, the shimmer, the excitement of just being alive and in the sunshine. Did you revel in the greenery of the gardens as you passed, and as you walked on and came nearer town did you feel the "throb"—the bustle and stir of the trams and buses, the motor-cars and lorries, and the policemen with their clean white gloves directing the ever-increasing traffic? Did you feel the heat-haze as you hurried on? The very pavements answered with a "click" to your step. Everyone and everything were full of haste; and the anticipation of what the day would bring forth was high. You could work wonders this morning! The sun was out early and the *joie de vivre* was coursing through you. You wanted to laugh aloud with somebody. "What a day for a tramp in the country!" Did you think that? And then did you have to put the thought away and think it was better to work on a fine day than a dull one? And then were you glad you had a job and that you could walk to it? Oh! it's a great life, "The Road to the—Office."

M. L. TULLOCH.

ABERDEEN NOTES.

THE staff of the Aberdeen Telephone House, to the number of nearly 60, met in the Imperial Hotel, Aberdeen, on April 27, to take leave of Mr. Alfred C. Scott, who has been promoted from the office of overseer in the District Manager's office, Aberdeen, to that of a higher clerical officer in the District Manager's office, Edinburgh.

Mr. Archibald Clow occupied the chair, and referred to Mr. Scott's long services in Aberdeen and to the esteem in which he was held by all sections of the telephone staff.

Mr. P. Edmund, district manager, in name of the staff, presented Mr. Scott with a handsome oak clock with Westminster chimes, and in doing so paid tribute to the highly efficient manner in which Mr. Scott had discharged the whole of his official duties.

On May 30, 1928, on the eve of his departure for Glasgow, Mr. D. J. Melville, of the Contract Department, Telephone House, Aberdeen, was met by his colleagues and presented with a dessert service, silver-mounted casserole and fountain pen as a mark of esteem and appreciation.

Mr. Melville, who has been nine years at Telephone House, has left to take up the duties of Development Officer in the Contract Department of Scotland (West) Telephone District, Glasgow.

KEW AGAIN!

ONCE more the mixed battalion of C.T.O. retired officers of all ranks, and both sexes—on the 13th of last month, to wit—met by the West Side of the Palm House, Kew Gardens, where the proposal that "a short ramble in gardens . . . shall take place," was more popularly rejected than accepted, until some of the keepers of the Royal demesne began to look rather suspiciously upon the gathering crowd. However, nothing happened except a partial block of the gravelled pathway, and a few resentful looks from one or two passers-by, as who would say, "Have you bought the place with your penny?"

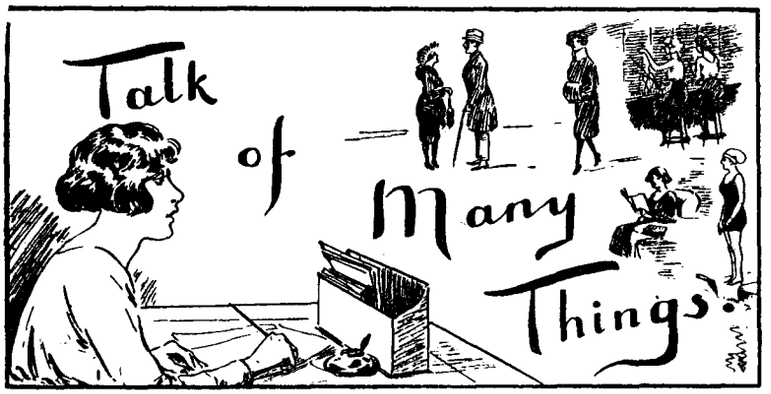
Hunger, and the clever shepherding of the ubiquitous Charlie Keen and his second in command, 'Arry Adams, soon led the crowd into the Imperial Restaurant, where a really liberal table and good service was provided.

The open air is not a good place for all but the most "leather-lunged" of speakers, and few could be heard beyond the immediate vicinity of their "soap box," except C. S. K. and friend Bailey. Everyone, however, did their best to make up for the lack of good accoustic properties of a huge riverside garden, but there was much regret at the continued absence from these gatherings of the ex-Controller, Mr. John Lee, whose doctor still vetoes his attendance at meetings of this and a similar nature. The Belgian traveller could not get to the festal board, but another of the clan was back in something like his old form. The presence of Miss M. A. Watts was the pleasant surprise of the party, and she has probably made a record for an ex-C.T.O.-ite of the weaker (?) sex at 86 years. A list of those present follows:—

Mrs. J. Abrahams, Mr. W. W. Abrey, Mr. and Mrs. H. E. Adams, Mr. and Mrs. T. J. Allison, Mrs. W. H. Ampleford, Mr. and Mrs. S. R. Ashby, Mr. J. Bailey, I.S.O., Miss H. E. Bartlett, Mrs. H. E. Bath, Mr. and Mrs. F. J. Bathe, Mr. and Mrs. A. Bathurst, Mr. O. Bathurst, Mr. W. A. Batten, Mrs. L. Beadle, Mr. A. F. Bell, Mr. H. E. P. Bell, Mr. G. T. Bennett, Mr. G. E. Birch, Mr. E. Bird, Mrs. M. Boddington, Miss A. E. Booth, Mr. C. J. Boulton, Miss S. E. Briault, Mr. and Mrs. F. W. Butler, Miss M. Camp, Mr. and Mrs. T. W. Charter, Miss E. J. Clarke, Mr. H. Clarke, Miss E. Coldwell, Miss P. L. Cooper, Mr. and Mrs. H. J. Dicks, Mr. and Mrs. R. Donaldson, Mr. E. Donne, Mr. C. Elphick, Mr. H. W. Evans, Mr. E. Fulcher, Mr. F. J. Furby, Mr. and Mrs. R. A. Furness, Mr. J. N. Geary, Mr. A. Gordon, Miss M. Grealy, Miss A. Grimmette, Mr. T. W. Gunter, Miss A. Hale, Mr. F. W. Harrison, Mr. E. L. Hilton, Miss M. E. Hitchings, Mr. R. Hewle, Miss A. M. Hutt, Miss E. M. Ireson, Mr. A. T. Jacobs, Mr. A. E. Johnson, Mr. D. W. Jones, Mr. J. J. Jones, Mr. W. E. Jones, Mr. and Mrs. C. S. Keen, Mr. R. E. Kemp, Mr. A. E. Kings, Miss A. A. Kitts, Mr. G. F. A. Lange, Mrs. A. J. Lawrie, Mrs. H. J. Lawrence, Miss A. E. Lee, Miss F. A. Le Pla, Mr. C. R. Lowe, Mr. A. W. F. Ludlow, Mrs. A. C. McEwan, Mrs. J. J. Mansell, Miss E. C. Mayersbach, Misses B. and E. Miles, Mr. F. W. Miles, Mr. C. J. Miners, Miss E. Moore, Mr. F. J. Muller, Mr. R. H. Mulock, Messrs. H. and S. F. Pace, Miss B. St. C. Page, Mr. S. Pearce, Mr. W. Plumer, Mr. H. Pond, Mr. and Mrs. B. W. and Miss Powell, Miss H. A. Read, Mr. T. Sadler, Mrs. A. Samuels, Mr. and Mrs. H. W. Senhenn, Miss E. J. Sleeman, Mr. and Mrs. S. J. Smith, Miss L. Strachan, Mr. and Mrs. E. Tibbles, Mr. W. J. Town, Mr. and Mrs. S. J. Treby, Mr. H. Trollope, Mrs. A. Turner, Mr. C. J. Turner, Mr. W. Turner, Mr. and Mrs. W. J. Twyman, Mr. J. J. Tyrrell, Miss F. Underwood, Mr. E. Walton, Mr. E. A. Ward, Miss F. J. Watts, Miss M. A. Watts, Mr. A. E. Wheeler, Mr. F. White, Mr. F. J. White, Mrs. F. W. G. White, Miss J. Wiltshire, and Mr. and Mrs. H. B. Winder.

J. J. T.

WE TELEPHONISTS.



"Hey, ho, the Wind and the Rain."

JUST now it's raining. It seems as though it has been raining for ever and that it will continue to rain for ever. I cannot see a break in the clouds because there is no break to see. There is no horizon because a mist is enveloping the world. The tops of the hills are shrouded and I doubt whether the tops of the mountains are high enough to pierce the soft coverlet of cloud. Columns of fleecy whiteness rise ever and anon from the trees in the valley. Last night I slept in a hut on the hillside and I listened to the steady patter of rain on the roof. It soothed me and brought a feeling of contentment and peace. I wanted to keep awake to hear it but its insistent monotone gradually lulled me to sleep. Sometimes the wind urged it to a higher note and hurried its pace or said to it with a wicked grin, "Go on, he's in there, soak him. What a joke!" But the rain wouldn't or couldn't—anyhow, it didn't. It sounded so gentle that possibly it wouldn't. I don't think that it was really bothering about me just then. It had previously met me in a wild shelterless region and had there thoroughly introduced itself and had kept company with me for many a mile. Nearby a rivulet gurgled appreciatively and trickled musically and in the distance a waterfall roared like a giant whose strength was renewed, sounding like thunder reverberating among the hills. I fancied I could see the trees swaying gently and laughing as the water danced through their foliage. I knew that on the morrow the sweet air would be sweeter, the green grass greener and that the way would be softer to the tread. The wild flowers would be lifting their faces daintily to be kissed by the sun and wind and the moss would turn to velvet. The rivers would brawl boastfully and would glisten the dry rocks, and the song of the birds would have added music. The stern frown of the mountains would soften and the weeping valleys would smile again. Thus I thought ere I drifted into sleep—but how different my thoughts would have been if the roof of that hut had leaked last night.

PERCY FLAGE.

A Reply to Mr. Flage.

Dear Editress,—A little help is worth a deal of pity—that Mr. Flage you allow to occupy so much of *our* column says he feels sorry for Nelson because the latter is so much out of the public mind. Why doesn't he, then, help to bring Nelson to mind—he could do this by giving everyone he met two half-nelsons; they would almost certainly pay attention, and give proof that they were so doing. He could wash away the results to his eye in one of the fountains under Nelson's eye and thus feel absolutely at one with Nelson.

The reason I have intervened is that I happen to be the model who sat for the girl at the desk. Mr. Flage is wrong in all his suppositions except when he refers to your beauty and mine. Mr. Flage has obviously never been to school, but has he never heard of the Operators' School at Clerkenwell? It was, of course, there that this studio study of me was made—a fact which explains the desk and the coiffure, because new entrants only learn the latest devices in the art of the hair dresser towards the end of their school course, and it is some time later before they learn the precise length of material which traffic tradition has standardised as appropriate for the dress of a first year's telephonist. The reason I have that "far-away" look in my eyes is not what Mr. Flage thinks at all, but because I am filling in a form for a second time and it is difficult to remember just what I said previously.

The smaller figures represent the images conjured up by my thoughts——so Mr. Flage is wrong again. The gentleman is a headquarters' official speaking to a supervisor who has unwisely made some slighting remark about automatics and he is telling her (look at the tilt of his nose), "Automatics have come to *stop*; and she is saying, "Oh yes—stop what?" The heavily clothed figure walking by herself is not, as you might suppose, dressed simply to cope with an ordinary June day, but as she lived near the exchange has hurriedly slipped home and put on two of everything in order to meet the needs of the swimmer who has been so intent on winning the Founder's Cup that she has found herself at the office without changing, having, thanks to our modern fashions, passed quite unnoticed through the streets. The girl who is reading is not in an exchange at all, she is my mother (doesn't she look young—it runs in our family—father's the same). That armchair was bought in one of fifty ways and was delivered in a plain van—you won't find an armchair like that in any exchange, not even in the night staff room.

Well, good-bye dear, I'm sorry to have taken up so much of your time and space, but I really could not allow Mr. Flage to go unanswered when he was so perceptibly and flagrantly wrong.

YOUR DEVOTED MODEL.

The Daily Joy Ride.

From the moment one leaves the precincts of home the fun begins! An hour ago we were peacefully sleeping; now—what a contrast!

To start with, the road is in chaos, half of it being roped off, while dozens of industrious workmen make as much noise as possible; buses there are, but you are lucky if you attract the attention of the driver, and the trams, well, the *trams*, 'nuf said.' Still, the train must be caught, and with our thoughts centred on this one fact we valiantly endeavour to board one or other of these vehicles. If we happen to be a little bit late, how it crawls, the only thing which acts as a spur being if a tram and bus are running a race with the two drivers intent on getting there first, though where the winning post is nobody apparently knows—however, they do move when the spirit of rivalry catches them.

Now for the train. Gentlemen first; if there are any seats to spare the girls can have them. Another stage over.

Now for the buses once more. Here they are all lined up, waiting. How considerate; but wait a moment, first one, "192," that won't do; second one, "349." Who wants a "349"? and so on, until we come to a likely number; apparently everyone else wants the same, and the people who have any corns on their feet had better look out. Here is where that little motto comes in that we all know so well, "If at first you don't succeed, try again." Patience, here comes another one. No luck; five more precious minutes wasted; we begin to see our names under the red line—this won't do. Cheers, here come two more vehicles both going in the right direction, and a minute later we have gained the coveted seat. A quarter of an hour later we enter the office. What a game!

L. R.

An After-thought.

Lest any of my friends should fear,
I've neither part nor lot in 'em,
Perhaps I ought to make it clear—
Anent my ode to Tottenham;

That whilst my visit I enjoyed,
I've no real wish to rusticate—
I find my time quite well employed
Where Hebrew Subs. do congregate.

Though round our premises do cleave,
Both warehouse and distillery,
I simply could not bear to leave
My dear old friend, Ann Cillary!

Of loyal workers we've no lack
And I have not forgotten 'em;
Although I pat upon the back
Our little sister, Tottenham.

The well-known proverb re self-praise
Restrains my pen from comment vain—
But gladly do I spend my days
With all my friends at Creechurch Lane!

C. A. S.

Competition.

Competitors are reminded that the closing date for sending in sketches for the column heading is July 9 next. Envelopes should be marked "Designs" and addressed as below:—

THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), E.C.1.

THE TELEPHONE IN THE WEST OF SCOTLAND.

MANY interesting things about the telephone service in the West of Scotland were related at a recent meeting of the Rotary Club of Kilmarnock by Mr. J. K. Murray, the District Manager of the Scotland Western District—a district which includes the area (excluding Glasgow) between Fort Augustus and Gretna.

It is essential, he said, that the Telephone Authority should provide equality of treatment to its subscribers and a speedy service of high quality. The desire is to progress and improve wherever possible, and no stone is left unturned in this direction. Telephone transactions now run into millions daily, and in such circumstances every second counts. The service is seldom without its critics, and each item brought to notice is carefully investigated, and if the fault is ours we try to find a cure.

We are sometimes accused of being very smart in pressing for payment of our accounts. When it is realised that a capital outlay representing many years' subscriptions is spent before the telephone service can be given to new subscribers it will be agreed that it is only reasonable that an immediate return on this capital should be forthcoming as soon as it is available for service. It should be specially borne in mind (1) that the service is installed free of all charge, and (2) that no charge is made for renewal of the plant from time to time, and (3) that reconstruction expenses consequent upon storm damage are borne by the Post Office without extra levy upon the subscriber whose plant is involved. Like the postal and telegraph service, the telephone service is essentially a pre-payable one, and the present rates have been fixed on the basis that accounts will be paid when rendered. The total number of items detailed on the actual accounts each quarter (in this district) is 884,490. The total number of originated calls made during 1927 was 15½ millions; roughly 12 million local calls and 3½ million trunk calls, an increase of 700,000 local calls and 160,000 trunk calls over the previous financial year. The total revenue collected for the district was £307,857, an increase of nearly £16,000. The operator at the Exchange is the servant most directly in touch with telephone users, and her attitude towards the public may make or mar its good name. The operators are trained how to speak to the subscribers and to effect their requirements with accuracy and dispatch, and perhaps I might take the liberty of hinting that occasional lapses from ideal standards of patience, courtesy and accuracy are not confined to the exchange end of the wire. The results of the test calls made by subscribers in the presence of the Service Inspectors in the course of their visits to offices, &c., for this district are as follows: Average speed of answer, 6.9 seconds; percentage of subscribers satisfied, 99.4. The written complaints totalled 585 for the district in the last year, or one for every 26,552 originated calls. The telephone instrument on the table represents to the subscriber the complete telephone equipment, although under the heading of plant must not be forgotten the intricate mechanism and miles of wire installed and available for connexion to that instrument, which is merely the last link in the chain, and which, contrary to popular belief, is less subjected to strain than portions of the plant not so readily visible to the public but equally essential. When anything goes wrong with this delicate electrical network there is a tendency to blame the operator at the exchange who is nearest to hand, without due regard to all the factors of the case. After giving some figures of the development of the district, Mr. Murray referred to various facilities available to telephone subscribers, which were not taken advantage of as they should be. On learning of these for the first time many people were surprised and even chagrined to find that such services were in existence and that they had not known of them before. Yet particulars regarding them were contained in the preface to the Telephone Directory, the study of which subscribers would find profitable to them. Thus it was possible for a telephone subscriber to 'phone a letter to an exchange and have that letter delivered by express messenger to any address—not necessarily that of a telephone subscriber, of course. A charge of 3*d*. was made for transmitting a letter of 30 words, and 1*d*. for every additional ten words, in addition to the 6*d*. for express delivery. Again, telegrams could be telephoned, and a subscriber could at any time get Greenwich Mean Time by ringing up the exchange, and it could be arranged that the exchange should ring up a subscriber—and ring violently, if necessary—at any hour of the morning, thus functioning as a particularly efficient alarum clock. Household users, continued Mr. Murray, are advised not to relegate the telephone to a position in a cold hall or a cloakroom, but rather to select a table instrument and have it in a suitable position in their most frequently-used sitting-room. The bell can be placed separately from the instrument at a central point within range of maid or mistress. In this way anyone sitting beside the instrument is not startled when the bell rings. Conversation is maintained in comfort, and if additional privacy is required for a special message plugs and sockets can be provided at one or more points at the cost of a few extra shillings. The instrument can then be carried through to another room—perhaps a bedroom—where it is also useful in cases of indisposition. In the domestic sphere a telephone can prove an economy, saving fatigue in visits to shops, and in making appointments. Disappointments at social gatherings can similarly be eliminated. Friction is avoided in hundreds of the emergencies which occur in every household, however well regulated. The business man can intimate his being detained to be late for a meal. He can take a longer luncheon interval in the confidence that by telephone he can be got for anything urgent. Indigestion is thereby avoided and long life secured. Surely all this is not dear at 2*s*. 6*d*. a week!

PRESENTATION TO MR. ROWLAND HILL.

AT the District Manager's Office, Scotland West, Glasgow, on April 3, 1928, an interesting function took place in the Contract Department Room, when Mr. Rowland Hill, Traffic Superintendent, Cl. I, was welcomed by a representative gathering of the staff and made the recipient of a handsome gold watch and casserole pyrex dish in silver stand, on the occasion of his retirement from the Service.

In making the presentation Mr. J. K. Murray, the District Manager, referred to Mr. Hill's sterling qualities, also detailing the various positions held by Mr. Hill since he entered the Service. Words of appreciation were added by Mr. Marshall, the Chief Clerk, Mr. Brodie, Contract Manager, Mr. Finlay, Traffic Superintendent, Cl. II, Mr. Buchanan, Assistant Traffic Superintendent, and by Mr. Dalziel, as representing the members of the staff associated with Mr. Hill since his coming to the Scotland West District in 1913.

Mr. Hill, in accepting the gifts, spoke feelingly of the reception given to him and offered his warm thanks for the good wishes expressed.

CORRESPONDENCE.

ADVERTISING THE TELEPHONE SERVICE.

TO THE EDITOR OF THE "TELEGRAPH AND TELEPHONE JOURNAL."

Sir,—Referring to Mr. Hood's letter in the May number of the *Journal*, it is agreed, of course, that the Telephone Service should be adequately advertised, but one hopes that desiccators and jointers' tents will not be used for the purpose. Trouble has already been caused by such methods and the practice was abandoned. When streets are disturbed by the Department and the public inconvenienced, the less the matter is advertised the better. Shopkeepers and others will grumble, but as often as not do not trouble to find out the party responsible for having the road up.

With regard to publicity generally, the Post Office possess excellent sites but, in my opinion, make inadequate use of them to advertise the various services provided.

The following are a few instances of inadequate publicity:—

1. A new building that is an architectural improvement to the town displays a cinema advertisement at the front entrance, but there is little to indicate that it is a Telephone Exchange and Post Office, except a few more or less insignificant notices in the windows and a stamp-vending machine hidden away in a by-street.
2. Almost all the larger Post Offices and many of the smaller ones display advertisements for other people's commodities. Many of these advertisements do not harmonise with the design and furnishings and often spoil what might otherwise be an imposing office.
3. Public kiosks and call offices are frequently difficult to find owing to the inadequacy of the notices.
4. Why should not the front door panel of the kiosk be used to advertise the telephone, making the notice fit in with the design of the kiosk?

Probably my critics will tell me that it is quite unnecessary to label a post office—everyone knows where it is and if they don't they can ask, and as regards advertising other people's wares, the Post Office draw a good income from this source. Again, am I not aware that canvassers are continually pushing the telephone? and so on. My reply is to look around and see what other concerns are doing, e.g., the railways, particularly the Underground Railways of London. This Company selects the best sites for its own advertisements, designs them artistically and as regards directing the public to the stations and booking offices leave little to be desired.

If, however, the Department does not set about utilising the sites at its disposal one does hope that the advertising matter will be presented to the public in a striking and artistic manner. A great public Department should set an example of high-class publicity: to adopt the methods of the roadside garage would be unpardonable.

The advertisements might give the public brief information on the following services, viz.:—

Telephones (including transoceanic telephony).
Telegraphs (including transoceanic telegraphy).
Savings banks.
C.O.D. system.
Express letters, night telegraph letters, &c.

Finally, the publicity should obviously be in the hands of an expert and the advertisements in certain cases should be varied at intervals. It will be of little use to print a lot of dull notices and send them out with instructions that they should be displayed in accordance with circular XYZ and leave it at that.

J. M. SHACKLETON.

LONDON TELEPHONE SERVICE NOTES.

Contract Branch.

THE results obtained by the Contract Branch during the month of May were a net gain of 4,461 stations as compared with a net gain of 4,093 stations for the corresponding month of last year.

* * * *

During the week-end of June 9/11 the Headquarters of the Contract Branch moved from 32 St. Bride Street, which had been their home for about eight years, to Cornwall House, Waterloo Road, which has been for some time the home of the Headquarters of the London Telephone Service and the Accounts Branch.

This move may be described as a return to the "fold" after eight troubled years spent in the "desert," but the removal was not hailed with the appropriate joy or enthusiasm by the staff who had become attached to the St. Bride Street premises and its position in the City. The new quarters are a distinct improvement on the old, but the fact that the branch only occupies an infinitesimal fraction of a floor gives it the impression that it has moved into a wilderness where it is surrounded by the philistines of other Government Departments.

Although human nature is intensely conservative and hates change, it is also very quick to adapt itself to new surroundings, and in a very short time the Branch will appreciate its new home and its neighbours, and would view any suggested change with as much or more misgiving than the removal to Cornwall House.

* * * *

At a recent meeting of the London County Council, one of the members suggested that telephones should be provided at all elementary schools in order to reduce the danger of delay in case of fire or accident and also to increase the efficiency of the service and bring it into line with modern practices.

On receiving an unfavourable answer the originator of the suggestion retorted with the following question: "May I ask whether the Chairman is aware that London is the only great City in Europe with the exception of Stamboul where the schools are not connected with the telephone system.

The Chairman contented himself by saying that he must have notice of the question but, as telephone people, we hope that he will reconsider his attitude to the suggestion.

* * * *

Sports Notes.

A team selected from the L.T.S. played the Brighton Engineering District at Brighton the first of two matches arranged this season.

A party of about 40, under the guidance of Mr. Adams, travelled by train and, favoured by fine weather, thoroughly enjoyed the outing. After the match the party were entertained to tea by the Brighton staff and later several of the party who still regard Automatics as something new and novel were conducted over the telephone exchange.

The mention of Automatics evidently stampeded many of the Traffic and Contract visitors, and with a cry of anguish accompanied by many strange and peculiar noises, interspersed with words which sounded like Holborn and Bishopsgate, they disappeared towards the sea, where many of them were found later taking advantage of the cooling waters so abundantly provided at Brighton.

Scores:—

Brighton	L.T.S.
111	63 for 8.

For the L.T.S. Adams knocked up a quick 24 and Shepherd the captain played very steadily for 17 not out. Smith also contributed a useful 13. Cowdray and Shepherd took the majority of the wickets.

The outstanding man for Brighton was Wood who scored 45 before being run out.

The return match should take place on July 14 and it is hoped to obtain a ground within easy reach of the city. Teas and refreshments will be provided if possible on the ground, and it is hoped that a good number of the L.T.S. staff will support the game. A further announcement will be made later.

The Contracts section team are making satisfactory progress in the Shield competition games and defeated a representative Accounts Branch team at Chiswick on June 5 by 101 runs to 80 runs.

Hodgkiss 20, Pearkes 29, and Wilson and Griffiths 13 each were the leading scorers for Contracts, and Pearkes bowled well throughout the innings, taking 3 wickets for 34 runs. Dickinson who was brought on late in the game took the last 3 wickets for 5 runs.

Bowls.—Two victories have been registered in the Bunbury Cup Competition. On May 31 the A.G.D. were beaten 77 shots to 60, and on June 20 the P.O. Engineers were beaten 59 shots to 53. The latest victory is particularly meritorious as the P.O. Engineers are the cup-holders.

It will be remembered that last year also, in their first season, the L.T.S. bowlers beat the holders.

Lawn Tennis.—A start has been made in the competition for the "Agnes Cox" Cup between teams representing various Sections of the Controller's Office and Exchanges.

The following first round results are to hand:—

Clerkenwell (holders) beat Hop.
Avenue beat Park.
A.R. 4 beat A.R. 1.
Wimbledon beat Operating School.
A.N. beat Ealing.
Willesden beat Kensington.
A.R.2. beat Ravensbourne.
Central beat Holborn.
Victoria beat Croydon.
Chiswick beat Putney.

* * * *

Retirement.

A respected colleague in the person of Mr. H. Scott of the Controller's Office retired recently. He had been in the service of the Post Office since 1904 and was regarded with esteem and respect by all those who came into contact with him. His retiring disposition eminently fitted him for staff work with which he was associated during the greater part of his official career. We wish him the best of health and good fortune in his retirement.

Mr. Scott was presented with a cheque by his colleagues as a token of the regard in which he was held.

* * * *

Night Staff Musicians.

The Night Staff have formed an Orchestra and Concert Party under the title of "Night Optimists." A successful first performance was given on May 15 at the Surrey Masonic Hall.

* * * *

Promotions to Assistant Supervisors, Class II:—

Miss E. M. AYRES, of Ealing Exchange.
Miss E .M. COOPER, of London Wall Exchange.
Miss R. WELLBY, of City Exchange.
Miss B. M. SAUNBY, of Hampstead Exchange.
Miss E. G. CURTIS, of City Exchange.
Miss W. F. AUSTING, of Clissold Exchange.
Miss E. T. AMOS, of Mayfair Exchange.
Miss C. A. GIBBS, of Rodney Exchange.
Miss H. E. DUNT, of Chancery Exchange.
Miss A. M. STORRAR, of North Exchange.
Miss M. ELIZABETH GARDNER, of Gerrard Exchange.

PRESENTATION TO MR. J. F. MURRAY (TRAFFIC SUPERINTENDENT, LEEDS).

ON May 5, 1928, at the Headquarters Telegraph and Telephone Traffic Section, Mr. J. F. Murray was presented, by his colleagues in the Section, with a wireless set, on the occasion of his promotion to the position of Traffic Superintendent, Class I, at Leeds.

When making the presentation, the Chief Inspector (Mr. J. F. Edmonds) recalled the fact that Mr. Murray had completed a quarter of a century in various branches of telephone service and referred to his direct association with important committees at Headquarters. In wishing Mr. Murray good luck and happiness in his new sphere, Mr. Edmonds remarked that among Mr. Murray's many characteristics his extreme stability and good judgment had gained for him the high esteem in which he was held by his colleagues at Headquarters.

The Deputy Chief Inspector (Mr. H. F. Deane) also gave testimony regarding Mr. Murray and his good qualities. Mr. A. Wakely paid his tribute to the good wishes for a departing colleague and took the opportunity of thanking Mr. Murray for the silver cup he had so kindly presented for annual competition amongst the golfing aspirants in the Traffic Section.

In a happy speech, which included some reminiscences, Mr. Murray referred to the enjoyable period of eight years which he had spent in the Headquarters Traffic Section and expressed his keen appreciation of such a handsome and useful gift, together with the good wishes which accompanied it.

SOME AMATEUR THEATRICALS.

DURING a recent visit to the West Country I had the pleasure of travelling on a local railway in a carriage with two prosperous business men returning home from B——, one of whom was slightly deaf and the other was hotly enthusiastic over his local dramatic society. It was impossible to avoid hearing all the conversation. Indeed, one cynical might have thought that much of it was intended to impress the stranger with the importance of his fellow passengers, as it dealt in figures with business and Stock Exchange deals and the cost of their present and proposed residences.

But the patron of the Thespian art could not remain long divorced from his hobby. He began to describe the various activities of his Society, its triumphs and its trials, and repeated time after time that many of their supporters attended the same piece at several successive performances. Perhaps the following description of the caste of one piece may account for the second visits! Who knows!

He waxed very wroth with the criticism of a visitor from London, who on one occasion declared that the caste was all wrong. "What did that critic know about amateur dramatic productions anyhow? It was not a professional show for which you could choose your artists from throughout the length and breadth of the country. A dramatic society had to make the best of the material which it had to hand, and to fit in those members who had a right to a part. [Oh! how true!] The caste in that particular case was, undoubtedly, a good one," he asserted, "though, of course, it had a few drawbacks. We chose Phyllis —— for the heroine. She was supposed to be about eighteen and slim, but as you know, Phyllis will not see thirty again, and she is certainly not thin. She has, however, a very nice voice though it is contralto and the part was written for a soprano, but what did that matter! The hero's part was that of a naval officer of imposing appearance and considerable strength. We caste —— for that part as he had a beautiful baritone voice, but, unfortunately, he is slight and rather frail. In one part he was supposed to swing the heroine off her feet, but we cut that out after a rehearsal at which there was nearly an accident.

"For another leading lady we chose Flora —— who is a splendid actress and, if you grant that she cannot sing a bit, well, you have said all there is to say against her."

And so on and so forth until the train drew up at their seaside station and I was left alone to wonder at the folly of two old gentlemen who babbled about their friends in loud voices, not even suppressing their surnames. Had I been a friend of Phyllis and Flora, the fur might have flown in real earnest and one more dramatic society have come to an untimely end.

But ye gods and little fishes, what a performance! No wonder the audience returned again and again to witness the Russian dances of the fat contralto and the thin baritone.

J.W.W.

RETIRED POSTAL WORKERS' ASSOCIATION.

PROVISIONAL COMMITTEE ELECTED.

THE meeting at Essex Hall on May 24 of all grades of retired pensioned Post Office officials to consider the possibility of organising a Retired Postal Workers' Association for social and recreation purposes was a success. In the unavoidable absence of Mr. J. W. Bowen, who was attending an important conference at Berlin, Mr. H. E. R. Alefounder, editor of *Supervising*, was unanimously voted to the chair. Mr. Middleton read letters of regret at inability to attend from Sir Robert Bruce, Sir Charles Sanderson, Messrs. C. G. Ammon, M.P., and W. B. Cheesman. Bath and Bristol Retired Colleagues' Association sent fraternal greetings. Mr. Middleton said that the object of the meeting was to see if arrangements could be made for retired colleagues to keep in touch with each other. Difficulty, doubtless, would be experienced in tracing those who had retired, as they were so scattered, but he hoped that by means of the Service journals their existence as a society would be made known. In London the postal superintending officers had a flourishing society, also the C.C. and T.'s and the C.T.O., and there was also the L.P.S. Retired Colleagues' Association, composed in the main of all grades from F.S. There were societies at Bath and Bristol, but so far no real effort appeared to have been made to organise the rank and file in general. One or two principles needed to be stressed.

After leaving office there should be no class distinction. A real All-Grades Association should be set up, as each grade in its way had served the State equally well. Careful thought should be given to the aims and objects. There should be social intercourse, and it should also be educational, and economics might be studied. In the evening of one's life there are splendid opportunities for improving one's knowledge and outlook, as well as to recapture some of the spirit of the old comradeship. Sometimes in retirement there is a loneliness, and there is an aching for old companionship. They wanted to add a little to the fullness of life by helping to provide the means for cementing old friendships and to make happier times for those now living in retirement.

Mr. Alefounder paid a glowing tribute to the existing London veterans' societies. Some his most valued friendships, he said, were formed in the Post Office. It was an excellent idea to form an All-Grade Society. It ought to be welcomed with open arms.

Mr. John Bailey (late W.D.O.) brought forward a personal grievance, which he thought the new Association might consider. He warmly supported the suggestion for an All-Grade Society, and would help in every way.

Mr. H. Walter (late N.D.O.) said that no one appreciated more than he the organisation of retired postmen. He thought the U.P.W. could protect the interests of retired men. To organise means money, and those retired were on half pay.

Mr. H. E. Gardiner (late I.S.), in an interesting speech, spoke of his many activities, and gave a retrospect of his past Post Office life. He warmly approved the proposed organisation.

Mr. A. J. Mosedale, in a sympathetic speech, wished the new society all possible success.

Mr. A. Seaton said that at first we must not be too ambitious, but should concentrate on a simple beginning. In time and as the organisation developed we should be better able to examine and estimate cost, but there would be no lack of sympathy on behalf of the U.P.W. At all times a retired colleague could always receive advice and guidance from the Union.

Messrs. A. R. Wilkin and A. E. Mowling also addressed the meeting.

A motion that a provisional committee be elected to hammer out a scheme was carried unanimously. The following were elected: Messrs. A. E. Mowling, R. Seaton, H. Walter, J. J. Fillmore, J. Bailey, and A. R. Wilkin. This committee would meet a week hence, and report progress at another all-grades meeting.

A hearty vote of thanks to Messrs. Alefounder and Middleton closed the meeting.

This is a promising beginning. It was obvious from the demeanour of those present that a Retired Colleagues' Society is badly needed, and would be well supported. Pensioners present came from Chatham, Gravesend, St. Neots, &c. There was a good sprinkling of retired supervisors, testifying to their deep sympathy in the proposed Association.

SHEFFIELD TELEPHONE DISTRICT.

A REPRESENTATIVE gathering assembled in the Contract Manager's room on June 1, to present Mr. G. H. Hamer, Contract Officer, Cl. I, with a handsome travelling bag, tray and pipe on the occasion of his transfer to the Western District, for family reasons, at his own request.

Mr. Edgar, Contract Manager, presided, and spoke in high terms of Mr. Hamer's qualities.

Mr. Hann, Chief Clerk, Mr. Wilson, Contract Officer, Cl. II and Mr. Ede, Engineering Dept., also paid tribute to Mr. Hamer, and at Mr. Edgar's request Mr. Ferguson, Traffic Supt., made the presentation.

Mr. H. W. Mitchell, Assistant Traffic Superintendent, has been appointed Superintendent of Posts and Telegraphs, Malay States. He left the District on the 6th inst., carrying with him the good wishes of the whole of the staff for Mrs. Mitchell (formerly a Sheffield telephonist) and himself.

Prior to his departure, the District Manager, on behalf of all sections of the Commercial and Engineering Staffs, presented him with a Gold Wrist Watch as a token of appreciation and goodwill. Mr. Mitchell was the guest of honour at a dinner and dance held on June 5.

A BRIEF CHRONOLOGY FOR STUDENTS OF TELEGRAPHS, TELEPHONES AND POSTS.

BY HARRY G. SELLARS.

(*Continued from page* 216.)

1853, Aug. ... Switzerland and Baden reached agreement on telegraph rates.

1853 ... ... Telegraphic Congress at which delegates from France, Belgium, Austria, Prussia, and minor German States were present. Sept.

Dr. Gintl, of Vienna, succeeded in obtaining duplex telegraph transmission.

Edward Orange Wildman Whitehouse, of Brighton, patented a recording telegraph system, with keyboards of five keys, using five-line wires. He used Bacon's five-unit code for signalling, with a method of locking the keys to ensure contact.

Moses G. Farmer, of U.S.A., patented a system of multiplex telegraph working and adapted rotary distributors to House's printers.

1853, Oct. ... Digney invented a single-key telegraph tape perforator.

1853 ... ... Fuller suggested the use of a solution of zinc sulphate for batteries if required for immediate use. He also invented the mercury-bichromate battery.

First effective cable laid to Ireland between Donaghadee and Portpatrick. Retardation and induction observed in underground circuits.

Cables laid across the rivers Ohio, Merrimac, Mississippi and St. Lawrence.

First cable to Belgium laid between Dumpton Gap and Middelkerke.

At a telegraph conference in Turin the views of the Austro-German Union were adopted.

1,000 miles of telegraph line in Canada.

Over 11 millions of telegrams transmitted in U.S.A.

Subsidies to steamship companies for carrying mails reached £853,140. Committee appointed to inquire into the working of Packet Services.

Commission appointed to revise Post Office salaries (Lord Elcho, Sir Stafford Northcote, Sir Charles Trevelyan, and Mr. Hoffay).

Decided that a post less frequent than once a day could be increased in frequency if the estimated revenue (calculating letters at ¾*d.* each) covered the cost.

1854 ... ... 41,392 miles of telegraph wire in use in U.S.A. Systems worked—Morse, House, and Bain. March.

1854 ... ... Principle adopted that all Post Office revenue should be paid into the Exchequer and all expenditure met by votes in Parliament. April 1.

It was proposed to connect Orfordness (Suffolk) with the Hague by seven separate cables, each with one core, and to twist them together near the shore. Three were laid and twisted about 3½ miles from the shore.

Lt. O. H. Berryman, on the *U.S.S. Arctic*, took soundings in the Atlantic with Lt. J. M. Brooke's apparatus. Lt. M. F. Maury, Chief of the U.S. Observatory, spoke favourably of the projected cable.

Admiral Fitzroy planned meteorological report system, and reports, in code, were telegraphed to newly formed Meteorological Office.

Frischen, of Berlin, obtained duplex telegraph transmission.

Charles Bourseul, of France, published a treatise on the electric transmission of speech and described experiments he had made. Speaking prophetically of the electrical transmission of sounds, he said, "What is spoken in Vienna may be heard in Paris. Imagine that one speaks near a mobile plate flexible enough not to lose any of the vibrations produced by the voice; that this plate establishes and interrupts successively the communication with a battery. You may be able to have at a distance another plate, which would execute at the same time the same vibrations."

J. B. Lindsay patented his method of conveying messages without the use of wires.

Siemens improved the perforator used by Bain and introduced an automatic transmitter.

Varley invented a double current telegraph key and a relay.

Whitehouse improved his recording telegraph apparatus and used only one wire.

Bombay-Calcutta telegraph line—1,500 miles—in operation. (The longest span of overhead wire used for telegraphic purposes is nearly 1¼ miles in length and spans the river Kistnah (India) at a height of 1,200 feet.)

1854 ... ... Georg Simon Ohm died. July 7.

Digney invented a double-key telegraph tape perforator.

Feddersen, Vernon Boys, and others, photographed the oscillatory discharge of a Leyden jar.

Thomas John, of Austria, devised a Morse inkwriter in which the signals were recorded on paper tape by a small metallic disc revolving in ink.

Lord Kelvin examined the effect of the electrostatic capacity and the ohmic resistance of telegraph circuits on the transmission of signals. He solved the mathematical problem of the propagation of currents in telegraph cables and devised a method of measuring the internal resistance of a battery.

(Edlund thought that elongation could be observed in strained wires when a current was passed through them.

Augustus Matthiessen, after experimenting, drew up a list of conductors of electricity in the order of their conducting powers.

Fizeau, Gonelle, Mitchell (U.S.A.) and Walker (U.S.A.) investigated the speed of electric currents.

Single needle telegraph replaced to a great extent by Bright's "Bell" telegraph, which produced two sharp different sounds representing dots and dashes.

1854, Aug. ... Bright, testing his "Bell" apparatus between London and Liverpool with messages containing plain language, cipher, names of foreign towns, &c., recorded greatest speed 37⅛ words a minute, average 27⅓ words a minute.

Foudrinier, Secretary of the Electric Telegraph Company, made tests of speed of double needle telegraph apparatus and recorded greatest speed 24½ words a minute, average 21¼ words a minute. Bain's printing telegraph recorded an average of 19½ words a minute.

Chartered Submarine Telegraph Company, which worked the Dover Ostend Cable, combined with the Submarine Telegraph Company, which worked the Dover-Calais cable.

European and American Electric Telegraph Company extended their lines from London to Birmingham, Wolverhampton, Stafford, Macclesfield, Manchester, and Liverpool.

40,000 miles of telegraph wire in United Kingdom—Electric Telegraph Company, 24,000 miles; English and Irish Magnetic Company, 13,000 miles; other companies, 3,000 miles. Electric Telegraph Company handled 520,890 telegrams.

1854, Sept. 4 ... Cable laid between Holyhead and Balscadden Bay, Ireland.

First Portpatrick-Donaghdee cable recovered.

1854, Oct. 14 ... Soren Hjorth patented an electrical machine.

Cables laid from Jersey to France, England to Ireland, Spezia to Corsica.

Cable laid across River Hudson.

1854, Nov. ... France and Spain reached agreement on telegraph rates.

Double needle working between England and France.

Telegraphic Company of New York, Newfoundland and London obtained the sole right of carrying cables to Newfoundland for fifty years.

6,000 miles of telegraph lines in France connecting 105 stations.

Practice of perforating sheets of postage stamps introduced.

1855, Jan. 1 ... First Irish Travelling Post Office established between Dublin and Cork.

Bright's "Bell" telegraph apparatus adopted by the Magnetic Company.

