

THE
TELEGRAPH AND TELEPHONE
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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XXXIII.—

MISS A. A. SHACKLOCK.

Miss A. A. Shacklock, the senior Chief Supervisor of the Central Telegraph Office, retires from the service in the course of October, and it is fitting that she should form the subject of this month's notice, for her retirement is an event of more than ordinary importance in the life of the Central Telegraph Office. She has passed right through all the grades, and ends her official career in what is now the highest position for women in the Central Telegraph Office. In temperament and character and attractiveness she has cared for the welfare of the large woman establishment, has directed the operations of the special departments under her care, and has always been



more than ready to help in particular cases where help was needed. Whilst welfare work, as ordinarily understood in industry, is a considerable portion of the responsibility of this post, it is not the whole responsibility nor is it separated from the direction and control of telegraph operations generally. To combine these functions with the sense of firm and just discipline, calls for those particular qualifications which Miss Shacklock pre-eminently possessed.

She has been sensitive and sympathetic to changes in the outlook of women and has never lost an especially sympathetic vision of younger life. Into her retirement she takes the particular esteem and regard of a staff which has been very fortunate in its principal women officers.

IMPERIAL WIRELESS SERVICES.

THE BEAM STATIONS.

ONE of the most remarkable developments in wireless telegraphy within recent years has been the discovery of the merits of the short-wave system for long-distance communication. Very short waves, under a metre in length, were used by Hertz in his pioneer experiments which proved the existence of wireless waves, but in the practical application of wireless to commercial purposes, the possibilities of short waves were largely neglected, and as the range of communication increased the trend of development took the direction of using longer and longer waves and greater and greater power, reaching its climax in giant stations, such as Rugby, which employ wave-lengths of the order of 20,000 metres and power of the order of 1,000 kilowatts.

During the war, Senatore Marconi, with the assistance of Mr. Franklin, took up the study of "directive" telegraphy, using reflectors to concentrate and direct the radiated waves in a narrow beam, after the manner of a searchlight. To secure effective results, it is found that the dimensions of the reflector must be of the same order as the wavelength employed, and this consideration precludes the practical use of reflectors for all but very short wavelengths. The development of the short-wave system was facilitated by the evolution of the valve transmitter which solved the problem of producing very short waves. Up to this stage it had been assumed that the range of short waves was too small for practical purposes, but in 1921 it was discovered that short-wave stations, using very low power, were capable of communicating across the Atlantic. This discovery was followed up by Senatore Marconi, who established the practicability of world-wide communication during certain hours of the day on waves under 100 metres in length, and showed that by means of reflecting screens the radiation could be concentrated within a narrow beam, thus ensuring greater economy in power and freedom from interference.

Up to this date it had been the policy not only of the Imperial Government but also of the Dominion and Indian Governments to provide Imperial wireless communication by means of high power stations, but suddenly in 1923 Senatore Marconi disconcerted all preconceived notions on the subject by announcing the wonders of the short-wave directive, or so-called "beam" system, which he claimed would provide adequate services for a limited number of hours per day at a much smaller capital expenditure. The Government decided to give the system a trial, and an agreement was accordingly made with the Marconi Company in July, 1924, for the erection on sites to be provided by the Government of a beam station in this country for communication with a reciprocal station in Canada, which they undertook to erect through their affiliated Canadian Company, with provision for its extension, if required, for similar services with South Africa, Australia and India. The Governments of South Africa, Australia and India adopted the same policy and arranged for the provision of reciprocal beam stations.

The Marconi Company, however, subsequently came to the conclusion that, for technical reasons, the original scheme of concentrating all the sending stations on one site and all the receiving stations on another was impracticable, and a Supplementary Agreement was concluded in November, 1924, which provided for the erection of two groups of two stations each, one in the south-west of England for communication with Canada and South Africa and the other in the Eastern Counties for communication with India and Australia.

Considerable difficulty was experienced in obtaining sites which would satisfy the technical requirements, but ultimately sites for the sending and receiving stations for communication with Canada and South Africa were secured at Bodmin and Bridgwater respectively, and sites for the sending and receiving stations for communication with India and Australia near Grimsby and Skegness respectively. The corresponding stations in the Dominions are

situated near Montreal, near Capetown, near Poona and near Melbourne.