1855, Feb. 23 ...	Johann Karl Friedrich Gauss, of Brunswick, died.
	David, E. Hughes produced a direct working printing telegraph apparatus on which the signals were sent by means of 28 keys arranged like those of a piano and letters, or figures, were printed by a typewheel on paper tape.
	(Froment modified and improved the construction of Hughes' printing telegraph apparatus.
	Exchange Telegraph Company of London uses typeprinter for dissemination of news, with a keyboard similar to that of the Hughes.)
1855, March ...	First street letter box erected at corner of Fleet Street and Farringdon Street, London.
	Journal entitled *Les Annales Télégraphiques* founded by a committee of French telegraphists.
	Duboscq constructed a clockwork regulator to adjust the carbons of electric arc lamps automatically.
1855, May ...	William Thomson showed that the apparent velocity of an electrical signal depends upon the resistance and capacity of the circuit.
	Jacob Brett made an unsuccessful attempt to connect Sardinia with Algeria by cable.
	J. P. Humaston, of U.S.A., patented a keyboard tape perforator, punching Morse characters, in which the operator used foot pedals to provide the necessary power.
1855, June 1 ...	Ten francs for 25 words charged in England for telegrams between England and France. France added 2 francs for the message plus 12 centimes for every 10 kilometres traversed by the telegram.
	Electric Telegraph Company purchased all patents of Cooke and Wheatstone and some of Bain's.
	British Association doubted possibility of establishing cable across the Atlantic.
1855, Sept. ...	Bright patented a method of duplex telegraph working which was adopted by the Magnetic Telegraph Company.
	Cable laid between Cape Breton and Newfoundland.
	Stark, of Vienna, and Bosscha, of Leyden, invented diplex telegraph transmission and suggested quadruplex telegraph working.
1855, Oct. ...	Representatives of Belgium, France and Prussia met in Berlin and agreed upon 41 Articles covering various phases of international telegraphy.
	Telegraph system composed of engraved dials and movable pointers installed in St. George's Hospital, London.
1855, Dec. 29 ...	Belgium, France, Spain, Sardinia and Switzerland, in Paris, agreed that the Spanish and Italian languages should be added to the three (French, German and English) authorised in the agreement of October, 1855, and that Spain could exercise choice as regards acceptance of German. The agreement also dealt with rates and urgent, ordinary and government telegrams.
	882,360 telegrams dealt with in the United Kingdom.
	Admiralty entered into a contract for the conveyance of mails between England and Australia, via Suez. Limited time for conveyance 54 days—Southampton to Melbourne.
	Stamp duty on newspapers abolished.
	456,000,000 letters delivered by Post Office.
	Rates for "Book Post" reduced to 1*d.* for 4 oz. up to 1 lb.
	Indian Mail sent from Alexandria to the Nile by rail.
1856, April ...	Digney devised a three-key telegraph tape perforator.
	Ernst Siemens invented an iron tubular telegraph post.
	Smee devised a battery of platinised silver and zinc. He prevented the deposition of hydrogen on the negative plate of a battery by mechanical means.
1856, Oct. 9 ...	Bright and Whitehouse showed Morse, who was visiting London, that 270 signals a minute could be transmitted over a circuit of 2,000 miles made up of underground wires joined in series.
1856, Oct. 20 ...	Atlantic Telegraph Company registered. Bright advised the Company to construct the Atlantic Cable with a seven-wire strand. This was adopted in the Newfoundland-Cape Breton cable.

1856 ... ... Whitehouse, experimenting in connexion with the rate of signalling over submarine cables, discovered that the speed could be increased by sending currents in opposite directions, alternately.

On Magnetic Company's underground lines the gutta-percha insulation began to decay and an overhead system was considered. This led to the absorption of the British Telegraph Company, which had already combined with the European and American Telegraph Company. The amalgamation was entitled the "British and Irish Magnetic Telegraph Company," and the new organisation entered into a working arrangement with the Submarine Telegraph Company which handled the traffic for the Continent.

Ernst Siemens produced a magneto-electric machine in which coils of wire were wound lengthwise on a spindle which rotated between the poles of several steel magnets.

Pension of £4,700 per annum granted in 1686 to Duchess of Cleveland, and her successors, out of Post Office revenue, commuted for £91,000.

London divided into postal districts. Postal Guide appeared for the first time.

Holland and Portugal signed the telegraph agreement of December, 1855.

Ernst Siemens invented a system of telegraph signalling in which the length of a dot or dash is determined by the intervals between the holes on perforated tape.

1857, Feb. 22 ... Heinrich Rudolf Hertz born, in Hamburg.

1857, April ... Bright patented a cable dynamometer.

1857, May ... Bright and Charles de Bergue patented some improvements in the machine used for paying out cable.

Cable with four conductors laid between Sardinia and Bona.

William Thomson invented his mirror galvanometer.

D'Arsonval, Melloni and Wiedemann also devised galvanometers.

Gaugain introduced a galvanometer consisting of two parallel rings with a magnetic needle placed midway between them.)

1857, Aug. 5 ... Shore end of Atlantic cable fixed at Valentia.

1857, Aug. 6 ... Shore end of Atlantic cable laid from Valentia, Ireland. H.M.S. *Agamemnon* and U.S.S. *Niagara* standing by with Atlantic cable on board.

1857, Aug. 7 ... Shore end of Atlantic cable joined to portion on board U.S.S. *Niagara* and paying out commenced.

1857, Aug. 11 ... Atlantic cable broke in 2,000 fathoms of water after 334 nautical miles had been laid. *Agamemnon* and *Niagara* returned to Plymouth and the cable was stored in dry tanks, defective portions being replaced by new ones.

1857, Sept. ... Austro-Germanic Union, meeting at Stuttgart, agreed to come to an understanding with l'Union des Pays Occidentaux.

1858, Jan. 1 ... Metropolitan Postal Districts established.

Registration of letters to and from the Colonies came into force at a fee of 6*d*. Various fees were charged on letters to foreign countries.

Longridge and Brooks, in a paper to the Institution of Civil Engineers, recommended the lightest possible form of cable for deep sea conditions.

Latimer Clark devised a conductor built up of segmental copper wire. Wilkes suggested an outer tube.

Latimer Clark, Frederick Braithwaite and William Preece patented a covering for cables.

Company formed to lay cables between Suez, Aden and Karachi.

First cable to Holland laid between Lowestoft and Zandvoort.

1858, June 26 ... H.M.S. *Agamemnon* and U.S.S. *Niagara* commenced laying Atlantic cable but the cable broke and both vessels returned to Queenstown.

1858, June 30 ... Two Telegraph Unions met in Brussels.

Jacob Brett failed to lay a cable between Candia and Alexandria.

1858, July ... H.M.S. *Agamemnon* proceeding towards Valentia, and the U.S.S. *Niagara* towards Newfoundland, commenced laying the Atlantic cable from mid-ocean.

1858, Aug. 1 ... Telegraph Conference at Berne "to simplify the telegraph service and to introduce uniformity of principles between the various administrations. Countries supporting the findings of this Conference were Belgium, France, Holland, Portugal, Sardinia, Switzerland and Spain."

1858, Aug. 5 ... H.M.S. *Agamemnon* and U.S.S. *Niagara* succeeded in laying Atlantic Cable.

1858, Aug. 5 ... Communication established by means of Atlantic Cable, which had broken several times during the laying, 640 miles being lost.

William Thomson's mirror galvanometer used on Atlantic cable.

1858, Aug. 16 ... Queen Victoria and President Buchanan, of the United States, exchanged complimentary messages over Atlantic Cable.

Culley stated that when a current was sent by cable from Ireland to Newfoundland no effect was observed at the receiving end until two-tenths of a second had elapsed.

1858, Sept. 1 ... Communication with America by the Atlantic cable ceased.

A ten-cell Smee battery was not considered sufficient to work the Atlantic Cable so a large Transformer, weighing about a ton, was constructed so that a voltage of about 2,000 was available. While the cable lasted, 366 messages, containing 3,842 words, were exchanged.

Edward Bright patented a curb telegraph key expressly designed for working the Atlantic Cable. The key was taken to Valentia but arrived after the cable had broken.

1858, Oct. ... Another Telegraph Conference held at Friedrichshafen.

Rouvier proposed fixing at each end of a circuit two pendulums provided with contact brushes which would brush over segments arranged in an arc and so transmit the letter signals. Siemens and Halske pursued this idea and produced the "Pendel" telegraph system.

C. F. Varley introduced telegraph repeaters at Amsterdam to transform the English double current system into the Continental single current system, devised the "loop" test for locating faults on telegraph lines, constructed the "reel" lightning protector for telegraph circuits and used condensers in cable working to overcome earth currents.

Michael Idvorsky Pupin born, in Hungary.

Sir Charles Wheatstone and John Matthias Augustus Stroh patented an automatic telegraph system.

Wheatstone patented a perforator for preparing telegraph transmission tape, using Steinhil's alphabet.

J. H. Johnson patented a dynamo-electric machine.

Muirhead introduced the "Chamber" form of Daniell cells which could be more easily handled than the troughs then in use.

United Kingdom Telegraph Company formed and used Allan's needle apparatus on overhead lines. This Company originated the system of universal shilling messages—20 words with addresses free.

Indian Mail sent from Alexandria to Suez by rail.

Delivery of letters at every house contemplated and system tried in districts round a few towns.

Colonial Money Orders suggested by Canadian Government.

1859, Feb. 1 ... "Limited Mail" trains introduced for the Scotch Night Mail Service—number of passengers and parcels limited.

Clausius, supporting the hypothesis of Grotthuss, postulated the idea that under the influence of an electromotive force the direction of constituent atoms of liquid is controlled.

Marqfoy and Garnier introduced an automatic telegraph tape perforator.

1859, May 28 ... Cable between Suez and Aden completed.

1859, June 1 ... Money Order system with Canada commenced, with limit of £5 and commission at four times the inland rate. Malta and Gibraltar issued orders payable in Canada.

(To be continued.)

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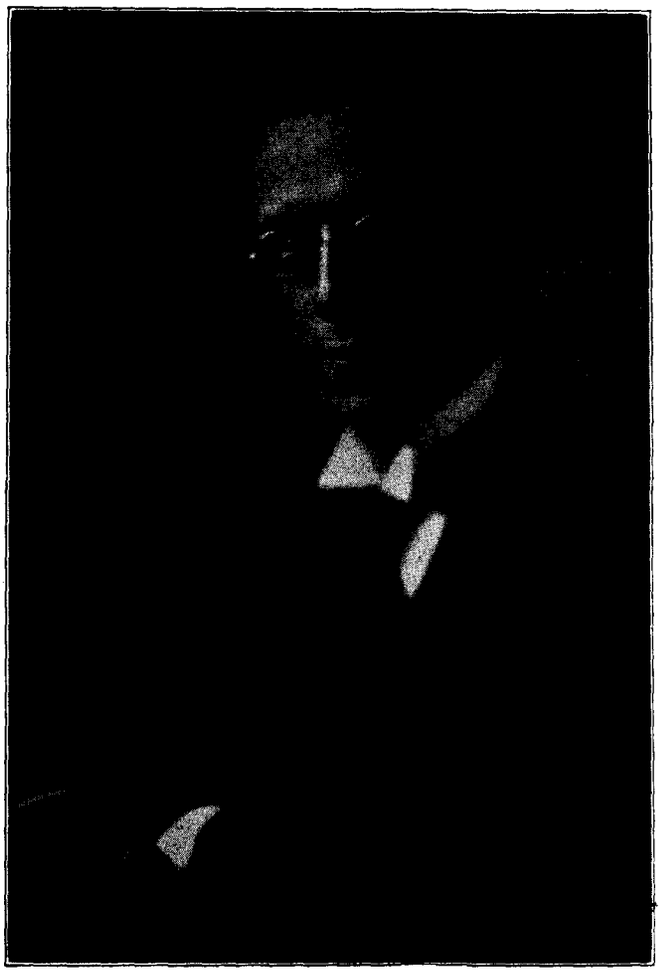
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

LV.

MR. A. J. WALDEGRAVE, M.B.E.

MR. A. J. WALDEGRAVE, who became Deputy Accountant General last April, entered the Civil Service in November 1891, and has spent the whole of his service in the Accountant General's Department of the Post Office.

Judging from his name, Mr. Waldegrave's ancestors must have come over with the Conqueror, and such an ancestry would account for his possession of a keen wit and a logical penetration of mind, but there must also be a strong Saxon strain in him, for he has solid qualities of a kind which are not usually associated with the Gallic character.



Mr. Waldegrave is a mine of information on all matters affecting Post Office financial practices and policy, and he is a refuge to distressed officers of other departments who get involved in these difficult matters. His blood is on his own head, however, if he finds these enquirers troublesome, for he invariably receives them so nicely that they return to him in further times of distress as to a Father Confessor.

He has been abroad on several occasions on international missions, and he was decorated for valuable services during the War. He has always been deeply interested in social problems, and his knowledge of the literature dealing with such subjects is both extensive and profound.

THE POSSIBILITIES OF A TRANS-CONTINENTAL LONG-DISTANCE TELEPHONE SERVICE BETWEEN EUROPE AND ASIA.

ABOUT a year ago Oberpostdirektor LITZINGER of Berlin published an interesting article on this subject in the Journal *Europäischer Fernsprechdienst*, of which an abridged translation is subjoined. Towards the end of his paper Herr Litzinger says that the radio engineer will have a word to say on the matter, and we confess that there seems to be every probability that wireless telephone service with the East and India is likely to be established before the stupendous task of providing physical communication between this country and India could be accomplished. There is, however, no reason why the next few years should not see telephone lines connecting Western Europe with Constantinople and even Angora.

Europe possesses a reliable telephone cable system (of which 7,400 km. with 720,000 km. of double wire are in Germany alone). For international telephone service a fixed basis has been established both in technical and administrative respects, upon which several countries have worked with success. Even in 1922 an expansion of the European telephone system could be spoken of which a decade earlier would have appeared fantastic. And now, six years later, it can be said that not only are the cable systems of the chief telephone-using European States to be found in full development but the interconnexion of these networks for a European trunk service has become a fact. The question of inter-European telephone service is thus solved.

How will development proceed further, according to the general laws of traffic ? Just as in the case of other kinds of traffic, whether by telegraph, by railway, by ship or by aircraft, first the networks of the periphery of the existing network will be united to the latter, and then, to extend their effective range of communication, will seek connexion with other interstate networks. On all sides countries hitherto little developed are bestirring themselves. They surpass the decade-long periods of development of States with dense networks and avail themselves of the newest devices.

Critical periods arise in stages of regular development, during which further progress stands still either for a short or long time. Sometimes this dead period is turned to favourable account by men of action. A great impetus was given to all kinds of communications by the war, otherwise so hostile to progress, e.g., uneconomic railways were built for strategic purposes. The railway built across the Suez Canal from Cairo to El Kantara and Palestine achieved a connexion with the Hedjaz Railway and forms an uninterrupted line of rail via Aleppo, Mosul and Baghdad to the Persian Gulf by using the Baghdad-Basra line, also completed during the war.

Moreover, the Syrian junction point, Aleppo, affords connexions with the Anatolian Railway line to Smyrna, Angora and Constantinople. Further plans for the extension of the railway from Baghdad to Teheran and thence to Peshawar and British India are only projected. . . . The necessities of communication gave a like impulse to telephone connexions. One of the longest trunk lines must have been that from Germany to Constantinople. Thus the experiences gained in telephony in war became useful to mankind in peace.

The technique of trunk line traffic is sufficiently far advanced that constructional difficulties do not appear invincible in comparison with those of long-distance railways, and measures for organisation of the European long-distance telephone traffic possess already a reliable foundation. Let us consider the question of a transcontinental trunk in the case of a given example, e.g., that between England and India.

We in Germany are in the happy position of being not only the pathfinders, but we also actually completed the work. It was Werner Siemens who, in 1869, created a complete Indo-European overhead telegraph which bridged with certainty a distance of 10,000 km. and still to-day fulfils the purpose for which its master created it. . . .

The Indo-European telegraph line is principally for traffic between British India and the Motherland, but the properties of a transcontinental telephone line would require that it also served internal and interstate traffic of the countries it crossed. If we consider the course of the Indo-European line, which runs from London via Emden, Berlin, Thorn, Warsaw, Rovno, Zhitomir, Odessa, Kertch, Tiflis, Julfa, Teheran, Ispahan to Bushir, thence to Jask, Gwadir and Karachi, using the cable of the British Indian telegraph system, we shall see that there are long sections on which the joint use of this line as a transcontinental telephone line for the traffic of intermediate States cannot be made forthwith. One must therefore look for other routes which run more favourably for telephone service.

* * * *

What route suggests itself for an Indian line, leaving out of account the Siemens line referred to ? From England to Budapest, in the nature of things, only the existing trunk cable system comes into consideration. Budapest can, therefore, be considered as the point of departure for the new route. The continuation of the trunk cable from Buda Pest to Belgrade is already being earnestly considered. There are considerable advantages in following the railway, which affords facilities for transport of workmen and material, is traversible in winter, and the route can be placed under the supervision of railway staff. The telephone line will thus follow in general the Orient Railway via Belgrade, Sofia, Philippopolis, Adrianople and Constantinople. The connexion of the more important Balkan lines with the route as contributory channels can be considered later.

The construction of a transcontinental telephone line through the rugged defiles of the Balkans will require great technical skill . . . The transit of the Bosphorus is another hindrance to the extension of the line. The terminus of the Orient line is at the Sirkeji Station, about 500 metres from Galata Bridge, in which direction a cable could be laid. The bridge is 468 metres long, but is useless for carrying the cable, as it is partly a swing bridge. The water about the bridge is 40 metres deep, under which lies a stratum of 20 metres of mud. The landing of the cable at the north side of the Golden Horn at Galata would present no difficulties, nor would the extension of a land cable through the European quarter of Pera. Some of the Turkish cables cross the same part of the Golden Horn. The Turkish lines run in a northerly direction to Rumeli Hissat, a mightly castle of old Turkish times on the Bosphorus. This is here at its narrowest (660 m.) ; and this is where Darius on his Scythian march, threw a bridge over the Bosphorus. Although the Turkish cable is laid at this point to the Asiatic coast at Anadolu Hissar, its depth of about 120 m., with a tearing current, is unsuitable for a telephone cable. The Sheitan Akintisi (Satan's Stream), as this part of the Bosphorus is called, on account of its strong current, must be avoided even at the cost of greater length of cable. The simplest way would therefore be to cross the southern outlet of the Bosphorus immediately near the terminus of the Orient Railway, about the Serai Point, in the direction of the starting point of the Anatolian Railway, Haidar Pasha. The Bosphorus has here a breadth of about 3 km. and a depth of 50-70 metres. The current is not so strong as further north. This route has the advantage of greater shortness, since it avoids a circuitous way round Scutari. The economic importance of further development of the telephone for Constantinople can be considered later.

It would be well to land the Bosphorus cable in the neighbourhood of the modern Haidar Pasha station, from which it would immediately continue its further route on Asiatic soil. The railway, a single line of normal gauge, is of great importance for the

development of the trade and agriculture of this region. After a journey of 157 km. Geve is reached, a place of some interest, as, south of the station the old caravan route for Persia via Angora (over which the telegraph line from Constantinople to Diabekir, Bagdad, Fao, and Bushire is carried) branches off. The railway now climbs the Anatolian plateau, and reaches a height of 810 metres above the sea level at Eskishehir. Here a line branches off to Angora, from which a continuation to Sivas is being constructed. In May last a railway line 400 km. long from Angora to Kaissarieh (the ancient Caesarea) was opened.

The Anatolian railway continues southwards to Alayund, Afiun Karahissar and Konieh, where it terminates and the Baghdad railway begins. This also is a single line of normal gauge. It crosses the Cilician Taurus, reaching 1,467 metres at its highest point, boring the range with numerous tunnels and crossing the wilderness by means of bold viaducts. In its conquest of the Taurus, the Baghdad railway is one of the most magnificent mountain railways of the world. A transcontinental telephone line would strike some historic memorials in these regions, where the traveller may recall with reverence events associated with the names of Xerxes, Darius, Cyrus, Alexander the Great, Harun al Rashid and Godfrey of Bouillon. Proceeding from Adana, the railway overcomes the Amanus range by means of further numerous tunnels and viaducts, and crosses to Islahia plain to Aleppo.

Aleppo is the junction for the Anatolian, Hedjaz, Syrian, and Baghdad lines. It would play an important rôle in the telephone system.

The Baghdad line proceeds via Jerablus, Ras-al-Ain, Tell Helif, and Nisibin to Mosul (near Ancient Nineveh). At Jerablus it reaches the Euphrates, which it crosses by a bridge 800 miles long, and along its route the telegraph wires are carried on iron poles. From Mosul to Baghdad it follows the right bank of the river.

The railway continues from Baghdad to Basra (570 km. distant) and about 100 km. from the Persian Gulf. Here the railway system ends and up to this point affords an assured route and a regular plan for a transcontinental trunk line about 4,574 km. long (2,840 miles). About 100 km. of land line would have to be constructed to Fao on the Persian Gulf.

The concluding section up to its route over the Inland land lines from Karachi must be laid as a sea cable in the Persian Gulf, about 50 metres deep, via Menama, Shuam, and Jask. For the remaining section from Jask to Karachi along the Gulf of Oman there is the possibility of either a land line or coast cable. The connecting link between Fao and Jask, of about 1,480 km., consist of single lengths of 620 + 520 + 340 km. altogether, the laying of which in favourable depths is not difficult.

The question whether this line is to be constructed as a land-cable, aerial cable or open wire requires special investigation and has not been gone into.

The various separate distances of the route already considered are set out in the following tables :—

TABLE I.

		Kilometres.
(*a*) Existing cable route—	A.—EUROPE.	
London, Frankfurt, Vienna, Budapest		1,956
(*b*) Beyond cable system—		
Budapest—Belgrade—Sofia—Constantinople		1,491
(*c*) Bosphorus cable—		
Constantinople—Haidar Pasha		5
(*a*) Anatolia Railway—	B.—ASIA.	
Haidar Pasha—Konieh		747
(*b*) Baghdad Railway—		
Konieh—Aleppo—Mosul—Baghdad		1,766
(*c*) Baghdad—Shatt-al-Arab—		
Baghdad—Basra		570
(*d*) Basra—Persian Gulf—		
Basra—Fao		100
(*e*) Sea-cable Fao—Jask		1,480
(*f*) Landline—Jask—Karachi		1,100
(*g*) Land line British Indies (Railway)—		
Karachi—Delhi—Cawnpore—Benares—Calcutta		2,695

TABLE II.

		Existing Cable. Km.	*New Sea Cable. Km.*	*Lines on Railways. Km.*	*Lines on Roads. Km.*
A*a* ...	London—Budapest	1956*	—	—	—
A*b* ...	Budapest—Constantinople ...	—	—	1,491	—
A*c* ...	Constantinople—Haidar Pasha	—	5	—	—
B*a* ...	Haidar Pasha—Konieh ...	—	—	747	—
B*b* ...	Konieh—Baghdad	—	—	1,766	90
B*c* ...	Baghdad—Basra	—	—	570	—
B*d* ...	Basra—Fao	—	—	—	100
B*e* ...	Fao—Jask	—	1,480	—	—
B*f* ...	Jask—Karachi	—	—	—	1,100
B*g* ...	Karachi—Calcutta	—	—	2,695	—
	Total ...	1,956	1,485	7,269	1,290

Grand Total 12,000 km. (7,450 miles).

* It may be observed that the route now taken between London and Vienna is that via Belgium instead of Holland, some 140 km. nearer. Vienna is 1,563 km. and Budapest 1,818 km. distant from London via Brussels.

From the computed total of 12,000 km. there must be deducted in the first place 1,956 of trunk cable, so that roughly 10,000 km. of line will have to be erected. Towards this there is 7,269 km. of railway line, so that roughly 73% can be led over an assured route, on which not only all the conceivable conveniences for the building of the line can be obtained by the use of railway trains, but also the care of the workmen, the service staff and the repeater stations is assured. The 1,485 km. of sea cable comprised in the scheme is certainly unsatisfactory. But as the route of the Indo-European telegraph line shows, which also uses a cable in the Persian Gulf and Gulf of Oman, this difficulty is not invincible. This sea-length could only be dispensed with if a land route through Persia could be selected. The question whether on this 1,100 km. length of coast or land cable, an overland construction would perhaps have to be chosen, can only be decided after special investigation. The first thing to be considered is only the possibility of providing the line. From the tables it will be seen that of the total 12,000 km. length of line 16.3% is existing trunk cable, 12.4% is on new sea cable, 60.6% on lines on railways and 10.7% on lines on roads. The existing trunk cable and the railway sections to be used make up roughly 77% of the whole route, from which it is apparent that more than three-quarters of the total route could be decided on straightway.

The foregoing topographical study is intended to discover on broad lines whether and in what way the idea of a trans-continental trunk line can be realised.

The figures of the table of distances will actually be somewhat varied. Exact measurements can only be obtained by the co-operation of the countries concerned. A study of the map shows that other routes come into consideration. It is therefore necessary to deal with the routes already occasionally indicated in the foregoing, such as the route via Eskishehir-Angora (or Geve-Angora), Sivas-Diabekir-Baghdad-Fao-Bushire, or via Erzerum-Teheran to India. Also there is the line from Baghdad via Teheran to Lahore to be considered.

Besides suchlike topographical studies, those of an economic kind are necessary in order to test whether the commercial, political or other economic affairs are of such sort that they will be able to feed a telephone line in sufficient measure and within a reasonable time, so that it will remain "alive" and yield the necessary receipts for its existence.

The ever more distant goals of World Air routes are not forgotten. These considerations lead further to the tariff question, on which again that of the organisation depends. Above all, the technical man will have to be heard, for the suggested plan contains a host of problems. Finally, also, the radio engineer will have a word to say, whose goal lies in the same direction as the foregoing. It will be an important question to elucidate whether in telephony the two services will develop together as in telegraphy, i.e., whether both can exist together and complement each other.

If we compare the present state of telephone technique with its beginnings in 1877, especially with reference to the question under examination, we can decide with satisfaction that a co-operative fixed objective of knowledge and practice has placed at the disposal of mankind a means of communication in the telephone without which present economic life is as little thinkable as without, for example, railways. On the other hand, it will be agreed that the way up to the present grades of perfection was far more difficult than will be the extension of the telephone to the farthest distances as treated of in the foregoing. In the first case a completely new technique had to be developed and in the present only the application of already proven methods to a special case. Looked at from this point of view the transcontinental telephone extension is no longer a bold project but rather a normal step in the development of a highly developed technique.

W. H. G.

REVIEW.

"*Telephone and Power Transmission.*" *By R. Bradfield and W. J. John.* (*Published by Chapman and Hall.*) *pp. xi* + 238. *Price* 21*s. net.*

Transmission Theory has in recent years become one of the most important items in the mental equipment of communication engineers, and of engineers who are concerned with lengthy power circuits.

Unfortunately, the mathematical methods which have to be employed, involving as they do the use of vectorial algebra and hyperbolic functions, are outside the ground usually covered by the ordinary technical student, and consequently, the standard books on the subject are, for him, written in a more or less incomprehensible language.

The difficulties of these mathematical methods are, however, far more imaginary than real, and, once the meaning of the notation employed has been grasped, vectorial and hyperbolic expressions become as easy to handle as those more usually met with. At the same time the student finds himself in possession of a tool by means of which he can solve easily problems which, without the aid of these methods, would be extremely difficult.

The present book has been written for those who need to use transmission theory in the course of their work, but who have not necessarily any advanced mathematical knowledge. It is divided into two parts. Part I deals with telephone transmission and Part II with the transmission of power.

The general mathematical theory involved is the same in each case, and is explained very clearly and from first principles in the first two chapters.

The next chapter deals with the application of the theory to telephone transmission, and the fourth chapter is devoted to the various line constants which have to be taken into account in transmission problems, together with the methods by which they can be measured. This concludes Part I.

The first chapter in Part II deals with the general questions of power transmission, and the next with the effects of the introduction of transformers into the circuit. The seventh chapter deals with travelling waves and "switch-in" phenomena.

The consideration of these transient phenomena, which are of extreme importance in power transmission, is continued in the next two chapters, where the elementary mathematical theory involved is developed.

In an appendix a series of useful tables is given to facilitate the numerical calculations involved in the application of the theory to practical problems.

The book is well got up, and is a valuable addition to electrical engineering literature.

THE POSTMASTER-GENERAL ON THE TELEGRAPHS AND THE HARDMAN-LEVER COMMITTEE.

WE reprint in full for the information of our readers those passages of the Postmaster-General's speech in the debate on the Post Office Estimates which dealt with the position of the telegraphs :—

Coming now to the telegraph service, there was in the year 1927-28, as compared with 1926-27, a slight increase of £40,000 in the deficit, but this is more than accounted for by a change in the method of dealing with the receipts from wireless receiving licences, on the recommendation of the Public Accounts Committee. In previous years these receipts, after payment of the cost of collection and the proportion due to the British Broadcasting Corporation, were treated as telegraph net revenue. However, it is now agreed that it really had nothing to do with the operation of the telegraph service proper, and that it only obscured the accounts. Accordingly, in 1927-28, we are bringing into account on the telegraph side only the 12½% which the Post Office receives as the sum due to cover the cost of collection and enforcement. As far as I am able to ascertain, that 12½% was an extremely good calculation, and almost exactly balances what we estimated for the cost of collection and management of the service.

The decline in the inland telegraph revenue continued in the year, but the position with regard to foreign services was of course much improved. Owing to the inception of the beam wireless service, a new form and a substantial amount of revenue began to come in. Apart from the reduction of the credit for wireless receiving licences, the telegraph revenue, on the whole, improved by about £57,000, while operating expenses, including depreciation, increased by about £32,000. There was, therefore, on the telegraphs a small net improvement of about £25,000. That, however, still leaves a substantial deficit of £1,389,000. About that I shall have something more to say later. On the telephone side, the telephone service working shows a small surplus. Both revenue and operating expenses continue to grow, but the revenue from the trunk service did not show quite the resiliency that I had expected and hoped. No doubt the continuing depression in the heavy industries had something to do with the matter, but there was a period during last year when the trunk revenue did not come up to expectations. However, I am glad to say that there were indications of a distinct improvement in the trunk traffic during recent months.

I ought, however, to point out that some of the comparisons and comments sometimes made by alleged experts, that the result of the combined working of telegraph and telephones shows a loss of something like £1,270,000 a year and that this shows how bad the management is—that sort of comment really does less than justice to the service, and less than justice to the unfortunate Postmaster-General, because such a criticism and such comparisons with great enterprises like the Western Union and the American Telephone and Telegraph Company really distort the facts in at least two very important directions. In the first place it ought to be remembered that it has been the deliberate policy of Governments in this country for many years past, as regards the telegraph service, to run it at rates which do not and cannot pay the community generally, and as far as the telephone service is concerned, it has been the policy to run it by giving back a large proportion of the profits in the form of rate concessions to the users and also of carrying a considerable unremunerative fringe of business in rural areas. Both those facts ought to be taken into account.

That is one of the directions in which I say that comparisons of this sort are really distortions of fact. But there is an even more important way in which that sort of comparison lends itself to misrepresentation. It is really incorrect to compare the results of the services I have given with what you might call the profits remaining available for dividend in the case of a private enterprise. In order to give a true comparison when you are dealing with these accounts, you ought to ascertain what is the figure of the profit or loss which is available to meet interest charges; that is to say you ought to ascertain what the profit or loss is after providing for the sums required for operating, for maintenance, and for depreciation, and see what the resultant figure left is then. That is the figure that is available, subject to the qualifications about the policy of reducing charges and the qualification that while figures in the case of a Government service bear a charge for rates they do not bear a charge for taxes, that resultant figure, the sum that is left after providing for operating, maintenance, and depreciation, to meet interest charges, is the proper comparison with the profits remaining available for dividend in a private enterprise. If you do that, the position takes quite a different shape. You can then see the very real progress which has been made in the last seven years. On that basis the results of 1921-22 working were, that the telegraphs showed, before provision for interest was taken off, a loss of £2,668,771, the telephone showed a profit of £1,095,656, or a combined loss on the joint undertaking of £1,573,115. In 1927-28 the telegraphs showed an estimated loss of £1,023,000, the telephones an estimated profit of £4,201,000, or a combined profit of £3,178,000.

* * * *

I must hasten on to say a word about the Inland Telegraph Service. I have already given the general financial results, and the Committee will have seen that there is little change in the general trend of these results. Indeed, there has been very little change in regard to the Inland Telegraph Service ever since 1885, when the 6*d.* telegram was introduced, on a private Member's Motion in this House. There has been since then a continuing deficit, which has varied in the last decade from something like £3,000,000 down to the figure of between £1,500,000 and £1,250,000 at which it stands now. I mention this because, possibly largely owing to the way in which, no doubt from considerations of space, the Report of the Hardman-Lever

Committee has been recorded in the Press, it is undoubtedly a fact that the impression has been produced on the public mind that an entirely new and unsuspected state of financial decrepitude has been revealed by an inquiry which someone has forced on a reluctant Postmaster-General.

The facts are, of course, entirely contrary. I found that for two generations every Government in turn, Liberal, Conservative, Coalition, and Socialist, had always accepted this substantial loss on the working of the Inland Telegraph Service as something inevitable; and, apart from the very simple expedient resorted to by the Administration of the right hon. Member for Carnarvon Boroughs (Mr. Lloyd George) of doubling the charges, they had accepted this position. I ought to except Mr. Hobhouse when he was Postmaster-General, because Mr. Hobhouse did appoint a committee of very much the same sort as I recently appointed, but the war intervened, their work was cut short, and nothing further was done in that direction. Having regard to this fact and to the views which I held on the subject, I started in the Department two years ago a review of the administrative position with a view to securing further economies. We reached certain conclusions and began the necessary revisions, but it was clear that even with those revisions, which were obvious, there was still going to be a very large gap.

All sorts of suggestions were made, from all sorts of quarters, as to how that gap should be filled—from Members of Parliament, from the Press, from private individuals, and from commercial organisations—and they all had different methods. Some were in favour of increasing charges, some were in favour of reducing charges, some were in favour of zone charges, some were in favour of a system of inverted zone charges; and so I decided that I would invoke the aid of three of the best business brains that I could command and ask them to advise whether anything, and, if so, what, could be done to fill up this gap. I deliberately asked three gentlemen from the outside world, not, as has been suggested, because I was anxious to use their Report as ammunition for an attack on a Government Service, but because, having lived, as I have done, in both worlds, I knew the difficulties which inhere in Civil Service administration, and I wished to see how far they regarded the problem as soluble as a matter of administration, and, if so, how far any of their plans could be dovetailed into the system.

The answer is frankly disappointing, because the Committee found that, even given the most favourable conditions of management by private enterprise, on ordinary commercial lines, the gap could not be filled, and their only suggestion for effecting a substantial reduction in the gap lies in an increase of rates to the public. I am not altogether surprised, because I had reached practically the same conclusion from the inquiry which I made myself, but I am most grateful to the Committee for their examination of this very difficult problem, and although I do not agree altogether with all their conclusions, I think the only matter that calls for criticism and regret is that the most vital paragraph in their Report is so worded that inferences have been drawn from it by critics which are really quite unfair and quite unwarranted by the facts. This matter is really so important that, at the risk of detaining the Committee for a few moments longer, I must explain exactly what has happened. The Committee say, in paragraph 24 of their Report:—

> "It is difficult for the Committee to express in figures what savings might be effected with an efficient staff and management; but in the course of the inquiry evidence was given by practical telegraph men that on the assumption of a free hand as in a commercial enterprise, and with a wider use of machine printing telegraphs, savings varying from 20% to 33⅓% of the present operating staff costs could probably be made, and the Committee see no reason to disagree with this view."

This paragraph has been widely quoted by critics as amounting to a statement that the present conditions are so inefficient that, if properly revised and with a free hand, operating costs can be cut down by from 20% to 33⅓%; and I am not saying that operating costs cannot be cut down. That is precisely what I have been trying to set out to achieve, but I confess that when I read that statement it staggered me, because I thought it was most remarkable that, after I had been groping after savings for months, it should be suggested that the operating heads of my own Department should all the time have had these savings lying right to their hands; and I may tell the Committee at once that I demanded to know what were the savings which had been suggested, and why they had not been suggested to me. When I went into the facts, I found, as no doubt some Members of the Committee have already guessed—those, at least, who have had experience of control of largish undertakings and who know what the methods of the operating side are—that what they said was something quite different. The evidence, so far from supporting such a conclusion, simply negatived it.

What the operating heads said was exactly what the operating side always does say under these circumstances, namely, that their estimated savings in costs from 20% to 33⅓% were not absolute; they were hypothetical. They depended upon the creation of a set of conditions ideally perfect from the point of view of operating costs of production, but which had and could have no relation whatever to actual practice. What did they postulate? Their postulate was, in the first place, an entirely new Central Telegraph Office, with the transfer of all the mass of cables to the new situation, at a capital cost which I have not begun to attempt to measure; in the second place, a large expenditure on new apparatus; in the third place, the ruthless scrapping of all operators except those of fullest vigour; in the fourth place, a system of piecework; and, in the fifth place, a slowing down of the speed of service. Shortly, they said what the operating side always does say under these circumstances, namely, "We can give you such-and-such a reduction in operating costs if we are given absolutely new machinery, piecework rates, and the maximum of efficiency output."

I am not for a moment suggesting that these gentlemen who expressed these views to the Committee either recommended such progress as financially wise or as being just to the staff, but they did answer, to the best of their ability, the question, "If you had a free hand, how far could you cut costs?" It is a little difficult, however, to read this from the wording of the Report, and still more from some of the glosses placed on the Report by the critics. I am very sorry still to detain the Committee, but there is so much ground to cover. I will bring my observations to a close at this point if it is desired, but I think it is a little unfair that I should be asked to do so, because there has been a certain amount of comment with regard to the observations of the Hardman-Lever Committee on the work of the Inland Telegraph Service, and this is the first opportunity I have had of saying anything at all about it, in Parliament or outside. I will try to be as short as I can, but there are one or two things I ought to say, because the position has been left rather obscure, and I think I ought to do what I can to clear up the points.

I have cleared up already one of the points which was most obscure in the Report, and I should like to say this further, that the existence of a deficit on this portion of the Post Office work is not a phenomenon which is singular to Great Britain. On the contrary, it is the common experience of practically every Government in Europe. They take the view that an efficient telegraph service confers such advantage on the citizens in general, and in the amelioration of conditions of life in general, that it is worth running, even if it be run at a loss. There is much to be said for that, and it ought to be borne in mind by some of those who are always rushing off to America for comparisons with regard to telegraph work in order to draw conclusions derogatory to State management. It is not my business to indulge in any party polemics to-day, and as I have said before, I am not enamoured of State trading. Although it has fallen to me during the last 12 years to have had more association with the conduct of State trading than any other man in this country and, I think, probably than any other man in the world, except Mr. Hoover, I am still not enamoured of it. This is not the occasion for discussing that question, but I do recognise that the case against State trading is only weakened by fallacious comparisons.

I read one scribe who contrasted the deficit on the Inland Telegraph Service here, according to the Hardman-Lever Report, with the enormous surplus gained by the American Telephone and Telegraph Company. He founded on that an argument against State management, but when I read that sort of thing I am inclined as an anti-Socialist to say "Heaven save me from my friends," because the American Telegraph and Telephone Company have nothing telegraphic about it except its name. It does not operate one single mile of telegraphs. The real truth is that the conditions of physical geography in America and the large distances between centres materially contribute to help telegraphic developments.

* * * *

I should like just to make this point, that distance in America is *pro tanto* an advantage to the development of a telegraphic system, because they do not get the same competition with mails as is the case in this country. For instance, take the distance from New York to Chicago and from Glasgow to London. If a man in New York makes up his mind at six o'clock on a Monday afternoon to post a letter, and he wants to communicate with Chicago and posts the letter, it reaches Chicago the first delivery on Wednesday morning. A man in London, however, has the first delivery on Tuesday morning of a letter posted at the same time for Glasgow. If the American wants to telephone, it costs him 3.25 dollars or 13*s*. 4*d*. It costs the Englishman 5*s*. 9*d*. For a telegram of 20 words, it costs the American 95 cents or 3*s*. 11*d*., and in England it costs 1*s*. 8*d*. Therefore, from the geographical point of view alone, there are considerable natural advantages which a telegraph service enjoys in a large country like America, which is not enjoyed by the telegraph service in a comparatively small country like ours.

I might say of the Report of the Hardman-Lever Committee that, although it is very helpful in many respects, it seems to me to lack definiteness, because they failed to distinguish between, on the one hand, a less costly telegraphic service, and on the other hand, one getting greater speed. It is possible to achieve either of these alternatives, but you can only gain acceleration in speed by an increased operating cost, and that cost increases in geometrical ratio to the increasing speed. The Committee will appreciate this if they realise how large are the variations in peak load, which occur not only in the course of the day, but between one month and another. The peak load in the Central Telegraph Office varies from a minimum rate of 2,000 telegrams an hour between 8 a.m. and 9 a.m. up to a peak load of 12,000 an hour between 11 o'clock and noon. Its variations from month to month can be seen by the fact that there were 2,000,000 telegrams in February, and 2,700,000 in July. It will therefore be seen that, if you are trying to get anything like a normal rate of speed, you have to try and have your system so adjusted as to deal with the normal rate of traffic. If you get extra acceleration, you can only do it at the expense of having too many staff. To get an acceleration at the peak hour, you will find yourself with a surplus of staff when the peak is at the lowest. It is fair to say in this country that our average normal speed challenges comparison with any other country. In the United States there are two great systems, the Western Union and the Mackay, and where there is competition you get an excellent service. In the towns of America the telegraphic service is very much worse than our own, and in the rural parts of America it ceases really to have any pretensions to be a telegraphic service at all. In Germany the ordinary telegraphic service is much slower. They have a system of urgent telegrams at triple the ordinary rate, and a lightning service at 30 times the ordinary rate.

Our best service in this country compares favourably with the best American practice, and with the German lightning service. Our average normal speed of telegraphic operations is certainly up to that of any other country in the world, and is I think a great deal better than most of them. Indeed, I believe it is true to say that it is better than any other.

TELEGRAPHIC MEMORABILIA.

AUSTRALIA.—The Sydney correspondent of the London *Daily Telegraph* under date June 29, telegraphed the following regarding Australia's first year results of Beam and Cable working :—

" The figures for the cable and wireless traffic from April, 1927, to March, 1928, covering the first year of the beam service, show that the latter obtained slightly over one half of the total of the United Kingdom traffic. The total figures for all classes are 14,136,000 words, of which the beam secured 7,131,000, the Pacific Cable 3,050,000, and the Eastern 3,920,000, the combined cable services being 161,000 words behind the beam.

" The fact that cable services carried nearly 7,000,000 words of the United Kingdom traffic alone indicates that they are still an important factor in Australia's communication problem. The cable services retain the major portion of the commercial traffic, the beam proportion of the full-rate messages being only 30%, but the beam secured three-fourths of the week-end and daily letter traffic. The cables obtained the larger share of the deferred Government and Press messages and of the Christmas and New Year greetings."

Mr. Wm. Gibson, Postmaster-General, stated that the Government " had not been informed of the reported completion of the agreement of the Imperial Committee on cable and wireless interests. The Committee, he stated, was not authorised to complete an agreement, but must report the result of its deliberations to the various Governments concerned. It was essential that a plan should be evolved to bring all interests together, as the cable companies with their huge capital are unable to compete with the wireless on a commercial basis. Cables, however, must be preserved for defence and other purposes.