The Agreement provides that the sending and receiving sections of the beam stations are to be capable of working simultaneously, the aerial system of the sending station being so designed as to concentrate the emitted waves within an angle of 30 degrees, and the receiving section to have a similar aerial system, designed to focus the received waves. The stations are to be capable of communication at a speed of 100 five-letter words per minute each way (exclusive of repetitions) during a daily average of 18 hours between England and Canada, 11 hours between England and South Africa, 12 hours between England and India, and 7 hours between England and Australia. Upon the completion of the stations the Company is to give a demonstration by actual working for seven consecutive days that they fulfil these conditions, and if the Engineer-in-Chief of the Post Office is satisfied with the results of the demonstration, the stations are to be handed over to the Postmaster-General, and one half of the agreed purchase price is to be paid to the Company. After six months' working to the satisfaction of the Engineer-in-Chief, a further 25% of the price is to be paid, and the remaining 25% is to be paid at the end of a further period of six months, if the stations have continued to work to the satisfaction of the Engineer-in-Chief. If the stations do not satisfactorily comply with the tests prescribed at any of these stages, the Postmaster-General is free to reject the stations, and the Company must, in that eventuality, refund any money which has already been paid in respect of them.

The Company undertake that any telegrams for this country which come under the control of their affiliated Companies in the Dominions shall be forwarded to a Government station in this country. A similar undertaking is given by the Company as regards any telegrams for the Continent of Europe which are not ordered by the senders for transmission by some other route. At the outset the rates of charge to the public are not to exceed two-thirds of the corresponding cable rates in force at the date of the Agreement (July, 1924), except in the case of Canada, where the rates are not to exceed the existing cable rates.

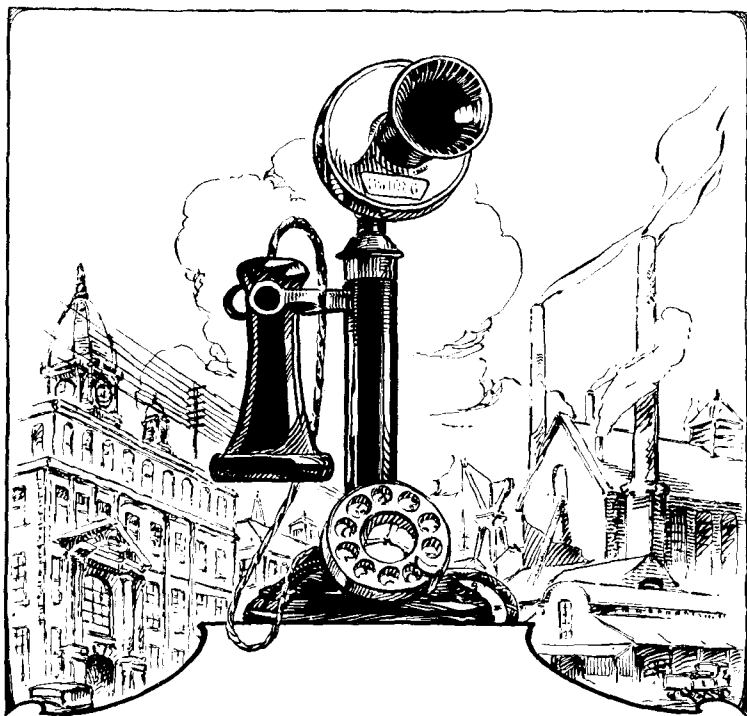
There are ten steel masts at each station 287 feet high, with a cross arm at the top, 90 feet broad, placed in two lines of five each, each line being at right angles to the direction of communication. The aerial and reflector system consists of a number of vertical wires suspended from the triatics attached to the cross-arms, the aerial wires being in front of the masts and the reflector wires behind. Each wire is brought down to a point within a few feet of the ground, and balance weights are provided to minimise the movement of the wires. Each vertical wire is connected to the transmitter or receiver as the case may be by a copper tube supported about two feet above the ground, and so arranged that there is the same length of tubing from the transmitter or receiver to each vertical wire.

The stations at Bodmin and Bridgwater for communication with Canada and South Africa are practically completed and are expected to be ready for the official demonstration within the next few weeks. The stations near Grimsby and Skegness for communication with India and Australia are expected to be ready for preliminary tests about the middle of November. All the stations are to be controlled from the Central Telegraph Office, London, which will thus be placed in direct communication with Montreal, Capetown, Bombay and Sydney.

J. D. C.

THE FRENCH TELEPHONE SYSTEM.

A considerable extension of the telephone system in France is at present in progress. Circuits are being established between Paris, Aurillac, Orleans, Saint Brieuc, Sedan, Troyes, Caen, Montlucon, and Nice. Fourteen new circuits are being provided between Paris and Boulogne (Seine), five between Paris and Clamart, four between Paris and Choisy-le-Roi, nineteen between Paris and Courbevoie, fourteen between Paris and Montreuil, six between Paris and Suresnes, ten between Paris and St. Denis, and one between Paris and Madrid.