The Commonwealth has continued the policy of a toll on communications, charging a terminal rate for the new beam service to the United States of fourpence a word on ordinary messages, and one penny for Press telegrams."

The Australian Press announce the formation of two new broadcasting companies. One is the Dominions Broadcasting Pty., Ltd., registered in Melbourne with a capital of £200,000. It is to acquire the businesses carried on by the Broadcasting Co. of Australia Pty., Ltd., and the Associated Radio Co. of Australia, Ltd. The other is the New South Wales Broadcasting Co., Ltd. (Sydney), capital £100,000. This company will acquire the broadcasting licences of 2FC, Ltd., and 2BL, or Broadcasters (Sydney), Ltd.

On July 3 Reuter's Canberra agency stated that " the Postmaster-General states that experiments at present proceeding indicate that ' beam ' telephony between Australia and England will soon be established on a commercial basis," to which the *Daily Telegraph* rejoined that enquiries in London and at Marconi House failed to elicit any confirmation of this statement.

The Electrical Review informs us of important developments in Commonwealth wireless communications in the proposal to establish a station at Canberra with a range of 5,000 miles, enabling the Government to have ready means of communication with the remainder of the Empire and ships at sea. The scheme is intended to supplement the short-wave " beam " radio and submarine cable services, and the *Financial News* says that Mr. Brown, Director of Postal Services, is at present in London consulting the authorities on the subject of the new station, which is to be the last link in the Empire chain, enabling rapid direct communication in all circumstances.

CANADA.—The two following paragraphs are supplementary to information which appeared on this matter in our last issue, and are respectively gathered from *The Electrical Review* and Reuter :—

" A further important development in the use of the Marconi short-wave ' beam ' system for Imperial communication took place on June 16, when the ' beam ' stations built for communication between Canada and Australia were officially opened for public service. Hitherto ' beam ' messages from England could be transmitted over two routes direct to Australia, one eastward over Northern Europe, Russia, and China, and the other westward over the northern part of South America and the Pacific. With the opening of the Canada-Australia service a third route by which messages can be relayed through Canada was added to supplement the other two routes in case of need."

" The messages travelled by the Canadian Marconi Co.'s ' beam ' circuit between Melbourne and Montreal, whence they were relayed by the short-wave system of the Radio Corporation of America to Washington ; the Corporation thus now has a direct service from New York to Australia."

The Vancouver correspondent of the *Daily News* recently published an interesting report of one of the latest practical uses to which radio has been applied in Canada, viz., that of " prospecting for ore."

" The scientific prospector is at work," says the informant, and the system is apparently in use in more than one mining area.

" The equipment consists of a transmitter—a big tripod loop with water levellers for working on uneven surfaces—and a receiver, operated by four men. The transmitter is set up on the property, and the receiver is taken from place to place. It is pointed at loop and the signals are checked to zero when received. The call ' line ' is to tell the operator at the receiver where to focus on the loop. ' O.K. ' and two whistles are a check report.

When these are received, the transmitter working on a wave of 3,000 metres, is turned on, and the signal is picked up from electric conductors underground, which are sulphide bearing ore deposits that re-radiate the signal to the receiver.

The angle of the signal is obtained, and the receiver is moved to another location, which should show another angle.

These angles constantly grow smaller and smaller, to zero, when the receiving operator checks his location by converging on it from the opposite direction. If zero is again proved, the location is over a sulphide bearing deposit. The depth is ascertained by signal intensity.

Should a number of zero spots be located at different places and no angles are disclosed, it is due to the fact that there is no electrical conductor underground to radiate the signal.

This method of prospecting is called the ' radiore ' system. The apparatus does not give the nature of the ore body located ; whether or not this is commercially valuable must be proved by drilling."

Reuter's agency states that the Canadian Government has issued a licence to the Canadian Marconi Wireless Telegraph Company for the establishment of a service between Montreal and New York. A contract has been entered into with the Radio Corporation of America.

The Elimination of Interference in Canada.—There is something very thorough in the following measures taken in Canada to track down interference, according to *World Radio*. Throughout the Dominion in town and village practically all electric power is carried overhead on poles ; 80.7% of the interference with broadcast reception reported last year was traced to overhead electrical distributing systems or power lines. All the revenue, amounting this year to approximately £40,000, derived from receiving licences is devoted in Canada to the suppression of electrical interference. This service, undertaken by the Radio Department of the Ministry of Marine and Fisheries, Ottawa, now covers the whole country. Fifteen cars visit in the course of the year most of the principal towns in Canada, and are touring the prairie provinces now that the roads are open. The most important apparatus carried on the cars consists of a superheterodyne receiver with a direction-finding loop, by means of which the investigator is able to associate interference, reported to him by listeners or dealers, with certain particular lines. The cars also carry small portable receivers fitted with exploring coils for investigations in power houses. In case interference is not to be heard when the investigator visits the town from which it has been reported, he endeavours to produce artificially such conditions as will cause the interference to start. Having the permission of the public utility companies to do so, he strikes poles carrying transformers and other electrical apparatus and shakes the guy-wires, causing the power lines to swing and vibrate as they would in windy weather, or when heavy traffic passes along the road. At the same time his companion in the car listens with ear-phones for electrical interference set up in the system by the vibrating pole, causing a bad contact or poor insulation to become apparent, and when the source is found the public utility companies take steps to repair the fault ; if found to originate in some privately-owned electrical apparatus the owner is asked to take steps to eliminate the interference, and in this case the investigator assists the owner in testing his apparatus ; where it is caused by the normal operation of electrical apparatus, the investigator will try the effect of various types of preventive devices which are carried in the car. When it is possible to prevent the interference by such means, generally the owner will buy equipment which is supplied at cost from the Radio Department, to stop the nuisance. Frequently, radio interference indicates defects which may in time cause serious damage from fire, electric shock or damage to plant ; so in a number of cases the companies themselves employ electricians to detect and prevent radio interference. Local wireless clubs and wireless dealers co-operate with the investigators in this vital service to listeners. Feeling is so keen that there is a general drive to clear up the trouble in towns where interference is most persistent. The following summary of the sources of interference investigated during the year ended Mar. 31 last, and the results are eminently satisfactory :—

Sources investigated—		
Domestic electrical appliances	291	5.3%
Electrical power lines	4,383	80.7%
Commercial electrical apparatus	610	11.2%
Radio apparatus (amateur and commercial)	152	2.8%
Total sources investigated ...	5,436	100.0%
Action taken—		
Number of sources definitely reported cured	4,880	89.8%
Number of sources not yet reported cured	465	8.5%
Number of sources having no economic cure	91	1.7%

EAST AFRICA.—The British Postmaster-General announced on June 15 that a direct radio-telegraph service had been inaugurated that day between England and Kenya and Uganda.

The British East African Broadcasting Corporation owns and operates the service from the African end.

The first broadcasting station in East Africa was opened on June 14, states the Commissioner of H.M. Eastern African Dependencies Trade and Information Office. The new station is situated in Kenya, a few miles out of Nairobi, the capital of the colony, and the enterprise was locally promoted and financed. Lord Delamere is chairman of the British East African Broadcasting Co., which is under the management of Commander L. Mansfield-Robertson, a well-known naval airman. Kenya is the third British colony to possess a short-wave broadcasting station.

From another source it is stated that "a series of experimental programmes would begin in the middle of last month." The two statements above are only apparently contradictory, and in any case the new station is now actually working, and that is all that really matters.

FRANCE.—It is reported that the Eiffel Tower station is undergoing complete transformation, says *The Electrical Review*. The power is to be increased to 100 kw., and the wavelength is to be reduced to 1,500 metres.

According to the *Wireless Trader*, the company which manages the Radio-Lyon station is increasing the power of its transmissions to 25 kw. The new station will be situated about eight miles outside the city, so that it will not interfere overmuch with its immediate neighbours. Accommodation for 100 performers is available in the studio, which will be in the centre of the city. It remains to be seen whether the necessary permit will be obtained.

Government Bill to Secure State Control.—Reuter's Parisian agency informs us that the Government, on June 29, tabled a Bill regulating wireless transmission in France; it is hoped to secure its adoption before Parliament rises. The Bill asserts the principle of State control of transmitting stations, which may either be worked by the State itself, or be leased for a period not exceeding ten years. A special Broadcasting Department will be created and placed under the control of the Minister of the Interior; its function will be to co-ordinate broadcasting from the various stations with particular reference to the preparation of programmes. An important provision of the Bill imposes taxes to meet the expenditure of the new Broadcasting Department. It is proposed, first, to enforce a small annual tax on receiving sets, varying from 10 to 20 francs per annum; secondly, to put a 4% tax on the retail price of valves; thirdly, to put a tax of not less than 20% on the revenue of transmitting stations from advertisements; and, lastly, to demand a share of the profit of private stations.

More Money for Telegraphs and Telephones.—The same agency reports that a loan was issued on June 25, the proceeds of which are to be used for bringing the telegraph and telephone services up to date. New long-distance telephone cables are to be laid down, the automatic telephone is to be installed in Paris and the big provincial towns, more rapid transmission by telegraph is to be provided, and automatic transmitters fitted, &c. Improvements are also planned for public wireless services, while a sum is to be set aside for larger and more convenient post offices. Five-hundred-franc bonds will be issued, which will be inscribed in a special column of the Public Debt; they will bear interest at 5%, and will be redeemable in a maximum of thirty years at par, bonds being redeemed by drawings every six months and also by purchases on the Bourse. The bonds will be exempt from any special taxation. The issue price has not yet been announced.

International Telegraph Users. Committee.—A new international body has recently been formed for the purpose of representing the users of the telegraph—the Committee on International Telegraphy of the International Chamber of Commerce, whose activities will be directed to the improvement of telegraph services generally. Inquiries will be undertaken periodically with this aim in view. The Committee has already held its first meeting at the Paris headquarters of the International Chamber of Commerce. Among the questions under discussion was that of the reduction of code words to five letters, which is to form the object of the Congress of the International Telegraph Union which meets in Brussels in September of this year. Demands have been made that if this system is adopted it should no longer be required that code words be pronounceable, and that rates should be reduced by 50%, otherwise the reform would offer to the users but slight advantages over the present system. The Committee was unanimous that the proposed reform should not entail additional expense to the user. This recommendation will be embodied in the report which the International Chamber of Commerce proposes to lay before the forthcoming Congress.

GERMANY.—Arrangements are well in hand for the holding of the International Radio Exhibition in Berlin from Aug. 31 to Sept. 9 next. Intending British exhibitors can obtain particulars from the organisers at 22, Queen Elizabeth Strasse, Charlottenburg.

Radio "pirates" (Schwarzhörer) to the number of 551 were sentenced from January to March, 1928, says *World Radio*, compared with 558 during the same period in 1927 and with 618 in the last quarter of 1927.

GREAT BRITAIN.—*Parliamentary Questions.*—On June 28 Mr. Hore-Belisha asked the Postmaster-General whether the recommendations passed at the conference of radio experts at Washington last year on the matter of broadcasting, including the recommendation to prohibit the use of spark transmitters, had been considered by his department; and, if so, what action it was proposed to take.

Viscount Wolmer, who replied, said that the International Radio-telegraph Regulations drawn up at the Washington Conference last year provided for a gradual reduction in the use of the spark system. Under those regulations no *new* land station might be established on the spark system, and the use of spark transmitters by land stations was to be discontinued entirely by the end of 1934. The regulations permitted the use of spark transmitters on ships, although after the end of 1929 no *new* spark transmitter might be installed of higher power than 300 w., and after the end of 1939 no spark transmitter of higher power than 300 w. might be used on a ship. The new regulations would be applied in this country, and a start had already been made in the work of converting British coast stations from the spark system to a different system.

On July 3 Sir A. Sinclair asked the Postmaster-General whether, in view of the frequent interruptions to which users of wireless receiving sets were subjected in Wick and nearby stations by the Wick wireless transmitting station, he was yet in a position to state when continuous wave equipment would be installed in Wick in place of the present spark apparatus.

Sir W. Mitchell-Thomson said that extensive building operations would be necessary before the new equipment could be installed at the Wick station, and as the work of reconstruction must be carried out without interfering with the normal working of the station it would necessarily occupy a considerable time. The preparation of plans and specifications was at present in hand, and it was hoped to complete the work during next year.

On July 4 Lord Wolmer, the Assistant Postmaster-General, informed Major Carver that the number of wireless receiving licences in force was just over two and a half millions.

On July 5 Mr. Kelly asked whether the Post Office staff was engaged on work for Trinity House on electrical communication with lighthouses and light-vessels.

Lord Wolmer said that no Post Office staff was inclusively engaged on work for Trinity House. The communications with the Trinity House lighthouses were part of the public telephone system, and were worked and maintained by Post Office staff in the ordinary course. The wireless telephone installations on light-vessels were not provided or worked by the Post Office.

Private Companies' Reports.—The Eastern Telegraph Co., Ltd., has declared a dividend of 2½%, free of tax, on the ordinary stock for the quarter ended June 30.

The Eastern Extension, Australia and China Telegraph Co., Ltd., has declared a dividend of 5*s.* per share, free of tax, in respect of the quarter ended Mar. 31 last.

The Globe Telegraph and Trust Co., Ltd.—Sir John Denison-Pender, G.B.E., presiding at the annual meeting on June 26, said that the one item calling for comment was the disposal of the company's shares in the Great Northern Telegraph Co. That action, continued the Chairman, was taken in view of the disturbed conditions in China, where the Great Northern Co. was greatly interested; the high prices of the shares gave the directors a favourable opportunity of selling them and a profit of £9,770 was realised. The proceeds would be re-invested as suitable opportunities arose, but it was becoming very difficult to purchase telephone and telegraph securities, to which the company was limited. During the year they had been allotted 100 ordinary shares in the United River Plate Telephone Co. at par, and they were to receive 100 new shares of the American Telephone and Telegraph Co. at par. Negotiations were still proceeding with respect to the American Telegraph & Cable Co. A committee had been formed, on which the company was represented, to discuss the matter with the Western Union Telegraph Co., but up to the present no scheme had been put before the shareholders. Referring to the proposed cable-wireless merger, the Chairman said that further progress awaited the report of the Imperial Cable and Wireless Conference which had been examining the question for nearly six months. The Eastern and Associated Telegraph Companies continued to carry a larger volume of traffic than the "beam" services in spite of the lower rate of the latter. It was clear, therefore, that the cables still held a definite and important part in the communications of the world. At the same time they could not afford to lose the traffic which the wireless system at a lower rate took away from them.

The report for the year ended May 31 records a net profit of £343,288, to which is added £51,375 brought forward, making £394,663. A final dividend of 5*s.* per ordinary share was paid on June 30, making the usual total of 10%, free of tax, for the year. The general reserve receives £20,000, leaving a balance of £52,322 to be carried forward. The report contains a list of investments, the principal being the Eastern Telegraph Co., Ltd., ordinary (nominal value £1,258,915), Eastern Extension, &c. (£973,200), and the Western Telegraph Co., Ltd. (£679,000).

W. T. Henley's Telegraph Works Co., Ltd.—A final dividend on the ordinary shares of 2*s.* 6*d.* per share, making 4*s.* per share for the year, and in addition thereto a cash bonus of 1*s.* per share was paid on the 13th ult.

India Rubber, Gutta Percha & Telegraph Works Co., Ltd.—Though not at a meeting, the following communication in the form of a letter to the shareholders, was authorised by the directors, who state that conditions still remain very difficult. In nearly all sections of the business the actual turnover was less than in the corresponding period of last year, but, notwithstanding this, the loss on trading has been very materially reduced, due to a large extent to economies effected in many directions.

The Marconi's Wireless Telegraph Co., Ltd., duly declared the dividend on the 7% cumulative participating preference shares for the half-year ending June 30.

The directors have also announced their intention to redeem the whole of the outstanding 6½% convertible 10-year debenture stock on Oct. 1. The redemption will be made in cash with a 5% premium. The option to exchange these debentures for shares will expire on Sept. 9.

The Telegraph Construction & Maintenance Co., Ltd., have paid an interim dividend of 2½%, free of tax, as last year.

Considerable interference with the transatlantic submarine cable *and* radio-telegraph services was experienced owing to a magnetic storm which made itself felt at midnight on Saturday, July 7, the effects being pronounced. Nature was apparently endeavouring to mete out even-handed justice to both systems!

The long-talked-of and long-expected new high-power broadcasting station of the British Broadcasting Corporation should soon be well on its way, as the most suitable site has been chosen and negotiations were actually completed on June 29 for the acquisition of an area of land of considerable dimensions near Potter's Bar. The land is on the Brookman's Park estate, which adjoins the Great North Road.

The new station will be the first to be erected under the regional scheme, and when completed it will be the most up-to-date station in Europe. A land line will be laid to it from Savoy Hill, and when broadcasting is started there the present transmitter in Oxford-Street will close down.

Statistics of British exports of radio apparatus during April are given by the *Wireless Trader*. The total value (excluding re-exports) was £96,164 (including valves £15,317). The leading customer was Australia, whose share was valued at £17,045 (valves £6,343). The next in order was France, which took goods to the value of £8,945 (valves £14). Other important markets were the Netherlands, £7,106 (valves £70); Spain, £5,616 (valves £134); Indian and Burma, £5,042 (valves £1,166); and Germany, £4,536 (valves £58).

The Bridgwater Experiments.—Experiments which are now being made at the Marconi "beam" station at Bridgwater indicate, says the *Electrical Review*, that wherever a short-wave "beam" telegraph service is conducted a telephone service may also be established, while the new "multiplex" apparatus that has been developed enables one set of apparatus and aerials to conduct simultaneous telephone and telegraph services. During the present tests at Bridgwater, a party listened to dance music which was being received from Montreal at the same time, and with the same apparatus and aerials, as two Morse telegraph services from Montreal. The demonstration was given to Mr. David Sarnoff, vice-president and general manager of the Radio Corporation of America, and Mr. W. A. Winterbottom, traffic manager of the Radio Corporation of America, by Senatore Marconi and Mr. G. A. Mathieu, the research engineer who has been working in close collaboration with him in the development of the Marconi-Mathieu multiplex system. The Bridgwater "beam" station is the receiving station for the commercial telegraph service between this country and Canada, and was built in 1926 by the Marconi Company for the General Post Office, which has allowed the use of it for the present experiments, which do not impede the commercial telegraph service, for another channel is used to carry on the present traffic between Canada and England. "With the multiplex system the wireless telephone channel can be run in connexion with the telegraph channel and might be regarded as a kind of 'bonus,' for instead of having only one channel of communication between each transmitter and receiver the multiplex system gives three or four at the same time."

The speech-amplifying equipment used at the Hendon aerodrome for the Royal Air Force Flying Display was, as on previous occasions, installed by the Marconiphone Company. This year yet another increase in the size and scope of the apparatus was evident, 40 powerful loudspeakers being used. Microphones were employed for announcements, descriptions of the events, and for relaying the band music. To provide adequate volume special amplifier panels were constructed, and over 120 super-power valves were used, 96 of them forming the last stage alone. Over one kilowatt of power was delivered to the loudspeaker circuits by the equipment, distributed through ten miles of wiring specially buried below the surface of the ground. The total weight of the equipment, excluding wiring, exceeded five tons.

The conditions at this stupendous gathering naturally demanded something special in the way of loudspeakers, as it was necessary to overcome the roar of dozens of engines and the noise of a crowd of over 100,000 people. Under normal conditions the speakers used could be heard two or three miles away.

Considerable publicity has been given regarding mains-operated equipment for radio purposes and the possible dangers to life and property of this type of apparatus when fitted by the inexperienced. It is therefore highly satisfactory to note that additional regulations "in respect of radio apparatus connected to electric supply mains" have been issued to the Ninth Edition of the I.E.E. Regulations for the Electrical Equipment of Buildings. *The Electrical Review*, which has drawn attention to this matter in company with other electrical journals, for some two or three years, says very truly: "This risk is a very real one, and we hope that users of radio apparatus, in their own interests, will take pains to guard against it. As we have previously suggested, the B.B.C. ought to broadcast a warning on the subject from time to time"; and re-urges that this risk is aggravated when battery eliminators are used.

The regulations have been prepared by a sub-committee on which the Radio Manufacturers' Association and other interested bodies were interested. Having read over the regulations, one is struck by the completeness and the range of the precautionary measures embodied in these protective regulations. From a mere layman's point of view they appear to have covered every possible contingency. The *Electrician* adds: "The Association has now approved the regulations, and will endeavour to arrange that all radio sets manufactured by its members comply with them. The fact that this question has been settled before the opening of the National Radio Exhibition should tend to make the exhibits at Olympia even more interesting, for whereas hitherto mains-operated apparatus complied only with the requirements of the manufacturer, both design and method of connecting have now been brought into line with other domestic and industrial appliances.

That the unobtrusive work resulting from the decisions made and the measures taken to control the frequencies of Europe is not in vain, the following paragraph is full witness: "In its June 15 issue, *World-Radio* published a useful chart of the measured frequencies of the majority of the European broadcasting stations using the medium (200 to 600 metres) waveband of from 1,500 to 500 kilohertz (1 kilohertz = 1 kilocycle per second) for the month of May. It is a reproduction of the official chart of the Brussels frequency-checking station of the Union Internationale de Radiophonie, and our contemporary hopes to publish during the third week of each month a similar record for the previous month. The apparatus used at Brussels permits of the actual measurement of frequency to one part in 10,000, whereas limitations of space in reproduction reduce the accuracy with which the chart may be read to one part in 1,000. It is a graphical record of the wave-repartition "Plan de Genève," which was put in operation on Nov. 14, 1926, and indicates how stations have varied during the month from the frequencies allotted to them. It is claimed that the chart shows the Geneva plan to have been successful in at least 80% of the cases."

IRELAND (Northern).—At a recent meeting of the Londonderry Chamber of Commerce, the Post and Telegraph Committee of the Chamber was re-appointed for the ensuing year. Councillor Magee availed himself of the occasion to inform the Chamber that he had learned that a new telephone cable was to be laid from Great Britain to Donaghadee. He considered that at the same time a telegraph cable should be included, which would restore the direct communication which Londonderry had with Great Britain in former years. As it was, there was very considerable delay in telegraph communication owing to the necessity for the retransmission of messages. The Chamber decided to appoint Councillor Magee on the Postal and Telegraph Committee with a view to seeing to this matter.

IRISH FREE STATE.—*The Telegraph Bill.*—In Dail Eireann, on June 27, the final stage of the Telegraph Bill, under which the minimum charge for a telegram is increased from 1*s.* to 1*s.* 6*d.*, was passed by 59 votes to 33. President Cosgrave said that this was one of the services which, by reason of the economic situation in the country, was rather more burdensome than it might otherwise be. He added that even this impost would not meet the entire demands of the service.

JAPAN.—It is stated that the North German Marine Cable Works Co., Nordenheim, has received an order from the Japanese Government for a marine cable 90 km. in length. This is the first time since the war that the Japanese Government has placed a contract of this extent in Germany.

KENYA COLONY.—(See East Africa).

POLAND.—It is *reported* from certain quarters, and more definitely stated in others, that the Polish Government is in negotiation with the International Telegraph and Telephone Corporation with regard to a credit of 300,000,000 zloty for the development of the telephone and telegraph system in Poland. The loan is intended to be chiefly applied to the substitution of underground cables for the present overhead network. The amount in sterling is between six and seven million pounds.

RUMANIA.—Mr. R. J. E. Humphreys, British Commercial Secretary at Bucharest, in the course of a report to the Department of Overseas Trade on economic conditions in Rumania, says that broadcasting rights have been conceded to a Rumanian company which is to construct two stations. Since the company began to operate, the importation of radio apparatus and parts has increased, and may be expected to increase still further. Rumania is a market which should not be neglected by British manufacturers of such apparatus. A programme of telephone and telegraph work to cost about £12,000,000 has been prepared; this includes the laying of cables from Bucharest to the western frontier through Ploesti and Brasov with branches to some of the larger towns. An automatic telephone system has been installed in part of the Bucharest area, and it is desired to completely convert the capital's system and to extend automatic working to other of the more important towns. An appendix to the report shows the various weights of electrical machinery imported in six months from eight European countries. Mr. Humphreys considers that British manufacturers would be advised to begin to introduce their goods in anticipation of the improved foreign trade which will follow the economical consolidation of the country. A certain amount of caution is necessary, and careful inquiries should be made, when credit is granted, as to the reputation and financial standing of prospective customers. It is not advisable to give open credits, but only against acceptances. Reliable agents are essential, and in this direction the Commercial Secretary offers his assistance to British firms. The report itself may be obtained from His Majesty's Stationery Office, price 2*s.*

SOUTH AFRICA.—An important Bill, introduced by the Minister of Posts and Telegraphs, to amend the South African Radio Act of 1926, has been introduced in the Union House of Assembly, says *World-Radio*. A section of the old Act is to be repealed and another substituted which provides that any person who erects, maintains, uses, or has in his possession any radio apparatus without an appropriate licence, or permit, as required by the Act, shall be liable to conviction with the penalty of a fine and/or confiscation of apparatus and cancellation of licence. Sub-section 2 of the Bill prohibits the sale, or gift, or supply, of any radio apparatus from one person to another unless he holds a licence to deal in, or permit to transfer, such radio apparatus, issued by the Postmaster-General. (Such licences, each of which shall expire on Dec. 31 next succeeding the date of its issue, and such permits may be granted free of charge by the Postmaster-General), and under sub-section 3 it is an offence for a person licensed under sub-section 2 to deal in radio apparatus, if he sell, give, or in any manner whatever supply, any radio apparatus (*a*) to any person who is not the holder of an experimenter licence, a broadcasting licence, or a listener's licence; and (*b*) unless he keeps a true record of such transaction by means of an invoice written by him or under

his direction and signed by him at the time of the transaction, setting out the date of the transaction, his name and address and the name and address of the person supplied. The last clause of the amending Bill attempts a new definition of the words "radio apparatus." It says: "'Radio apparatus' means any radio aerial, radio crystal set, radio loudspeaker, or radio telephone receiver, and includes any other article used for radio which the Minister has from time to time declared to be radio apparatus, provided that the Minister may at any time cancel any such declaration."

SWEDEN.—Reuter's Trade Service, Stockholm, says that the annual report of Telegrafstyrelsen shows that Sweden's telephone system continues to make further steady progress. During 1927 the number of telephone subscribers in Sweden increased by 15,000 to 453,500. Telephone communication with foreign countries was extended in 1927 to Great Britain, France and Belgium, and foreign traffic increased considerably. The largest number of conversations was with Denmark (260,000). Inland telegrams during 1927 numbered 2,719,000, and foreign terminal telegrams 2,544,000. These figures represent a considerable increase in foreign telegrams and a slight decrease in inland telegrams. The income derived by Telegrafverket from telephones and telegraphs increased during 1927 by Kr.3,500,000 to Kr.86,500,000, while expenditure rose by Kr.2,400,000 to Kr.67,600,000. The net profit increased by Kr.1,100,000 to Kr.18,900,000, or 6½% on the invested capital.

From the same agency we also learn that the number of wireless receiving licences issued in Sweden showed a further increase in May, the number on the last day of the month being 363,863, as compared with 360,059 at the end of April.

U.S.A.—It was announced on June 25 that the Transmitter Section of the National Electrical Manufacturers' Association Radio Division had recommended that radio broadcasting stations be classified as to power thus: 0.5 kw., 5 kw., 50 kw., 500 kw. Mr. L. B. F. Raycroft, vice-president of the N.E.M.A. and head of its radio division, stated that this proposed rating means that, in the Association's opinion, the smallest power possible to give good service shall not be less than 0.5 kw., that stations designed for greater service shall then start in power at 5 kw., then 50, and then 500 kw. It is understood that the N.E.M.A. power recommendations advise the relative increase of power in all stations, whether small or large.

The electrical press announced at the end of last month that the merging of the Mackay Companies with the International Telephone and Telegraph Corporation as the "Postal Telegraph and Cable Corporation" has been completed. Mr. Clarence Mackay is chairman and Mr. Sosthenes Behn president, respectively, and it was expected that trading in the new corporation's $30,000,000 7% preferred stock and also the $52,000,000 5% gold bonds would begin last week.

During its annual meeting in Chicago in June the Radio Division of the National Electrical Manufacturers' Association favoured the increased use of higher power by broadcasting stations, and also recommended to the Secretary of Commerce that radio inspectors working under him be supplied with adequate apparatus for the accurate measurement of the carrier frequencies of broadcasting stations. During the last session of Congress, many voices were raised against the use of high power by broadcasting stations, the loudest of which was that of Mr. Ewin L. Davis, of Tennessee, who boldly announced that 10,000 watts was the largest power which should be permitted any broadcasting station, but the attitude of the Transmitter Section of the National Electrical Manufacturers' Association, expressed at its annual June meeting, is in direct opposition to that of Representative Davis and to all who sympathised with him.

On July 13, the Exchange Telegraph, New York, informed the London Press that technical experts comment favourably on a television experiment yesterday in which the movements of a tennis player in white flannels, on the top of a sky-scraper, were clearly visible on the screen several floors beneath

This is considered epoch-making, because it is the first time sunlight has been used instead of artificial illumination.

A camera-like televisor on the roof was connected with the screen of the receiving apparatus by wire, but it is claimed it would be just as successful if wireless were used. Doctors Herbert Ives and Frank Gray conducted the experiment.

Memo.—In the July issue of *Television*, published in London, Dr. J. A. Fleming, F.R.S., states very definitely that he has had the opportunity of seeing in practical operation in Mr. Baird's laboratory this same striking advance in television apparatus which makes daylight television something more than a possibility.

Mr. T. Thorne Baker, in *The Electrical Review* of July 20, gives a very clear, brief and unimpassioned "Review of the Present Stage of Development of Television" in this country and in the U.S.A.

Our telephone friends may be interested in a telephone attachment invented in the States which enables a number of regular calls to be made without passing through an exchange. The information regarding this device is somewhat meagre, but it is stated that the invention "is intended for the use of banks and other firms with branch offices." No further particulars are given, but one can imagine the possibilities of a selective dialling which, when calling a certain "extension" of a P.B.X., would pass any call thus dialled, direct through to the private room of a Manager, &c.

At the annual meeting of the Radio Division of the National Electrical Manufacturers' Association on June 6 at Chicago, it was announced that a sound plan for rating radio broadcasting stations on a merit basis would soon be released.

On the recommendation of its Technical Committee, the Council of the Union International de Radiophonie has adopted as the standard of expressing the power of broadcast radio-telephone transmitting plant that of the power, expressed in kilowatts, fed to the aerial when the carrier wave is unmodulated.

The wireless photogram service which has been conducted by the Marconi Company since May, 1926, for the transmission of photographs, drawings, signatures and facsimiles of all kinds by wireless between London and New York, has been extended so that photograms received in New York by wireless may be transmitted by wire on to other important commercial centres in the United States of America. A photogram sent from London by wireless addressed to these cities is transferred in New York to the telephone-wire picture service of the American Telegraph & Telephone Company. The cities included in the service are Boston, Cleveland, Atlanta, Chicago, St. Louis, Los Angeles, and San Francisco. It is thus now possible for an illustration of the day's happenings and facsimiles for business or engineering purposes to be received in the cities mentioned within a few hours of their being handed in at Marconi House, London.

It will be recalled that *The Electrical Review* recorded the opening of this service in its issue of June 4, 1926.

The following may be looked upon as correct up to about the end of January of the present year:—

"Outside the United States, the most powerful broadcasting stations are those at Motala (Sweden) and Moscow (Russia), having 40,000 watts each; Russia also has a 29,000-watt station at Moscow, and one of 10,000 watts at Leningrad. Daventry (England) operates on 16,000 watts. A station of power ranking above 40,000 watts is reported to be under construction in the Netherlands. The ownership of 34 broadcasting stations has not been reported; Governments own and operate 77 stations; associations and institutions, 87; commercial and industrial establishments, 69; broadcasting companies, 127; and private citizens, 33. Of the Government stations, two are municipal, 16 provincial, and 59 national, the latter being subdivided into 33 operated by ministries of communication, two by ministries of education, and four by ministries of war, the 20 stations in the United Kingdom being administered by an independent government broadcasting commission.

"Radio organisations operate 65 of the 87 stations in the organisation group; church organisations, 6; and educational institutions, 5. Aviation, political, military, radio merchants and theosophical societies operate the remainder. Merchants, mostly electrical and radio, have 35 stations, manufacturers maintaining 5. The stations operated by publishers number 15, most of them newspapers; by railways, 3; and grain dealers and farmers' co-operatives, 2 each; telephone companies, hotels, sales agents, theatres, and power companies are represented by a single station each.

"Radio amateurs account for the largest group, with 40 stations. Nation-wide chains include 29 stations, 21 of them being owned by companies holding national broadcasting monopolies. Local broadcasting companies each operating a single station number 31. Regional monopolies with exclusive broadcasting rights in only a limited part of the country own 27. Private citizens control 33; in a sense these are of the amateur class, though their stations are of the broadcasting classification. Fifteen broadcasters have part-time use of stations owned by other organisations. Four of these are church organisations, one a radio society, two are publishers, and one a railway, the latter having arrangements with eight stations in different cities.

"The fact that certain London papers have extended their news facilities by the adoption of means for telegraphing illustrations, &c., to and from the metropolis and some provincial centres, is indicative of the progress of photo-telegraphy, which may be achieved by wire and wireless means. Services are available to the public in America, between England and America, and on the Continent of Europe, the several systems in use being known as the Ranger-Marconi, Western Electric, Thorne-Baker, Belin, Bartlane, and Siemens-Karolus-Telefunken (Siemens-Schuckert (Great Britain), Ltd.). The two last-named are understood to be those used by the London Press.

"The most recent development of the system was demonstrated in the U.S.A. when the American Telephone & Telegraph Co. 'telephoned' a short kinematograph film from Chicago to New York, where it was developed and made completely ready for use in exactly one hour 35 minutes after the actress had posed for it in Chicago. The total length of the film was 10 ft.; it was cut into strips 6 in. long, three of which were transmitted at a time. The cost of transmission was $10 (£2) per foot." (The transmission of the film piece by piece is not to be confused with Television transmission.—Ed. *T. & T. Journal.*)

Personal and General.—As a result of the Associate Membership Examination of the I.E.E., held in May, 70 candidates passed or completed the whole examination; 18 passed Part I only and 7 Part II only.

The Council of the Institution made the following awards of Students' Premiums for papers read before the Students' Sections during the 1927-28 sessions: £10 each to Mr. J. T. Allan, B.Sc., for his paper on "The Education of the Engineer"; to Dr. R. C. Fox, for "The Three-electrode Carbon Arc"; to Mr. C. J. O. Garrard, on "Phase-Advancing"; to Mr. J. W. Gibson, B.Eng., for "Control Equipment for Direct-current Trains"; and to Mr. E. A. Loban, for "The Economical Transmission of Electric Power." £5 to Mr. L. Burdes, for "Electric Lifts," and to Mr. J. A. H. Lloyd, for "Carrier Telephone Systems."

The following is excerpted from the *C.T.O. Chronicle*, to which the writer would wish to add a personal tribute to the quiet heroism with which an old colleague struggled against the sad adversity of ill-health: "The many friends of the late Mr. C. A. Craighead will regret to learn of his passing away

in April last at the age of 53. He was transferred from TS to the Controllers' Staff, C.T.O., in 1920. An illness in 1924 was followed by a further breakdown in 1926, and he was superannuated in 1927. He leaves a widow and two daughters, for whom much sympathy is felt."

While the pages of our last issue were issuing from the press, came also the sad sequel to my few lines of sympathy and hope on account of his retirement from the Cable Room owing to ill-health of Mr. R. H. Matthews, who only survived his pension date by a few weeks. They laid the tired body to rest in his "wee garden of remembrance," the peaceful little cemetery of old Amersham, and, as an esteemed colleague describes it, "the green corn waving round it, the lark singing overhead." A goodly company from the village followed, including Mr. Ratcliffe the community singer, and Messrs. S. R. Green, W. R. Jones, Lange and E. A. Ward representing the office. The floral tributes were numerous and beautiful, including one from the Cable Room.

The fable so persistently believed by many, including the captain of the *Homeric*, that "the increasing use of wireless communication is responsible for the increasing frequency of unusually violent storms on land and sea," should have received its *quietus* during the long spell of glorious sunshine in which our little island has basked—or gasped!

If not, then the article on the subject by the Royal Meteorological Society, which appeared in the *Radio Times*, must surely have buried that theory under the waves of oblivion.

The issue of the prospectus of "Baird International Television, Ltd Cap., £700,000. To test, exploit, exercise, develop, manufacture, improve, exhibit, work, let out on hire and generally turn to account and trade with inventions relating to a system of transmitting views, portraits and scenes by telegraphy or wireless telegraphy, and to adopt two agreements with Television, Ltd. Reg. office: 133, Long Acre, London, W.C.2" has not received an unqualified approval in all quarters. The financial side of these enterprises must naturally be calmly weighed and plain matter-of-fact reasoning and criticism applied to every scheme, however hopeful it may appear to the promoters. *The Electrical Review*, in its issue of June 29, however, went so far as to say: "In our opinion the art of television is not even in its infancy, but in the embryo stage, and not in a fit state to place before the public in its naked immaturity."

I have been asked "What do you think of the Merger?" Well, I think a good many things concerning it but, not being better informed than the ordinary public, there would be no justification for the expression of any personal opinion of so insignificant a person as the writer. All I can do is to place before readers one or two press cuttings which may show how the matter is being viewed from various points, thus:—

This from the *Melbourne Age*, and according to the Exchange agency: "It seems incredible that a valuable and indispensable monopoly should pass out of the Government control. It is imperative that cables and wireless should be combined, but it is much more imperative that they should be directly and absolutely controlled by the Government.

"If the Federal Government proposes a different answer it is guilty of the gross betrayal of the Australian people."

The Montreal correspondent of the *Daily News* cables: "It is feared that the union of British Marconi and Eastern Cables will cut out messages to and from Australasia now carried by the Pacific Cable, in which Canada is a partner.

"The view is expressed that the merger and the proposal to leave the Pacific Cable for ten years would result in leaving it without business or connections. It is considered doubtful that Canada will agree to any merger scheme."

Reuter's Ottawa agency states that: "The Government is seeking to preserve Canada's investment in the Transpacific Imperial Cable and to impose safeguarding conditions in respect of rates and other matters."

Then there is the special correspondent of the *Times Engineering Supplement*, who only a few weeks ago wrote, among other things, as follows: "No one at the present moment is going to object to mergers *per se*. Administrative and other economies are undoubtedly possible from combination in respect of international communications as in respect of other combinations. But there are peculiar features in connexion with international communications which may possibly counterbalance some of the good which a combination would achieve. For example, the wireless rate to South Africa at the present moment is 4*d*. per word lower than the cable rate, and we need not be surprised at the fact that the cable companies declare that they have lost a considerable amount of traffic. That this traffic is economic from the wireless point of view is proved by the fact that the South African Wireless Company has declared a dividend of 20%. The deduction which the plain man would make from this is that further research and development with wireless communications would probably lower the rate still further, to the great advantage of industry, so that if a merger is to take place the public will need to be guaranteed not only that the wireless rates will not be raised in order to protect the cables but that it may get the benefit of still further reductions as science may make them possible."

Then, during the sitting of the Imperial Wireless and Cable Conference, the Empire Press Union, in a memorandum to that body, stated that: "The Empire Press Union has no preference for any particular system of telegraphy, but it is evident that the improvements that have lately occurred in long-distance telegraphy are entirely due to wireless. Before the threat of wireless competition the cables showed practically no sign of development."

Again, there is the declaration by Sir Robert Donald, Chairman of the Imperial Wireless Telegraphy Committee, who, in writing to the *Daily Mail*, declared that: "The beam stations and the cables will remain the property of the State and no one will contend that they will not be more efficiently managed and that progress will be greater when they form part of one huge all-Empire organisation under the direction of first-class business men. The Dominions, especially Australia, have never taken to operation by the Post Office and will welcome the transfer. Under the proposed scheme no branch of Empire Communications will be under State operation."

To round off this symposium, let me terminate by quoting from the financial section of the *Daily Telegraph* of only but a few days before this journal goes to press, which lifted the warning finger thus: "That an agreement has already been come to, as was alleged in some quarters, is obviously incorrect, since it must await the report of the Imperial Conference, which is not expected to be received for several weeks. A satisfactory settlement eventually is more than probable, but there are many delicate matters to be adjusted which have nothing to do with the terms of the proposed merger published last March."

And there, as the popular novelist says, we will for the present leave them!

Writing.—It is the greatest invention man has ever made, this of marking-down the unseen thought that is in him by written characters. It is a kind of second speech almost as miraculous as the first.—*Carlyle.*

J. J. T.

THE POSTMASTER-GENERAL ON BROADCASTING.

IN his speech on the Post Office Estimates, Sir William Mitchell-Thomson said:—

Let me now deal with one or two rather more detailed matters. I come first of all to a form of activity for which the Post Office has only a vicarious responsibility—broadcasting. The first report of the British Broadcasting Corporation was presented to me a short time ago. I at once laid it on the Table of the House and it is now available to Members in the Vote Office. On the whole I think it can be said, and said fairly, that the institution of the British Broadcasting Corporation, which was an entirely new experiment—I confess that I recommended it to the House with a little trepidation—has justified itself. On the whole it can be said that we have established broadcasting in this country on a foundation which is not merely firm, but which is the envy of many other countries. I told the House of Commons when the Corporation was being set up, the general lines upon which it was proposed to proceed, and I have followed those lines very closely. That is to say that in the ordinary matters of detail and of day-to-day working, the governors are absolutely masters in their own house. I do not interfere and do not seek to interfere with their absolute freedom in those respects and I hasten to say that, because I observe a certain amount of controversy in sections of the Press about the character of the programmes that are being broadcast. If any hon. Member of the Committee, therefore, is desirous of making remarks on the character of the programmes, all I have to say is that I shall faithfully see that what he says is conveyed to the British Broadcasting Corporation and the governors thereof; but as I told the House of Commons at the time when the Corporation was set up I firmly refuse to have any responsibility whatever myself for these details.

As regards matters of general policy, for which I am prepared to take a certain measure of responsibility—because, of course, we must retain a measure of control over larger matters of general policy—the most important, probably, is the new regional scheme. After considerable experiments at Daventry, attended with a good many difficulties, but on the whole successful, the British Broadcasting Corporation made up their mind that they would like to embark upon a regional scheme of large twin stations. They applied accordingly last February for authority to begin this system by erecting a high-power station at Brookman's Park, near Potters Bar, in substitution for 2 LO. After going into the matter with them I have authorised them to proceed with the erection of the station, and it is expected that it will be completed some time next summer. In the first instance, single wave working only will be adopted from that station until it is seen by further experimental tests whether reception from a twin station is generally practicable. On June 14, the Corporation applied for general permission to proceed with the preliminary steps—that is to say, the search for sites and the consideration of technical details—for twin wave, high-power stations at Manchester, Glasgow and Cardiff, and for a single wave, high-power station at Belfast. That application is having consideration at present, and I anticipate I shall be in a position to give permission almost at once, and the search for the actual sites will then have to begin.