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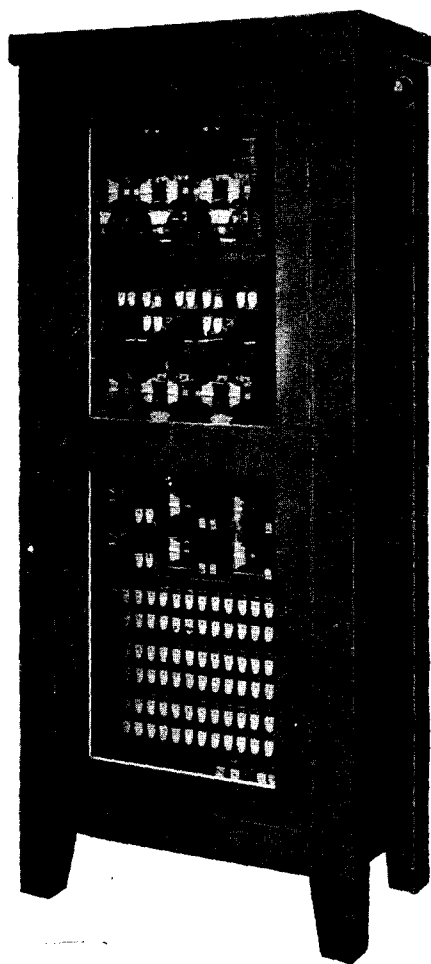
Special service features can be fitted to the standard equipment; to mention but a few:—

Secretary's Service.

This is an arrangement by which ordinary calls for the executive are received by his secretary, who can extend the connection to the executive if desired. The executive, however, can be rung direct by another number known only to a few. The executive has means of cutting out the secretary's telephone, and putting through calls directly.

Fire Alarm Service.

Any person discovering a fire can, by dialling the fire number, automatically sound all fire signals throughout the premises. Those responsible for the fire brigade service can then get into instant communication with the person giving the alarm.



Watchman's Service.

Any or all of the telephones on a Peel-Conner P.A.X. System can be arranged for use as Watchman's stations. On his rounds the Watchman dials a certain number and the station and time of the call can be recorded on an automatic clock, fitted in conjunction with the P.A.X.

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Construction, Etc.

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The automatic units leave the works fully wired and tested. Their installation is therefore a very easy matter. It is only necessary to connect the incoming lines to the terminals on the main distribution frame, and to couple up the power panel and batteries.

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Telephone: Regent 7050.
Telegrams: "Peelcontel, Westcent, London."

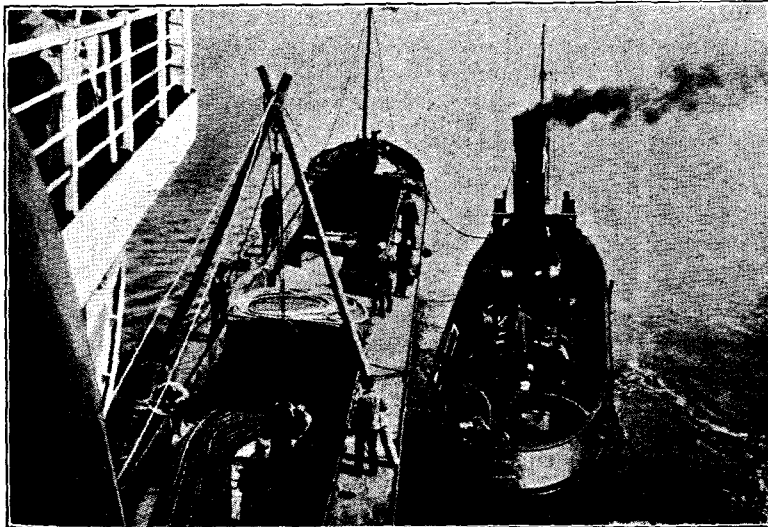
THE LAYING OF THE THIRD ANGLO-DUTCH CABLE.

THE following particulars of the manufacture and laying of the third Anglo-Dutch submarine telephone cable, designed to afford direct communication between this country and Germany, may be of interest to our readers. They are drawn chiefly from an interesting, well-illustrated booklet issued by the manufacturers,



ONE OF THE CABLE-TRAINS ON ITS JOURNEY TO NORDENHAM.

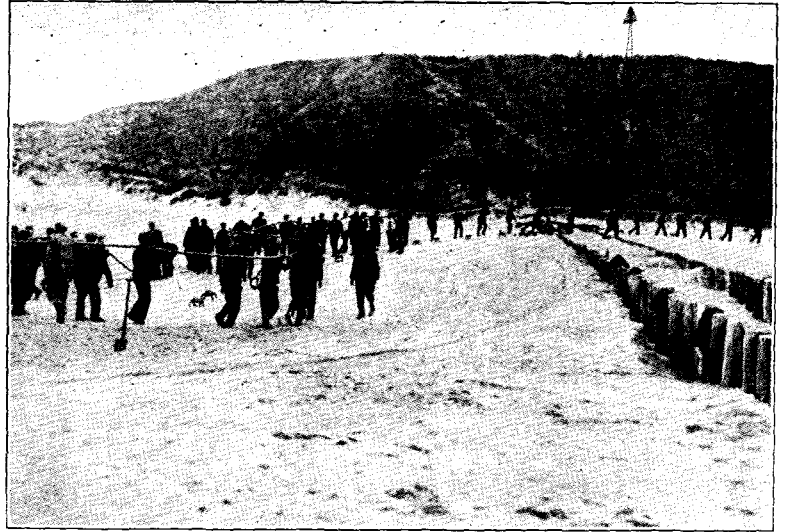
Messrs. Felten & Guilleaume, of Mülheim, near Cologne. The two previous Anglo-Dutch cables, it may be remembered, were manufactured in England by Messrs. Siemens Bros. & Co., of Woolwich, and laid by British cable ships. (An account of the laying of the second cable was contained in our issue of October 1924.) The Netherlands Government, who share with the British Government