As regards Empire broadcasting, I authorised the British Broadcasting Corporation to conduct experiments in short wave broadcasting for the outlying parts of the British Empire, and these experiments are still in progress. The Committee may be interested to hear some of the figures about licences. The total number of wireless receiving licences in force on June 30 last was approximately as follows: Paid licences, 2,506,300; free licences for the blind, 12,722; total, 2,519,072. The number in force on the corresponding date of last year was 2,307,678, showing an increase during the 12 months of 211,394, or over 9%. It may further be of interest to note that the number of licences per 1,000 of the population is regionally distributed as follows: England and Wales, 59; Scotland, 37; and Northern Ireland, 21. The receipts from the licences were divided in the following proportion. The total receipts, as the Committee may be aware, were £1,253,150, and, of that, £898,804 goes to the British Broadcasting Corporation, while the 12½% to the Post Office for cost of collection is £156,644, and the balance retained by the Exchequer is £197,702.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations working at May 31, 1928, was 1,651,240, representing an increase of 12,673 in the total at the end of the previous month.

The growth for the month is summarised below :—

	London.	*Provinces.*
Telephone Stations—		
Total at May 31	585,704	1,065,536
Net increase for month	4,532	8,141
Residence Rate Subscribers—		
Total	135,783	215,789
Net increase	1,333	2,372
Call Office Stations (including Kiosks)—		
Total	5,277	19,096
Net increase	32	137
Kiosks—		
Total	959	4,026
Net increase	32	113
Rural Party Line Stations—		
Total	—	10,231
Net increase	—	38
Rural Railway Stations connected with Exchange System—		
Total	—	918
Net increase	—	9

The total number of inland trunk calls dealt with during the year 1927-28 was 102,206,596, or roughly 7½ millions (8%) more than in the previous year.

A comparison of the inland trunk statistics for the years 1926-27 and 1927-28 is shown below :—

	1926-27.	1927-28.	*Increase.*	%
No. of Trunk Calls	94,661,136	102,206,596	7,545,460	8.0%
No. of Exchange Lines (mean for year)	920,207	1,000,940	80,733	8.8%
Average No. of Trunk Calls made per Exchange Line ...	103	102	—	—
No. of Trunk Circuits at end of year	13,955	14,867	912	6.5%
Average No. of Trunk Calls made per working day ...	306,347 (309 working days)	329,168 (310½ working days)	22,821	7.4%

During the year 1927-28 the Continental telephone service was extended to eight more European countries, and at March 31, 1928, telephonic communication was available between Great Britain and 13 European countries as compared with five a year previously. The transatlantic service, inaugurated on Jan. 6, 1927, for service between Great Britain and the U.S.A., and (later) Cuba, was extended to Canada in October 1927.

The total number of outgoing Continental calls made during the year 1927-28 was 338,377, and incoming Continental calls 360,946, representing increases of 55,256 (19.5%) and 46,753 (14.9%) respectively, over the totals for the previous year.

In the last three months of the year 1927-28 the transatlantic telephone service was extended to certain European countries, viz : in January to Holland and Belgium, in the following month to Germany and Sweden, and in March to France (Paris) ; all calls between America and the Continent of Europe pass over the radio-telephone link between New York and London, and are switched in the London Trunk Exchange on to the Anglo-Continental telephone cables.

Further progress was made during the month of June with the development of the local exchange system.

The more important exchanges extended included the following :—

LONDON—Sutton, Hatch End, Malden.

PROVINCES—Aylesbury, Bramhall, Cambridge, Cosham (automatic), Cowes, Fleet, Fort William, Hayling Island (automatic), Idle, Low Moor, Tipton, York (automatic).

During the month the following addition to the main underground system was completed and brought into use :—

Canterbury—Dover—Folkestone cable,

while 68 new overhead trunk circuits were completed, and 78 additional circuits were provided by means of spare wires in underground cables.

TELEPHONE DEVELOPMENT STUDIES.

BY E. ERRINGTON (*Field Officer*).

IT is of great interest to read the views expressed in the May issue by one who, to the great majority of Field Officers, is only known by the initials H. J. M. Mr. Maclure has covered the ground regarding development studies, pointing out some of the difficulties and problems which surround various schemes submitted to Headquarters.

It has occurred to me that there may be other little items of interest especially from the temperamental point of view of the man who has to go out and do the job, namely the Field Officer.

Visualise an officer, armed and equipped with the maps, C.M.1004, and classification schedule (not forgetting his personal luggage if a stay has to be made) landing at a strange station some cold foggy morning, with the idea of worming out all the secrets in the universe regarding the area bounded by the thick white line, plus a vital consideration, the effect on adjacent areas. His maps will show him that High Street runs up and down this way, the river winds in a certain direction, that certain railways run from point to point, but apart from this, it is left to the Officer's discretion and experience as to how he intends to tackle this probably roaring hive of industry in the best possible manner, to finish up with a complete and comprehensive scheme supported by chapter and verse, to give a conviction that the study has been done properly. It is all very well to say "I have done it—Go thou and do likewise," but one must be suited temperamentally to the work if he is to be successful in the collection of relevant data and information. It is he who has to issue forth and slay the "dragon in his lair," viz., the council authorities, the surveyors, the land agents, the employers of labour and other gentlemen quoted in the Instructions, who are (always) so obliging and willing to give a stranger the benefit of their ideas. What joy if he is successful in obtaining a copy of a building lay-out and emerge with it tucked away in the inside pocket for safety.

Well, I must say that it required certain gifts of tact, &c.

Then, the great question of what to believe and what not to believe. One authority states that the canal will be filled in and made into a main road. This would mean the development of various sites into huge business establishments, &c., and probably alter the outlook for some number of miles. What effect will this have on an area where only few telephones exist ?

Another authority states : "No, it will never happen in our time." Perhaps the speaker is about three score years and ten—you are about thirty. "Silence is golden," and to conform with the proverb would be the safest course, I presume.

The question of how far, and at what period, road traffic will successfully compete with the railroad, opening up for development portions of the country not yet touched ?

If a village is some miles from the exchange building, will it develop to any extent from a country residential point of view ? If so, at what period will a rural exchange mature ?

Then again, as the development of areas is one of finance, a good Field Officer must possess the brains and foresight of a "real estate agent" and financier rolled into one, optimistic and imaginative when necessary, to be able to visualise streets and streets of houses, factories and works, &c., where at present only grass "whispers in the wind." But it is these little difficulties that make the work of interest, and give zest to the game of "Approved or Not Approved."

The question of a school for Field Officers is of considerable interest, notwithstanding that the majority of districts have passed, or are passing through a "Correspondence course" with headquarters on development studies.

We know, of course, how some officers can be optimistic on a wet day, and others cannot be, even on a fine day.

A training centre would probably obviate difficulties now encountered, assist in co-ordinating ideas, and in the end justify the means.

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Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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TELEGRAPH AND TELEPHONE WORKING AND ITS CRITICS.

THE annual statistics issued for 1926 by the Telegraphic Union, Berne, will afford a certain cold comfort to telegraph men in that they show that the annual shrinkage in the number of inland telegrams handled is not confined to Great Britain but is even more pronounced in other countries belonging to the Union. On the other hand, as in previous years, the volume of international telegraphic correspondence continues to increase. In Japan, the heaviest users of the telegraph, the inland telegrams declined from 67.7 million in 1925 to 65.9; in Great Britain from 49.8 million to 47.4; in France from 40.1 million to 34.4; in Germany from 32.8 to 28.9; in Russia from 29.3 to 28.5; whilst in the Argentine and Italy there were increases from 32.4 to 32.9 and 26.8 to 28.3 respectively. The international traffic rose in Great Britain, where it is highest, from 27.4 million to 27.8, in Germany from 17.4 to 18.3, in Japan from 2.4 to 2.5 million, whilst in France and Italy it suffered a small decline to 14.3 million and 7.2 million respectively. The ratio of international to internal telegraph traffic in this country increases every year, and it may be said that in this branch of the service at least, the yearly progress is solid and satisfactory. In 1922 the proportion of international and inland telegrams in this country was 23 to 55 millions—now it is 27 to 49. Germany also shows an increase from a proportion of 14 to 51 to a proportion 17 to 32.

Much warmer comfort will be obtained from the Postmaster-General's speech on the Post Office estimates, which we reprint elsewhere, where he states that our best service compares very favourably with the best American practice, and with the German "lightning" service, and that it is certainly up to that in any other country in the world as regards average normal speed of operations. He also has a good deal to say as to the fallacious deductions of critics with regard to the economic result of the combined working of telegraphs and telephones.

In fact the critic of Government services seems always to be in two minds. In the first he expects the Government, pursuing commercial ideals with ardour and enterprise, to make a handsome profit out of its undertaking; in the second, he expects the services to be placed, regardless of cost, within the reach of the most inaccessible and sparsely populated districts in order to safeguard the inhabitants from fire, flood, pestilence, or sudden death without medical aid. Sometimes he vaguely suggests that the vast profits which a commercially inspired Administration ought to earn should cover the loss on the compassionate services to be provided in the villages—in other words, that the townsman should be charged at a rate which is, in effect, bearing part of the cost of the villagers' service.

To a limited extent some loss is incurred in providing rural call offices, and to a greater extent in maintaining a telegraph service to all (including the remotest) parts of the country. As the Postmaster-General said in the speech referred to, the view of practically every Government in Europe is that an efficient telegraph service confers such benefits on the citizen in general that it is worth running even at a loss. This, it need hardly be said, is not and could not be the view of a commercial company. But there is no end to the confused thinking which exists upon this subject. The writer of an editorial in a recent issue of an East Anglian daily paper dealing with the telephone service is moved to scorn at the mere idea of asking for guarantees. Does a motor-bus company ask for a guarantee before it opens a new 'bus route? he asks. As if there were any comparison between the capital cost of running omnibuses over a route thoughtfully provided by the ratepayers for the omnibus company, and the cost of building 4 or 5 miles of pole route and of maintaining an exchange in operation! If a 'bus route does not pay it can be, and frequently is, discontinued, and the omnibuses are employed on another itinerary; but you cannot "scrap" an exchange and pole route without an enormous loss of capital. Again, we are asked if railway companies require a guarantee before they open a station. We believe that builders developing an estate have sometimes contributed to the cost of providing a railway station, but whether this be so or not, we do know that small villages of a few hundred inhabitants may be observed by the traveller nestling against any main line of railway—villages which have remained without a railway station since the 'fifties of last century, and whose inhabitants still walk or send their goods to the nearest station 4 miles distant. Many a fair-sized market town lies a mile and a half or 2 miles from the station named after it. No spur line is ever thrown out in its direction; but whether a guarantee is ever offered or refused in these cases, we do not know. We only know that a State undertaking has responsibilities which a commercial company has not, and that if it does good by stealth in the way of assisting the (commercially) unattractive hamlet, it has ultimately to blush to find itself famous for failing to make sufficient profit.

OUR PRIZE COMPETITION.

A FAIRLY gratifying response from our male readers has been received to the offer of the Editing Committee in the April issue to award prizes to the writers of the best papers on the subject of "Eliminating the Waste." The contribution of our women colleagues to the competition, however, has been so scanty that the Editing Committee are unable to find a paper of such outstanding merit as to deserve the second prize.

The prize-winners are :—

1st (Men).—Mr. F. J. Lane, District Manager's Office, Reading.

1st (Women).—Miss M. J. Clement, "Royal" Exchange, London Telephone Service.

2nd (Men).—Mr. H. B. Carroll, Traffic Section, Telephones, Liverpool.

Cheques have accordingly been sent to them and their papers are published in this issue.

Some of the papers submitted were rather outside the scope of the subject or touched on administrative questions which are outside our province. Others contained useful suggestions more suitable for submission to the official Awards Committee. We shall print some of the more valuable unsuccessful papers in subsequent issues.

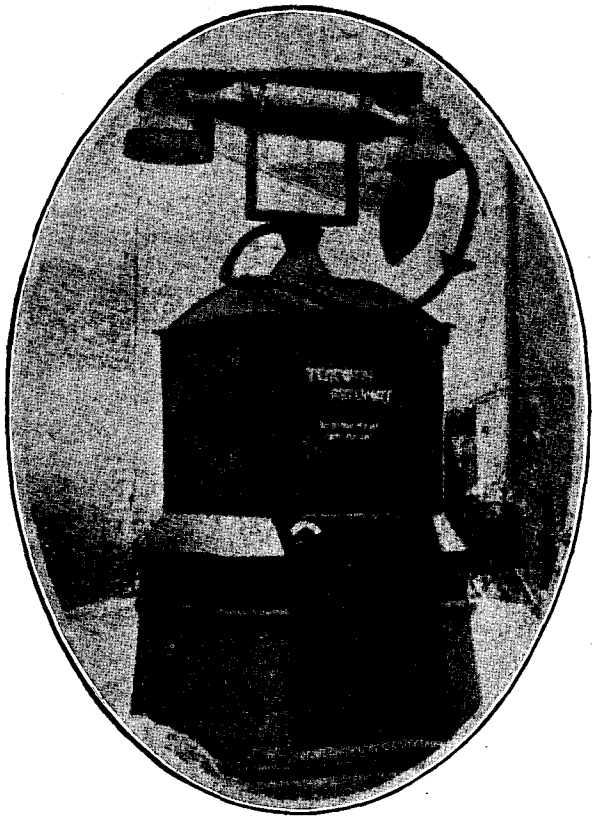
HIC ET UBIQUE.

WE learn from the *Blue Bell*, Montreal, that the first link in a Trans-Canadian trunk telephone circuit was completed last month, when the section between Sudbury (Ontario) and Fort William was bridged. Sudbury is already in direct connexion with Toronto, Montreal, and Quebec, and Fort William with Winnipeg (Manitoba). There is thus now a direct high-grade circuit between Eastern Canada and Winnipeg, to which city traffic has hitherto been circuitously routed via the United States. Extensions westward to Saskatchewan are planned, and when the British Columbia—Alberta line, now under construction, is completed, direct circuits between Winnipeg and Vancouver will be available. Much will yet have to be done in building up a complicated network of repeaters and other aids to good transmission before East and West will be able to talk, but the completion of the scheme will ultimately realise the dream of a Trans-Canadian telephone line.

Trunk telephone service between Palestine and Egypt has been extended to all places in Palestine and to Amman in Trans-jordania. We have before us a mimeographed trilingual circular in English, Hebrew, and Arabic, announcing the good news. "Talafouniat-al-aksshanj" (exchange telephones) seems a far remove from the "Arabian Nights."

We notice that twice recently in the Coventry district, thieves took advantage of the telephone to lure a maidservant away from a house with the story that her mistress had met with an accident and required her immediate aid. When the house was thus left vacant, they proceeded to rob it. Cases of this sort are sometimes used by shortsighted people as arguments against having a telephone in the house. We should have thought that the ruse was now so old-established and well known that a maid receiving such a call would know that the proper course is to communicate at once with the police. But ruses like this, we suppose, are like old stories, there is always someone who has not heard of them. When a raconteur steps on the platform to indulge an audience with a "few little stories," it will generally be found that to about half his hearers the venerable tales have the bloom of freshness. At least, so the resultant laughter would seem to testify.

A correspondent in the *Manchester Guardian* gently chides the compiler of the Telephone Directory for instructing us to say "S for Sally, T for Tommy, and X for Xmas." Does anybody, he asks, really say Exmas ? We do not know, but our critic will grant that it is hard to find a well-known word beginning with X. Xenophon and Xerxes, though known to the educated, are caviare to the general, and we imagine that there may be many telephone users who are doubtful of the spelling of "xylophone," "xyster," and "xebec." "Xmas" serves its purpose, although many who are familiar with the abbreviation are not aware that the "X" represents the Greek chi. Hence the dreadful "howler" we once saw in an American paper where "Xtal" was made to represent "Crystal." Did the perpetrator imagine that the word was spelt "christal" ?



The above is a picture of a telephone kiosk of highly original design in a Moscow street. We can imagine the three simpletons of the Arabian fable encountering it and exclaiming: "Verily, how mighty of stature were the men of old, who used telephones of such size !" We are indebted for it to the Brazilian paper, *Sino Azul*. Telephone information is sometimes secured by round-about ways. Not long ago we saw in an Italian electrical journal a paragraph purporting to be translated from a German paper, which in its turn proved to be a translation of a paragraph on page 249 of last September's *Telegraph and Telephone Journal*.

Representatives of the Soviet Postal Administration, says *The Electrical Review*, have left for Reval to negotiate with the Estonian Ministry of Communications with a view to establishing a telephone service between Russia and Germany via Reval and Riga.

We regret that pressure on space compels us to hold over a further instalment of Mr. Sellars' "Chronology of Telegraphs, &c." and several personal paragraphs.

RECOVERING THE WASTE.

(Prize Paper.)

BY F. J. LANE, *District Manager's Office, Reading.*

MR. F. J. LANE.

THE outlook of most customers of a public service is that they pay the piper and are entitled to call the tune. Generally, there is little to complain of in this attitude, but in telephone service the customer is called upon to do a little more than call and pay if the service is to remain efficient. Nevertheless, the fact that the subscriber does pay, does confer on him the right to demand the highest efficiency from the administration before he will exert himself in the necessary co-operative effort.

For this reason it is thought desirable, not to make first a list of the causes of waste in order of importance, irrespective of which party is guilty, but to split them into two sections: those for which the administration is mainly responsible, and those which are particularly under the subscribers' control. Broadly speaking, they are divided as follow:—

The Administration.	*The Subscriber.*
Junctions engaged.	Number engaged.
Cut-offs.	Failure to answer, and delay in answering.
Delay in clearing.	
Wrong connexion.	Inexpert attention to calls.
Apparatus out of order.	Careless making of calls.

Since it is admitted that those who live in glass houses should refrain from throwing stones, it will be as well to take the failings of the administration first, and, of these, "junction engaged" is, perhaps, the most serious and, one might say, the least excusable. The problem, however, of providing adequate inter-exchange facilities (paying due regard to reasonable economy) is one of considerable magnitude. There is not a specific solution for it and, in fact, perfection is not at all possible.

The tendency at present is to connect groups of small exchanges with the main exchange to which they are presumed to be satellites. Generally, this form of concentration appears to work well and with economy, but it would be dangerous to make a fetish of it. I have in mind a case of a main exchange to the west of which are three smaller ones, more or less equidistant from one another, the farthest being about thirteen miles from the main centre. The first is near enough to the large town to be almost a constituent part of it, socially and in every other way. The other two are, to a much greater extent, communities apart from the town, but similar socially to one another. It is clear that the junction calls to the main exchange in the first case are likely to form a higher percentage of the total calls than is the case with the other two, which, however, would require intercommunication one with the other. All that appears fairly obvious, as indeed it is, but it serves to show the necessity of studying local conditions and opinions seriously, and not adhering too closely to a mechanical system. This study, in fact, is a process which has to be maintained in the effort to reduce to a minimum wastage by junction delays. Providing short-distance junctions between exchanges for the purpose of "borrowing" trunks is theoretically unsound, but may be of value in cases of exchanges afflicted with seasonal traffic peaks (a term which I hope is self explanatory).

Cut-offs, wrong connexions, delays in answering, and clearing, so far as the administration is at fault, can with advantage be taken together. Bluntly put, they are often due to carelessness, however excusable, on the part of the operating staff. The cause of a cut-off always appears to be wrapped in mystery, but it is feared that the simple explanation frequently lies in the universal instinct of self-preservation common to all telephone users, professional and otherwise. For example, in times of great pressure, the wrong plug is freed from the "tangle" and the defaulter, faced (telephonically) with the irate subscriber, is tempted sorely to blame another of the units in the long chain of communication—and she falls. What is the remedy? It must be confessed that there is no immediate one ready to hand. The progress made in the conversion of exchanges from magneto working to common battery working helps considerably along the road, as the more modern apparatus, with automatic signalling, reduces considerably the chances of error (excluding gross negligence) in the matter of cut-offs and clearing delays. In the case of magneto working the fault is largely the subscriber's. Called upon to do too much, he fails to do it. In the meantime, and in fact for all time, we must depend on efficient service inspection and maintenance for detecting and correcting the culprits, human and mechanical.

Another possible reason for wrong connexions is the similarity of exchange names accentuated by the enormous increase in number since the inception of the rural exchange scheme. Phonetic similarity of numbers is an affliction which we must bear with, but there is a certain amount of elasticity permissible in the naming of exchanges. Need we adhere too closely to the actual name of the village however awkward sounding its name, seeing that, after all, the exchange name is little more than an index to the number!

A further point which is also worth attention is the discouragement of subscribers from giving the number carelessly. In some small exchanges subscribers, familiar with the operator, frequently give numbers without prefixing (or affixing) the name of the exchange. The telephonist understands and, locally, all is well, but the subscriber is unnecessarily infected with the germ of carelessness. Gentle correction is really a useful weapon much employed. I have observed in London, that a subscriber gives a number: "Regent, three, double-nine, six," and the inflexion (without offence) in the telephonist's voice in the check, "Regent, three-nine, nine-six, is more effective than pages of printed instructions.

Finally, regarding wrong connexions, it is suggested that close investigation might be made of a number of cases with a view to discovering how far this form of delay is due to carelessness, defect in apparatus or other causes. The information, admittedly difficult to obtain, would be of incalculable value in applying correctives.

Turning to wastage for which the subscriber is wholly or mainly at fault, it is flattering to say that it forms the greater part of telephonic delay, but disheartening in the fact that treatment must of necessity be indirect, and therefore less effective.

"Number engaged" heads this list beyond argument, but to such an extent do other causes impinge on it, that it is thought as well to deal with the others first.

Excluding cases where attention to the telephone is impossible (business premises closed, &c.), delay or failure to answer calls may be caused by pure dilatoriness on the subscriber's part, for which education is the only remedy, or rather, device to mitigate the evil. There are, however, other reasons to which more positive correction may be applied. The position of the instrument bell sometimes has an important bearing on such delay, more particularly in the case of magneto table sets with partly enclosed bells which are comparatively feeble. In dealing with new subscribers, contract officers and fitters might suggest suitable positions (or draw attention to the disadvantages of unsuitable ones) and if necessary point out the advisability of renting an extension bell (obviously, service inspectors can similarly advise in cases of existing installations).

Generally speaking, in small houses connected to magneto exchanges, the wall instrument (with its externally mounted bell) fitted in the hall is most likely to command attention.

Inexpert attention to calls is a fault which is only amenable to educative effort. Frequently it is found that the actual subscriber is perfectly competent, and the fault lies with his or her domestic or office staff. A gross case can be cited of a caller being cut off through a servant replacing the receiver when going to call her employer! Office boys fresh from school are often deputed to answer the telephone, and anyone with imagination can sympathise with them when first faced with this fearsome (and strange!) instrument. It is a pity that though, in the final stages of his education, a boy is familiarised with the higher branches of commerce, he is left in ignorance of how to use so common an essential of office equipment as a telephone. Perhaps the Board of Education may assist us.

Careless making of calls has been referred to before with the suggestion that telephonists could help with tactful correction. Printed advice supplements the direct influence of operators, but, admittedly, it is not very encouraging to observe that after years of instruction and actual requests, tradesmen's vans are seen in thousands bearing the telephone number followed by the exchange name.

Coming finally to the "number engaged" bugbear it is easily seen that practically all other forms of delay by whomsoever caused tend to increase the number of "engaged" reports. It is clear that so long as a call is ineffective or delayed, one number at least is engaged unnecessarily—therefore any successful efforts to reduce delay will react favourably to diminish this crowning evil. Apart from such hopes, however, there is a sovereign remedy in the provision of auxiliary junctions—if every subscriber could be induced to double his exchange line facilities "number engaged" would be a thing of the past, and certain other evils would lose some of their force. Such a telephonic paradise is, of course, outside the range of practical politics, but the fact remains that we have a specific cure to utilise to the greatest possible degree.

At present a certain reduction in rental is made for additional lines, but still the contract officer has to make out a fairly good case before the subscriber considers the proposition sufficiently attractive. It is boldly suggested, therefore, that the difference in rental between the first and auxiliary lines be made greater. It is admitted that from the point of view of maintenance economy the scheme is unsound, but it must be borne in mind that the recovery of such enormous waste would make a handsome compensation (even in actual revenue) for the apparent loss.

It is observed from the foregoing remarks that educating the public forms an essential part in the campaign to recover waste, and from the fact that hints and instructions have for years appeared in directories, it is obvious that something else is required. It is proposed, therefore, that suggestions might be regularly sent out with quarterly accounts where they would command more attention. It is not suggested that a parcel should be posted on each occasion, but that different leaflets should be dispatched at various times. This has been tried with advertisements for extensions, and on several occasions it was noticed that subscribers were previously unacquainted with the rental of such facilities, although paragraphs describing them have appeared in directories!

Adequate service inspection is of paramount importance and, what is more, so is a high degree of competence of the inspectors. The mere collection of facts for the Traffic Superintendent's attention is likely to lead to the magnification of minor points and the overlooking of serious defects. The efficiency (and indeed, the magnitude) of a telephone service is governed largely by the Traffic Department, for poor quality must eventually mean reduction of quantity.

In conclusion, it must be said that the essential co-operation of the subscriber can only be secured by letting him see that the administration is human, and to rid his mind of the feeling that it is but a complicated robot from which nothing can be expected but quarterly accounts.

RECOVERING THE WASTE.

(Prize Paper.)

BY MARGARET J. CLEMENT, *Royal Telephone Exchange, London.*

IT is to Samuel Smiles that we are indebted for the following:—

> "Accumulations of knowledge and experience of the most valuable kind are the result of little bits of knowledge and experience carefully treasured up."

The Editor of the *Journal* places this same view before us, when in reviewing the subject of Waste he writes, ". . . it is very desirable to pool experience from all parts of the country, or to obtain fresh suggestions from those in actual touch with the subject." It is from the viewpoint of a busy London exchange that the "little bits" of the writer are presented, possibly no other branch of the Service offering such a field for exploration.

In an attempt to gather in the wastage of Lost Calls, Mr. Johnson sets before us a possible standard of 90% of calls effective on the first application, and if we are to achieve this it seems that we should first of all investigate each class of call individually, analysing every operation that takes place.

Space, however, prevents this, so what are known as "wrong connexions" will be delved into first.

A "wrong connexion" is a call which, so to speak, goes astray. It can wander from its path for various reasons, but in every case, unless the number required is connected by the monitor—normally an out-of-order procedure—the call proves abortive, and has to return home again and start on its journey afresh. At a few exchanges special positions for dealing with these calls are fitted, but this again is a wasteful procedure, and there is a distinct loophole for error in the fact that when the call travels to these positions via the information desk, no busy-back flash is received at the originating exchange. Why then do these calls go astray? For the subscriber plays no part in the error, it being an A telephonist who directs the call on its journey over the order wire and a B telephonist who meets it half way.

The reasons surely are:—

(1) A telephonist picks up the wrong junction.

(2) A telephonist picks up a junction on the wrong exchange.

(3) B telephonist allots a junction, but for some reason forgets the number required.

(4) B telephonist understands a peg number to be asked for when number is O.K.

In all four cases an error has occurred in the exchange which causes the B telephonist in the case of (1), (2), and (3) to receive a signal from which she gains no knowledge of what is required. At this stage the call is literally hanging in mid air. The B telephonist being unable to make a connexion, passes the work of finding out what is wanted on to the monitor. This officer duly finds out the number required, and then, much to the annoyance of the subscriber, she does nothing more or less than refer the call back to its base by flashing the distant telephonist into circuit and advising her to ask again, the flashing procedure taking on an average 30 seconds. So ends the journey of a really lost call.

That the wrong connexion trouble is a very real one is proved by the fact that at some of the most important exchanges in London, 40% or more of the work performed by formal desk officers is in this connexion. What a saving of temper, time, and money could be effected here!

The reasons already given will now be dealt with in the order referred to above.

(1) *A Telephonist Picks up Wrong Junction.*

Not many wrong jacks are picked up—that is to say, a telephonist does not often pick up, for example, a junction in the strip above or below the correct one—but a large number of wrong junctions are picked up by reason of the fact that A telephonists accept from B telephonists junctions on which the articulation is doubtful.

The junction is accepted on chance.

If it is a wrong one and the junction is clear, it is picked up and a wrong connexion is the result.

If the junction happens to be engaged it prevents it being picked up, but how often does a supervisor see another junction of phonetic similarity tested and picked up in its place ?

Obviously, in the mind of the telephonist there must have been doubt in the first place, and the proof that it is a common irregularity appears in the " wrong connexion " traffic. If this is not the case it points either to the fact that telephonists' hearing as a whole is not good, or that they are working with defective instruments.

The weekly test of all instruments cuts out the latter reason, and as regards the former there is no substance in it, telephonists' hearing in general being particularly keen.

What, then, is the reason that a telephonist with keen hearing and a good instrument picks up a wrong junction ?

It surely comes down to two reasons :—

(1) Lack of concentration in accepting a junction.

(2) Accepting one of doubtful accuracy.

It is with the latter that the writer would deal.

The law of the land states that the receiver of stolen property is as bad as the thief (or is it, worse ?), and in order-wire working the acceptor of a badly articulated junction is surely as bad as the giver of it.

This point is of major importance in operating, for unless the call is built up on the foundation of a correct junction it must fall to the ground again.

The same principle is at the very root of the wrong number trouble, for if the B telephonist accepts faulty articulation from the A telephonist, the balance of responsibility for any error surely lies with the acceptor ?

The following may be a little aside from the actual subject of wrong connexions, although wrong connexions and wrong numbers are closely allied, but how often does an error such as this come under notice—8022 required, 0222 connected.

The phonetic similarity between 8 and 0 and 0 and 2 is not great, but when used collectively, as in the numbers quoted, and articulated badly, the numbers are of similar sound.

It may be that in this we reach the very root of the wrong number trouble, the acceptation of collective sound in place of well ordered digits.

Whether this is so or not, the fundamental importance of deliberate articulation cannot be too strongly emphasised, and by its consistent application much wastage could be retrieved.

Let us have a campaign then against " wrong junctions " or " wrong numbers " being picked up, and let more mention of articulation on order wires play its part in the scheme.

Before leaving the subject of wrong junctions being picked up it is suggested in the case of multiple order wire groups, that as an aid to telephonists in knowing which junctions work on each individual order wire, the outgoing junction field should be suitably bracketed.

To junior staff this knowledge should prove helpful, and would prevent, for instance, a junction being picked up on the second order wire when application was known to have been made on the first. Perhaps heavier marking of the 5th, 10th, or 15th jack would also help.

The next item to be dealt with is :—

(2) *A Telephonist Picks Junction on Wrong Exchange.*

Provided order wire and junction field marking are both good, it only needs care on the part of the telephonist to prevent errors. There is, however, one point worthy of mention and that is whether Tandem or Toll A should be given a distinctive colour. These two exchanges are different from any other by reason of the fact that the exchange, as well as the number, must be given over the order wire, perhaps colour would prove an aid as TM jc's are often picked up for TL A, and vice versa.

It is conducive to error that the alphabetical arrangement of junctions in most exchanges places TM and TL A next to each other. In the interests of accuracy these 2 exclusive neighbours need parting or be given colour.

(3) *B Telephonist Allots a Junction but for Some Reason Forgets the Number Required.*

There is in B operating a factor which, although recognised, has never been provided for. Various expressions for use in given circumstances are at the disposal of the B telephonist, but no expression has ever been provided for use when, in the interests of accuracy, a second's grace is needed and traffic should be held back. The consequence is that telephonists allot junctions past the safety level, and wrong connexions are the outcome.

Exceptionally expert B telephonists probably need no such aid, but average B telephonists no doubt do, especially on split order wires, otherwise why so many wrong connexions ?

(4) *B Telephonist understands a Peg Number to be asked for when Number is O.K.*

The cause can only be inaccurate reception of the number, and the above remarks under (1) apply.

The number of wrong connexions due to this gives a slight index of what the " called in error " trouble must be like, as it is certain that only a peg in the multiple causes the monitor to be called in error instead of a subscriber.

Summing up, then, it would appear that at the very root of the wrong connexion difficulty is :—

(*a*) Faulty transmission or incorrect acceptation of either junction or number over order wires.

(*b*) B telephonists having no authorised means of holding traffic back, and at times taking in more work than can be accurately managed.

If the reasons for wrong connexions have been arrived at it only needs combined effort to cut the trouble down.

However, a certain percentage of error is bound to occur, and provision must be made for this.

It is therefore suggested that instead of the B telephonist sending a guard signal forward along an unproductive road, the call be sent backward to the controlling A telephonist by automatic means, and here the maintenance staff could perhaps be asked to step in and carry on the good work of recovering the waste by fitting a jack which, when a junction was connected to it, would transmit a flashing signal to the distant A telephonist.

The receipt of this flash, which should be a distinctive one, quicker and more easily detectable than a monitor's flash, would signify to the A telephonist that an abortive junction had been

picked up, and that another should be obtained. So far as key-sending B positions are concerned the writer has not sufficient knowledge of the mysteries of automatic working to suggest how picked-up junctions should be dealt with, but no doubt some means would be possible.

With the growth of the automatic system there are other channels open for exploration, and London Tandem Exchange offers some very interesting points.

It is the pioneer exchange of its kind, providing direct order-wire communication to all exchanges within a radius of 10 miles from Oxford Circus.

Its value will perhaps be realised when it is stated that at some of the smaller exchanges 60% or more of the traffic is routed via this centre, all the old methods of indirect routing being cut out. Yes, we have advanced in telephone land and with the extension of the Toll A system we advance still farther.

But although under normal conditions Tandem Exchange proves such a boon there is a very important factor which has to be guarded against, and that is pressure, for pressure can create almost a deadlock. A Tandem telephonist, in accepting a number over a split order wire, has to do five things, viz., make mental note of calling exchange, allot a junction, mentally register called exchange and number, transpose name of called exchange into a code and finally key-out code and number.

It is therefore of the utmost importance that calls be transmitted over the order wire in orderly sequence, and that no breaking-in should occur. But both breaking-in and congestion do occur; one follows the other, and much valuable time is wasted and inaccuracies occur as a result. The question seems a very common one to write about, but it is one of first importance, and really a governing factor in the whole scheme. To overcome the trouble is not an easy task, but the difficulty being there it should be attacked.

It is suggested that when a telephonist meets congestion on the order wire she should not wait, but should make a note of the call, advise the subscriber: "I am trying to get them," and answer another call. If on the second attempt she again meets congestion, she should advise "Junctions engaged, shall I call you," and complete the call at the first opportunity. Why add to the disorder by breaking in? The telephonist may as well retire from the order wire first as last.

Order is the best manager of time, and to aim at this is a step in the right direction.

Under existing rules a call, for example, from Ravensbourne to Greenwich 0640 would be passed over the order wire as Ravensbourne-Greenwich 0640.

As a saver of time and in order to assist the Tandem telephonist in the mental acceptation of the call, it is suggested that a code for Tandem order wire use be given to each exchange, for example, X, Y or Z. Also that the work of converting the required exchange name into a code be performed by the A telephonist, and not by Tandem as at present. The call would be passed over the order wire as X-GRE 0640. This would help in four ways:—

(1) It would save seconds.

(2) It would prevent tandem telephonists from keying out the calling exchange in place of the called exchange.

(3) It would prevent phonetic inaccuracies, such as Woolwich being mistaken for Greenwich.

(4) It would assist tandem telephonists in the mental registration of the call. The quickness with which the guarding tone is connected, cutting out any necessary repetition of junction, suggests an aid is necessary.

The question of phonetic similarity between codes must not be overlooked, but this may prove a lesser evil. It is suggested also that on key-sending B positions, colour be introduced on the keys as an aid to the vision. Even one key marked green would help, say the 5th key. It should prevent errors such as this: 6691 keyed out for 6591. Colour would also be of great assistance when positions are taken over, as the telephonist then views some of the keys at an angle.

One other little point in connexion with C.C.I. positions. It is suggested that a white line about one-sixteenth of an inch in thickness be drawn from the cord to the associated clearing signal. A telephonist often works over a range of three positions and the clears are viewed at an angle. Every aid to accuracy is a time saver.

Space forbids many other little problems being mentioned, but the value of changing junctions on no reply calls would certainly admit of useful discussion. So also would the practice of waiting 5 seconds on a single clear before tapping off, and the question of the busy-back tone and the tone test, with over 30% of error on tests. All indirectly have a bearing on the subject of waste.

CONCERNING WASTE: THE VALUE OF SEGREGATION.

(Prize Paper.)

BY H. B. CARROLL, *Post Office Telephones (Traffic Section), Liverpool.*

MR. H. B. CARROLL.

IN the whole domain of human activity there is perhaps, nothing more familiar than waste, nothing which takes so many forms or which engages the thoughts of practical people as waste of time, of material, of energy. There arise, here or there, suggestions to "recover" waste, to "eliminate" it, or to prevent it; but all have their origin in an intuitive or practical objection to the thing itself, the desire to bring it under control or treatment.

A condition so generally manifest could scarcely be absent from an organisation so widespread as that which controls a public telephone service, or be exempt at least from critical attention. No apology is needed in making the prevention of waste an object of diligent pursuit at all times and in all places. Telephonic communication is a public and social necessity, and hardly could there be a service which depended more upon attention to methods for promoting efficiency, for to that end the control over waste is a powerful adjunct. In the present case efficiency, broadly, depends upon the fullest practicable use of time, material and energy—these, properly related, furnishing the basis for all co-ordination between the personnel and the plant engaged—to the end of creating a fruitful alliance between the industry as a whole and the public it is destined to serve. In every department, therefore, wherein some part of this vast organisation is carried on, there is need for constant vigilance, so that waste in any form

may be effectively treated. It is the purpose of these notes to examine, in a general way, one of the many branches of enquiry, namely, the character of the work performed at certain operating and kindred positions; and to see whether there does not exist, in things as they are, some condition tending to waste, and the opportunity to derive some advantage from its study.

One of the most noticeable facts concerning the work of telephone operators—whether it be carried on at subscriber's, junction, trunk, monitor, testing or observation positions—is that it requires the employment of elaborate and costly plant. And although this plant (representing the "working" position) is only a part of the apparatus required, the fact of its existence is generally striking; whilst to those who have responsibility for its use, the occupancy of these valuable units of telephone equipment is a matter of vital concern. Obviously the number of such positions installed has a most important bearing upon the cost of providing service. The amount of work which an operator —the average operator—is capable of performing satisfactorily in a given time has therefore been a subject of the closest study; and upon these studies, and the standards derived from them, the number of positions required, the general design, and the size of the exchange premises largely depend. The "standards" are related to the proper "loading" of the various positions and are consistent with service of high quality. In the studies referred to, the manipulative time values of various types of telephone traffic and other operations have been resolved from observations taking account, in some cases, of so small a period of time as one-fifth of a second. This fraction of a second represents approximately one per cent. of the operating time of an average call; and to assist in forming a judgment of the effect of this apparently small consideration upon working expenses, it may be stated as amounting to some hundreds of pounds per annum for wages alone in a comparatively large exchange.

Preceding these studies there must, of course, be understanding of the character of the work proper to be carried on at the position. Even when that has been determined there is need, in practice, to consider the circumstances of its application. In what has been said of the effect which even one-fifth of a second may have upon working costs there is an illustration of the regard due to every detail which makes demands upon the attention and time of an operator occupying a position equipped with apparatus. The facilities afforded by the plant are limited. There remains the use which the operator will make of them: herein lies the condition most susceptible to control. Any tendency to acquire other functions at the position, and so to restrict its own peculiar capacity for service, needs critical examination. There should, so to speak, be established in the mind, for reference in many different circumstances, a principle that plant specifically furnished with the means for providing certain elements of service shall be used to the fullest practicable limits for that purpose; that other work, however incidental, shall be provided for elsewhere, especially if, as a consequence of its separation, it can be dealt with satisfactorily under simpler conditions. Not always could such a principle be rigorously applied. Regard for other conditions will often be necessary; but the principle is important and must, it seems, constitute the keystone to any such proposition even though subject to modification in the light of other requirements. Moreover, there may be periods when the staff at certain equipped positions are not fully "loaded," when some additional duty (such as routine testing) may be provided for without detriment to the ordinary services required at the positions. But circumstances which have relation to the "slack" hours have a different importance from that which is under consideration here, for the extent of the position equipment required is governed not by the conditions in those periods, but by the demands to be made upon the plant during the busiest periods of the day.

Some examples will serve to illustrate the point: At a switchboard position, a telephonist takes demands from subscribers, makes connexions, registers or prepares tickets for the calls. On a ticket there will ultimately be recorded the charge for the call. That, however, is an operation which can be done away from the switching position; not only at least as well done but, generally, at less cost—at a simple writing table. Again, matters which arise at the switchboard which would tend to impede the ordinary work of the position (thereby restricting the capacity of the plant engaged) are diverted, that is, they are referred to a supervisor or to a special desk where they can be effectively dealt with.

When so much has already been accomplished in the organisation of these matters, the field of enquiry would seem at first to possess little promise for further fruitful investigation, but another example will show how—only in comparatively recent times—the principle has been applied to the elimination of waste in the handling of phonogram traffic. Hitherto, it was customary for the operator at a message position to enter on the message form (in addition to other particulars) the originating subscriber's number and the charge; and, having done this, to "hold" the circuit connexions whilst she prepared a docket upon which these details (required for charging purposes) were repeated. This process involved waste to the extent that, during the preparation of the docket, the plant at her position was lying idle, unavailable for the receipt of a further message. By the omission from the message form of such details as are necessary for the docket (now a counterfoil), and the addition by stamping, at a separate position, of each message and its counterfoil with the same number, the identity of the message is provided for, the operation time at the message stalls reduced and the plant at those positions made available to fuller use.

When the volume of work at any exchange reaches a certain stage, some lines of demarcation become possible as between the various classes of work to be dealt with. The process of separation is sometimes known as "segregation"—the grouping of one class of work on one set of positions. As for an exchange, so in the system as a whole, expansion of the service and the enlargement of its functions lead to segregation. It is an extension of the principle of reserving to particular classes of plant the functions appropriate to it.

It is interesting to contemplate this process and its tendencies in the light of the future. Manual working is giving place to automatic machinery; but for certain purposes manual equipment will continue, and expand with the system itself. Segregation is likely, therefore, to survive as a problem for continuous study—efficiency and economy always supplying the motive. There may be visualised a development in this country resulting in the number of installed telephones being trebled, and a tendency to carry segregation to further stages in the form of centralisation, where work at present performed in individual exchanges would be removed, all work similar in character arising from a group of exchanges being brought together and dealt with at one suite of positions specially designed to deal with a large volume of that class of traffic. Whilst revision along these lines may not yet be due, it is useful to consider the trend of future requirements. It seems probable also that the nature of manually-controlled operations will undergo some material changes; and that these in turn will call for alterations in the structure of the organisation which at present prevails. To endeavour to appreciate the potentialities of segregation and, from the knowledge of its uses, to influence as far as possible the evolution of the service along productive lines, may therefore be regarded as reasonable aims to ordered progress.

Even in the consideration of things as they are, the study of segregation can hardly be less than a pursuit deserving serious attention, tending as it does to the concentration of effort, specialised control, and thereby the fullest utilisation of the plant available. It would be impossible in these notes to prescribe for any requirement without knowledge of the circumstances of the case, so that little more may be done perhaps than to call attention to an important principle, and to some of its applications—especially its bearing upon waste. To illustrate, however, the nature of

possible enquiry into existing arrangements, the following are suggested :—

(1) Work which reaches the monitor's desk. The study of its character, and susceptibility to division, especially where several such positions are in use; and the removal of the simpler operations, such as the treatment of enquiries, to positions adequately but less elaborately equipped.

(2) Work performed at observation positions—where the service given at trunk and local positions is observed and charted; whether the plant at these positions is in a condition of full availability, and if not, to what extent that condition may be approached by the elimination of purely clerical operations not essential to the business of recording—that is, by the removal to office desks of incidental work, such as the totalling and carrying forward of information tabulated in the daily summaries.

(3) Work at manual operating positions. Careful examination of any proposal tending to impose upon the switching staff duties which could be effectively performed at simple positions of a clerical character; for example, the treatment of some element of ticket procedure intended to facilitate accounting either in the exchange or office.

In conclusion, it may be said that waste does not always "catch the eye." It can be very elusive. Its discovery may therefore be a fascinating occupation. But always its elimination or recovery are worth while. In industry, however, control over it must remain one of the powerful attributes of efficiency.

PARTY LINES.

A CORRESPONDENT writes :—

Reading an article in the *Telegraph and Telephone Journal* for April 1928, entitled "Recovering the Waste," it brought in my mind the waste there is in connexion with a residential subscriber's circuit. A would-be subscriber decides to have a telephone installed in his house, connected to the nearest exchange, for which he agrees to pay £1 7*s*. 6*d*. a quarter. In many cases the main reason for having the telephone installed is that the wife may do her shopping by telephone, and that other originating calls may be made for services so well described in circulars issued from time to time. The point I wish to emphasise here is that the circulars referred to advertise outward services chiefly, and there is no doubt this service is all that is required in a large number of cases. The use made of a Residential exchange circuit is an average of 2 or 3 calls a day at about 3 minutes each, or approximately 10 or 15 minutes for the whole day, the money value of which, including the subscription, is roughly £10 a year. Now take a residential main road and its adjacent bye roads, my idea is that if a main line were run for say 1½ miles from the exchange in the direction of these roads, and by means of spurs connect up a number of would-be subscribers along the road forming a Party Line, but for outward service only, to overcome the difficulty of code ringing for inward service, it might be possible to connect as many as 20 subscribers on the one line. That being so, it would, no doubt, be a paying proposition if a rental of 10*s*. a quarter were fixed for each subscriber which, with a possible one call a day each, would bring in revenue of approximately £50 a year for the circuit. It might also be a means of persuading some of these Party Line subscribers to have direct lines once they had found the benefits of the telephone and then wished to have inward service.

As regards the check on the timing of calls, I should think in these progressive times there could be some very simple electrical device for disconnecting a conversation at the end of three minutes or even a little longer, and also a contrivance for illuminating a small opal disc at the subscriber's instrument to signify to other subscribers on the line that the line was engaged. By this means, I do not consider the line would become congested, and we should be getting nearer the time when it might be possible to have a telephone in every home, and in the meantime to obtain subscribers who will never entertain the present tariffs.

NOTES ON ROCHDALE AUTOMATIC TELEPHONE AREA.

TRUNKING ARRANGEMENTS.

THE conversion of the Rochdale telephone area to automatic working involves the cut-over of eight new automatic exchanges, with a total of 3,880 lines. The new exchanges and their initial and ultimate capacities are as follows :—

Exchange.	LINES. *Initial.*	*Ultimate.*
Rochdale Main	2,050	4,000
Heywood	470	800
Shaw	380	900
Littleboro'	380	700
Whitworth	100	200
Milnrow	200	300
Norden	100	200
Castleton	200	300
Total ...	3,880	7,400

With the opening of these exchanges, subscribers in the Rochdale area will be provided with a full automatic service for all calls within that area, including calls from coin-box lines.

The system installed is the Step-by-Step Automatic System, similar to that which was recently cut over at Macclesfield. The application of this system to a multi-exchange area such as Rochdale introduces some interesting features in the trunking arrangements between automatic exchanges.

In the small satellite exchanges—Whitworth, Milnrow, Norden, and Castleton—there are no group selectors. All calls are routed through the group selectors in Rochdale main. This means, of course, that for local calls 2 junctions are used between the satellite and the main exchange, but traffic conditions warrant this arrangement, and it effects an economy in the satellite exchange equipment.

At the three larger satellites—Littleboro', Shaw and Heywood, a discriminating selector-repeating scheme is installed. In this scheme a subscriber on originating a call is connected through his line-switch to a discriminating selector in his own exchange, and, through an outgoing secondary switch associated with the discriminating selector, to an outgoing repeater and an incoming first selector at the main exchange. The 1st digit, which indicates whether the call is local or not, operates both the discriminating selector and the incoming 1st selector. If the call is local the discriminating selector releases the outgoing junction and restores to normal. The 2nd digit then operates the discriminating selector again, and this switch functions as a group selector extending the call to a final selector, which receives the last two digits.

If the call is for another exchange, the discriminating selector repeater remains set after the 1st digit has been dialled, but does not hunt. It holds the junction and the incoming selector, and the latter hunts for a 2nd selector in the main exchange, or in another exchange, according to the level to which it has been set by the 1st digit.

Calls outgoing from the Rochdale area to manual exchanges such as Manchester Central or City, Oldham, Bolton, Bury, Middleton, Liverpool Central, Bradford and Halifax, are routed via the central manual board in Rochdale main; thus, subscribers on Rochdale main, or any of the satellite exchanges, requiring a connexion with any of these manual exchanges, first dial "0," which routes the call to an "A" operator in Rochdale. The operator receives particulars of the call, and completes it over an order wire or signal junction. Trunk calls are routed in the same way via the Rochdale manual board.

Incoming traffic from the three manual exchanges, Manchester Central and City and Oldham, handled over order wire junctions terminating in cordless "B" positions in Rochdale main. From the cordless "B" position the call is extended through the automatic equipment to the particular exchange required, by the cordless "B" operator, who "key-sends" the four digits of the required number. The cordless "B" equipment is the same as is being installed in the London area.

A number of manual exchanges including Bolton, Bury, Burnley, Bradford, and Halifax, are equipped with dials at "A" positions, so that traffic to the Rochdale automatic area may be routed direct over "dialling-in" junctions to the automatic equipment. These junctions terminate at Rochdale main, in some cases in dialling-in repeaters associated with first numerical selectors; in other cases they terminate direct on first numerical selectors. The "A" operator at the manual exchange is thus able to complete calls to the Rochdale area without the aid of an operator in that area. Calls from Liverpool trunk exchange are dialled in a similar manner.

AUTOMATIC EQUIPMENT.

The main items of automatic equipment are as follow :—

Line and Final Units.—These are installed both in the main and in the satellite exchanges. Each unit carries the equipment particular to 100

subscribers' lines. On one side the 100-line switches are mounted on two gates. The arrangement of the gates is such as to give easy access to the bank wiring of the lineswitches. On the other side of the line and final unit are mounted the final selectors which give access to 100 lines.

Trunk Boards.—These are installed in the main exchange and in the there larger satellites. In the main exchange they carry the 1st and 2nd group selectors which operate on the 1st and 2nd digits of the number dialled, and which build up the path to a final selector, giving access to the 100 numbers in which the required line appears. Each board consists of two racks, having a capacity of 120 selectors per rack. The terminal assembly on which the commoning required in trunking between stages is effected is mounted at one end of the trunk board. In the larger satellites—Littleboro', Shaw, and Heywood—the same type of board mounts the incoming 2nd selectors from Rochdale main, the discriminating selectors and associated outgoing secondary switches, and the outgoing relay groups reached from the latter.

In the smaller satellites these units are not installed, since there are no regular group selectors.

Repeater Racks.—In the initial equipment there are three repeater racks installed in Rochdale main exchange, mounting the relay groups in lines outgoing to automatic exchanges, and the " dialling-in repeaters in lines incoming from certain " dialling-in " exchanges.

Junction Apparatus Rack.—This rack installed in the main exchange, mounts the junction relay groups associated with those incoming junctions which are operated through the cordless " B " positions.

Sender and Outlet Rack.—This rack installed in Rochdale main, mounts the automatic equipment associated with the cordless " B " positions.

Special Apparatus Rack.—In each exchange a special apparatus rack is installed. In the main exchange this rack carries the miscellaneous apparatus associated with the manual board and desk circuits.

In the satellite exchanges the rack mounts repeaters (other than those associated with discriminating selectors), miscellaneous apparatus, and supervisory equipment.

MANUAL EQUIPMENT.

As indicated above, it is necessary even in the full automatic area, to have a certain amount of manual equipment to handle special service calls (assistance and enquiries, and calls to trunks, &c.) from automatic subscribers and also, since call-indicator equipment is not installed in the surrounding area, to deal with calls outgoing to manual exchanges.

The cordless " B " boards are advantageous where the volume of incoming traffic from manual is so large that it is undesirable to adopt the " dialling-in " scheme, which considerably increases the time taken by the originating " A " operator to deal with each call. The cordless " B " system enables the " B " operator at the automatic exchange to handle a load much greater than is possible at the ordinary " B " switchboard. At the same time the distant " A " positions and the operating procedure at these positions remain unchanged.

In the Rochdale area the manual board services are centralised in the main exchange which has 14 " A " positions and two cordless " B " positions.

FAULT ALARM ARRANGEMENTS.

To facilitate maintenance it is essential to have a comprehensive and yet simple supervisory scheme, which will give clear indication of the occurrence of any fault in the automatic equipment, or of any faulty operation on the part of the subscriber which would hold apparatus unnecessarily. This supervision is provided by a series of ceiling lamps in a conspicuous position in the exchange, the lamps being coloured to indicate the nature of the fault. In certain cases an audible alarm is provided by means of a bell. In addition to the ceiling lamps common to groups of apparatus racks, individual lamps are provided at each rack to assist in locating the fault.

In the satellite exchanges, arrangements are made for extending the alarm where necessary to the main exchange. In Heywood, where there is a local test desk, the alarm is given locally during the day. At night by the operation of a key, the alarm is extended to the manual board at the main exchange over one of the lines, which is also used for " O " level (assistance) calls. The operation of the same key suppresses the local alarm at night.

In the case of satellites other than Heywood, the alarm during the day is given locally, and at the same time is extended over one of the test lines between the main and the satellite exchange, announcing the fault at the Rochdale test desk. At night, by the operation of a key, the local alarm at the satellite exchange is suppressed, and the alarm is extended to the manual board at Rochdale.

POWER PLANT.

The power plant in an automatic exchange such as Rochdale differs from that in a manual exchange, mainly with respect to the capacity of the battery and charging plant and the scheme of power distribution to the apparatus. The increased battery capacity is, of course, necessary for the operation and holding of switches used in setting up a connexion.

In distributing power to the apparatus racks in the exchange, common leads are run from the power board to a centrally located distribution fuse panel. From this panel leads are run through fuses to groups of apparatus racks, the cross section area of these leads being such as to ensure correct operation of the switches, and to avoid cross talk or switch noise.

In addition to the main batteries, a small battery of 50 volts is necessary to give the additional voltage required for the " booster metering " scheme adopted in the area.

A battery of seven counter E.M.F. cells is installed at the main exchange for reducing the 50-volt exchange battery supply to the correct voltage for supplying power to manual P.B.X.'s.

In the main exchange, Standard Telephones & Cables Ltd. were responsible for installing the whole of the power equipment, with the exception of the booster battery, which was supplied and installed by the G.P.O.

In the satellite exchanges, the batteries, power board, and charging machines were supplied and installed by the G.P.O. The ringing panels and ringing machines were ordered and installed by Standard Telephones & Cables Ltd.

SIGNAL TONES.

The signal tones used in the Rochdale area are those which have been standardised by the G.P.O. for all automatic exchanges. These tones are necessary to give the subscriber an indication of the progress of his call, as follows :—

Dialling Tone.—This tone is received by the subscriber when he has lifted his receiver, and when his line-switch has found a free 1st selector. It indicates to the subscriber that the automatic equipment is ready to receive his call.

Ringing Tone.—This tone is given to the subscriber if, at the end of dialling, the automatic equipment has secured a path to the desired line. It indicates to the subscriber that the bell at the station he is calling is being rung, and that, therefore, so far as the automatic equipment is concerned, the call has been successfully completed.

Busy Tone.—This indicates to the subscriber that his call has been unsuccessful, due either to one of the automatic switches having failed to find a free path to a subsequent switching stage, or due to the called line being already engaged on another call at the moment when this call was made.

Number Unobtainable Tone.—In the automatic equipment it is impossible to avoid having certain paths which may be selected inadvertently by the subscriber and which do not lead to any subsequent stage, or any subscriber's line. For example, it is necessary to reserve certain levels on selectors for extensions. Should a subscriber dial a number which brings him on to one of these paths, that is, should he, for example, dial a number which brings him on to a spare level, or an unallotted number in a final selector, he is given an indication of his error by a distinctive tone, called the number unobtainable tone. The same tone is given to the calling subscriber if he calls a line which is temporarily out of order, or " plugged up " for other reasons.

STROWGER AUTOMATIC TELEPHONES.

WE have received two bulletins from the Automatic Telephone Manufacturing Co., one (No. 300), a very useful and well illustrated production of some 60 pages containing a description of subscribers' and exchange apparatus, exchange equipment (with good diagrams) and an account of the Tandem exchange in London. It is supplemented by an imposing list of the places in England, the United States, Canada, Japan, the Argentine, India, Australia, New Zealand, Iraq and other countries where the Strowger system has been or is being installed.

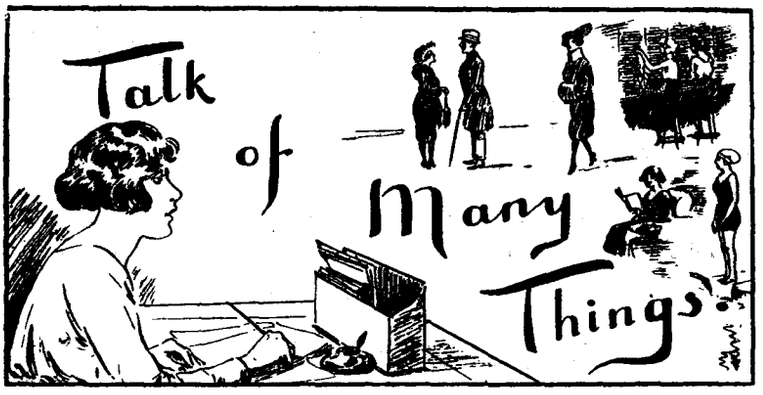
The other booklet, styled " The A.T.M. Universal Duplex Unit," describes the operating features, advantages and testing features of this unit, and is also well illustrated with photographs and diagrams.

THE AUTOMATIC TELEPHONE EXCHANGE AT THE NEW UNIVERSITY COLLEGE, NOTTINGHAM.

THE new University College, Nottingham, which was formally opened by His Majesty the King on July 11, is equipped, for inter-departmental communication, with a private automatic telephone exchange. The switchboard installed is one of a series specially developed by Ericsson Telephones, Limited, 67-73, Kingsway, London, W.C.2, for small private installations.

The initial equipment of 32 lines and 5 links or connecting circuits, can be increased to 44 lines and 7 links, and by means of an additional panel an ultimate capacity of 89 lines and 14 links is given. The components are identical with those supplied to the British Post Office for public exchanges. The links consist of a set of relays arranged in unit form on the jack and plug principle, so that it is quite an easy matter to make an addition, or to remove a set for examination, should a fault occur. This feature, together with the accessibility and designation of the various parts, simplifies installation, and especially maintenance. The equipment operates from a low-capacity central battery of 24 volts, and the charging panel, for convenience in this case, is lined up with switchboard unit.

WE TELEPHONISTS



Written in the Heat of the Moment.

PHEW ! Isn't it hot ! That, of course, is a perfectly ridiculous remark and so unnecessary. If it were not hot I should not have said it, and as it is hot there is no need for me to say it. It is highly probable, moreover, that by the time you read this it will no longer be hot and you will wonder vaguely why ever I made such a remark. But it is just the senseless sort of thing that we all say from time to time, and I am vastly relieved to be able to think that I am not peculiar in my peculiarity.

Think of the consternation it would cause if I asked the same question on a bitterly cold day. Yet why should it be any more ridiculous to call attention to what obviously *is*, than to call attention to what obviously is *not* ? I would tell you the answer if it were not so hot—too hot indeed to think.

One of these days when it is again very hot, I shall be oozing around in a feeble, starchless manner asking the same silly question. I know that I shall meet with the same silly answer—the answer that is always uttered in a particularly hearty tone of agreement—" Yes, isn't it ! " And then suddenly the world will stand still, a solemn hush will settle over everything, and amid the stillness and silence a harsh solitary voice will cut through the hot heavy air like a flash of brilliant sound and the words will snap out viciously—" No ! It isn't ! " Then the ninety and nine just persons will reel dazedly. The one Daniel among the lions will glare round defiantly and shout out again a vehement denial in a voice of brass, which will rebound in the vaults of heaven and roll away among the hills. After that the world will gradually return to consciousness, and its pulse will again begin to throb.

What will happen to the one bold man I don't know. Perhaps he will be confined to a museum as a rare example of sanity—but I doubt it, and in any case it's much too hot to bother about him, isn't it ? Phew, yes.

PERCY FLAGE.

To the Editress.

Dear Madam,—I was very shocked to learn that " Devoted Model " was the original of the " Girl at the Desk," because hitherto I had supposed that she was a creation existing only in the artist's horrid imagination. I am considerably relieved, however, to be assured that Clerkenwell School has—well, a modifying effect. It is at least comforting to be able to hope.

Of course, now that I know the truth, I can appreciate that " Devoted Model " must have felt rather peeved at my innocent remarks, and I suppose I deserve the severe castigation she has administered. But if she has dealt with me so drastically, what must she have done to the artist who so cruelly caricatured her beauty ! My one desire now is to meet what is left of him and to inspect the wreck that was once man.

Well good-bye, dear—er, beg pardon—I beg to remain, dear Madam,
Your obedient Servant,
PERCY FLAGE.

An Old Bore's Almanack.

Wherein is forecast those strange things which will occur in the telephone world each month, every year :—

January.—Disputed accounts will provide checks on cheques. Traffic Officers negotiating will go armed.

Staff authorities will throw a gloom over all exchanges.

February.—Follow-up observations on *all* outgoing calls will commence, redundant staff operating.

Odd days will be taken by odd people.

March.—About the tenth of this month the Call Office Attendant will be heard calling his mate.

Spring will be in the air, and a male cleaner will hum as he props up the mop.

April.—All Fool's Day will occur on the First—and as often after as a subscriber gets a wrong number.

Swimming Club secretaries will emerge from their winter sleep and share pushers for tennis clubs will become aggressive.

May.—Queens of the May will be called early if 8 a.m. duty. A general rising will take place in telephone exchanges at 8 p.m. each evening.

Traffic Superintendents will commence bringing their garden produce (purchased en route !) to decorate the Chief's desk.

June.—This is the month of roses : amorous engineers will find there's never a rose of a telephonist without a thorn of a Supervisor.

Towards the end of the month a Contract Officer will develop peculiar symptoms and offer to forego his commission. . . . This will seal his doom.

July.—Holiday fever will begin to break out. Boarding houses and bathing costumes will fill up.

A C.C.I. marker will contract St. Vitus' Dance and will only be soothed by a routiner injection.

August.—Continental boat trains will be full of Supervisors taking Mothersill and a trip to Europe.

An I.D. Officer will admit it was entirely her fault.

September.—Bonuses will loom largely on the horizon. A night operator will forsake pints for points.

During this month a subscriber will make a complaint and cause thereby great consternation.

October.—Peg Counts will be completed after reference to Mrs. Beaton. Discussions will continue as to when a figure is representative.

On the twentieth precisely, a caller will successfully use a Multi-Coin Box, and will be given an honorary A.M.I.M.E. degree.

November.—Fogs will delay operators reaching exchanges but most of them will be found O.K. An engineer will ask the meaning of R.W.T.

December.—This is the month of indigestion.

An outer London exchange will promote a social and forget to thank the M.C. in the *Journal*.

X. Y. Z.

Competition.

Owing to the absence of the EDITRESS (to whom we wish a speedy and complete recovery) on sick leave, the judgment of the Competition Sketches for the heading of this column has been postponed. A further announcement on the subject will be made next month.

Contributions to this column should be addressed THE EDITRESS, " Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), E.C.1.

PRESENTATION TO MR. F. W. A. CLUTTERBUCK.

Mr. F. W. A. CLUTTERBUCK, Assistant Traffic Superintendent, Manchester, has been appointed Traffic Superintendent, Class II, and transferred to Chester.

An informal gathering was held in the dining room on Friday, 22nd inst., for the purpose of bidding him good-bye, and to " speed the parting guest " with several tangible expressions of our good will.

In the absence of the District Manager (Mr. J. T. Whitelaw), Mr. Parry, Traffic Superintendent, officiated. In a humorous way he traced Mr. Clutterbuck's descent from the old " voyageurs " from Bristol, who left their mark on the American Continent (Mr. Clutterbuck being a Bristolian), and on behalf of the staff at Manchester wished him all the success he deserved in his new district ; after Mr. Battersby (his particular Acting Traffic Superintendent colleague) had said a few eulogistic words, Mr. Parry made the presentation consisting of a loudspeaker and a handsome case of fish-eaters from the staff at Peru Street ; A cut-glass salad bowl with servers, and a flower vase from the City and Trunk exchange staffs.

It is also understood that Mr. Clutterbuck was the recipient of other gifts from members of the staff at Head Post Office.

Mr. Clutterbuck, in happy vein, suitably responded, and expressed his sincere regret at having to leave his many old friends at Manchester.

IMPERIAL WIRELESS AND CABLE CONFERENCE.

WE publish below a summary of the Report of the Imperial Conference which was appointed to examine the situation that has arisen as a result of the competition of the Beam wireless with the cable services. The personnel of the Conference has already been mentioned in the March issue of the *Journal*; it included no member representing the British Post Office as such.

The report begins with a general summary of the position. In the course of the summary an estimate of beam traffic, based on the three months March to May, 1928, is given as follows:—

Canadian service ...	...	6,000,000 words.
Australian service ...	...	9,000,000 „
South African service	...	9,000,000 „
Indian service ...	...	10,500,000 „

Although there is evidence of an appreciable increase in the total volume of telegraph traffic, the Conference were informed that the cable undertakings affected by the wireless rate reductions and the Indo-European land-line service had been brought to a serious position by the reductions in rates adopted in order to meet beam competition and by the loss of a considerable volume of traffic to the beam services. The Pacific Cable Board, as a result of generous budgeting and drastic economies, succeeded in making a small profit for the year 1927-28.

The Conference consider that the Australian, South African and Indian beam services could afford to make a further substantial reduction in rates and still give a handsome return on the capital invested, and that if competition remain unrestricted, the beam would render the cable systems unremunerative. It was suggested to the Conference that "those responsible for the Cable Companies might be pressed, unless a satisfactory means of obviating the effect of acute competition could be provided, to liquidate their undertakings at once and distribute their large reserves among their shareholders rather than to remain in operation and dissipate their resources."

The Conference consider that the cable system must be retained. They give three reasons:—

(1) Many parts of the Empire are not at present served by wireless and may not be for some time to come.

(2) The existing wireless services are subject to fading and occasional prolonged interruption which would constitute a serious hindrance to urgent commercial telegrams if the cables were not available.

(3) The cables have a strategic value.

After an allusion to the increasing influence of foreign competition, the Conference proceed to discuss possible lines of solution. They rule out non-intervention and the payment of a subsidy as plainly impracticable, and they consider that the guarantee to the cable system of a minimum revenue or the institution of some sort of "pooling" scheme would furnish only a temporary solution. They prefer the solution of a fusion of the cable and wireless interests concerned, and have ascertained that, apart from certain reservations on the part of South Africa, the Governments concerned had no objection to the search for a solution on these lines.

The Conference then outline the merger proposals submitted to them by the Eastern group and the Marconi Company. The total proposed capital of the Merger Company is £53,700,000, divided into Preference, "A" Ordinary and "B" Ordinary shares in the proportions roughly of 23, 21 and 9. The greater proportion of the preference and the "A" ordinary shares would be allotted to shareholders in the Eastern group and the greater proportion —65%—of "B" ordinary shares to Marconi shareholders. The merger would acquire the whole of the capital of the Marconi Company but only the ordinary capital of the Eastern group. The arrangements contemplated by the companies included the transfer to the merger of the beam wireless and cable assets of

H.M. Government in Great Britain, and the Conference thought it possible that unless the beam installation were transferred to the new company the merger would not, in fact, take place. The Conference arranged for the whole scheme to be examined on their behalf by two financial experts, Sir Otto Niemeyer and Sir William McLintock, and ascertained that H.M. Government in Great Britain, while reserving its decision until precise details of the scheme were available, did not preclude the Conference from enquiring into the possibility of the transfer of the Government cable and wireless services to the merger company.

The Conference consider that a solution on these lines would be satisfactory and recommend accordingly. They recommend that in addition to the merger company there should be established a Communications Company which would own all the communication assets of the Eastern group and the Marconi company (i.e., excluding the investment interests of the Eastern group and the manufacturing, &c., interests of the Marconi Company), would acquire the holdings of the companies concerned in other communication companies, would acquire the Government cables concerned, and would lease the beam stations. The capital of the Communications Company is not to exceed at its inception £30,000,000.

The Conference recommend that the transfer of the Government undertakings concerned (i.e., the sale of the Pacific and West Indian systems of the Pacific Cable Board and the Imperial Cables and the lease of the beam services) should take effect as from April 1 last. The company would be required to provide for the transfer of existing staffs and to make payments as follows :—

(*a*) for the beam services, which would be leased for 25 years, a capital payment of £60,000 and a basic rent of £250,000 per annum with an addition (after 1931) of 12% on any increase of the company's profits from communication services above the standard revenue ;

(*b*) for the Imperial Cables a capital sum of £450,000.

The Conference recommend that the board of directors of the Merger and Communications Company should be identical, and that any increase of net revenue from communications service above a certain standard revenue (which is equivalent to about 6% of the capital of the communications company) should be divided in the proportions of 50% to the company and 50% to reduction of rates, &c. The Conference recommend that an Advisory Committee consisting of the British and Dominion Governments concerned should be set up, and that the company should be bound to consult them on questions of policy ; no increase of rates would be permitted except with the consent of the advisory committee. They recommend finally that the external telephonic services of Great Britain should be reserved to the British Post Office, which would agree with the company as to the terms on which it would have the right to use the company's wireless stations.

The report is sad reading, and on the whole we had better refrain from comment. It will suffice to say that although the report makes no reference to the manner in which the beam services have been administered and operated by the Post Office, it makes it clear that it was their outstanding success that created the whole problem ; and the Post Office played no small part in establishing this success. In spite of the report and whatever its outcome may be, we may reflect on our achievement with pride.

GLASGOW TELEPHONE NOTES.

Mr. J. B. Mathieson, late of the Edinburgh District, took up his duties as Traffic Superintendent, Class II, Glasgow, on July 1. We offer cordial greetings to him and we trust his stay with us will be marked by every success and happiness.

Our congratulations to Miss J. B. McArthur on her promotion to the Telephonist Allowance post at the Clydebank Exchange.

Good wishes to Miss E. Welsh, telephonist, of the Bridgeton Exchange, who resigned the Service on June 30 to take up residence in London, Ontario. As a token of appreciation her colleagues presented her with a wristlet watch.

Congratulations to the following Contract Officers : Mr. S. W. Russell, promoted to Acting Contract Officer, Class I ; Mr. J. Blackwell, Mr. R. S. Forsyth, Mr. A. E. Dickson, Mr. R. H. Wilder, promoted to Development Duty Officers, with allowance.

In the midst of a spell of weather which merited the worst criticism ever passed upon it, Tuesday, July 3, was ideal for the outing arranged by the Glasgow Post Office War Hospitals Entertainments Committee for the patients from Bellahouston and Ralston War Hospitals.

Lt.-Col. and Mrs. Westbury represented the postal staff and Mr. Reid, Acting Contract Manager, deputised for Mr. Coombs (Chairman), who was on leave.

Leaving Bellahouston Hospital by chars-a-banc at 1.15 p.m., the route was via Helensburgh to Luss. There the party embarked on motor-launches for a trip down Loch Lomond to Balloch. High tea was served at Balloch Castle Tea Rooms, where Mrs. Campbell, the manageress, gave the party a hearty welcome and a splendid tea, which was thoroughly enjoyed by everyone. The company then wended their way to the putting greens, where a competition took place. Some very good scores were returned and Mrs. Westbury presented the prizes. A pleasant run home in the cool of the evening completed a "perfect day."

The following is an extract from a letter received by the Secretary of the Committee from the Medical Superintendent of Bellahouston Hospital :—

> "On behalf of the patients of this hospital, would you please thank the members of the staff for all the kindnesses shown during the past year. The entertainments have all been thoroughly enjoyed and are always looked forward to by the men.
>
> "The outing yesterday was the best event of the year and the patients are full of enthusiasm over it."

J. L.

Coloured Telephones (Applications for).

OFFICIAL : ". . . and I would like an instrument of royal blue colour."

(*Note.*—The wishes of the subscriber, an admitted supporter of Rangers F.C., have been met.)

UNOFFICIAL : "My telephone that was orange has all peeled off. Please have it repainted red, white and blue, as my mother-in-law died this week."

D. REID.

Pollok Estate Park.

Birds twit their songs and flit
From tree to tree ;
The evening still hath cast its spell
O'er me.
The pool is full of living things,
And over it
Myriads, on tiny wings,
Hover.
The wondrous hush of tree and bush
At even
Doth fill my soul with peace
of Heaven.

M. L. TULLOCH.

On Relaxation and Holidays.

"The mind is very apt to receive a strong cast from the manner in which it is employed. When a man is constantly engaged in something which requires great study and application, he is in danger of acquiring a hardness of temper which will make him disagreeable, or a tone of mind which will render him incapable of going through the common duties of life as a friend, a relation, or a parent. Nothing will preserve him from these bad consequences so much as his taking advantage of a holiday, and allowing himself to be unbent with recreations of an easy, and in themselves of a frivolous nature. This will not only afford him an agreeable relaxation, but will give his mind a gentleness and a sweetness which all the hardness of application, and all the agitation of his employments, will not be able to destroy. There is no anecdote in antiquity which I have read with greater pleasure than that of Scipio and Laelius, related by Cicero : 'I remember to have heard that Laelius and the great Scipio were frequently wont to fly from the hurry of business and the bustle of the town to a quiet retreat in the country, and there to grow, as it were, boys again in their amusements. Nay, they used to pass their time at Caista and Lauresitium in gathering shells and pebbles on the sea-shore, unbending their minds, and amused with every trifle.' "—The *Mirror*, August, 1779.)

"There were times when I could not afford to sacrifice the bloom of the present moment to any work, whether of the head or hands. I love a broad margin to my life."—(Thoreau.)

"'You should learn to read, Jasper.'

"'We have no time, brother.'

"'Are you not frequently idle ?'

"'Never, brother ; when we are not engaged in our traffic, we are engaged in taking our relaxation ; so we have no time to learn.' "—(Borrow.

LONDON TELEPHONE SERVICE NOTES.

Contract Branch Notes.

THE results obtained by the Contract Branch during the month of June were a net gain of 2,542 stations as compared with 2,254 stations for the corresponding month of last year.

* * * *

The following letter indicates how the kiosks which are dotted all over London are appreciated by visitors from distant lands :—

"Two years ago on my last visit from Australia, I had cause to write you rather strongly about your so-called Public Telephones, which in the district of Lee and other places were inside shops locked up at 8.0 p.m. I find on this visit around the S.E. district of London that the 'phone is in the street and can be got at morning, noon and night—allow me to congratulate you on the improvement.

At first you will find the boxes will not pay or may be damaged by the rough element, all that is necessary is the "birch" or "cat" for the rough element and a few catchy advertisements as : "Use the 'phone, pay 2*d.* to do your shopping and save wet feet and shoe leather."

. . . .

The thousandth kiosk has now been brought into service and the number in use is being increased at the rate of fully one a day.

* * * *

The writer of the following letter appears to believe that there is luck in odd numbers. Their oddness must be beyond reproach for him to be satisfied :—

"As soon as possible, I request that I may be given a list of VACANT numbers to choose from.

I want a number whose DIGITS add either to 1, 5, or 7 (AND NOT to 2, 3, 4, 6, 8 or 9).

THUS, for example, my present number 5947 adds to 7 (5 plus 9 plus 4 plus 7 add to 25, and 2 and 5 add to 7).

Example for a new number :—

3151 add to 1. (3 plus 1 plus 5 plus 1 = 10 = 1).
6287 add to 5.
7999 add to 7.

Any of these would do or any that similarly added to 1, 5 or 7.

Therefore, I SHALL REGARD IT as a FAVOUR and extension of the courtesy I have formerly received if a number is chosen for me as above, or if I am sent a list of vacant numbers to choose from."

* * * *

Sports Notes.

Cricket.—A decisive game was played on Tuesday, July 10, at Chiswick, between the Contracts Branch and Traffic Branch, which resulted in a complete victory for the Contracts Branch by 138 runs. There was considerable enthusiasm at the conclusion of the match, which resulted in the Contracts' team annexing the L.T.S. shield for the first time.

Much credit for the success of the team is due to Mr. T. Culley, the Secretary, who has for several years been mainly responsible for the sports activities of the Contract Branch, and to him more than any other individual must the success of the team be attributed.

SCORES.

Contracts.		*Traffic.*	
Hodgkiss	17	Beaumont	5
Wilson	4	Thomson	0
Holdstock	43	Mears, not out	14
Pearks	4	Evans	0
Oliver	6	Berry	0
Cowdray	53	Niles	0
Goodger	16	Gerrard	12
Griffiths	0	Gregory	0
West	11	Hancock	0
King	4	Holcombe	0
Sharp, not out	0	Extras	2
Extras	13		
Total ...	171	Total ...	33

Pearks and Holdstock bowled unchanged for Contracts. The former took 6 wickets for 13 runs, and Holdstock had 3 wickets for 16 runs.

For the Traffic Branch Capt. Berry bowled well and took 7 wickets at a small cost.

A team selected from the rest of the league will play the champions in a match at Chiswick before the close of the season.

Boy Messengers' Cricket.

A most enjoyable and interesting afternoon cricket match took place on June 28, at Chiswick Polytechnic Ground, between the Cornwall House Boy Messengers' team and the Accounts Branch Club.

The Messengers won the toss and elected to bat first. It was soon apparent that these young fellows knew the game, and the innings finished with the creditable score of 112. The last man in, Sander, was top scorer at 29. The Accounts only managed to get 81, this giving the Messengers a comparatively easy victory. The bowling and fielding of the winners was excellent, while that of the Accounts' men was below their standard. Among the supporters were Mr. Valentine, whose presence greatly encouraged the players, Mr. Stirling and Mr. Bold who did so much to promote the success of the occasion. One must not forget a number of young ladies who took a very keen interest in the play of the Messengers. Mr. Hugh Williams, the Chairman of the L.T.S. Sports Association, was also present. Capt. Berry umpired.

An effort is being made to arrange another match before the end of the season. The fixture will be duly advertised, and it is hoped an equally enjoyable afternoon will be spent ; the pleasure will be considerably enhanced by the attendance of a greater number of the staff.

* * * *

Bowls.

The L.T.S. team was defeated in the "Bunbury Cup" competition at Chiswick on July 17 by the C.T.O., who thus obtained their revenge for the defeat inflicted upon them in the corresponding match last year.

A notable achievement is the appearance in the final of the London Area Rink Competition of an L.T.S. team skippered by Mr. R. Cleland.

* * * *

Tennis Competition.

Steady progress is being maintained in the competition for the "Agnes Cox" Cup between ladies' teams.

In the second round :—

Wimbledon beat A.N. Section.
Tottenham beat Chiswick.
Avenue beat Ravensbourne.
Clerkenwell beat A.R. 3.
A.R. 4 beat Trunks.

In the third round :—

A.R. 4 beat Wimbledon.

* * * *

"Night Optimists."

This Concert Party, organised by the Night Staff, gave another very successful performance on July 1 at the Surrey Masonic Hall. The G.P.O. (South) Staff are to be congratulated upon the excellence of the talent displayed, and give promise of becoming entertainers of high order.

* * * *

Promotions.

To Assistant Supervisor Class II :—

Miss MABEL E. SMITH, of Royal.
„ N. HAMER, of Museum.
„ LILIAN M. BANKS, of Sloane.
„ M. S. PROSSER, of Rodney.
„ M. C. MOONEY, of Finchley.
„ E. G. HUTCHINGS, of Clerkenwell.
„ F. K. E. WATERHOUSE, of Hampstead.
„ K. BRAIN, of Kingston.
„ E. C. WARNER, of Maida Vale.
„ L. A. WILKINS, of Royal.
„ M. L. HARRIOTT, of Paddington.
Miss M. CONNOR, of Clerkenwell.
„ F. J. KEEL, of Gerrard.
„ G. M. TURNER, of London Wall.
„ S. E. CHAPLIN, of Tottenham.
„ L. A. BOSTOCK, of Park.
„ N. HUCKELL, of Riverside.
„ E. M. SYRETT, of Central.
„ A. PRICE, of Langham.
„ E. M. GOODING, of Kensington.
„ L. JENNINGS, of Avenue.
„ G. E. LEWINGTON, of Museum.

Miss E. D. EVANS, promoted to Assistant Supervisor Class I should read :—

Miss E. D. STEVENS, promoted to Assistant Supervisor Class I.

THE

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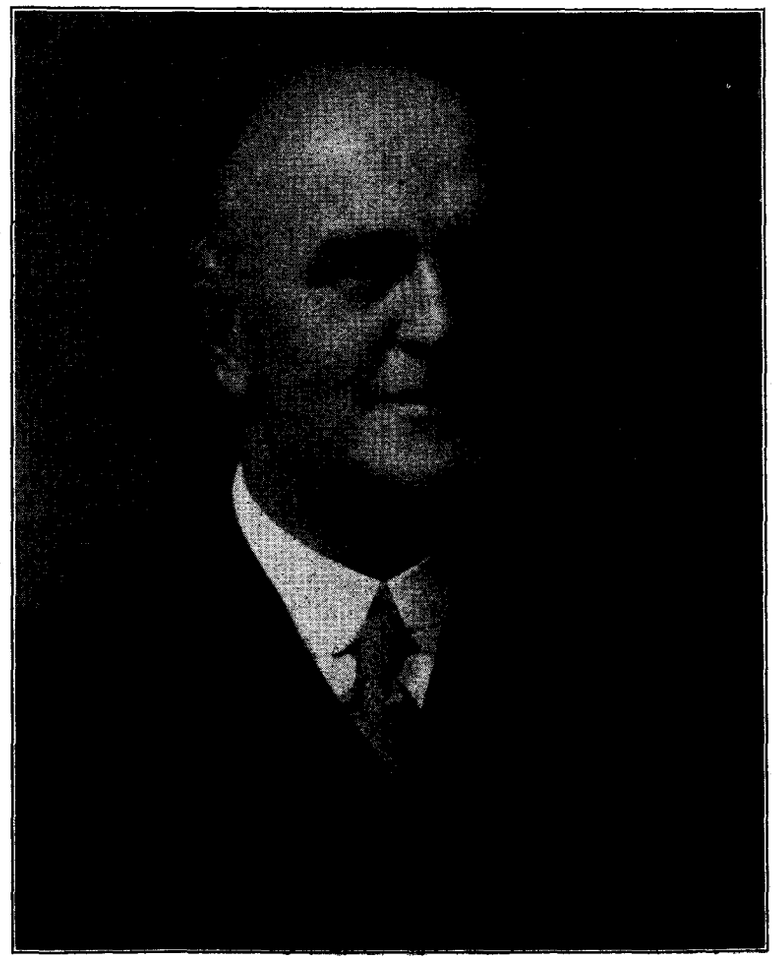
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

LVI.

MR. E. GOMERSALL.

MR. E. GOMERSALL, who was recently appointed Deputy Superintending Engineer for the Metropolitan District, is 52 years of age. He entered the Post Office service at Leeds as a Telegraphist in the Spring of 1893, and he transferred to the Engineering Department three years later. In 1898 he came to Headquarters, and his subsequent advancement was phenomenal. By 1909 he had become an Assistant Superintending Engineer and promotion to Superintending Engineer came to him in 1915.



Whether Mr. Gomersall is a typical Yorkshireman we do not know, but at all events he possesses in full measure the grit, determination and hard-headedness usually associated with the county of broad acres. Mr. Gomersall has remarkable force of personality and his keenness on his job is almost a byword in engineering circles. Since 1915 Mr. Gomersall has been in charge of the North Midland District, and for his services during the war he received the honour of appointment as an Officer of the Order of the British Empire. Last Spring he was brought to London as Deputy Superintending Engineer.

INTERNATIONAL TELECOMMUNICATIONS AND FOREIGN LANGUAGES.

BY J. J. T.

A time may be coming when business and political intercourse will make some one or two languages understood by the educated all the world over.—"Daily Telegraph."

FOR well over half a century international telegraphy has been an everyday fact, little realised by any but those sections of the State and private activities directly interested in Anglo-foreign trade and finance. On the other hand, the very rapid strides which international telephony has made during the latter part of the present decade, with that very personal touch which telephony alone can give to the individual public, and the much wider and more aggresive publicity now made possible by the modern press, have quickened the sense of interest and wonder in long-distance telephony, and that, over more extensive areas than was possible during the similar stage of telegraph development: let us say during the first twenty years of Anglo-European telegraphy with its then restricted Continental ramifications.