THE LIGHTER MAKING READY TO START.

the cost of manufacturing and laying these submarine cables, provided the cable on the present occasion and placed the contract with the German firm above mentioned.

The cable contains 17 wires, namely, four quadruple groups known as "quads" (affording 12 channels of speech), and a worming circuit serving as a thirteenth channel and for voice-frequency

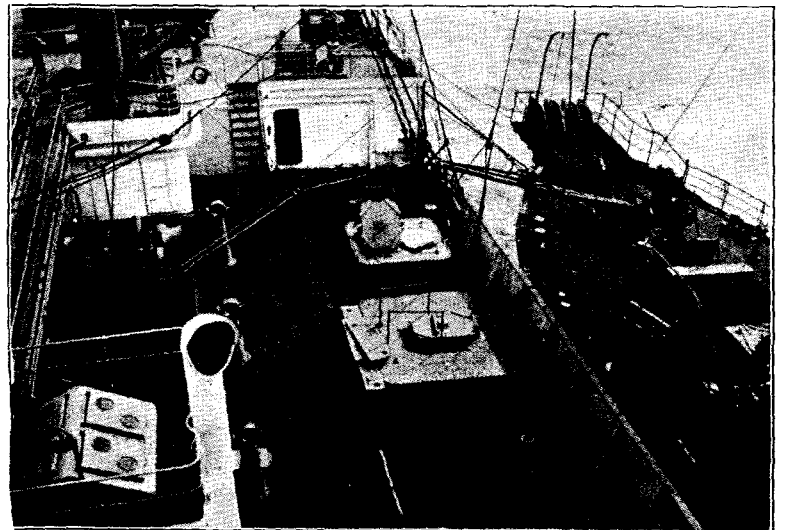


THE CABLE BEING CARRIED TO THE DOMBURG REPEATER-STATION.

telegraphy. The constituent conductors of the quads are massive circuits of 2.3 mm. diameter, and the worming circuit is formed of seven copper wires of 0.8 mm. All the copper wires are wound with a thin, special iron-wire on the Krarup system to increase the self-induction, and insulated by two layers of paper. The cable core is surrounded by two seamless lead-coverings of 2 mm. each in thickness, between which is placed a compound filling. The armouring consists of 22 galvanised iron wires of 5.8 mm. diameter. Beneath it lies a single layer of jute compound, and above it a double layer. The total diameter of the cable is nearly 54.5 mm. and its weight 10.31 kilograms per metre.

In April the cable was ready in three manufactured lengths, which were taken by rail from Mülheim to the Norddeutschen Seekabelwerke, at Nordenham. There they were spliced together and shipped on to the cable-steamer. The total lengths delivered were 165 kilometres and weighed 1,702 tons. Their carriage by rail necessitated the employment of 55 special goods-wagons, each 15 metres long and with a loading-weight of 35 tons.

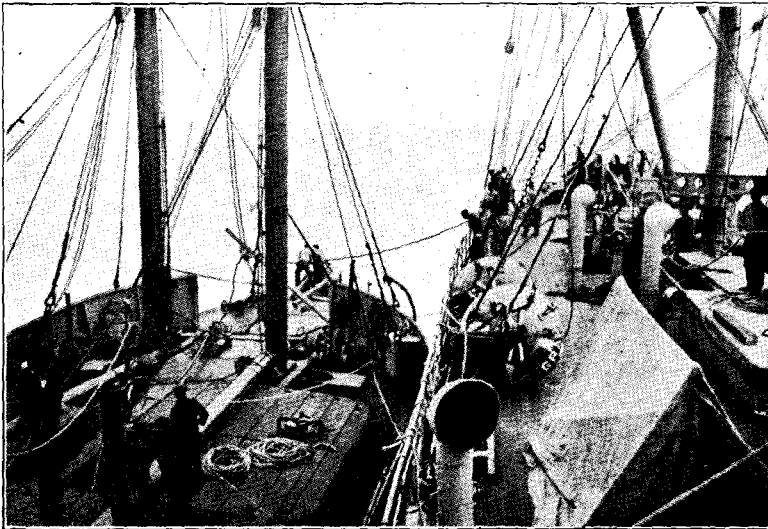
The laying was carried out by the cable-ship *Neptun*, and was delayed and rendered more difficult by very unfavourable weather. The start from the mouth of the Weser was hindered by fog, but on April 26 the *Neptun* set out, and on the morning of



THE REMAINDER OF THE CABLE TRANSFERRED FROM THE "NEPTUN" TO THE "NORDENCY."

the 28th began to lay the marking buoys off Domburg. Between Domburg and Aldeburgh eight large buoys were laid, with ten small ones in between them. Next morning the landing of the cable at Domburg went off smoothly. A Dutch lighter took off about 2.5 km. of cable from the *Neptun* and laid it in the shallow sea, and even while the cable-end was being carried to the Dutch repeater-station the *Neptun* began her voyage on the open sea.

In a short while speaking-connexion was established with Domburg and was maintained during the whole voyage of the cable ship. Thick fog came on at night which greatly increased the difficulties of navigation in the incalculable currents of those waters.



UNLOADING THE CABLE-END FROM THE "NORDENEY" ON AN ENGLISH COAST-VESSEL.

The buoys which had been laid were of little use, and for the most part could not be seen. Nevertheless, towards morning an accurate course was maintained; a slight deviation then occurred which was confirmed as one of the buoys at the English shore came in sight. This cost some hours' loss of time, and resulted in several days' delay. The English landing point, Aldeburgh, was not reached until evening, and the weather became so much worse up to the following morning that a landing of the cable was impossible. The cable was therefore cut, doubly soldered with lead, and laid to a buoy until the weather improved. At this juncture the sister ship *Nordene*, on its return from laying a Spanish cable, was signalled, and the two ships entered Harwich Harbour together.



THE CABLE-END LANDED AT ALDEBURGH.

Here the remainder of the cable was transferred to the *Nordene*, and the *Neptun* set free for other work. Not until the fourth day had the weather sufficiently improved for the *Nordene* to complete the work of laying the cable. On the morning of May 5 she lay off Aldeburgh. An English coastal boat carried out the landing while the *Nordene* took on board the two ends to be spliced. About 6 p.m. the English end of the cable lay in the Repeater Station, the balancing was undertaken, and then only the cable connexion with the *Nordene* remained to be established.

At 10 o'clock a whistle gave the engineers on land the signal that the copper connexion was ready, and while the tests were being made, the junction was completed on board with all speed. The stormy weather began again, and when the completed splice went overboard at 2 a.m., it was high time that it did so. In spite of contrary conditions the laying was satisfactorily and happily completed.

We are indebted for the excellent illustrations we reproduce to Messrs. Felten & Guilleaume's booklet before referred to.

THE RETIREMENT OF MR. E. LACK.

On the 11th ult Mr. E. Lack, M.B.E., Asst. Staff Engineer of the Engineer-in-Chief's Dept., G.P.O., was presented with a handsome wireless set by his colleagues at headquarters as a token of the high esteem in which he has been held, and as a souvenir of the completion of 44 years' service with the Government Telegraph Department, he having joined the service in 1882 as S.C. and T. at Hull.

From that office he was transferred to the East Dean Repeater Office (near Beachy Head), thence to Lowestoft, a year later obtaining a 2nd Class Engineership at Dundalk in 1899. Brentwood, Chelmsford and then London saw him, the latter point being coincident with his promotion as Engineer 1st Class. He had charge of Victoria Exchange about this time and subsequently the Mayfair and Victoria sections combined. In 1909 he was made Staff Engineer 2nd Class and Asst. Staff Engineer in 1911.

By few of our engineers could a more interesting record of services rendered be shown.

Mr. Lack formed one of the Anglo-German Telegraph Commission in 1910, had charge of the telegraph section of the E.-in-C.'s Office during the war, and was responsible for the arrangements in connexion with providing and laying the Beachy Head to St. Nazaire, and Peterhead to Alexandrovsk cables 1914-15, and the Imperial cable, Penzance to Halifax, N.S., in 1916.

He also carried out the transfer of the direct United States cable office at Ballinskelligs, Ireland, during the Irish troubles, and was responsible for arranging the application of the Gulstad vibrating relay principle to the Post Office standard relay, now known as relay "G." He received a well-merited M.B.E. in January, 1918.

During the war he also established duplex repeaters for Duplex Baudot working at Dieppe for the service between London and Paris, and equipped Lord Haig's train with telegraph apparatus for his movable headquarters during the war.

In 1924 he was sent on two occasions to the West Indies in connexion with the laying of new telegraph cables between Turk's Island, Barbadoes, Trinidad and Demarara. As one who rose from the telegraphs at the bottom rung of the telegraphic ladder, Mr. Lack has always been respected by the instrument galleries of the C.T.O., and certainly by the foreign cables with which he has been so closely associated. Of a bright, cheery, and ever optimistic nature, one could never feel depressed in his breezy company. Our kindest and best wishes follow him. J. J. T.