The language difficulty to-day in all matters of international communications has, therefore, without doubt been better realised since the rapid extension of international telephones than had hitherto been the case with international telegraphy, and by so much the latter section of telecommunication has benefited. It is feared, however, that the extent to which a knowledge of foreign languages is absolutely necessary for the efficient administration, supervision, and operating of international telegraph circuits has not always and everywhere been acknowledged.

From time to time there have been very serious efforts in the direction of inventing an artificial language for international use quite apart from the needs of telephony or telegraphy, the Volapuk and Esperanto systems, for example, the former now seldom mentioned.

In 1911 there was founded in Paris *L'Association Espérantiste du Personnel des P.T.T. de France et des Colonies*, which, up to 1914, was the most important professional Esperantist association in the world. The war cut short its activities, but these were revived in 1920, and in 1921 the high patronage of M. le Sous-Secrétaire d'Etat des P.T.T. was accorded to this worthy organisation, and Esperanto was subsequently formally acknowledged as an auxiliary language for inland use throughout France, by the Telegraph and Telephone Administration of that country.

Esperanto has since been added to the list of authorised languages for public use in international telegrams.

This artificial tongue appears to have made very considerable progress. Certainly in postal, telegraph, and telephone circles it has enthusiastic supporters among the staffs in many parts of the world.

It has not yet taken much hold in this country inside the Service, but quite recently some 70 members of the Lancashire and Cheshire Esperanto Federation being present at Evensong in Waddington parish church, near Clitheroe, the service was conducted in Esperanto, the lesson being also read in that tongue by a youngster in his early teens! This incident is cited to suggest that, despite its artificial genesis, there would appear to be no inconsiderable pliability about the system. A well-attended international Esperanto conference was recently held in Antwerp.

Such a language, however, even its promoters do not wish to utilise save as an *aid* to international converse, for Petro Filliatre, its energetic and most enthusiastic protagonist, in *Le Lien des P.T.T.*, the quarterly organ of the Post and Telecommunications Esperantistes, writes thus: "The aim of Esperantists is *not* to supplant national languages. Esperanto even becomes an unsuspected aid in their study. By the side of one's mother tongue it becomes an auxiliary language, an international *liaison*. Esperanto comes to abolish that present monstrosity of two civilised men finding themselves face to face without the power to understand one another."

Praiseworthy as is both the motive and the aim of the Esperantists, the restricted extent of the claim for its use by the sponsers themselves of this most widely acknowledged of artificial languages, for the moment, at any rate, it must be reluctantly admitted that the need for a knowledge of two or even three European languages still remains a *sine qua non* in the most efficient administration, supervision, and operation of the world-wide telecommunications.

Useful work has been done by internationally appointed sub-committees by the compilation, in parallel columns, of international vocabularies of engineering, technical, and operative terms in three or more languages.

There has also been recently published a most comprehensive international dictionary of engineering terms giving the equivalents in six languages for every conceivable machine, engine, &c., and every single screw, bolt, cam, pinion, &c. All these materially help in many ways but such methods cannot be considered as satisfactory for any but very elementary needs.

One, of course, hears the insular mind vocalising "Why don't they all speak English?" Insular minds are not, however, confined to those living on an island, for it is reported that at the last international conference held in Washington not half the American delegates could speak any language but their own, while not so very long ago there was some hubbub in a certain European capital because some of the local firms were selecting salesmen with a knowledge of foreign tongues instead of "compelling their customers to speak the language of the country." It was even considered to be a degradation of one's mother tongue thus to set it aside for mere commercialism!

These side-lights upon the matter of languages give proof, if such were needed, of the sensitiveness of the earth's peoples on this subject, and show how far off are the nations from agreeing to the substitution of any one language for that of their own.

On the other hand there are indications even in unexpected quarters of a desire to conform to modern conditions as regards this matter, for it was nothing less than a revolution for Turkey to agree to the substitution of Roman in the place of Arabic characters for use with the Turkish language.

The writer makes no claim to a profound knowledge of any language, not even his own, but one thing that has impressed itself upon his experience and mind is the frequent failure of one national to catch the *spirit* of another's language. So much has one seen of mere dictionary translation that the illustration from one's own school-days is scarcely an exaggeration, where a young hopeful in all sincerity translated "School Board" into French as "*planche d'école*!"

Truly it is the literalist who causes all the trouble and that in other spheres than those theological.

Even a public school and university training does not apparently correct this defect, for was it not in the diary of a now deceased statesman and Prime Minister that one read: "Had a rather interesting luncheon to-day with Delcasse, Cambon, &c." Then writing of one of the most prominent members of his own Cabinet then present, the diarist proceeds: "X . . . was very eloquent. In the very worst French anyone ever heard. *S'ils savent que nous sommes gens qu'ils peuvent conter sur*, was one of his grand efforts!"

Quite naturally it is not easy to absorb the *spirit* of another tongue, and here, too, in literary circles, let me say we are occasionally shown how *not* to do it. Thus in a translation from French into English in a work the published price of which is nearly £1, the phrase, "*Mais les lycées ne suffisent pas*," could well have been done into our mother tongue almost as it stood, but was turned into, "But lyceums were too little."

Sometimes it is extremely difficult to catch the exact shade of meaning of a foreign word, and a personal experience on an official pre-war visit abroad, when the word "discreetly" used to an English colleague, was interpreted as "secretly" by the representative of another country who overheard it, is ever-present with me, reminding me of a very bad quarter of an hour which, however, ended happily.

If individuals blunder over translations, entire nations will sometimes fail to check their errors. Witness how glibly the phrase, "the psychological moment" has become current. It is over fifty years old and yet it was left to the compilers of the Oxford Dictionary, not so very long ago, to point out that the phrase as now used simply means nothing! The Germans used *das psychologische moment* in 1870 with moment, as will be seen, in its neuter form. It then means *momentum*! The phrase was translated by the French into *le moment psychologique*, and in that form crossed the Channel, where it was accepted at its face value but actually as what Professor George Gordon now tells us is a "vulgar error."

Language difficulties are typical of the varieties of view-points which may present themselves to the various nationals, even on subjects upon which all concerned are anxious to agree. In the case of the international vocabulary of telegraphic and telephonic terms, already mentioned, it is interesting to note how such points of view may differ even when naming the apparatus, machinery, operations, &c., within the common daily knowledge and in the daily use of all concerned. Thus, "Filament battery," becomes in French "Batterie de chauffage," and in German "Heizfaden batterie," the two latter accentuating the heating feature and the British stressing that of the thread. Take again "Manhole." Here the German engineer accepts the English view and responds with "Mannloch," while our French friends prefer "chambre d'épissurage (splicing chamber), certainly a more descriptive term. "Monkey wrench," says the Britisher, against which in one long word our German colleague replies "Schraubenschlussel" (screw-key). The French engineer attempts no translation other than "English key" (clé anglaise) and leaves it at that!

Will there ever come a time when a single language shall be understood throughout the world? Will the talking film lead to the Americanisation of European and Fijian speech, and will every telegraph and telephone official everywhere know with a certainty that a "trouble shooter" only carries a linesman's kit and is perfectly harmless?

SLOANE AUTOMATIC EXCHANGE.

THE Sloane Automatic Exchange situated in Sedding Street off Sloane Square, is the third Automatic Telephone Exchange to be cut into service by the General Post Office in the London area and has been manufactured and installed for the General Post Office by the Standard Telephones and Cables Limited. This Company is engaged at the present time in the installation of further automatic exchanges in the London area at Langham (which will be known as Welbeck Exchange), Temple Bar, Bermondsey, and Fulham, and these exchanges will form part of the G.P.O. scheme for transforming the London Telephone area to Automatic Working.

In general, the automatic exchange equipment at Sloane is similar to those which have already been installed and put into operation during the last few months at Holborn and Bishopsgate. It has been arranged to cater for an ultimate capacity of 10,000 lines and is at present equipped for 8,400 subscribers; that is, it is capable of being extended by a further group of 1,600 lines when the necessity arises.

The equipment is installed in a typical Post Office building which was utilised to accommodate Sloane Manual Exchange prior to the transfer to Automatic working on July 28.

The automatic plant is arranged on three floors, the first accommodating the Main Distribution Frame, to which are connected the underground cables carrying the lines to the subscribers and the junction lines to other exchanges. This frame also carries the necessary protective equipment to ensure against damage to the plant if by any chance high voltages or heavy currents should be impressed upon any of the incoming lines. On the same floor is another large frame known as the Intermediate Distribution Frame, which serves as a convenient method of cross-connecting the subscribers lines and junctions to the various parts of the automatic plant.

The Test Desk and Power Plant are also situated on the first floor, the former to enable tests to be made of the external cables and the exchange equipment, and the latter as its name implies, provides the necessary electrical power for operating the automatic switches and providing the current required for the proper level of speech transmission.

The major portion of the Automatic Switching apparatus itself is situated on the second floor, but as there is insufficient room on this floor to accommodate all the automatic gear, it was found necessary to erect part of it on the first floor. A further part of the equipment is installed on the third floor and this is known as the Auto-Manual portion and consists of the so-called "A" and "B" switchboards together with the supervisor's desk. The "A" switchboard is for the purpose of handling calls for special services such as calls from Coin Box Stations, complaints, queries and assistance generally to the Sloane subscribers. The "B" switchboard handle incoming calls from manual exchanges, and the operators at this board complete the call by operating press-button keys corresponding to the four digits of the wanted number. This operates the automatic machinery in the Sloane exchange, and extends the calling subscriber to the Sloane number required.

With regard to the Automatic equipment itself, each subscriber's line on the exchange is allotted a special switch called the line switch individual to that line and this switch operates when the subscriber lifts his receiver and connects his telephone to the main automatic equipment and he is advised by hearing the characteristic dial tone that the machinery is ready to receive the electrical impulses which will be sent out when the exchange letters and required number have been dialled.

A special feature of the automatic switching equipment which is being provided for the exchanges in the London area enables the impulses from the dial for the three digits representing the first three letters of the exchange name, to be translated to any combination of from one to six figures as may be determined by the engineers of the General Post Office when designing the exchange. Calls for Sloane Exchange or for other exhanges which are in great demand by the Sloane subscribers are given a simple one or two-digit translation, while those exchanges on which there is not very heavy traffic are allotted the more complicated translations which enable the calls to be piloted through the tandem exchange (which acts as a routing centre for distant exchanges) and from this tandem centre through to the required automatic or manual exchange in the London area. In the case of a call from one Sloane subscriber to another subscriber on the same exchange, the Register Translator, as this special device is called, routes the call to switches in the Sloane building specially allocated to handle this local traffic and when the called party has been selected by these switches, which operate in accordance with the four digits of the required number, the telephone bell of the called party is rung and a signal passed back to the caller indicating this fact.

For calls from a Sloane subscriber to a subscriber on another automatic exchange, the signals from the dial are routed to the Register Translator where they are given a different translation from that used when a local subscriber is wanted, and the call is routed direct or via the tandem exchange to a set of switches situated in the distant exchange. Here it is pioted to the required telephone which is rung and, as in the previous case, the caller is notified by the usual ring-back tone. If a number on a manual exchange is wanted, the Sloane subscriber proceeds in a similar manner to that described above and the call is routed to the distant exchange, where it is received on a manual position, the required number being displayed by a set of lamps in front of an operator, who has merely to complete the call as if it were from a manual exchange.

Calls to exchanges outside the London area must be handled, as at present, through the Toll or Trunk exchanges. For such calls, all the subscriber on Sloane Automatic Exchange will have to do is to dial the first three letters T-O-L for "Toll" or T-R-U for "Trunk," and he is immediatley automatically put into communication with an operator at the Toll or Trunk Exchange, who will deal with his call. In a similar way, a subscriber can transmit by telephone by dialling T-E-L, when the operator dealing with telegrams will immediately give him the desired service.

If any subscriber on an automatic exchange experiences difficulty with a call and requires assistance to complete it, he can obtain help at once by dialling the digit "O" which connects him to one of the operators on the "A" switchboard in his own exchange.

HELP!

READING the American magazine *Telephone Review* recently, I found an inspiring article giving details of a competition between the different sections—plant, operating, commercial, &c.,—in and around New York, to see which section could obtain the most new orders for extension telephones. There was no prize, apparently, but the whole thing was a labour of love; it was not merely an individual effort, but a section effort, just a desire on the part of everyone to help the service with which they were connected. The results were wonderful and showed with what enthusiasm everyone had entered into the competition. There was evidently none of the "It's not my job," or "What do I get out of it" attitude, but a genuine desire to help to "boost" the section record and the service as a whole.

The result of a two-weeks effort in Manhattan, which is central New York, may be summarised as follows:—

ORDERS OBTAINED FOR EXTENSION TELEPHONES.

Commercial.	*Traffic.*	*Plant.*	*Other Departments.*	
7,213	3,190	3,113	183	13,699

Over Manhattan and two other adjacent areas a grand total of 27,852 additional extensions was obtained! More than half our total net gain in a year in London. Surprising and suggestive, is it not?

How many orders are sent in to the London Contract Branch in a year by the staff of other departments or sections? The total is insignificant, unfortunately. How many of the staff also through whose hands a ceasement passes give a thought as to how the subscriber may be induced to retain the station, and do their part to prevent the waste due to recovery?

You Mr. Traffic Man, and you Miss Operator, you Mr. Engineer, and Mr. Fitter, you Mr. Clerical Officer, and the rest of you, how many orders did you send along last year, I wonder?

Opportunities occur in the course of your duties when it would be easy to suggest an extension telephone, or where you see that an extension would help the subscriber and the Service at the same time.

You, no doubt, feel when you leave your job, whatever it may be, after a strenuous day's work, that you have done enough and want to forget business. Perfectly natural;—we all of us have that feeling, but that same old business has a way of obtruding itself. On the tennis court, or golf links, or river, or football ground, or whatever your hobby or pastime, you can't wholly eliminate the telephone from your actions and thoughts, can you? You hear people talking in the train or tram, or on the playing fields. You know people who make a large use of the kiosks and call offices, or need I say, of their neighbours' telephones, and get only half a service and prove a nuisance to their friends. You see and probably speak every day to people who ought to have telephone service and have not. You know of a case of illness where a telephone would be a Godsend, and nobody has thought of it. You know of a tradesman with whom you or someone you know deals, who has no telephone service, or only an inadequate one. You see cases where there is delay on a line because the person called has to be brought to the telephone; you come across cases where the housewife has to dash up or downstairs at the risk of wind and limb to answer or make a call, and so on.

Without having any competition, would it be too much to ask you to suggest to these, or any of them, that a telephone or an extension would help them in business or at home—to suggest to a tradesman that he would relieve the strain on his service and increase the efficiency of his business by having a P.B.X.—to suggest to an existing subscriber how handy an extension telephone would be—to tell people how wonderfully cheap the service is when its advantages are considered—how favourable its price is when compared with pre-War costs, and so on.

"But I don't know the rates, and wouldn't know how to get an agreement signed," you say. Well, never mind—there are others whose job it is to know these things, and a hint to the Contract Manager is all that is needed. He will see to the rest.

There is another aspect of the question which may not have struck you, but it will interest you, I am sure. This old country of ours is passing through a spell of bad trade. Many people are out of employment and youngsters are growing up daily and are clamouring for jobs. Well, you can help them. An order for telephone service means additional employment for people both outside and inside the Service. The more orders manufacturers get for telephone material the more employment they can give, and every telephone added to the service means more work and more staff in the Contract, Clerical, Engineering, and Traffic Sections.

Will you turn the matter over in your mind, and, as opportunity offers, help? It is not suggested that you should emulate the boy scouts and do one such good deed every day. If each member of the staff were to obtain, or at any rate influence the obtaining of, one telephone a year which would not otherwise come to the Department, think what it would mean—say 15,000 additional telephones in London alone in a year, and twice as many in the Provinces!!

W. F. T.

DEATH OF MR. VINCENT ALSOP.

WE deeply regret to record the passing of Vincent Alsop, who died of pneumonia on Aug. 19, on the eve of his retirement from a position in the service which he had filled so long with such ability and distinction.

Mr. Alsop was born in Devonshire in 1868 and educated at Newton Abbot College and in Germany. He was articled to Mr. Robert Baker of Newton Abbot and admitted a solicitor in 1891. In 1894 he entered the Solicitors' Department of the National Telephone Company and was appointed Assistant Solicitor in 1900. On the transfer of the Company's system to the Post Office in 1911 he entered the Solicitor's Office, retaining the title of Assistant Solicitor. Mr. Alsop's work was chiefly concerned with the telephone side of Post Office work, of which he had unique knowledge and experience. He was one of the most accessible and helpful of officers, and was esteemed and beloved by all who came in touch with him. His colleagues in the Solicitors' Department, in particular, will feel his loss deeply. His many amiable qualities had gained their sincere affection, and he was especially popular with the junior members of the staff, whom he invariably treated with kindness and consideration.

Members of the ex-National Company's staff will never forget his untiring work on their behalf in connexion with the Staff Transfer Association, and as a witness before the Select Committee of 1905. The value to that staff of his activities during those years was incalculable.

The interment, which took place at Fulham New Cemetery, North Sheen, on the 23rd, was attended by Mr. R. W. Woods, Solicitor to the Post Office; Messrs. F. E. Waters and G. S. Stow (representing the Secretary's Office); Messrs. T. E. Tutton and J. P. Leckenby (Investigation Branch); and Messrs. Bostock and Evans, representing the London Telephone Service. Flowers were sent by the Solicitors' Office, the Telephone Branch of the Secretary's Office, the London Telephone Service, and by former colleagues of Mr. Alsop now in the London Telephone Service.

TELEGRAPHIC MEMORABILIA.

ARGENTINA.—Reuter's Trade Service at Buenos Aires informs us that the Rio de la Plata Telephone & Telegraph Co., of Buenos Aires, is about to extend its wireless telephone system to Santa Fé and Paraná, in Argentina, and to Montevideo, in Uruguay. The Buenos Aires station transmits on a 10,000-metre wave and receives on a wave of 17,629 metres, while the Rosario station is adjusted reversely. A recent test of high-frequency telephone communication between Buenos Aires and Rosario is said to have given highly successful results.

AUSTRALIA.—The Melbourne *Argus* reports that reserved judgment has been delivered in the action brought by Marconi's Wireless Telegraph Co., Ltd., and Amalgamated Wireless (Australasia), Ltd., against David Jones, Ltd., alleging infringement of a Commonwealth patent covering grid leak rectification. The defendants attacked the validity of the patent. The invention was patented by Dr. Irving Langmuir in the United States on Oct. 29, 1913. The Marconi Co. became assignees of Langmuir on Nov. 21, 1919, and in the following year they applied for the grant of Commonwealth letters patent; the patent was granted and dated as of Oct. 29, 1913. The matter was one of the test cases which, under the terms of the recent statutory agreement between the Commonwealth Government and Amalgamated Wireless, Ltd., that company is required to prosecute to determine the validity of a patent. The judge held that the granting of the patent by the Commonwealth to the Marconi Co., as assignees of Langmuir in November, 1923, was invalid, and that the plaintiffs had no right over the invention in the Commonwealth. He ordered the plaintiffs to pay the costs occasioned by the reference to the court.

The Australian Prime Minister, announcing the Commonwealth Government's future policy towards broadcasting, said that it was contemplated that the Government would take over the plant and equipment of all privately-owned "A" class stations, and that provision would be made for the broadcasting of complete programmes of news and entertainment by private contractors after tender, says *The Times*. The contractors would be paid a percentage on each licence fee. The Postmaster-General would be given power to ensure the maintenance of the standard of programmes by withholding part of the licence fees payable, or by cancelling the contract. Investigation and research work would be financed from the balance of licence fees after paying the contractors. An advisory committee would assist the Postmaster-General in all matters requiring expert technical consideration and in the supervision of programmes. Practically all existing broadcasting licences expire next year, when, it is assumed, the new system will become operative.

BELGIUM.—Reuter's Agency at Superior, Wisconsin, reports that Mr. Coolidge has appointed three American representatives to the International Telegraph Conference which is to meet in Brussels on Sept. 10, namely, Mr. C. H. Shedd, of Messrs. Swift & Co., Chicago, Mr. J. Goldhammer, vice-president of the Commercial Cable Co., and the American Minister in Stockholm. The United States, though not a member of the International Telegraph Union, was invited to send representatives to the conference.

CANADA.—Wireless broadcast receiving equipment for passengers will be one of the features of the *Lady Nelson*, the twin-screw steamer which was launched at Birkenhead recently, for the Canadian National Steamships' Canada-West Indies service. Leads will be provided in all public rooms of the ship, and it will be possible to plug in loud-speakers as desired. Similar equipment is to be installed in four more ships which are being built at Birkenhead for the Canada-West Indies service.

A Canadian Commission is to be appointed to inquire into the question of broadcasting. The Commission will visit Great Britain and France to inquire into the working of the national system.

CEYLON.—Amongst Government efforts that are being made to encourage the use of portable wireless sets is the removal of the import duty on privately-owned sets, so that any person may now import a set and possess it for six months without a licence.

CENTRAL AMERICA.—From San Salvador, through Reuter's Trade Agency, we learn that an agreement has been concluded between the three Latin-American Governments of Honduras, Mexico and El Salvador for the establishment of an international telegraph service. The Honduras National Congress has already approved of the measure, and the two other States are expected to record their sanction without delay.

CZECHO-SLOVAKIA.—From official sources we learn the following interesting items regarding tele-communication among the Czechs:—

In 1927 both telegraph and telephone communication was further improved. The telephone department realised a further portion of its programme by the completion of the trunk line between Dresden and Prague. This section was opened in November last by *direct* conversations for the first time with Paris, Copenhagen, Stockholm and The Hague. On the Prague to Budapest section the cable was laid from Jihlava *via* Brno to Bratislava. The year's programme was completed with the laying of 467 kilometres of trunk cable. Arrangements have also been made for extending the trunk lines to meet the proposed Polish lines, connexion to be made in the direction of Brno, Olomouc, and the Polish frontier. Further linking has been arranged for with the German network in the direction of Prague-Plzen-Nuremburg, and in that of Mistek-Cosel. Inter-urban communication in the individual provinces of Czecho-Slovakia has been extended, so that all the more important towns will be linked with the important long-distance cables. At Prague an automatic telephone exchange for 20,000 connexions, at Smichov one for 6,000, and at Vinohrady one also for 6,000 connexions, have been completed. At Zizkov, a new inter-urban telephone exchange for 380 inter-urban lines has been erected. Wireless transmitting stations have been extended, and several added. In respect of broadcasting, an arrangement has been introduced which enables the same programme to be sent out from Prague, Brno and Bratislava.

World Radio adds the following regarding broadcasting conditions in that country:—

In Czecho-Slovakia, where any radio subscriber can give a month's notice at the beginning of any month to terminate his contract, there were recently 226,748 subscribers, of whom 146,070 were in the Prague postal district. Brünn (Brno) came next with 41,790, and Kosnice (Kaschau) was lowest with 3,721. In Austria subscribers can only give notice just before the end of the year. People terminate contracts even when they are only going away for holidays, knowing that they can resume when they like.

DOMINICAN REPUBLIC.—Reuter's Trade Service at Santo Domingo reports that a powerful radio station (call letters HIA-HIZ) has been erected in Santo Domingo, the capital of the Republic, at the mouth of the Ozama River. The station is able to broadcast on a wavelength of 450 metres and preliminary tests have shown that it can be heard in South America and Canada as well as at nearer places.

ESTHONIA.—The *Commercial and Industrial Gazette*, Moscow, reports that the Weak Current Trust has signed a contract for the building of a wireless station at Reval (Esthonia) with a power of 5 kilowatts.

FALKLAND ISLANDS.—The Southern Whaling & Sealing Co., Ltd., is making important additions to the existing Marconi installations of its fleet for the coming season. During the last two seasons good use was made by the whale catchers of the wireless telephones with which they are fitted. The sets are operated by the gunners, and enable the individual ships of the fleet to keep in touch with each other and with their headquarters at South Georgia and the South Shetlands. The *Southern Empress* is the new floating factory ship for the South Shetlands, and will be accompanied by three whale catchers: they will be equipped with telephone sets and direction finders, for fog or snowstorms normally cause considerable delay in whale catching, and there is always a fear of losing the "mother" ship. The *Southern King* is attached to the South Georgia headquarters, carrying out the materials, stores and men for the season, and returning with oil. At the headquarters, a telephone set similar in power to that carried by the whale catchers is installed, but with an additional device that enables it to be used as a telegraph transmitter on the normal wavelength for ships. Four whale catchers are attached to headquarters, each of which carries a wireless telephone. The *Southern King* and *Southern Empress* carry more equipment than the rest of the fleet, because of their different duties; in addition to the telephone equipment, short-wave transmitters are installed to keep the two ships in communication with British Post Office stations from the Antarctic, thus placing them in practically direct communication with their owners. Quenched-spark transmitters for working with other ships and with local coastal stations during the voyage are installed, and also direction-finders. Advantage has been taken of the high amplification factor of screened-grid valves to incorporate two of them in each direction-finder. The result has been to increase the selectivity and sensitivity of the amplifier, with which a fixed-frame aerial system is used.

FRANCE.—The Compagnie Française des Câbles Télégraphiques is paying a dividend of 43.17 fr. per ordinary share out of net profits of 6,161,000 fr. for 1927.

The Compagnie Générale de Télégraphie sans Fil reports net profits of 9,209,000 fr. for 1927. The dividends are 50 fr. per "B" and 25 fr. per "A" share.

The annual French Radio Exhibition is to be held in the Grand Palais, Paris, from Oct. 25 to Nov. 4 next as part of the Motor Cycle and Cycle Show. The exhibitors will be limited to members of the Syndicat Professionel des Industries Radioélectriques.

An electrical depth-sounding instrument which indicates the depth of the sea, and records, by means of different coloured lights, whether the vessel is passing over rocky or sandy ground, was included in the apparatus carried by the French trawler *Wagram* which arrived at Fleetwood last week.

GERMANY.—The *Wireless Trader* says that Germany's exports of radio apparatus during 1927 amounted to £2,099,000, as compared with £1,580,000 in 1926. This is the highest figure yet reached by any country and puts Germany in front of the United States in this trade.

The number of subscribers to the German broadcasting service increased during the second quarter of the year by 49,576; the total on July 1 was 2,284,248.

The Exchange Telegraph Agency reports that, due to the frequent disturbances in the Prussian diet, "a microphone with 75,000 times intensifying power is now being installed before the President's desk, and is connected with a loudspeaker, which, it is hoped, will enable the President's ruling to be heard above the greatest uproar.

A similar contrivance is being provided at the desk from which orations are delivered, so that it will not be possible to howl down the member who has the floor."

GREAT BRITAIN.—*Parliamentary items.*—Mr. Kelly, on July 24, asked the Postmaster-General if he would state why the Engineering Department of the Post Office had suggested to manufacturers of telephone cable in Liverpool and elsewhere that they should temporarily close down this section of their factories and disband their staffs. Sir W. Mitchell-Thomson said that no such suggestion had been made by the Post Office. It was, however, true that development would be, for the present, more in the direction of local lines than of main cables, and consequently the demand for those cables would be smaller.

A propos of this is the report of the *Liverpool Post*, which states that an official of the British Insulated Cables, Ltd., Prescot, stated recently that unless that company could obtain a big increase of foreign orders the drastic cuts in the P.O. programme would mean that 2,000 workers would be out of employment in Prescot alone. "The telephone cable-making industry throughout the country will be seriously affected," he said, "and will result in about 20,000 being thrown out."

Yet another phase of this question is referred to in the second report of the Selective Committee on Estimates to the House of Commons, to the effect that the total value of the stores purchased by the British Post Office is at present about £5,000,000 per annum. To give preference to British manufacturers, foreign tenders are *not* invited, except when the articles required cannot be obtained at a reasonable price in this country. The report states that the manufacture of cables is, with the exception of two firms, in the hands of the Cable Manufacturers' Association, from whom the Post Office buys about 80% of its total requirements, which amount to £1,000,000 per annum. The cables could be obtained from foreign manufacturers at considerably lower prices. The Committee are of opinion that the Post Office should have a free hand to accept tenders from abroad in cases where it is unable to obtain satisfactory evidence that the prices quoted by British manufacturers are not excessive.

Further references to both the telegraph and telephone services are made in Appendix I of the same report, comparing the business done by the Post Office in 1913-14 with the years 1924-25, 1925-26 and 1926-27, showing the following financial results after charging interest on capital and allowing for depreciation of plant, buildings, &c. :—

Telegraph Service.—

Deficit for the year 1913-14	£1,211,742
Deficit for the year 1926-27	1,436,690
Estimated deficit for the year 1927-28 ...	1,519,000

Telephone Service.—

Surplus for the year 1913-14	239,111
Surplus for the year 1926-27	284,074
Estimated surplus for the year 1927-28 ...	200,000

The telephone service is developing rapidly: the capital expended, which was about £29,600,000 in 1914, had increased to £99,700,000 by 1927. The surplus for 1913-14, after providing for interest and depreciation, was £239,111, and for 1926-27 £284,000, and the estimated surplus for 1927-28 was stated to be £200,000, or one-fifth of 1% on the capital expended. The Committee notes that according to the statement of the Postmaster-General in the House on June 12, the figure for 1927-28 is now estimated to be £120,000 only, or less than one-eighth of 1% on the capital. Of the surplus of £284,000 in 1926-27, £103,802 came from the Continental telephone services. Over 1,000 rural exchanges have been put up in the last five years. A proportion of the rural exchanges is unremunerative, and the estimated total net loss on this class of business is £40,000 a year. The policy on which the telephone service is being administered is to run it as near as possible to cost price; so long as this policy is continued, the Committee considers that caution should be exercised to avoid the small surplus shown by the home telephone service being converted into a loss, and recommends that this point should be carefully kept in view.

As the issue of the Hardman Lever Report on Inland Telegraphs was so very recent, the Committee naturally does not comment on the telegraph service.

Telephone capital has been provided by loans, but the necessity of obtaining a vote for postal and telegraph buildings results in the relegation of their commencement into the worst months of the year; if all such buildings could be charged on the loan account, economy would result. The Committee is of the opinion that all capital required by the Post Office should be obtained on a single principle, and it recommends that the same course should be adopted for postal and telegraph capital as for telephone capital.

On Aug. 3, Mr. W. Baker raised the question of the report of the Imperial Wireless and Cable Conference, and a number of attacks were made upon the interests concerned.

Sir John Gilmour, replying for the Government, said that whatever might be the success of the beam wireless, it had not attained either that measure of continuity of service or of secrecy which was essential to the Empire as a whole. The report came before the House after very long considerations of the problem by a body consisting of men representing a great variety of views, so far as the Dominions were concerned, some of them having to make a measure of sacrifice to attain a common purpose, and the Government having to make also the major sacrifice in order to obtain unity of purpose. This was an Empire bargain, in which they all had to take their common share and common responsibility. In so far as any sacrifice was made, it was not a sacrifice without ultimate repayment, in attaining, as he believed they would attain under the scheme, a measure of security, of secrecy, and of improvement in the commercial enterprise between the various parts of the Empire. The bargain that had been driven was a good one for the State. What were needed in the interests of the public were cheapness and efficiency. It was an established fact that, at the present time, wireless would not wholly supersede cables for all classes of traffic, and for some years to come cables would be necessary. The greatest use and benefit would be derived, in the opinion of the Conference, from the combination of the wireless and cable services, acting as a complement one to the other. The Government had decided to accept the report and to put its recommendations into effect. In doing so it felt that it was acting in the best interests of the public generally, and of the users of the services in particular. It was proposed to enter forthwith into negotiations with the companies concerned with a view to drawing up a formal agreement on the lines recommended by the Conference.

Written Replies.—In a written reply to a question in the House of Commons, Sir William Mitchell-Thomson, Postmaster-General, stated that on the basis of current earnings, the gross receipts of the Post Office from the Imperial "beam" wireless services might be put at about £470,000 a year, and the credit balance before charging depreciation or interest on capital, at about £212,000 a year. The corresponding figures for the Imperial cables were about £143,000 and about £3,000. The Pacific Cable Board was not within his sphere of responsibility, but he understood that in the year ended March 31 last the gross receipts of the Pacific cables were £397,730 and the credit balance (before deductions for interest, capital repayment and allocation to reserve) amounted to £129,852.

In similar manner Sir William answered a question regarding telephone boxes, stating that the number of telephone call boxes in December, 1926, was 21,493, while in March, 1928, they totalled 24,054. The receipts from call offices for the year ended December, 1926, was £881,100, the amount received for the year ended March, 1928, being £953,400.

The two following items were also dealt with in the House of Commons :—

A proposal by the Scottish Board of Health to have wireless telephone apparatus provided for communication between Foula and the mainland of Zetland for medical purposes is not being proceeded with at present owing to the expense involved.

The Postmaster-General has installed experimental short-range wireless telephone apparatus between islands in the Channel Island group for the purpose of testing its efficiency for Post Office purposes.

The Postmaster-General also announced through the usual official channels and the Press, that in future any "Reply Paid" telegram from Great Britain or Northern Ireland to an address in the Irish Free State will be charged an additional 6*d.* for the reply. The minimum for a prepaid reply will thus be 1*s.* 6*d.* for 12 words, and the maximum 4*s.* 6*d.* for 48 words.

The Board of Trade has referred to the Standing Committee under the Merchandise Marks Act, 1926, an application for an Order-in-Council requiring the marking with an indication of origin of imported wireless receiving sets and components. The date of the public inquiry will be announced later, and communications regarding it should be addressed to the Secretary, Mr. E. W. Reardon, Board of Trade, Great George Street, S.W.1, not later than Aug. 24.

To Our Advertisers.—The following tenders are open until the dates specified. Where not otherwise stated, application should be made to the Department of Overseas Trade, London, quoting references where such are given :—

Ministry of Public Works, Cairo, October 1.—Supply and delivery of 250 ornamental electric lamp standards to support electric public clocks, with necessary accessories. (Reference B.X. 4635.)

Postmaster-General's Department, Melbourne, Oct. 2.—Supply of switchboard cords (schedule C. 349). (Reference B.X. 4621.)

Egyptian Posts and Telegraphs, Oct. 3.—Telephone trunk cable from Cairo to Alexandria. Specifications from Chief Inspecting Engineer, Queen Anne's Chambers, Westminster, London, S.W.1.

Postmaster-General's Department, Melbourne, Oct. 16.—Register coils and mounting plates (contract S.28/543; schedule C. 356). (Reference B.X. 4639.)

New Zealand Public Works Department, Oct. 30. Protective relay system. (Reference B.X. 4573.)

Postmaster-General's Department, Melbourne, Nov. 6.—Automatic telephone switching equipment (schedule C. 353). (Reference B.X. 4638.)

Barrowford.—Yet another Radio "Exchange" has been opened. This at Barrowford, near Burnley, where the township is now enjoying community programmes due, it is understood, to the enterprise of Mr. N. Plunkett. A 10-valve set has been installed at the distributing station, and the telephone authorities are said to have run lead-covered wires from the station to the houses, where the only requirement is an efficient loudspeaker. The householder can "plug in" for London, Manchester, or Daventry programmes.

Swansea.—The first delivery of five trawlers out of 25 for the Consolidated Fisheries, Ltd., as an addition to its Swansea fleet, will shortly be commissioned, and they are to be equipped with Marconi radio apparatus somewhat similar to that with which the present Swansea fleet is fitted. The transmitters will be of the 0.25-kw. quenched-spark type, which is of sturdy construction and compact. The two-valve receivers can be tuned to all the wavelengths in commercial use from 300 to 25,000 metres. A modified form of direction-finding receiver has been adapted to the requirements of smaller vessels; a

powerful amplifier is used with a small frame aerial contained in a water-tight box, and the amplifier covers two ranges of wavelengths (170 to 240 metres and 600 to 1,100 metres) enabling approximate bearings to be taken of other ships, coastal stations, and the beacon transmitting stations.

Eliminators Again!—It is understood, says *The Electrical Review*, that the Westminster Electric Supply Corporation, Ltd., London, has issued a circular notice to the effect that "no authorisation has been given for the use of its lighting or power circuits in connexion with wireless sets. In the event of the Corporation desiring to change the supply to any premises from d.c. to a.c., it will not pay the cost of making any necessary changes to wireless sets so connected."

Private Companies.—A dividend of the Anglo-American Telegraph Co., Ltd., of £1 10*s.* per cent. has been declared on the preferred stock and one of 15*s.* per cent. on the ordinary stock for the quarter ended June 30.

The earnings report of the Western Union Telegraph Co. for the first half of the current year shows gross revenues of $67,066,225, as compared with $65,961,326 for the first six months of 1927. After deducting expenses and interest on bonded debt, there is a net income of $7,278,705, against $7,322,086.

The dividends in respect of the half-year ended June 30 of the Cable, Telephone and General Trust, Ltd., have been declared on the 6% cumulative and 7% non-cumulative preference shares.

Marconi's Wireless Telegraph Co., Ltd.—The City notes of *The Electrical Review* of Aug. 10 last, give the following interesting information: "In a reply to an inquirer the company stated last week that there was some misapprehension as to the nature of the scheme for a merger between the company and the Eastern and Associated Cable Companies. The merger proposals do not provide for the liquidation either of the cable companies or of the Marconi Company, and the rights of the holders of the different classes of shares in the Marconi Company in a liquidation or winding-up do not come into question. It is hoped to form the merger company as soon as the necessary legal formalities can be carried out, which must necessarily occupy some time. An offer will then be made by that company to the shareholders of the cable companies and the Marconi Company to acquire their shares in exchange for shares in the merger company. The capital of the merger company which has been allocated to the cable companies will be offered to the shareholders in those companies, and the capital allocated to the Marconi Company will be offered to the Marconi shareholders. It will be necessary for the Marconi board, in due course, to prepare a scheme defining the terms upon which the shares in the merger company will be offered to the holders of the different classes of shares in the Marconi Company. Those terms have not yet been finally settled, and the offer cannot be made until the merger company has been formed, but it is the intention of the Board that the offer of the exchange of shares shall be made not on the basis of a liquidation or winding-up, but shall be such as the board considers fair and equitable as between the different classes of shareholders."

The 97th Ordinary General Meeting of the Eastern Telegraph Co., Ltd., was presided over by Sir John Denison-Pender on July 24, and with pardonable pride the chairman briefly reviewed the history of a period which nearly covers a century of telegraphy.

One therefore makes no apology for occupying space with the following much-abridged report of Sir John's speech at that gathering: "The direct circuit between London and Bombay is awaiting the completion of the underground lines between Suez and Port Said; that was expected within the next few weeks. Then, with the two new cables laid between Alexandria and Port Said during the year, the regenerator should be working between Electra House and Bombay. [Direct telegraphic touch with India was obtained from Electra House on the 27th ult.—ED., *T. & T. Jl.*] These and other improvements had resulted in greater speed and efficiency with a smaller staff. Palestine had now been joined up with the main line system, via Cyprus. The Turkish concession had been duly ratified, and direct communication with Turkey was re-established in November last. Further reductions had been made in the rates to South Africa and India, in addition to those in the Australian and New Zealand rates made in the preceding year. They had closed unremunerative stations and proposed to dispense with two cable ships in the interests of economy. The company's policy of so many years of reasonable dividends and of building up the reserves had enabled them to consistently reduce their rates. In 1902 they first encountered Government competition, and last year the 'beam' radio system was established for communication with Australia, South Africa, and India. In spite of that the company continued to carry more traffic than the radio system, and it was clear that the cables still held a definite and important position in the world's communications. At the same time, they could not afford to lose the traffic which the cheaper radio service was taking from them. In anticipation of a satisfactory conclusion to the merger negotiations, and in order to complete the scheme, they had purchased the controlling interest in the Direct West India Cable Co., which, in turn, controlled the Cuba Submarine Telegraph Co., the Halifax & Bermudas Cable Co., and the West India and Panama Telegraph Co. The group owned 8,000 miles of cable, 22 cable stations, and two wireless stations. Those companies would eventually be brought in under the merger, and so complete the whole system of cables and radio in the West Indies, both owned and controlled by the British Government or by British companies. In conclusion, Sir John said that if the anxious time through which they had passed resulted in the formation of a merger company, comprising the whole of the overseas telegraphic communications of the Empire, while maintaining connexion with foreign countries, with suitable protection for the public in the matter of rates, and a reasonable return on the invested money, coupled with an unsurpassed mobility and efficiency, one of the greatest advances in British commercial enterprise would have been achieved."

The companies mentioned, it may be added, have important agreements, so it is understood, for the exchange of traffic with the Commercial Cable Company and the Western Union systems.

The financial conditions of the purchase of this group are not yet known, but the following history as recorded by the *Daily Telegraph*, in its issue of July 23 last, is as informative as it is interesting: "The Direct West India has now a paid-up capital of £197,873, and was formed in 1897 to carry out an agreement between the Government and the Halifax and Bermudas Cable Company for the laying and working of a cable from Bermuda to Jamaica via Turk's Island. The British Government subsidy of £8,000 p.a. expired in 1918. Last year the Direct West India acquired control of the Cuba Submarine Telegraph Company, paying £7 per share for each £10 share of the nominal amount of £157,060, and £10 for each share of that denomination for £59,820 preference shares. The Cuba Submarine dates back to 1870, and in its turn controls the West India and Panama Telegraph Company. The capital of the Cuba Submarine amounts to £160,000 in ordinary shares and £60,000 in 10% cumulative preference. The Halifax and Bermudas has £50,000 in £5 shares, and the West India and Panama £1,275,530 as to £345,630 in 6% first preference, £46,690 in second preference, and £883,210 in ordinary shares." The London addresses of the above-mentioned companies are now transferred to Electra House, London.

The financial aspect of the "merger" as a whole, is perhaps best expressed in the words of *The Electrical Review* which, while in an ordinary leaderette declaring that, "All the Dominions approved the proposals in principle, although some of them, South Africa for instance, considers that State control of the combined services should be assured, while Canada and Australia call for the clarification or amplification of some details," nevertheless expresses every confidence that these details would not be likely to prove any real stumbling-block in the path of whatever negotiation and discussion may still be necessary.

Writes also the financial editor of our able contemporary: "Shareholders in the cable companies deserve to be congratulated upon the outcome of negotiations which might easily have gone agley. The fact of Eastern ordinary having been down, at one time this year, to 140, against the present quotation of 250, is in itself a testimony to the uncertainty which was felt, not unmixed with nervousness in regard to the outlook of the cable companies, *vis-a-vis* the competition which was being so successfully carried on by the wireless and beam systems. The cable companies have been in existence for more than half a century, and shareholders must feel very thankful to think that events have turned out so propitiously for their interests."

The *Review* says it has only one criticism "of a scheme which is an achievement of the highest order" and that is—what? "That it leaves the external telephone services of this country in the hands of the Post Office." *Verb. Sap.*

The B.B.C. announces that the contract for the buildings for the new London regional station near Potters Bar has been awarded by the Board of Governors to the Anglo-Scottish Construction Company, in competition with several other large contracting firms, and work has started. The design for the building was prepared by Messrs. Wimperis, Simpson and Guthrie, and the specification by the Corporation's engineers, who will directly supervise the construction of the building.