NOTES ON TELEGRAPH PRACTICE.

BY G. T. ARCHIBALD.

(Continued from page 260.)

XX.—Concerning the Treatment of Press Traffic.

THE treatment of press traffic is an interesting feature in the history of telegraph practice, largely by reason of the fact that the work has always been conducted at a loss to the taxpayer.

The old telegraph companies had instituted a press service and supplied newspapers with all kinds of news reports for which they demanded payments ranging from £150 to £250 per annum. Subscribers to this service were allowed to send press telegrams at half the usual rates and the charge for such telegrams addressed to several newspapers was reduced for every subsequent address to 25% of the amount charged for the first address.

In this connexion it is interesting to recall the fact that in 1867 the newspaper interests desired to set up their own press distribution service on the grounds that they were the better judges of what news the public wanted. The telegraph companies refused, however, to agree to the truncation of their service; it has been urged that as a consequence, the press identified itself with the agitation in favour of the nationalisation of the telegraph service.

The press tariff laid down in the Telegraph Act of 1868 was based on the principle that as the transmission of news was a matter of national importance the charge for the service should not be more than was necessary to make the service fairly self-supporting. The tariff was fixed at 1s. for every 100 words handed in between 6 p.m. and 9 a.m. and 1s. for every 75 words handed in between 9 a.m. and 6 p.m. to a single address, with an additional charge of 2d. per additional address for every 100 words or 75 words as the case may be, of the same telegram.

The question of the press tariff has ever been a source of anxiety to the Administration. In 1875 a Treasury Committee found that telegraph wires were largely occupied with press traffic to the exclusion of more profitable work and in 1876 it was reported to a Select Committee on the Post Office that the loss on this traffic amounted to £20,000 a year: one of the witnesses informed the Committee that it cost the Post Office about £1,000 a year to deal with the press work at two offices for which only £320 was paid by the senders. The Committee recommended that steps should be taken to increase the press charges to a point sufficient to cover the estimated loss on the traffic but the matter was not pursued.

In 1888 the loss on press traffic had risen to £200,000 a year. When the matter was raised in the House of Commons the Postmaster-General said that he feared it would be difficult to increase the press tariff which had been fixed by the Act of 1868 and had been in force for more than eighteen years. In 1895 the estimated loss had risen to £300,000 per annum. The matter was again discussed in the House of Commons and the Postmaster-General, Mr. Arnold Morley, then said he was willing to arrange for a thorough investigation if the press would abide by the result of an enquiry, and undertake not to oppose legislation for an increase in the charges if it were proved that such a course was necessary. Satisfactory assurances were not, however, forthcoming and the tariff remained unaltered until 1920 when in consequence of the increase in wages and maintenance, &c., due to the European War, the rates, authorised by Parliament in 1915, were increased to 1s. for 80 words or a fraction of 80 words between 6 p.m. and 9 a.m. and 1s. for every 60 words or fraction of 60 words between 9 a.m. and 6 p.m. with a charge of 3d. for every 80 or 60 words or fraction thereof for each additional address after the first. Although there has been a striking reduction in the amount of press work handled by the Post Office since the war, the press service is still conducted at a loss of about £250,000 per annum.

The Telegraph Act of 1868 provided that

- (i) News rooms, clubs and Exchange rooms as well as newspaper publishers should be eligible to receive telegrams at press rates.
- (ii) the names of all such concerns should appear in the official list of registered newspapers, &c., and that news telegrams should be addressed to the registered address given in the list;
- (iii) abbreviated addresses registered for ordinary telegrams should not apply to press telegrams, and that
- (iv) all telegrams addressed personally to managers, editors, publishers, secretaries, or any other person connected with newspaper institutions should be chargeable at the full inland rate.

A press telegram may contain only intelligence intended strictly for publication in a newspaper or for exhibition in a club, exchange, or news room. Letters to the editor, advertisements, notices of births, marriages, deaths, election addresses, matter not intended for immediate publication or exhibition, cypher or foreign language, or any matter for the publication of which a money prepayment is usually made are not accepted at press rates. When any such matter or matter of a private nature is included in or added to a press message the full ordinary inland rate is charged for the addition. If, for instance, the words "to follow report sent by train" are inserted in a press message, they are charged as a separate telegram at the full inland rate.

The method of counting words and signs for charging purposes is similar to that employed in connexion with ordinary inland telegrams with the following exceptions:

- (1) Figures and affixes such as st., nd., rd., th. are counted as one word each; thus 1st is counted as two words and 13th as three words.
- (2) A letter following a group of figures is charged for as one word; thus 104A is counted as four words.
- (3) Fractions expressed in figures and the bars and affixes used in combinations are counted and charged at the rate of one word for each figure, bar and affix used in a combination; thus 109 $\frac{7}{8}$ is counted as six words, 94 $\frac{1}{4}$ ths is counted as eight words.
- (4) In groups of figures expressing time the bar or other sign separating hours and minutes is charged for; thus 12-45 is counted as five words.
- (5) Sums of money are counted at the rate of one word for each figure, letter or symbol; thus 7/6 is counted as three words, £20 15s. 7d. as eight words.
- (6) The symbol % is counted as three words.
- (7) Marks of punctuation with the exception of the full stops and the symbol denoting a fresh paragraph are counted and charged for if they are required to be signalled. Marks of punctuation expressed in words are chargeable at the ordinary inland rate, but the word "stop" is allowed exceptionally to pass at the press rate.

Press messages exceeding 200 words in length in respect of which twenty-four hours' notice has not been given are accepted only at the sender's risk and are not permitted to cause delay to other telegrams; the sender is informed that the Post Office will not be responsible for any delay which may occur in the transmission of unnotified press telegrams.

When special arrangements have been made for the disposal of notified press telegrams and similar messages are tendered for other newspapers, without notice, the acceptance of such telegrams depends upon local circumstances. If arrangements can be made to dispose of them without prejudice to the advised matter the telegrams are accepted and the sender warned that they cannot be transmitted until the wires are clear, but that all unnecessary delay will be avoided.

Press telegrams exceeding 500 words in length may be accepted without additional fee outside the normal hours of telegraph business provided that at least 24 hours' notice has been given. In the case of press telegrams containing fewer than 500 words, Postmasters are at liberty to keep their offices open for the transmission of such telegrams to any telegraph office which is open at the time, or the attention of which can be gained, and to charge late fees in addition to the ordinary press message charge. The following are the fees which the Postmaster may retain for his own use and for the use of his staff:—

(1) For each telegram, not exceeding 500 words in length, irrespective of the number of addresses.

(a) If the office is open for postal business but not for telegraph business 1s. for the clerk and 6d. for a messenger if one is required.

(b) If the office is open for the receipt by wire of press telegrams 6d. for the Postmaster and 6d. for the clerk.

(c) If the office is not open for either postal or telegraph work 1s. for the Postmaster and 1s. for the clerk.

(2) For messages exceeding 500 words the like fees for each 500 words or fraction thereof.

(3) For each continuous message, part of which was tendered before the normal hour of closing, the like fees for so much of the message as is tendered after normal hours.

(4) When several press messages are tendered by the same person at one time, the messages are counted together for all the purposes of this regulation.

(5) Separate fees are payable by each person who tenders a telegram for transmission outside the normal hours of telegraph business.

Late fees are payable in respect of special attendance at transmitting and receiving offices as well as at the forwarding office.

The charges on a press telegram must be paid at the time of handing in except when a telegram is franked by a pass entitling it to transmission without prepayment. Newspaper owners, news agencies, &c., may, by arrangement with the Postmaster-General, send press telegrams under franked passes, the accounts being submitted periodically. A message containing more than 200 words may not be franked unless notice that they will be tendered has been received in sufficient time to enable suitable arrangements to be made for their disposal. A "pass" which has been altered or defaced in any way is not accepted.

In 1870 the sender of a press telegram addressed to several newspapers was required to furnish a sufficient number of copies of the text of the message to admit of one copy being placed at each circuit over which the news was to be transmitted. For some obscure reason this rule was suspended in 1878 and re-established in 1883 and is still in operation.

The addresses may either be written on one form or on separate forms. Originally charges not exceeding 10s. were brought to account by means of stamps, and charges in excess of that amount were included in the appropriate abstract. This arrangement was apparently abolished in 1876 on the modification of abstracts (see Chapter XVIII) and all charges have since been brought to account by means of stamps. If the addresses are written on separate forms the charge at the full day or night rate as the case may be is affixed in stamps to the first form and the copy rate on each of the other forms.

Since 1878 it has been the practice to accept press messages and to signal them before the charge is assessed, in order to avoid delay, if the sender is prepared to deposit a sum of money sufficient to cover the estimated charge, any balance being returned when the charge is computed.

An important concession to the press was the arrangement whereby a long news message may be handed in in several portions. These telegrams are known as "continuous" press telegrams and are subject to the following conditions:—

(i) The whole message must relate to the matter (as, for example, a report of a speech): it must be complete in itself, and must necessarily be printed consecutively in order to render it intelligible.

(ii) It must be sent to one address or one set of addresses.

(iii) No portion of copy tendered for transmission between 9 a.m. and 6 p.m. can be counted together with a portion tendered between 6 p.m. and 9 a.m.

(iv) No copy shall consist of less than the prescribed number of words. When any batch contains less than the prescribed numbers it is charged for as if containing them.