The latest list of exhibitors at the National Radio Exhibition, which is to be held from Sept. 22 to 29, at the New Hall, Olympia, London, makes a brave show. The newest newcomer, so far as the writer can trace, is that of the Baird Television Development Co., Ltd., which has taken stands numbers 11, 13, and 14.

Despite the "halt in cable stocks" recorded as these lines are being written, the following paragraph should cheer up the pessimists who talk of the obsolescence of submarine cable telegraphy: What will be, it is claimed, the world's fastest submarine telegraph cable is to be laid for the Western Union Company by the cable ship *Dominia*, belonging to the Telegraph Construction and Maintenance Company, which sailed from Greenwich on Aug. 7 for Horta, Fayal, Azores. When the survey of the route has been completed at Bay Roberts, Newfoundland, *Dominia* will begin the laying operation in the latter part of August, and it will be completed on or before Sept. 10, thus opening a new channel of communication between North America and Germany, Italy and Africa. The new cable will represent an advance in ocean telegraph engineering. It will make possible the simultaneous transmission of five messages in each direction, ten messages in all, over the cable between Bay Roberts and Horta, whence eastbound traffic will be divided and routed over cables to Germany, Italy and Africa.

It is equally interesting and satisfactory to read in the electrical press that experiments were recently carried out aboard the Cunard Co.'s liner *Mauretania* by Dr. D. D. F. McIntyre, a Board of Trade medical inspector, in co-operation with Dr. H. C. Case and Dr. P. Morton, in connexion with a scheme for the establishment of an international medical marine radio code to enable ships' captains to communicate diagnoses to other vessels, with a view to affording medical assistance to people at sea on vessels not carrying surgeons. The scheme is the work of the British Medical Association's special committee which was formed a year ago, and representatives of the Admiralty, the Board of Trade, the Ministry of Health, the steamship companies, and the Post Office have all combined to produce a code that can be extended for international use.

GOLD COAST.—The *Board of Trade Journal* shows that during February last, the value of electrical and telegraphic apparatus imported into the Gold Coast Colony was £10,526, against £3,013 in February, 1927.

HUNGARY.—*The Electrical Review* reports that a Railway Broadcasting Company has recently been formed in Budapest for the purpose of providing loudspeaking broadcast receiving apparatus in railway station waiting rooms.

INDIA.—It is understood that the British Broadcasting Corporation has agreed to co-operate technically with the Indian Broadcasting Company. As a preliminary step it has commenced to relay the London programme from 5SW once a fortnight at a time specially suited to the needs of Indian listeners.

KENYA COLONY.—The British East African Broadcasting Company's Nairobi station operates on a wavelength of 90 metres; its power is approximately 4 kw.

NICARAGUA.—Reuter's Trade Service at Managua, reports that a concession has been granted to the Tropical Radio Company, a Boston concern associated with the United Fruit Company, for the erection of a radio station at Puerto Cabezas.

NORTH AFRICA.—It was announced last week that the Algiers station had changed its wavelength from 304 to 353 metres.

PERSIA.—The *Board of Trade Journal*, dated July 19, contained a translation of the new Persian Customs tariff which was approved on May 3. This shows the minimum and maximum duties; British goods receive the benefit of the minimum rates. Among the goods affected are machines and apparatus (including generators, &c.), telephone and telegraph apparatus, electric lamps, scientific instruments, &c.

PORTUGAL.—The British Vice-Consul at Lisbon, Mr. Leonard H. Leach, has prepared an interesting report on the present conditions in Portugal, due mention being made of tele-communication in that country. He says that the "beam" radio station of Monsanto has been in operation for a year, and stations have been erected at the Azores, Madeira, Cape Verde Islands, Loando and Lourenço Marques. The Portuguese system is directly linked up with the other main radio systems, and so is available for communication with all parts of the world. The operating company, the Cia. Portuguesa Radio Marconi, which is affiliated with the British Marconi Co., was formed in 1925 to take over from the Portuguese Government the concession for international radio communication for Portugal for a period of 40 years. In January last a contract was signed between the Government and the Anglo-Portuguese Telephone Co. for a renewal of that company's concession for the telephone systems in Lisbon and Oporto. The contract covers a minimum period of 40 years with the possibility of extension to 75 years. The Government has under consideration proposals by other interests to take over the Government telephone system and develop the service throughout the whole of Portugal.

RUSSIA.—Reuter's Trade Service, Moscow, states that broadcast radio-telephone stations in service, or in course of construction, at the beginning of 1928 in Russia numbered 64. The wavelengths used range from 60.12 to 1,700 metres, 10 stations using 1,000 m. or over, while the power employed ranges from 0.02 to 40 kw.

The Kazitsky factory at Leningrad has completed a combined 25-kw. radio-telephone broadcasting station which can also work as a radio-telegraph station, with a power of 35 kw. The plant was tested in the presence of a special commission of the Commissariat of Posts and Telegraphs, and the results are said to have been excellent. This type of station has been adopted by the Commissariat of Posts and Telegraphs as the standard type for use in the Soviet Union.

SWEDEN.—The following information, extracted from the statistical report of the Swedish Telegraph Department for 1927, has been received by the Department of Overseas Trade from the Commercial Secretary at Stockholm (Mr. W. Peters): At the end of 1927 there were seven broadcasting stations belonging to the telegraph service, with an average yearly service of 2,043 hours per station, and 24 smaller private relay stations. The big Motala station was put into operation in the middle of 1927. The stations at Gothenburg and Malmö are to be enlarged to 10 kw. The licence fee is Kr. 10. The number of licences granted at the end of the year for receiving apparatus was 328,133, or 53.9 per 1,000 inhabitants, as against 242,559 and 39.9, respectively, at the end of 1926. Stockholm 56,931, or 90.5 per 1,000 inhabitants (80.0 in 1926): Gothenburg 29,051, or 77.4 per 1,000 (81.6); and Malmö 16,703, or 98.7 per 1,000 (101.9).

The Crown Prince of Sweden, on July 24, declared open, at Stockholm Concert House, the second International Congress of Radiology. Some 1,200 delegates from all parts of the world were present, including 80 English scientists, says *The Electrical Review*. The King received all the delegates at the Royal Palace. The most important items on the agenda of the Congress are the British recommendations for X-ray protection and for the accurate estimation of doses of radium for therapeutic purposes. An exhibition of apparatus was held at Lillievalchs Exhibition Hall, in which many British manufacturers of X-ray and radiological apparatus took part. This is the first occasion on which it has been possible for British manufacturers to show their products on a large scale abroad.

SWITZERLAND.—The London *Times* says that the original proposal for a purely League radio station on neutral territory has been reconsidered, and a special committee formed to analyse the situation will submit to the council, alongside the original proposal, a new one whereby, instead of the League being saddled with the definite initial expenses and the problematical working expenses of a station of its own, the acceptance is recommended of the offer of Radio-Suisse (a commercial wireless organisation in which the Swiss Government is largely interested, now operating the Berne station) to construct in the Canton of Geneva a special wireless telegraph station equipped with the latest appliances, which will be placed at the service of the League in times of crisis.

A wireless telephone service has been opened between Switzerland and North America, says the *Electrician*.

The *Daily Telegraph* recently published an interesting report in its City Article on the Finances of Switzerland during 1927. The following is excerpted from the same and is based on the Accounts of the Swiss Confederation for last year, commenting on which the editor says: "On the whole, the various Federal services are improved since 1920, and for 1927 they yielded a net surplus of 5,920,000f, in comparison with 5,504,000f in the previous year. The combined result of the working of the telephone and telegraph services for 1927 was an excess of revenue over expenditure of 30,953,000f, against 30,114,000f in 1926, the net result being a profit of 2,599,000f, against 1,993,000f. It is not without interest to note from an analysis of the figures that, apparently, while the telephone service alone could show a surplus of 4,283,000f, the telegraphs suffered from their competition and showed a loss of 1,684,000f. This deficit, however, represents a decided improvement on the previous year, when there was an adverse balance of 2,312,000f. After remarking that it now remains to be seen whether a reduction of postal and other charges cannot be secured, the writer of the bulletin sounds a note of warning to the Swiss Government lest they should be carried away by the existence of a surplus, and give in to the pressure which will certainly be brought to bear upon them with a view to securing additional expenditure."

All aeroplanes fitted with wireless apparatus have now been assigned five-letter call signs by the International Bureau at Berne. The first letter is the nationality designation, and the remaining four letters are the registration mark of the aircraft. In the case of several countries having the same nationality prefix, the first letter of the group of four letters also signifies nationality. Thus, Haiti begins its four-letter group with H, Holland with N, &c., so that a Dutch plane would be registered H-NADY. British aeroplanes carry the prefix G, and the general call for all R.A.F. machines is G-EZAA.

U.S.A.—The U.S. Commissioner of Patents recently rejected an application for a patent on a variable condenser with plates shaped to give a straight-line frequency effect, says the *Wireless World*, on the ground that it "lacked the dignity of an invention." The decision was sustained by the Supreme Court.

Realisation of a fact, says *The Electrical Review*, that has been appreciated in this country all along, but which is described in America as "a somewhat startling discovery," striking at the foundations of the present system of broadcasting in America, has been made by the John Wanamaker store, which was the pioneer broadcaster in Philadelphia. "Investigations made by a special inquiry among radio listeners during the past two years," runs a statement by that firm, "having revealed that broadcasting is not helping the store in general or in an advertising way," the Corporation has accordingly closed down broadcasting station WOO, Philadelphia, which has been "on the air" ever since 1922. It is extremely unlikely that WOO will ever be heard again, declares the *Wireless World*. The opinion appears to be growing that many other broadcasting interests would reach similar conclusions if they carried out investigations. The American public may well hope that the question will be allowed to drop, for practically all their broadcast entertainment is provided by firms seeking advertisement.

In its issue of July 20, the *Electrician* gave a review of the Radio Industry in the U.S.A., according to which the year 1927 was one of heavy losses. "Of some 2,500 producers engaged in the trade this time last year only 1,200 remain! The elimination, continues the review, "has done much to improve the position of the industry as a whole."

"The industry, generally considered, has recently been benefiting also from a larger public demand for wireless receiving sets and accessories than is usually experienced at this season. The total value of retail radio sales, after expanding from only $60,000,000 in 1922 to slightly more than $500,000,000 in 1926, declined to $446,000,000 last year—a drop, as compared with 1926, of 11%. During the early weeks of 1928, trade continued at a lower rate than in the corresponding period of the preceding year, but afterwards for several months was substantially heavier than in the corresponding portion of 1927.

"Moreover, although sales have lately been declining in accordance with seasonal influences, they continue to make a better showing than they did a year ago. Reports from ten of the principal retail markets indicate that although all sections are not participating in the increased buying, the gains are, nevertheless, rather widely distributed. Dealers in seven cities state that business is more active this year than last, while in two centres only is trade falling under its 1927 volume. It is equally significant that retailers view with optimism the prospect for business during the late spring and summer."

A new radio patent, which is said to cover features found in all types of broadcast receivers now manufactured for general sale, has been announced by Mr. Edward H. Loftin, co-inventor with Mr. William F. Grimes. The serial number is 1,675,186 of June 26, 1928, and the patent has been assigned to Mr. Loftin as trustee. "The claims allowed by the United States Patent Office are extremely broad," according to the *T. & T. Age*, "for a principle that has proved essential to efficient amplification in tuned radio-

frequency receivers capable of bringing in distant stations." The application for the system is said to have been filed with the Patent Office more than five years ago.

Is this another Merger ?—Prevented by law from combining with the Radio Corporation of America to form one trust, the International Telephone and Telegraph Corporation is reported to have formed two new companies designed to meet foreign competition. The two new subsidiaries, called International Communications Corporation and International Cables Corporation, with nominal capitalisation, have broad powers to operate, own, lease and construct cables, telephone lines, radio-broadcasting stations, television apparatus, telegraph and radio-telegraph systems throughout the world. It is suggested that the company may be laying the ground work for a communications merger in case the repeal of the White Act, which forbids mergers of wireless with cable companies, can be obtained. It is learned also that the International Telegraph and Telephone Co. has concluded a contract with the Western Union Telegraph Co., whereby the latter is granted the use of the International Co.'s wire systems, paving the way for the eventual elimination of equipment duplication. It has also contracted to lease to the Western Union Co. apparatus developed in the International Co.'s laboratories, thereby enlarging the capacity of the Western Union's present equipment. Similar contracts are available to other telegraph companies.

General and Personal.—Sincerest congratulations to Mr. H. L. Dent upon his promotion from Higher Clerical Officer in the C.T.O. to Staff Officer in the same department.

To Miss H. E. Wallis, Chief Supervisor of the C.T.O., the heartiest of good wishes for a long and happy retirement. As the first to hold this recently-authorised administrative position in the C.T.O., Miss Wallis has fixed a standard of efficiency difficult indeed for her successor to attain, and therefore no idle compliment to Miss G. Hall who takes her place.

The very best wishes also go out to Mr. W. R. Jones, Overseer, Cable Room, C.T.O., upon his retirement, which it is hoped that, together with his good wife, he may live long and healthily to enjoy. Mr. Jones first saw telegraph service in the late Submarine Telegraph Company, which was "merged" into the Post Office Telegraph System in 1889 and is one of the gradually diminishing number of officers thus transferred.

The writer of these paragraphs had wished to "let himself go" this month somewhat on Television, but the Parliamentary items, as will have been noted, are so numerous and lengthy that little, if any, space is likely to be found for much on the subject. In any case, curtailing as far as possible, an endeavour will be made to put our readers up to date with matters as they stand at the end of August, especially in view of what may happen when the Radio Exhibition opens at Olympia. There has been quite a flood-tide of information, of varying quality, let it be said, with a certain amount of scepticism regarding the acclaimed fact that "*moving* pictures had been successfully transmitted over lengthy distances," besides which a natural amount of confusion had also been caused between the transmission of "still-life" pictures and that of "moving figures."

On Aug. 3 the London Press published a message from Berlin, one journal heading the paragraphs "Television Solved," which read in effect thus :—

That Prof. Karolus, the physicist of Leipzig University, has actually solved the problem of television is the claim seriously put forward by this evening's Berlin papers.

"Within a forseeable time," says the *Vossische Zeitung*, which gives the fullest account of his apparatus, "we shall have in the house, alongside the radio receiver, the telephotographic apparatus, so that it will be possible to transmit simultaneously the scene and music of an opera."

An expert in telephotography, who witnessed the working of the Karolus device when it was running far short of full power and transmitting per second only eight pictures of 8,000 light points each, stated that he received "absolutely the illusion of movement, though indeed, somewhat angular and jerky, as in the case of a slowly running film." The pictures were "clear and recognisable, the face of each separate actor being easy to identify.

That, however, was with eight pictures per second, and it is claimed that the apparatus has now been improved to a point at which it can transmit twelve. According to the paper already quoted, the complete apparatus will from the outset cost not more than from £50 to £75. Its cheapest constituent will be the "Karolus cell," which, at the same time, is its essential novelty. This electric light relay, from which, it is asserted, the element of inertia has been completely eliminated, is filled with nitro-benzol, and varies its penetrability for light according to the fluctuations of the current from the transmitter.

Later the B.B.C. informed the Press that it had not been found feasible to plan a television service for the near future, but stated that there might be some development in the matter before Christmas. "We have definitely decided not to proceed with the Baird home apparatus scheme," an official explained, "but we have carried out several tests with the Fultograph, which transmits photographs by wireless (i.e. still life pictures). Nothing, however, has been decided upon."

On Aug. 9 or 10 the special New York correspondents of the *Daily News* and *Daily Telegraph*, of which the following is the more succinct account, cabled as follows :—

"Cinema pictures were successfully transmitted by radio yesterday from the Westinghouse factory in Pittsburgh to a receiving station two miles distant. Officials of the company and a group of scientists who had assembled to witness the demonstration confidently predicted that in a few months radio cinema pictures would be a commonplace, and be broadcast daily throughout the United States.

"In yesterday's experiments pictures were sent through the air at the rate of sixteen per second. They were picked up on the receiving instrument with only slight defects, and thrown on the screen as clearly as the usual newspaper half-tone illustration."

Prior to this by about a week, the alleged improvement on the English and American systems of television, mentioned above, was announced from Leipzig, where Professor Karolus, whose method of sending still-life pictures by wireless was patented by the Telefunken Company of Berlin, and is now in use in several printing works in England, has been experimenting for some months.

The cost of his apparatus, which, it is said, will enable film pictures to be projected upon a screen in every home, and to be used with an ordinary wireless set, is between £50 and £70.

About the same date the wireless correspondent of the *Daily Telegraph* wrote :—

"It is now fairly certain that the B.B.C. will this autumn start the transmission of still pictures receivable in the home. This must not be confused with television, or the transmission and reception by wireless of moving pictures.

"Important experiments have already taken place in the broadcasting from 5XX, the senior Daventry, of photographs and drawings. These may be reproduced on apparatus with a small rotating cylinder on which the picture is traced.

It was also definitely stated during the second week of last month, and demonstrated to certain members of the Press by Mr. J. L. Baird, that "*Stereoscopic* television pictures" were now an actual fact.

The writer has very good reason for anticipating an early success, not only with *daylight* photographic television, but also of another development, viz., in the direction of coloured televised pictures.

The 1928 Sports gathering of the Cable Room Staff at Wembley was a complete success, despite the usual christening by Jupiter Pluvius. What strikes one as the happiest feature of this function is the "family" element, so many junior representatives down to the tiniest toddler being present at the gathering. Happy youngsters ! You *all* received prizes whether you came in first or last, so amply did the kind-hearted Committee fill the prize table !

The articles which recently appeared in *The Times Engineering Supplement* from the pen of Mr. John Lee, and entitled "Letters to an Absentee Director," have now been published in book form by Messrs. Isaac Pitman & Sons.

IDLENESS : An idle life is death anticipated.—*Goethe.*

J. J. T.

PRESENTATION TO MR. G. F. FINDLEY.

To mark Mr. G. F. Findley's departure from the Headquarters Telegraph and Telephone Traffic Section to take up the position of Traffic Superintendent, Class II, in the North Midland Telephone District, a large gathering was held at General Post Office North on July 16, when the Chief Inspector, Mr. J. F. Edmonds, on behalf of the members of the Traffic Section, presented Mr. Findley with a mahogany striking clock and a Jacobean canteen of Sheffield cutlery.

In appropriate terms the Chief Inspector referred to Mr. Findley's long experience of telegraph and telephone matters, both in the provinces and at headquarters, and said that in parting with Mr. Findley the section lost an efficient and conscientious officer. It had fallen to Mr. Findley's lot to perform important traffic work in connexion with the extension of the Anglo-Continental telephone services and the arrangements made for the broadcasting of B.B.C. programmes and outside events.

On behalf of the Traffic Section, the Chief Inspector then extended to Mr. Findley best wishes for a successful career in his new sphere, and a continuation of good health and happiness.

Before making the presentation other members of the section made eulogistic remarks concerning their friend.

Mr. H. G. Trayfoot expressed his personal loss in parting with a capable officer, and made special reference to Mr. Findley's activities in promoting social and sporting events in the Secretary's Office.

Mr. C. Anderson, in a humorous vein, made racy references to unofficial incidents in which Mr. Findley is alleged to have been involved.

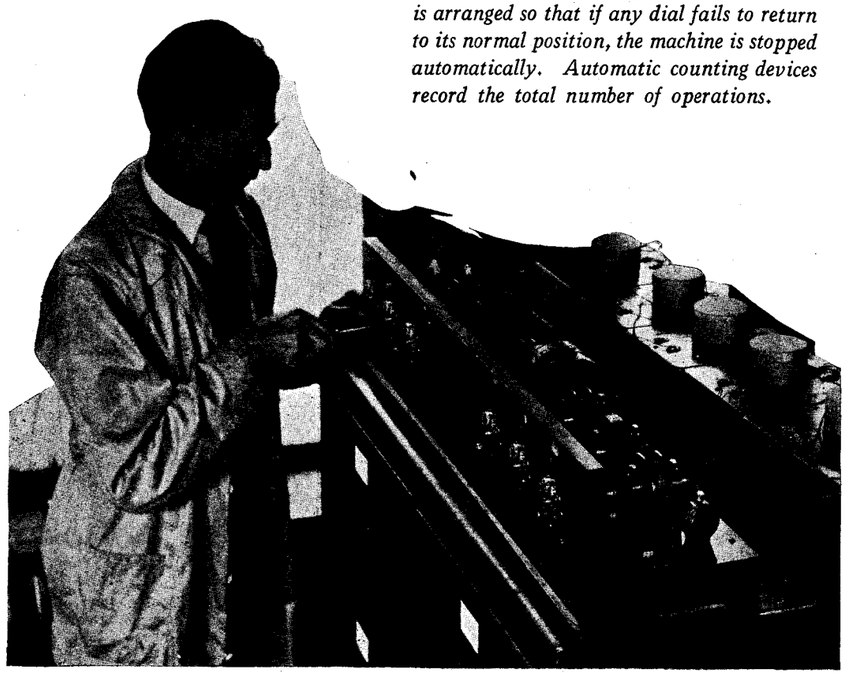
Mr. J. Magnall, on behalf of the cricketers, testified to the enthusiasm Mr. Findley had always shown in the capacity of Secretary and Treasurer to the Secretary's Office Sports Association. It was during his term of office that inter-departmental cricket matches came into being, with the result that a shield, presented by Mr. W. T. Leech, is now available for annual competition. The fostering of this rivalry in the playing fields between Headquarters departments is all to the good and tends to facilitate the performance of official duties.

In characteristic manner Mr. Findley expressed his heartfelt thanks for the handsome gifts and his appreciation of the goodwill extended to him as indicated by the size of the gathering and the sincerity of the speeches.

Where Strowger Automatic Leadership Begins ~

The Dial Tests.

The Dial Testing Machine shown below is an ingenious device whereby each dial under test is turned mechanically from "O" to the finger stop and then released, delivering the equivalent of ten impulses. The circuit is arranged so that if any dial fails to return to its normal position, the machine is stopped automatically. Automatic counting devices record the total number of operations.



THE Type 24 Dial perfected and placed on the market two years ago by Automatic Electric Inc. has attracted the attention of telephone engineers and operating men throughout the world, because of the remarkable and hitherto unequalled records for endurance which it has established. Its perfect operation without any attention whatsoever, both in laboratory tests and in the hands of the telephone user, is the result of years of painstaking and untiring effort on the part of the Research and Development Staff of Automatic Electric Inc. to perfect a dial whose performance and endurance would be unapproached by a contemporary product.

The Dial Testing Machine is but one of the many ingenious devices which have been originated and constructed by the Research and Development Department purely for its own use in carrying out development work on various pieces of automatic telephone apparatus which are being improved or perfected. That the effort is not in vain is daily proved by the economy and efficiency of hundreds of Strowger Automatic exchanges in operation in this and other countries throughout the world.

More Than 3,500,000 Strowger Automatic Telephones in Service or on Order Throughout the World

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STROWGER AUTOMATIC

The
Telegraph and Telephone Journal.

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Editing and Organising Committee - - - J. STUART JONES. W. D. SHARP. J. F. STIRLING. W. A. VALENTINE. J. W. WISSENDEN.

Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. XIV. SEPTEMBER, 1928. No. 162.

THE IDLENESS OF THE WISE.

OUR thoughts at the moment are concerned rather with sea waves than wireless waves; with trunks loaded with raiment rather than "traffic"; with hotel rather than telephone tariffs, for as we write the holiday season is at its height. Many familiar faces are missing, many are preternaturally bronzed from recent contact with the sun's rays, many reflect the joyous expectation of a holiday to come. Others of our colleagues again are wistfully wondering if their official responsibilities will enable them to get away while the sun is still in friendly mood.

It is a blessed institution this, which gives us a complete temporary release from the daily task, however congenial the work in hand may be. Though the very steamer in which we cross the North Sea, or the Channel or the Irish Sea, may blatantly advertise its wireless telegraph, we shall be unconcerned in its working. Our landlord may bellow "Allo! Allo!" into his telephone with a foreign intonation, but we shall be indifferent to the result; strange telephone standards may strike us by their pleasing or fantastic design, but we are content to feel that others had the task of obtaining wayleaves for them, that others had the care of their erection or of figuring out the wires and loads they carry or the revenue they earn. This is our season of leisure; that of those others has come or will come, we trust, in due course. The outward emblems of our craft or profession may intrude on the landscape; we can view them with indulgence or indifference. Ours is no 'busman's holiday, for, like the Preacher, we believe there is a time for all things. Idleness, says Lord Chesterfield, in his Letters, is the holiday of fools; holidays, we may contend, are the idleness of wise men. The great loom will be running on with a contemptuous indifference to our absence, and we know that we can pick up the threads again on our return.

But it is easier to write in this vein than to carry out the precepts of aloofness and entire freedom from concern in our life's work which it inculcates. Even as we cast a languid and incurious eye on the daily papers which follow us wherever we go, a paragraph on the doings of our Department—some new service opened, some old service extended—fixes our attention and arouses our interest. Although holiday resorts are not the likeliest places to afford object lessons in telephone or telegraph practice, no sooner should we discover in our wanderings something worthy of note, something in our special milieu to view or read of which could lay claim to novelty or instructiveness, than we should be moved to visit and study it, however cursorily, by an instinct or habit stronger than ourselves.

HIC ET UBIQUE.

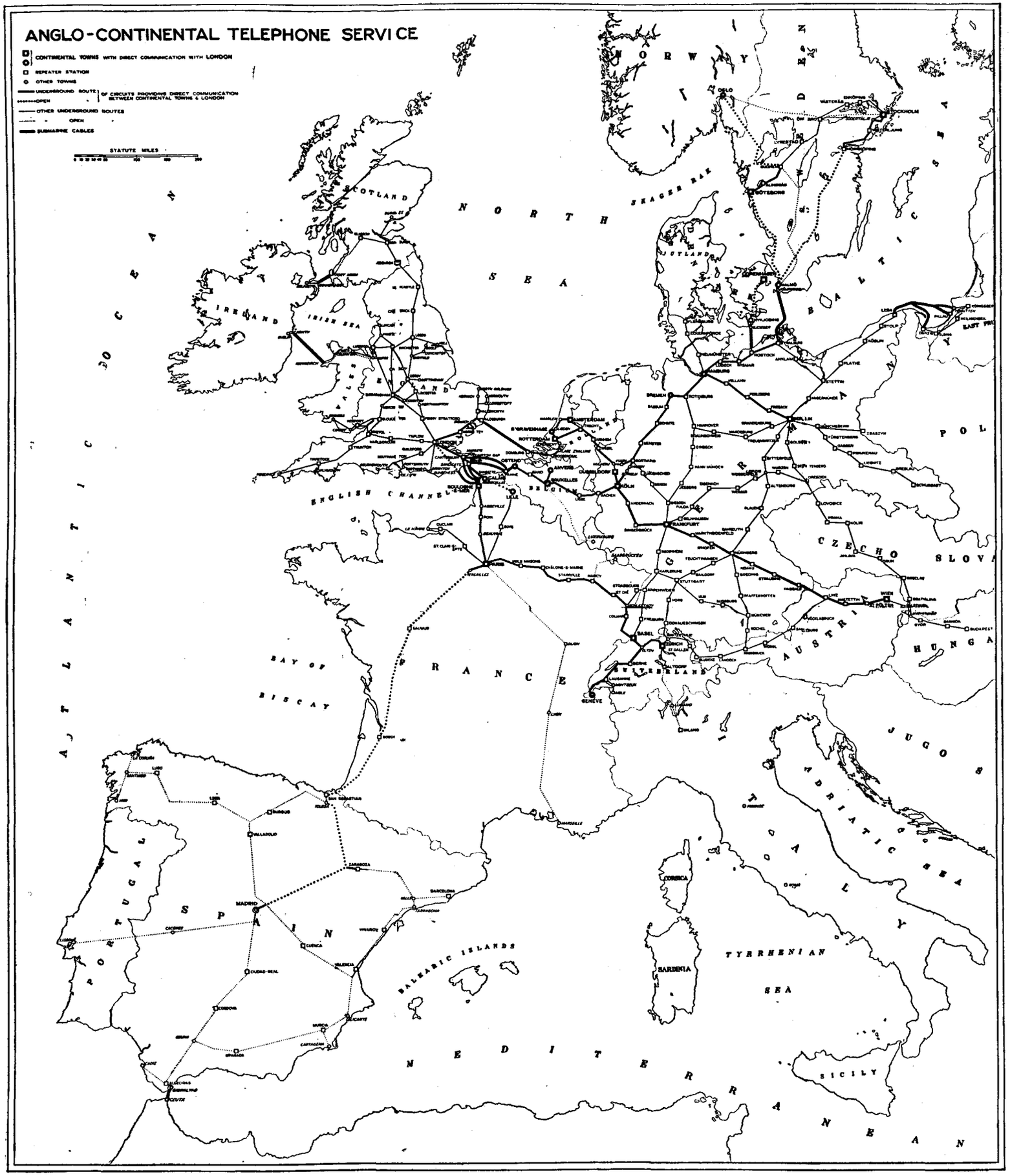
AUGUST was another eventful month for the Anglo-Continental telephone service. In the first place service was extended to all places in the I and II Norwegian zones, i.e. to all places in Norwegian territory south of latitude 64° 30′. The service, therefore, now reaches Bergen, Stavanger, Trondhjem, Kristiansand, Kristiansund, and other important Norwegian ports.

In the second place, a new telephone service was opened between this country and Italy, confined for the present to Milan. The charge for a unit day call between London and Milan is 9*s.* 6*d.*

Thirdly a "through" circuit was opened between London and Vienna, the service having hitherto been switched at Frankfurt-on-Main, and the charge for a unit day call between London and Vienna reduced to 14*s.* There are now "through" circuits existing between London and 9 European countries, i.e. to France (Paris, Lille, Calais, Boulogne), to Belgium (Brussels and Antwerp), to Holland (Amsterdam and Rotterdam), to Germany (Berlin, Hamburg, Cologne, Düsseldorf, Bremen, and Frankfurt), to Switzerland (Basle, Zurich, and Geneva), to Sweden (Stockholm, Göteborg), to Denmark (Copenhagen), to Spain (Madrid), and to Austria (Vienna). The map reproduced on the opposite page shows the routes taken by these circuits. The longest of these through circuits are those to Stockholm 1,325 miles, Madrid 1,144 miles, Vienna 993 miles, Copenhagen 938 miles, and Berlin 863 miles.

On Aug. 1 a temporary "through" circuit was provided between London and Paris—Plage for seasonal traffic, affording an accelerated service between those places. Last of all, on the 30th of the month, service was opened between London and Ceuta via Madrid, thus providing communication for the first time between London and the North of Africa. The charge for a unit day call between London and Ceuta is 26*s.*

A paragraph in the *Sunday Times* deploring the backwardness of this country's telephone development, says that there are fewer



THE ABOVE MAP SHOWS THE "THROUGH" LINES BETWEEN LONDON AND CONTINENTAL SWITCHING CENTRES AS WELL AS THE MAIN UNDERGROUND CABLE ROUTES. IT DOES NOT PURPORT TO SHOW ALL THE PLACES IN EUROPE WHICH CAN BE REACHED FROM LONDON.

stations per head of population here than in any civilised country. This is overstating the case with a vengeance. Our development is ahead of that of Holland, well ahead of that of France, Belgium, Austria, and Italy, to say nothing of Spain, Portugal, Hungary, Poland, &c., and we hardly think the writer would deny the claims of the Argentine and Brazil and several other extra-European states to be considered civilised countries, though these also are far behind us in development.

Mr. J. K. Waterson, in the course of an interesting article on Transatlantic Telephony in the *Bell System Technical Journal*, remarks :—

"Differences in the English language as spoken in London and New York became evident as soon as our New York operators were placed in communication with the operators in London. Each group expressed some concern as to what the other was doing to their language. I believe the London operators were inclined to think the broken English spoken by the telephone operators in Holland was sometimes easier to understand than New York City English."

We imagine that by now New York telephonists no longer believe that Londoners habitually say "Hamerican" and "Hinglish," as they are fabled to do by American humorists, and that on our side operators will have learned that Americans do not introduce "sure" and "some" and "Oh, boy" into every sentence.

In the article, "Possibilities of a Trans-Continental Long-Distance Telephone Service between Europe and Asia," by a typist's error "m." was sometimes expanded to miles when it stood for metres. We do not, however, think that our readers were deceived into the belief that the Euphrates is 800 miles wide at Jerablus.

WASTE.

THE prize papers in the issue of the *Telegraph and Telephone Journal* for August on the saving of waste are very interesting and provide much food for reflection. There are, however, two particular features which probably struck one. First, that all the papers were on traffic matter, and second, that the waste, at least according to two of the papers, came mainly from the human element.

To take the first point. While traffic may be the main item of the telephone business one cannot imagine that it is the only section where there is waste. What, therefore, are we to deduce. That it is the only section who have suggestions to make for reducing or eliminating it ! Surely not. Perhaps the other sections fight shy of the term "waste," but call it what you will it cannot be denied that there must be some waste in all departments. Where are the Accounts Section and the Contract Section ? Presumably the Engineering Branch are not excluded.

The paucity of papers is most probably due to the modesty of the staff, who hide their light under a bushel, as there is evidence of the fact that many of the staff often make valuable suggestions for improving matters, perhaps quite small in themselves, but having a cumulative effect. For instance, at frequent conferences of operating staff, to which reference has been made in the *Journal* from time to time, many points are raised and suggestions made tending in the direction of improving methods which, after all, is the same thing as saving the waste.

A few examples of saving in Accounting methods can be given, which it is believed have been adopted, viz. :—

A number of hours saved per quarter by the association of 20 or more days' Trunk tickets for sorting, instead of for 8 days at a time.

Printed forms used for investigating disputed calls, spare number calls, and such-like, instead of dealing with each in manuscript or even mimeograph form.

Using adding machines for totalling the number of "large user" local calls on Forms Tp.291.

Eliminating all superfluous figuring for meter calculations, i.e., "Tests and Credits" entered in such a manner that they can be deducted mentally instead of additional figures being written.

Trunk ticket values machined on the "strip" paper instead of to account forms for Call Office "Large user." Time is saved as only one account form is used to which the "strip" paper is attached.

These are sufficient to show that there is room in sections other than Traffic for the elimination of waste, or, if preferred, for improvement in methods tending to reduce costs.

The next and second point brought out, i.e., the personal element, points rather to waste on waste and causes one to ask whether the right persons have been selected for the posts. The appointment to a telephonist position is one of few positions that is in the hands of the local administration. Traffic Officers and Clerical Officers are recruited from open competition, but telephonists from selection. It is, therefore, clear that if we make a mistake in the primary selection we are introducing the elements of waste. Waste of time and money in training an officer who will create more waste by not giving a maximum of efficiency.

Great responsibility, therefore, rests with those who have this duty, in selecting only those who show all the essentials necessary for meeting this standard. The opinion is that, generally speaking, the standard of applicant to-day is as good as or better than in the past, and if only the best are selected and then given a sound training and not allowed to become too mechanical (thus destroying their initiative), but rather to develop their individuality, it will tend to eliminate much of the waste of which the writers mention.

W. E. G.

THE POST OFFICE TELEGRAPH AND TELEPHONE SOCIETY OF LONDON.

SESSION 1928-29.

THE opening meeting of this Society will be held at the Institution of Electrical Engineers, Victoria Embankment, on Oct. 15, when Mr. Frank Gill, O.B.E., Past-President, I.E.E., and Vice-President International Telephone and Telegraph Corporation, will give a lecture entitled "International Telephony." We feel sure that Mr. Gill will have a large and interested audience.

Other lectures and addresses during the session will be given by Mr. J. Stuart Jones, M.B.E. (Chairman for the Session), Mr. M. C. Pink, Mr. G. T. Archibald, Mr. A. J. Waldegrave, Captain P. P. Eckersley and Mr. J. J. Tyrrell. The complete programme will be published in the next edition of this journal.

CORRESPONDENCE.

ADVERTISING THE TELEPHONE SERVICE.

IN Mr. J. M. Shackleton's letter in the July issue the word "not" was inserted by a printer's error in the 5th paragraph, which should begin :—

"If, however, the Department does set about utilising the sites at its disposal," &c.

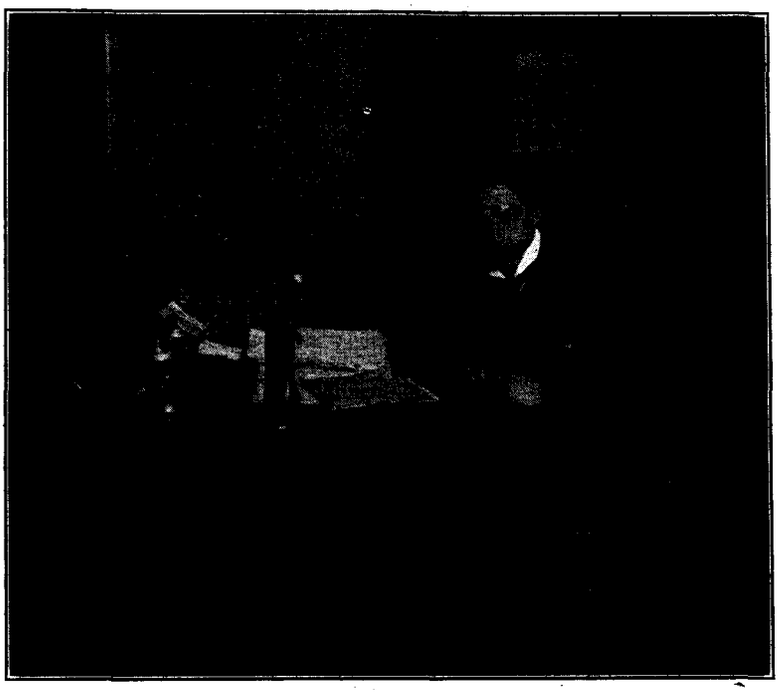
ECONOMICS: FANTASTIC AND OTHERWISE.

BY E. J. JOHNSON (*Glasgow*).

TRUE economy should go hand-in-hand with increased efficiency and therefore implies the elimination of all waste in material, time and effort. Thus the simplification of operations which are unnecessarily complex, or which, if performed by hand, can be done equally well, or better, by machine, is progress in the right direction.

In telephone exchanges there are many complex operations, and if anything can be done to simplify them a saving is effected.

The manual operations in central battery exchanges have been so standardised that little, if anything, can be done to make them easier or more simple.



MR. E. J. JOHNSON.

The only thing that remains, therefore, is to cut out non-productive calls and to ensure that each time a connexion is desired there is a reasonable possibility of effecting it. To achieve this there must be an adequate supply of junctions, both to other exchanges and to subscribers' private branch exchange switchboards. Also the arrangements made by the subscriber for answering the calls should be such as to ensure that this is done without delay. There should be an absence of wrong number trouble due to careless operating or bad pronunciation.

A high standard of maintenance is also necessary.

Subscribers' complaints cause a waste of time and energy, and if these can be rendered unnecessary by good operating and maintenance, or if and when they occur they can be "nipped in the bud" by telephonist or monitor and a letter prevented, then much time and worry will be saved. In this connexion it is usually better to accept blame rather than set up a defence and to reconnect than to argue. A sentence on the office wall in a film scene, "The voice with the smile wins," is worth remembering in this connexion by all who transact business over the telephone.

Clerical work in exchanges has a tendency to grow and anything that is unnecessary should be ruthlessly cut out.

The accounting work in connexion with trunk calls in all exchanges is increasing and in the larger centres an excess of checking for errors is liable to develop. A case was observed recently where the error detected and corrected by checking was in the nature of 1 in 10,000, a serious expenditure of time and energy which should have been put to better purpose.

There is one item which is growing and is causing an increasing amount of work in combined exchanges—the dating of trunk tickets.

In the Glasgow district there are between 8,000 and 9,000 of these to date stamp by hand daily. This takes 3 to 4 hours; surely an inexpensive rotary dating machine is available, or could be manufactured at small cost which would do the work in a few minutes.

The flow of telephone traffic, while retaining its general characteristics, varies in volume from day to day. Elaborate attempts are made from time to time, four times a year at least, to adjust the staff to the traffic in such a way that at all hours throughout the day the telephonists are taking a standard load. To take a record of telephone traffic the primary and secondary meters are read 25 times in 12 hours. In an exchange of 85 positions this is equivalent to reading 4,250 meters; also the same number of peg counts are recorded to determine the number and percentage of local and junction calls. There is an almost endless number of subtractions, additions, and multiplications to be gone through before the count is reduced to valued calls. The load thus obtained is true, in volume, only for the day or days during which the record was taken.

The staff is adjusted to the load so obtained and expected to suffice for three months, there being no allowance to cover day-to-day fluctuations.

The expansion of the actual load to the volume anticipated 3 months ahead is recognised as being of assistance in providing staff after training, but it is of little value for immediate purposes.

The characteristic shape of the loadline for the large exchanges is well known and unless the exchange is growing rapidly, varies little from year to year. In any case the number of "A" telephonists is usually determined by the number of positions it is necessary to staff during the busy hour.

Why not make use of the facts already stored in our Traffic Statistics? Draw a large scale characteristic load line on squared paper, and at the quarterly statistics, or when necessary, read the meters at 8.0 and 9.30; 9.30 and 10.0; 10.30 and 11.0; 1.0 and 1.30; 5.0 and 5.30; 7.30 and 8.0, or twelve times instead of twenty-five, also the peg count, and thus save many calculations and much time in exchange and traffic offices. The valued load so obtained would be marked on the load-line paper and the intermediate points in the load would be plotted in as indicated by the actual figures and the characteristic load line. Any increase in the load would be readily detected by the plotting on the curve and the total load for the day would be given by the difference between the first and last readings of the meters.

The adjustment of staff to load should certainly be as close as possible, but as we are dealing with averages the agreement to any one particular record should not be pressed too closely. If this is done overload may occur and revenue be lost by inefficient operating. Much time is spent and worry caused by efforts in this direction. The time and effort so spent would be much better occupied in dealing with other problems of the service. This is particularly true when too close agreement, on theoretical lines, is pressed without the correcting factor of knowledge of local conditions.

It will be necessary to take a full traffic record at suitable intervals, possibly not more often than once a year, to correct any variation in the characteristic shape of the load.

The reading of position meters is a troublesome and lengthy business, and if a master meter of some kind were available, much time per reading would be saved, also the more frequent checking of the load would be possible.

The problem has been attacked from the electrical standpoint but hitherto has not been solved.

Has the question been put to the calculating machine people ? They might be able to design a machine which would register and tabulate successive, and when necessary simultaneous, impulses delivered to the mechanism by suitably designed electro-magnets.

A Traffic Superintendent once, in a dream, saw every position register connect to a hopper of steel balls and each time a register actuated one of the balls rolled down into a scale pan graduated to read calls, the load for any period being obtained by reading the scale indication. But alas, so seemingly simple a method is but a dream and because of the space required and complications does not appear possible of realisation.

The economical working of an exchange staff, no matter what the Traffic Office arrangements may be, is very largely dependent on the supervisors and their alertness to the distribution of telephonists according to the day-to-day incidence of the load. The proper distribution of reliefs and their restriction to the recognised limits may make all the difference between the staff giving a good or bad service. Economical working may, I think, include the efficiency of a given number of telephonists equally with alterations which may result in their reduction in number at the expense of service.

Any seeming economy which tends to restrict traffic requires careful consideration, because a slight increase in traffic is most valuable and has far-reaching effects. If 50,000 stations can be induced to make one call per day more than at present, the revenue benefits to the extent of £62,500 per year of 300 working days, and conversely anything which restricts traffic will have the reverse effect. Considerations of this kind make it dangerous to press economy in telephonists, junctions, or other equipment, to the limit.

The telephone service exists to cater for traffic and must do nothing to restrict or hamper the making of calls. A wise discretion must be used and the spirit of true economy will be shown by the provision of facilities where they are necessary and refusing to provide for an imaginary need.

In the larger C.B. exchanges there is frequently an extensive junction multiple, and as a result of the growth of the system and increasing number of junctions congestion is approaching.

The years of most large manual exchanges are numbered, and expensive alterations and re-arrangements are to be avoided if at all possible. When junction multiples reach a large size, they are a serious drag on the operating, and for multiples of 720 jacks and up to 1,200, there is an allowance of 0.05 to compensate for this in some measure. It is my opinion that when there are 1,000 jacks this allowance is not sufficient, and that 0.10 would more nearly represent the drag.

For the larger groups of junctions order wires are in use and the necessary keys, &c., occupy much valuable space on the switchboard.

It is suggested that the larger groups of junctions, say from 10 lines upwards, be connected to rotary line selectors, led to a jack on the junction multiple, the operation at the " A " end being : Telephonist plugs in jack, gives number to " B " telephonist, and sees call through.

At the " B " end of the junction a lamp associated with the junction selected to glow, the junction automatically connected to the " B " telephonist who repeats the number to the " A " telephonist and connects. As the board is keyless the operation will be speedy, and arrangements should be made for waiting calls to be " stored " for the few seconds which may be necessary on occasion.

If a method as outlined can be adopted the following advantages over the present large multiples may be anticipated :—

(1) Reduction in size of the junction multiple.

(2) Reduce the wrong number trouble (there being no repetition of junction number necessary the subscriber's number is repeated by the " B " telephonist).

(3) Plugging into wrong jack or depressing wrong order wire reduced as the selector jacks being few in number can be well separated and clearly labelled.

(4) Reduce the operating value of outgoing calls.

The operation of an order wire call, while very speedy, is complicated. A comparison of the manipulation of an order wire call and a selector junction call is given below :—

" A " TELEPHONIST.

After repeating Number to Subscriber.

Order Wire.	*Auto-Selection.*
1. Goes out of circuit.	1. Plugs in auto-selection jack.
2. Depresses order wire key.	2. Gives number.
3. Gives number.	3. Sees call through.
4. Tests junction assigned.	4. Restores speaking key.
5. Plugs in.	
6. Goes into circuit.	
7. Sees call through.	
8. Restores speaking key.	

The number of operations is considerably reduced, halved in fact ; this reduction in the number of operations should reduce the value of the call by say 0.09. There has been no means of testing this but a figure which appears reasonable has been adopted.

In the Glasgow Central Exchange the value of a junction call is 1.64. If the size of the multiple be sufficiently reduced the allowance of 0.05 must be taken away, leaving 1.59, and if a further reduction of 0.09 be made for the simplified auto-selection calls, the value is reduced to 1.50, a reduction of 0.14.

The busy hour equated E load for the Central Exchange with a junction value of :—

1.64 is 16,942, and
1.50 ,, 15,733

giving a reduction of 1,209 valued calls or a saving of six telephonists.

The possible saving under this heading (provided the assumed reduction in value of the load holds good) will go a long way towards providing the necessary switching equipment.

In exchanges where the junction multiple allowance is 0.1 the saving will probably be greater than in the case cited.

There is one other point which may be worth consideration—a reduction of " A " positions by six will, in many cases, prolong the life of an exchange sufficiently to " tide over " to the introduction of full automatics.

This paper is in the nature of a series of suggestions which have a bearing on the prevention of waste, otherwise economy, more than a record of actual achievement, my previous paper having dealt with this aspect of the subject.

Mention has not been made of the introduction of machines for accounting purposes and other items which are the outcome of known Departmental policy, neither has there been any attempt to trespass from the pastures (green or otherwise) assigned to the Traffic Office.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations in the Post Office system at June 30, 1928, was 1,662,201, representing an increase of 10,961 on the total at the end of the previous month.

The number of stations working at June 30 last, in London, England and Wales (excluding London), Scotland, and North Ireland was as follows :—

	No. of Stations at June 30, 1928.
London	589,861
England and Wales (excluding London)	900,774
Scotland	150,852
Northern Ireland	20,714

The growth for the month of June is summarised below :—

	London.	*Provinces.*
Telephone Stations—		
Total at June 30	589,861	1,072,340
Net increase for month ...	4,157	6,804
Residence Rate Subscribers—		
Total	137,103	217,638
Net increase	1,320	1,849
Call Office Stations—		
Total	5,313	19,248
Net increase	36	152
Kiosks—		
Total	993	4,139
Net increase	34	113
Rural Party Line Stations—		
Total	—	10,294
Net increase	—	63
Rural Railway Stations connected with Exchange System—		
Total	—	936
Net increase	—	18

The total number of inland trunk calls dealt with during April (the latest statistics available) was 8,489,292, an increase of 476,563, or 6% compared with April, 1927.

Outgoing international calls in April numbered 31,889 and incoming international calls 35,602, representing increases of 6,747 (27%) and 8,298 (30%) respectively, over the corresponding month last year.

Further progress was made during the month of July with the development of the local exchange system. New exchanges opened included the following :—

LONDON—Beckenham, Sloane (automatic).

PROVINCES—Batley, Garston, East Grinstead. Automatics : Rochdale, Castleton, Heywood, Littleborough, Milnrow, Norden, Shaw, Whitworth, Lofthouse Gate, St. Marychurch.

and among the more important exchanges extended were :—

LONDON—Croydon, Kelvin, Kingston-on-Thames, Purley.

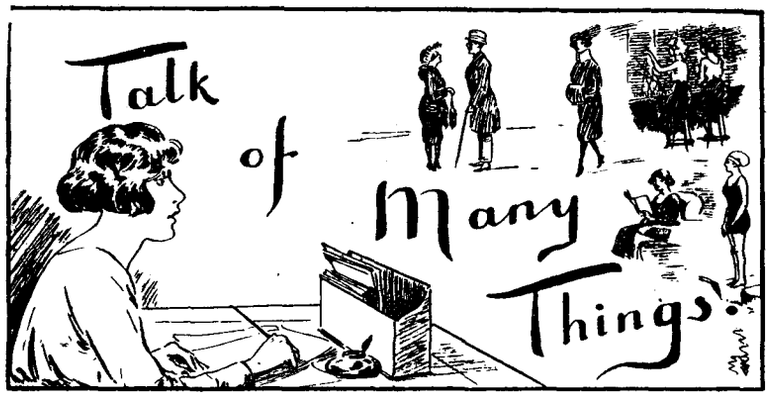
PROVINCES—Bristol, Cheetham Hill, Felixstowe, Glasgow (Western), Gosport (automatic), Old Swan (Liverpool), Wavertree (Liverpool), Rotherham, St. Helens, Trafford Park, Wallasey.

During the month the following addition to the main underground system was completed and brought into use :—

London—Camberley—Bracknell cable,

while 63 new overhead trunk circuits were completed, and 72 additional circuits were provided by means of spare wires in underground cables.

WE TELEPHONISTS



The Coffee Cult.

ONE morning recently I dropped into a teashop to have a cup of coffee. Doubtless, that statement will be received with but the slightest flicker of interest. There does not appear to be anything extraordinary about it, and it does not seem to justify the use of pen and ink and paper. Possibly you might have evinced rather more interest—or even some concern—had I said that I had dropped into a coffe-shop for a cup of tea. A visit to a teashop implies a certain degree of moneyed leisure, but a visit to a coffee-shop implies a certain degree of neediness coupled with a suggestion of manual labour which is quite tiring. But behind the simple fact of my entry into a teashop there lies much that is remarkable. I was aware that numbers of people indulge in morning coffee, but I had hitherto regarded it merely as a habit and of no special significance. I find, however, that I am wrong—morning coffee is not a habit of the dilatory, it is an act of devotion attended by the solemn rites of a mysterious cult.

My interest in the matter was first aroused when I realised that at about 10.30 in the morning the movement in the streets undergoes a sudden and peculiar change. The stream of people on the pavements becomes diverted to certain definite points, and the usual alert business stride is replaced by a sort of furtive scurry. Ever and anon unobtrusive office doors open carefully and people sidle out cautiously in ones and twos. It is as though they had been summoned mysteriously to a secret meeting of an even more secret society at an altogether secret rendezvous. Their evident desire for self-effacement and anonymity appeared to confirm this view and to imply that discovery would involve persecution and perhaps annihilation.

I resolved, therefore, to investigate the phenomenon in person, and, disguised as an Anxious Enquirer, I borrowed twopence and entered a teashop. At first my steps led me downwards to what I thought must be catacombs, but I found myself instead in an underground hall ablaze with light and wondrously decorated with gold and crystal. Marble tables were placed at regular intervals throughout the hall, and at these tables were seated the devotees of the cult. There, amid a haze of the incense of tobacco, they sipped their coffee and devoted themselves to a ritual, involving the use of dominoes, draughtsmen and chess pieces. Participation in these devotional duties appeared to be limited to members of the cult, for I could perceive that such unbelievers as were present were only permitted to watch. Coffee was served by vestals clothed in black and white robes who were known generically by the name of Miss. Apart from the unbelievers, there seemed to be three well-marked divisions in the assembly—the novices, who were occupied with dominoes, the coffers who were deep in draughts, and the arch-coffers who were lost in chess. There were only a few of the latter, and they never touched their coffee until it was cold—presumably some added mortification of the flesh to maintain the highest degree of piety. These, I gathered, were the very high priests of the order—a dignified position reached only by graduation via draughts. While I lingered, there was a continual procession of members in and out. On the faces of those who left I noticed a calm and beatific expression as of a conscience well satisfied in the performance of a high spiritual duty.

It was all so very wonderful and inspiring that it seems impossible to believe that the cult is unpopular with the chiefs of offices and business houses, and that devotees have frequently to change their rendezvous to escape discovery. Why, I myself was nearly—but hush ! PERCY FLAGE.

The New Moon.

Tradition tells us that it is unlucky to see the new moon through glass—and tradition is, undoubtedly, right.

The " Man in the Moon " appears to possess a peculiar attraction for our young people ; when new he greets them through the leafy boughs of the tall trees, and when he has grown to his full stature he bestows a benign, fatherly smile upon them as they wander hand-in-hand along the rural avenues or the quiet, country lanes.

But this friend of youth does not love all the sons of men, for when he appears in the glory of his newness amid the stars of Heaven, the tempers of certain mortals are stirred with an exceeding fury.

We know your ways, oh Moon ! They are thrust upon us in the course of our daily work and are known as " Verbal and Written Complaints."

The subscriber affected by your frolics knows neither reason nor understanding. The emancipation of women is of little importance to him. He will not speak to a woman ! The telephonist talks of " trying to get the number " he requires, the supervisor talks of doing her best to obtain it. How these women can talk !

Connect him to the Service Superintendent, the District Superintendent, the Controller ; give him a man ! He *must* hear the low, vibrating tones of a man's voice as he gives vent to his anger. But tremble, oh man ! for our " New Moon " subscriber is either a relative of the Controller or a personal friend of the Postmaster-General.

Consider the economy which might be effected if written complaints were entirely eliminated ; no longer would the interminable documents be circulated from one office to another, and that wonderfully executed curve would cease to be exhibited in the exchange.

But " Father Moon " decrees that these things shall continue. For what other excuse can be found for the caller who inserts sixpence in a multi-coin box for a twopenny call and expects to receive fourpence change ?

The pen may be mightier than the sword, but the subscriber evidently regards the hammer as mightier still, who states his complaint in such terms as these—" It would be a good idea if all the operators were known by a number, for then you would be able, readily, to hit on the head the person responsible for the trouble."

What scientific relationship exists between the moon—especially the new moon—and the human temperament ? Try as one will, one cannot find a satisfactory explanation ; the mystery eludes us, the problem remains unsolved. Let us examine it more closely.

We can safely assume that in the ecstasy of " Love's young dream," that great force of nature is viewed through the naked eye, but no such assurance can be given concerning those upon whom the moon visits his displeasure. Perhaps they discern his golden splendour with the aid of glass and he is affronted.

So Tradition is probably wise when she says—" Never look at the new moon through glass—it is unlucky ! "

G. M. T.
London Wall Exchange.

An Experiment in Friendship.

On Aug. 11 a brief notice appeared in the Daily Press to the effect that 17 nationalities bathed together at Sandwich Bay. Some of you who saw the announcement may have wondered who these people were, and will perhaps be interested to hear of the experiment in international friendship, of which the incident referred to was a part.

Just outside the old town of Sandwich, in the huts which formed part of a large military camp during the war, there gathered together, on Aug. 3, from all parts of Europe, a company of 250 people, representing 17 nations, including Great Britain and India. They came together at the invitation of the Fellowship of Reconciliation—a few, just because it was an international gathering, but most with a deeper concern to study together the spiritual foundations of peace—all sharing in the common desire for friendship and understanding.

Groups made up of various nationalities such as Germans, Czechs, Austrians, Americans and British, sat together, discussed problems and shared experiences in a frank and friendly spirit. Translations were usually necessary to enable everyone to understand, but any difficulties of language were easily overcome.

In lectures and discussions, through friendly conversations, through the sharing of work in the camp and in common recreation—walking, bathing, tennis, and other games—we were drawn close together till, by the end of the week, we seemed a large family gathering and were loath to break up and scatter to our various homes.

Perhaps the most memorable scene was the closing meeting round the camp fire when, after national songs and dances, in the gathering dusk, the flaming torch—symbol of love which nothing can quench—was passed round the inner circle of representatives chosen out from each nation. Then in the deep stillness which followed the lighting of the fire, one after another rose up to express in his or her own language, something of the inspiration and help which the Camp-Conference had brought. In that wonderful experience of fellowship the barriers of race were broken down and we realised our unity as parts of the great world family.

Telephone supervisors and operators were represented at the conference, one of the supervisors coming from Liverpool Trunk Exchange.

This was the third of such international gatherings arranged by the Fellowship of Reconciliation, the two previous camps being held in Germany and Switzerland. Next year they hope to hold a camp at Nancy, in France. Many of those who were present this year are looking forward to meeting again then, and would, of course, welcome the presence of any others who are interested.

I. E. REES.

Competition.

A further postponement is necessary, owing to annual leave, in connexion with the report of the result of the competition. It is hoped to report fully in the October journal. In the meantime, sketches may still be submitted.

Contributions to this column should be addressed THE EDITRESS, " Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office, G.P.O. (North), E.C.1.

GLASGOW TELEPHONE NOTES.

ON one or two previous occasions reference has been made in these notes to the good work being done by the Telephone District Staff by way of entertainment to those of our boys who are still in hospital as a result of disablement or injuries received while on active service.

The scheme consists of teas and concerts during the winter months plus a theatre show if funds permit, while during the summer season at least one char-a-banc or other type of picnic is given.

It is very nice to " do good by stealth and blush to find it fame," but even that principle can be carried too far. It would be well in this work-a-day world of ours if we remembered the good things that were being done as readily as we recollect the " otherwise."

Therefore, all honour to those members of the District Manager's Staff who contribute their mites to this commendable arrangement, to those who collect and remit, and last, but not least, to those who take on the additional duty of acting on the committee, and who see to it that the funds are well and truly applied and that the concerts never fail to attain the desired standard.

As for the artistes, all of them honorary, it is sufficient to say that the writer has many times paid highly for his entertainment and often been less pleased with the provided fare. We have specially to thank also our energetic and genial Hon. Secretary, Mr. T. S. Ward, for his services in connexion with these entertainments.

The war ended nearly ten years ago. The fever has subsided and, to a great extent, reaction killed war-time fervour and worship of the boys in uniform. That now there is still to be found in Glasgow the spirit of loyalty to those who suffered, and who are suffering, for us is something of which the district may be, and is, proud.

During the last four financial years I am told that no less an amount than £267 2*s.* 9*d.* has been raised, and a number of books contributed by the Glasgow Telephone Staff for this purely local effort. Comment is unnecessary, but that the good work may continue is the earnest wish of those who can still remember.

Life's Little Ups and Downs.

[N.B.—All characters (bad or otherwise) in this drama (?) are entirely fictitious, not to say superstitious and decidedly suspicious. If by chance (or design) any actual individual happens to be named, no personal reference is intended.]

Scene : A noble edifice in Hanover Street, Glasgow.

*A SUMMER MORNING.

ACT I.

At the foot of the stairs. Time 8.58 a.m. (A notice bears inscription ** " HOIST OFF.") *Enter dripping, singly, various Props and Pillars of the Glasgow Telephone Service.*

1st P. (or P.) of G.T.S. (pressing bell-push) : " Nasty mornin' !"

2nd Ditto : " Aye ! "

3rd Ditto : What like was it oot at Mulguy this mornin' ? "

2nd Ditto : " Och ! no sae bad as this."

3rd Ditto : " Well, at Mosspark it was simply ——" (seeing notice) " Och ! look at yon ! " [*Exit, upstairs.*]

2nd Ditto : " What, again, sae soon ? " † [*Exit, upstairs.*]

1st Ditto : " Ach tae —— ! " †† [*Exit, wearily, upstairs.*]

(*Band outside commences to play " There's a long, long trail awinding."*)

ACT (or rather won't) *II.*

A cage-like contrivance, stationary, between 2nd and 3rd floors. Time—the same.

[A diminutive gentleman (in uniform) is toying with a brass handle, apparently ornamental. A number of Props and Pillars, &c. are contemplating him with equanimity †].

D.G. (in U.) [confidentially, to nearest P. (or P.)] : " Did I tell ye the yin aboot —" (c-l-c commences to descend.)

ACT III.

The basement—immediately below scene of last act, 1⅛th second later.

[*Enter, suddenly, from above, cage-like contrivance, with contents as aforesaid.*]

Chorus of P. and P. (male) : " Ouch ! "

Chorus of ditto (female) : " Ooh ! "

D.G. (in U.) : " Well, I never ! " [*All collapse in heap.*]

Curtain.

(All rights deserved.) A. E. HIGGENS.

* Or spring (might even have been autumn or winter.)
† Or words to that effect.
†† A Gaelic expression of extreme delight.
** [We take it that this is Scots for Lift (Elevator or Ascenseur) not working.—ED., *T. & T. J.*]

"No Reply."

An operator, having reported "No reply" from a number, was requested by the calling subscriber to try once more as he was certain there should be an answer. The operator, therefore, made a further attempt to gain the attention of the desired number, but was still unsuccessful, and, on advising the caller of this, was greeted with "Good gracious, exchange! there's a baby in the house."

Visions of the baby vainly struggling to reach the receiver to oblige the irate subscriber were conjured up, but nevertheless the call remained ineffective. M. L. T.

West End Park, Glasgow: A Reverie.

I was resting on a seat by the "Lord Roberts" statue overlooking the West End Park. It was an autumn evening and nature was resplendent with warm colourings. And as I gazed and mused on the beautiful scene all around me I marvelled at the richness of the picture set like a cameo in the midst of a busy city—the park itself, a joy of wild wood and stream, cultivated lawn and flower bed surrounded by beautiful buildings—the whole aspect representative of almost everything in life; the University, standing out on the hill, proclaiming learning, the Art Galleries with their treasures representative of the arts, the Kelvin Hall in the near vicinity telling of trade exhibitions and frivolity, the tennis players flitting to and fro typical of recreation.

The very play of Life was being enacted before me in the steps of the passers-by—the light, happy step of irresponsible youth, the slower tread of experience and thoughtfulness, the satisfied stroll of age and the dragging feet of sorrow.

And over all there was a blue-grey haze; and as I listened to the songs of the birds I seemed to hear numbers of melodies vibrating in the air, and as evening fell and the haze deepened a great peace spread all around, and the melodies harmonized themselves into a wonderfully beautiful chorale. And as the music swelled forth the name of it was written in flames across the sky, and was called "The Search for Light."

Then black night came down and hid the park in darkness, and the distant lights shone out one by one and I was wafted on the wings of night and music, and found myself in Venice drifting idly on the Grand Canal. A ripple of laughter floated towards me as another gondola glided past my own and —— some friend touched me on the shoulder "Dreaming again!" What is it this time? M. L. TULLOCH.

REVIEW.

Letter to an Absentee Director: By John Lee, C.B.E. (*Sir Isaac Pitman & Sons, Ltd., 5s. net.*)

We have always known Mr. Lee as a man of many parts. Here we find him as a junior director, a man of about 40, "not much of a letter writer" (the remainder of the book does not justify this disclaimer), writing "chatty letters" to the chairman of his company, who is trying to recover his health on the Riviera. The letters purport to "look on business movements in England through the eyes of an absentee director." It might have been more appropriate for the absentee director to be the writer rather than the recipient of the letters; but the distinction is of no importance, for Mr. Lee gives the views not only of the writer but of the absent chairman, of a professor of political economy, and of a certain Briggs, a blunt but kindly old reactionary, and assumes the character of each in rapid succession.

In 100 pages of large print Mr. Lee treats of some of the principal problems of industry, such as profit-sharing, group-insurance, and works' councils. He attaches the greatest importance to personal contact between the directorate and the executive, and from this point of view advocates a system of functional directors, adequately trained for their respective duties. He considers that the employers should not only recognise trade unions but should take them into their confidence and seek their co-operation,—not a novel point of view but one that is worth reiterating. He is suspicious of welfare work: "mankind wants to work out its own salvation and hates to have its salvation thrown at it." He is suspicious also of schemes of profit sharing on the ground that they double the workers' risk. He warns us of "the danger of phantom secrets": we are glad to see that this danger is not confined to the Civil Service. He considers that capitalism is being glorified into a system of peasant proprietorship (by shilling shares and similar devices), and supports the comfortable doctrine that productive work is generally profitable to business.

Very few of us are directors, but we shall all welcome this further example of that vigorous and suggestive comment which used to delight us in the days when Mr. Lee was with us.

LONDON TELEPHONE SERVICE NOTES.

Contract Branch.

THE results obtained by the Contract Branch during the month of July were a net gain of 3,865 stations, as compared with 3,694 stations for the corresponding month of last year.

* * * *

Certain London newspapers are always tilting at the Telephone Service and asserting, without any equivocation, that if it were managed by business brains the development position of this country would approximate to that of America. Anyone would be convinced after reading many of the articles that have appeared recently that newspaper offices are the only business houses on this side of the Atlantic where telephones are provided on the American scale. On enquiry, however, we find that the newspaper which has been most blatant in its assertion has only *one telephone to every 13,500 of its circulation*, whereas a comparable American newspaper has *one telephone to every 1,130 of its circulation*. Nevertheless, let us be charitable and think that they have forgotten the old adage about people in glass houses rather than assume that they do not know the extensive use made of the telephone in American newspaper offices.

* * * *

It is interesting to find that sometimes we move far too expeditiously for our subscribers. In a recent case, 15 days after the completion of an order, the subscriber asked us to cancel the agreement as he had not been able to secure the lease of the premises ! ! !

He returned with this communication the official letter, sent a month previously enclosing an agreement to be signed, with the following limerick written on the back of it ! ! !

There was a young lady of Ryde
Who ate some green apples and died,
For within the lamented
They quickly fermented,
And made cider inside her inside.

Just as the above paragraph was being written the messenger brought another letter, which starts as follows:—

"The telephone which I asked for was installed so promptly that I did not have time to tell you that I wanted it installed at a different address. . . ."

* * * *

Retirement of Mr. T. W. Northmore.

Mr. Northmore, who retired on pension on June 22 last, had held the position of Contract Officer with the late National Telephone Company and the Department for many years, the greater number of which he had spent in the West District Contract Office. An amiable disposition endeared him to all with whom he came in contact, but his retiring nature somewhat narrowed the circle of his acquaintances.

He was a Cambridge graduate and for two years was cox of the light blue boat in the annual tussle from Putney to Mortlake. He served in the South African War and despite the inexorability of Anno Domini, joined up in the Great War.

As a mark of respect and goodwill his friends and colleagues presented him with a cheque for a substantial amount. The actual presentation was made by Mr. G. W. Livermore, District Contract Manager, who spoke of his long acquaintanceship with Mr. Northmore and his appreciation of the sterling work accomplished by their departing colleague, and Mr. Northmore suitably replied.

* * * *

Obituary.

It was with the keenest sense of loss and grief that the Branch learnt of the death, on Aug. 14, of Mr. F. F. Hogan, from phlebitis, following an attack of pneumonia, at the early age of 44.

Mr. Hogan joined the Post Office canvassing staff in 1909, belonged to the L Signal Battalion of the Royal Engineers during the war, and spent many years on the Development Section at Headquarters, where he was promoted to 1st-Class Contract Officer in 1923.

Later he had served both in the West and South-East Contract Offices, so that he was well known and his sterling qualities appreciated throughout the Branch, and the deepest sympathy is felt by all for the widow and her three young children in their great sorrow.

Gerrard Exchange.

The staff of the Gerrard Exchange and their friends gave another entertainment at the Queen's Hospital, Sidcup, on Saturday, Aug. 11. Though it is nearly 10 years since the war ended there are still about 300 men at the hospital, about two-thirds being confined to the wards, and many to their beds. Happily, for all concerned, the event was favoured with glorious weather, and the lovely grounds were looking their best. Proceedings began with tea in the wards for the invalids, followed by a dining-room tea for those patients well enough to be away from the wards, and the visitors, and then everyone wandered about the grounds and hospital while preparations were made for a concert in the Recreation Hall. The little orchestra which has given its services on many previous occasions came to swell the programme, and gave an hour of light music till the concert began.

Many of the "Stars" of the recent London Telephonists' Society Plays came to sing, and a thoroughly enjoyable evening followed, with ices and light refreshments in the interval, and, of course, "smokes." A number of wives and families of the patients were invited to join in the festivities. The patients appeared to have a really good time and the visitors certainly did so. The Committee were very pleased that Miss Cox was again able to join the party, and much appreciate the help given by Mr. Pounds and Mr. Buckeridge, old friends and supporters, and Mr. H. Dean, whose first visit it was.

The Gerrard Staff have been giving these parties at Sidcup for over ten years, and have subscribed or collected about £800 for them.

Some time ago it was proposed to collect for a complete wireless installation but it was found that the building was not suitable for the usual hospital equipment. They have, however, a set for the Recreation Hall and a number of individual sets in the wards, &c., and as there are no funds to maintain these the Superintendent of the hospital is very glad of contributions towards the upkeep. If, therefore, any other exchanges would like to help with this, Miss James or Miss Roe, at Gerrard, will be pleased to receive subscriptions.

* * * *

Cricket and Football notes.

A most successful season was concluded with a match between the Contracts (Champions) and the rest of the league at Chiswick which resulted in a draw; the final scores being :—

Contracts :	*Rest :*
148	55 for 5 wickets.

The champions displayed fine form with the bat and fielded exceptionally well. Hodgkiss and Goodger put on 60 runs for the first wicket, and other useful scores were contributed by Evans and Dickinson.

The "Rest" batsmen were in no hurry to score runs, and seemed to be content to save the game. Nearly an hour was taken in compiling less than 30 runs, and Widdup seemed to display excessive caution in taking 1¼ hours to score 18 runs.

The L.T.S. will again run a football team and compete in the Civil Service League, Division II. The headquarters of the club will be moved from Raynes Park to Chiswick, and in view of the difficulty of accommodating all who would like to play on the Chiswick ground, it is considered fortunate for the club to be able to rent a ground there so early in their career. Several practice games will be notified shortly and arrangements are almost completed for the season's engagements.

Mr. Evans, of the Traffic Branch, will continue as the Secretary. It is expected that the team will be strengthened by the addition of several new players.

* * * *

Swimming.

The end of the swimming season is in sight and a number of galas have been arranged for September and October.

City and Central Exchanges will combine forces at the Holborn baths on Monday, Sept. 10, and in addition to numerous club events, the L.T.S. Plunging Championship will be decided.

Trunks and Toll will be at the same bath on Tuesday, Sept. 25, and two special events will be decided. There will be the L.T.S. 100 yards' Championship (free style) and a team race, the Civil Service versus Insurance Officers.

Avenue Exchange will hold their gala at Aldgate baths on Friday, Oct. 5, and the special event there will be the L.T.S. Graceful Swimming Championship.

Holborn Exchange follow at the Holborn baths on Friday, Oct. 19, at which gala the L.T.S. Diving Championship will be the special attraction.

The L.T.S. Swimming Association will hold its Annual Gala at Pitfield Street baths on Friday, Oct. 12, when the usual full programme will be presented.

A new event is down for decision, the L.T.S. 66 yards' Breaststroke Championship.

There will be the usual heavy demand for tickets, and those who do not wish to be disappointed should make early application to Miss N. Temme, Trunk Exchange.

A BRIEF CHRONOLOGY FOR STUDENTS OF TELEGRAPHS, TELEPHONES AND POSTS.

BY HARRY G. SELLARS.

(*Continued from page* 240.)

1859 ... ... Cable between Great Britain and Denmark completed. July 14.

Thomas Allan patented a mechanical keyboard tape perforator and another in which a series of electro-magnets actuated the punches.

Jacob Brett's second attempt to lay a cable between Candia and Alexandria failed.

London District Telegraph Company formed and used overhead lines. It afterwards became the London and Provincial Telegraph Company.

Gaston Plantè invented the first secondary battery, the plates of which consisted of rolls of pure lead.

British Government voted a sum for cable from England to Gibraltar, but decided to lay a cable from Rangoon to Singapore to improve communication with China. Before the cable was completed the China War ended and the project was not carried out.

Mr. Sikes, of Huddersfield, revived the idea of a national savings bank and was supported by William Ewart Gladstone, Chancellor of the Exchequer, and Sir Rowland Hill, Secretary to the Post Office.

Total Post Office Staff in the British Isles, 24,802. 615,500,000 letters were dealt with.

1860, Feb. ... Bright patented duplex telegraph apparatus and a printing telegraph system.

1860, April 1 ... Packet service returned to the control of the Post Office, at the request of the Admiralty.

1860, April 25 ... T.P.O. established between London and Dover for sorting Continental mails.

1860, May 14 ... Communication with America, via the Faroes, Iceland, Greenland, and Labrador, proposed by Col. T. B. Shaffner before the Royal Geographical Society.

Dr. Antonio Pacinotti, of Florence, constructed an electro-magnetic machine and introduced the ring armature.

Z. T. Gramme introduced an armature of similar form.

Central Telegraph Office moved from Founder's Court. Lothbury, to Telegraph Street.

Clocks at Greenwich Observatory and London Bridge railway station connected electrically.

Bonelli devised an electric type-telegraph.

Varley "Mill" Repeater, installed at Amsterdam on Anglo-Continental circuits.

Everett, in Nova Scotia, showed variations in atmospheric electricity at various seasons.

Prof. Balfour Stewart showed the connexion between sunspots and magnetic storms. At Kew, he investigated the daily variations in atmospheric electricity.

Sir Edward Sabine discovered that there is a larger variation in magnetic declination every eleven years.

Emperor Napoleon III invented a battery composed of two plates of copper, one in sulphuric acid and the other in caustic soda, separated by a porous cell.

Minotto and Meidinger produced zinc and copper gravity batteries.

Pabst constructed a battery of carbon and iron.

Callaud, Chaperon and Grenet devised batteries of various kinds, while De Luc constructed a dry pile.

Gernez showed that in a bent tube containing positively and negatively charged liquids, the positively charged liquid crept over into the negative side of the tube.

Porrett observed that, when a current was passed through two liquids separated by a porous partition, part of the liquid in one section passed into the other.

Professor Quincke discovered that forcing liquid through a porous diaphragm set up a current. Showed that contraction is exhibited by resin and oily bodies under electrostatic stress.

Glamond made an iron-galena thermo-electric battery which was used by the Submarine Telegraph Company and in the Central Telegraph Office, London.

1860, Aug. 1 ... Malta and Gibraltar began to pay as well as issue Money Orders.

New posts only set up when revenue covered the cost—calculating ½*d.* on each letter arriving.

Mail Guards abolished and assistant superintendents, overseers, sorting clerks and telegraphists, sorters, postmen and porters began to take the place of "clerks."

Arrangements made for sorting mails on steamers between Holyhead and Kingstown. Travelling Post Offices established between Dublin and Limerick, Dublin and Belfast.

1860, Aug. 29 ... Sir Charles Bright, assisted by Count Thaddeus Orzechowski (Senor D'Oksza) laid the Barcelona-Port Mahon cable.

Hughes improved the governor of his printing telegraph apparatus by adding a friction device.

Krajewski, of Moscow, added a coiled spring to the Hughes governor to obviate breakages of the suspension rod.

Philip Reis, of Fredericsdorf, transmitted sound by means of a transmitter consisting of a cube of wood hollowed conically, with the smaller end of the boring covered with a fine stretched membrane. Suitably fixed platinum contact points brought a battery into circuit in response to vibrations. The receiver was a violin with a knitting-needle fixed in the bridge. The needle was surrounded by a coil of insulated wire and became magnetised and demagnetised, emitting a slight sound which the violin reproduced.

W. H. Burnett patented a complete multiplex printing telegraph system using Bacon's five-unit alphabet, and introduced the "cadence" signal for operators.

Attempts to lay a cable between Toulon and Algiers failed.

Several attempts made to raise the Atlantic cable, which had been laid in 1858 and worked for only one month.

Suez-Aden-Karachi cable completed.

Sir Charles Bright, on behalf of the Magnetic and Submarine Telegraph Company, laid an Anglo-German cable and a cable between France and Jersey.

1860, Nov. ... Sir W. H. Preece supported observations made by Bright in 1859, relative to surveying, and discussed the merits of light and heavy sheathed cables.

1861, Feb. 8 ... House of Commons considered a plan for a Savings Bank which had been devised by Mr. Chetwynd, Book-keeper of the Money Order Office, and supported by the Receiver and Accountant General.

1861, Feb. 8 ... William Ewart Gladstone introduced, in the British House of Commons, preliminary resolutions on the Post Office Savings Bank Bill.

1861, May 18 ... Secretary to the Post Office announced the end of the Galway postal contract, the company having failed to comply with stipulations.

1861, May ... Money Orders for Malta and Gibraltar issued at fees ranging from 9*d.* for £2 to 3*s.* for £10, and for Canada, 1*s.* for £2 to 4*s.* for £10.

1861, May 19 ... Post Office Savings Bank Act passed.

1861, Sept. 16 ... Post Office Savings Bank commenced with deposits of 1*s.* or multiples of 1*s.*, the limits of deposit for individuals to be £30 a year, or £150 in all. Interest fixed at 2½% per annum.

1861, Oct. ... Foundation stone of a new Post Office laid by Prince Consort in Edinburgh.

Sir Charles Bright and Latimer Clark, in a paper read before the British Association, pointed out the desirability of establishing a set of electrical standards for practical use. After discussion, a committee was formed to determine a rational system of electrical units and to construct an equivalent standard measurement. The committee consisted of Sir Charles Tilston Bright, Sir Charles Wheatstone, Dr. J. P. Joule, Dr. Esselbach, Dr. Matthiesen, Prof. Williamson, Prof. Wm. Thomson, Prof. G. C. Foster, J. Clerk Maxwell, William Allen, Miller, Fleming Jenkin, Balfour Stewart, W. Siemens, D. Forbes, C. F. Varley, Latimer Clark and Charles Hockin.

Telegraphic communication established for conversation between Queen Victoria, at Balmoral, and the Princess Royal, at Potsdam.

Johann Philipp Reis exhibited his telephone to the Scientific Society of Frankfurt-on-Main.

Caselli invented the pantelegraph.

Malta-Tripoli-Benghazi-Alexandria cable laid.

Blavier and Wartmann experimented with duplex and multiplex telegraphy, respectively.

Number of letters registered in the United Kingdom about 1,500,000.

1862, March ... H. C. Forde calculated that a speed of 8 w.p.m. could be attained on Atlantic cables if Thomson's mirror were used.

Léclanché, of the French Eastern Railway, devised a battery made up of carbon, binoxide of manganese, zinc and salammoniac.

K. W. Siemens introduced an electric arc lamp in which two solenoids regulated the positions of the carbons.

Serrin constructed a clockwork regulator to adjust the carbons of electric arc lamps automatically.

Ernest Siemens and Bright devised the "plate" and "ladder" lightning protectors for telegraph circuits, respectively.

J. B. Saunders designed a lightning protector for submarine cables.

1862, Aug. 1 ... Registration fee for Inland letters reduced to fourpence. All letters passing through London containing coin, registered compulsorily and double fee charged.

Cecil and Leonard Wray tried to improve the telephone apparatus devised by Philip Reis.

Sir Charles Bright and Latimer Clark examined the Aden-Karachi cable and were unable to find 100 miles intact, the outer covering having perished. They patented a preservative for cable which would resist the teredo and other boring seaworms.

Charles Bright perfected a curb telegraph key which effected more rapid transmission by neutralisation of residual electricity.

Lesaffre suggested partial discharge of submarine cables by momentary earthing between signals. (This arrangement works satisfactorily on the Toulon-Ajaccio Baudot installation.)

Needles of Needle Telegraph apparatus shortened and speed increased.

Derling constructed a single needle telegraph apparatus in which the needle was placed near an electro-magnet instead of a coil.

Neale produced an Acoustic Dial for use with single needle telegraph apparatus.

Spagnoletti devised coils for single needle telegraph apparatus, and induced needle galvanometer.

United States Post Office suggested a Postal Congress of all nations to discuss international postages, &c.

Foreign Pattern Post introduced.

Money Orders issued with commission, 9*d.* for £7, 1*s.* for £10.

Post Office Savings Bank had 180,000 depositors with deposits amounting to £1,750,000.

Estimated that 94% of letters were delivered at houses of addressees.

1863, Jan. 1 ... Fee on "registered" letters dropped into letter boxes reduced to eightpence and compulsory registration extended to the whole of the United Kingdom. Number of registered letters reached 2,000,000.

1863, Feb. 20 ... Pneumatic Dispatch Company started work. Mail bags sent through tubes from Euston station to Eversholt Street Post Office.

1863, May 11 ... Fifteen Governments met in Paris to discuss postal arrangements, as proposed by U.S.A.

Wilde devised magneto-electrical machine in which coils of wire, forming the armature, rotated between the poles of a large electro-magnet, which was excited by means of a small separate magneto-machine.

Committee of the British Association in London determined the value of an ohm,

Telegraph Conference at Bregenz at which Australia, Bavaria, Baden, Wurtemberg and Switzerland were represented.

Bonelli's type-telegraph used between Liverpool and Manchester.

Herman Ludwig Ferdinand Helmholtz, of Berlin, carried out experiments in the reproduction of sounds. Helmholtz calculated mathematically the effect of self-induction upon the strength of an electric current. He also constructed a galvanometer.

Maron devised the bridge method of duplex working.

Telegraph Act gave Postmaster-General certain wayleave rights for telegraph wires over public roads and streets.

Inland Pattern Post introduced, rates ranging from 3*d.* for 4 ozs. to 18*d.* for 24 ozs.

1864, March ... Sir Rowland Hill resigned from the Post Office.

Lenoir devised a writing telegraph system.

1864, April 25 ... Electrophone (invented by Dr. Strethill Wright) laid before Royal Scottish Society of Arts.

1864, May ... Cable between Persian Gulf and Karachi completed.

1864, June 6 ... House of Commons granted £20,000 to Sir Rowland Hill.

1864, Aug. 10 ... Post Office Insurance Bill received Royal assent.

Walther Nernst born at Briesen, Prussia.

Three attempts to lay a cable between Cartagena and Oran failed.

Siemens and Halske introduced a Morse telegraph transmitter in which signals were stored.

Free re-direction allowed in the case of letters, packets, &c., re-directed by the Post Office within the same "free delivery." The London Postal Service was regarded as one "free delivery."

Pattern Post rates reduced by one third.

Annual average number of letters passing through the Post Office, 630,000,000.

Musical sounds conveyed to, and reproduced by, harps on the stage of the concert hall of the Old Polytechnic, London, by means of wooden rods which connected the harps with the musical instruments played by artistes located in the basement.

1865, April 1 ... Postage rates above 1 oz. altered from 8*d.* for each ounce to 4*d.* for each half ounce.

1865, April 17 ... Life Insurance and Annuities obtainable through the Post Office in certain towns in England and Wales.

1865, July ... Shore end of new Atlantic cable fixed at Foilhommerum, near Valentia, Ireland.

1865, July 23 ... Shore end of new Atlantic cable spliced to the main portion carried by the *s.s. Great Eastern* (22,500 tons) in three iron tanks. Captain, Sir James Anderson; Engineer, Mr. Canning; Electricians, Sir William Thomson and Mr. C. F. Varley. Paying out began.

1865, July ... Fault discovered after 84 miles of Atlantic cable laid. 10½ miles of cable re-wound and fault removed.

1865, July 31 ... Fault found and repaired in Atlantic cable after 716 miles had been laid.

1865, Aug. 2 ... Another fault observed after 1,186 miles of the Atlantic cable had been laid. After being wound in for about a mile the cable broke and could not be recovered. Atlantic Company ruined.

Anglo-American Telegraph Company formed, and Mr. John Pender guaranteed a sum of two million pounds for a new Atlantic cable.

Abbé Caselli devised a method of tele-photography.

Vavin and Fribourg suggested a telegraph printer in which the printed letters were "built up" in response to certain perforations on the tape. J. Harris, Rogers, Favarger and others constructed apparatus on these lines.

Adam Millar, of Camden Town, suggested correcting variations of speed in distributors by means of gearing actuated by electric currents additional to, or part of, the working currents.

Maxwell published his theory on the propagation of electro-magnetic waves.

S. M. Yeates, of Dublin, constructed a telephone which was an improvement of that devised by Reis.

Favarger devised a single-channel telegraph distributor.

(*To be continued.*)