(v) The copy must be tendered at intervals of not more than one hour during the period 6 p.m. and 9 a.m. and thirty minutes between 9 a.m. and 6 p.m.

(vi) Where the authorised interval is exceeded a fresh charge is calculated from the commencement of the portion next following the break.

At the outset news agencies were permitted to enter into special arrangements with the Post Office for the transmission of their news reports and the system is still in operation. The different descriptions of intelligence are classified under distinctive headings and each office concerned is supplied with a list of the items required by local subscribers. The advantage of this scheme of distribution is that the signalling of long descriptions and addresses is avoided and each office is able to select from the news wire in which it is included the items for delivery to local subscribers. In 1872 the Press Association and Central News had adopted the scheme, the Exchange Telegraph Company followed a year or two later, and by 1888 all the important agencies had come into line.

Classified news telegrams handed in by news agencies are not delivered to any newspaper except under instructions from the Secretary to the Post Office. If a subscriber wishes to make a change in the class or classes of intelligence supplied to him he must communicate with the news agency concerned and not with the Post Office. On receipt of advice from the agency the Post Office makes the necessary change in the local distribution list.

In order to facilitate the transmission of stock and share reports, codes were devised for all descriptions of stock included in the daily reports, and specially printed sheets containing the full name of the stocks and shares and the official abbreviations were supplied for use at delivery offices. These sheets are still in use. All such reports being classified the work of the receiving operator is simplified, it being necessary only to insert the market quotation opposite the appropriate stock.

Another expedient designed to facilitate the transmission of a code for fractions in Stock Exchange reports signalled over the principal news wires. The code was:—R for $\frac{1}{4}$; L for $\frac{1}{2}$; CR for $\frac{3}{4}$; CK for $\frac{2}{8}$; FK for $\frac{5}{8}$; K for $\frac{1}{8}$; GK for $\frac{7}{8}$.

All operators engaged in the transmission of news telegrams were required to make themselves thoroughly conversant with these codes in order, as the rule says, "that the delay, which must necessarily take place if the reports are signalled in full, may be avoided." The code for fractions was, however, abolished in 1888 and all such combinations of figures have since been signalled in full.

Other abbreviations such as "tt" for "that" "t" for "the," "cd" for "could" "shd" for "should" were also in common use although no standard list was apparently laid down before 1918 when a list of ninety-two word contractions was issued together with a number of abbreviated terminations. No useful purpose

could be served by quoting the word abbreviations, but the terminations may be of interest. They are:—

fly for fully	...	...	...	e.g. wonderfly
g „ ing	...	...	...	e.g. breakg
gs „ ings	...	...	...	e.g. proceedgs
l „ ial	...	...	...	e.g. substantl
l „ ual	...	...	...	e.g. individl
mt „ ment	...	...	...	e.g. consignmt
n „ ion	...	...	...	e.g. positn
nl „ ional	...	...	...	e.g. professnl
ot „ ought	...	...	...	e.g. brot. thot.
vr „ ever	...	...	...	e.g. howvr
y „ ary	...	...	...	e.g. precautyony

(To be continued.)

THE EXPANSION OF THE ANGLO-CONTINENTAL TELEPHONE SERVICES.

By W. H. GUNSTON.

TELEPHONE service between England and the continent of Europe was first established in March, 1891, when a four-wire cable was laid from St. Margaret's Bay to Sangatte and direct service opened between London and Paris. It is interesting to note that this service antedated the opening of the first trunk line between London and Scotland by at least two years. The service was so great a success that in 1897 additional cables were laid in the Channel by both England and France, the first named between St. Margaret's Bay and Sangatte, and the second between Abbots Cliff and Gris Nez. These cables provided two additional London-Paris circuits, one London-Lille circuit and two telegraph circuits. The service was soon extended to the provincial cities of both countries, and by 1904 was in operation between Birmingham, Bristol, Cardiff and the Lancashire and Yorkshire towns on the one side, and Boulogne, Calais, Lille, Havre, Rouen, Orleans, Nancy, Marseilles, Lyons and Bordeaux on the other. In 1902 a system of charging by zones had been introduced, each country being divided into three zones, an arrangement which still exists.

It was originally proposed to serve Brussels telephonically by the London-Lille circuit, and experiments with this end in view were carried out in 1897. However, in 1902, a direct cable was laid between St. Margaret's Bay and La Panne, and service by means of two direct wires was provided between London and Brussels in the summer of 1903, and extended to other towns in both countries in the October of the same year.

It must nevertheless be admitted that despite its increasing popularity and the steady growth of its traffic, the Anglo-Continental telephone service, 30 years after its inception in 1891, was still, owing in great part to unforeseen and unavoidable causes, practically confined to communication between London and Paris, the North of France, Brussels and Antwerp. The progress of the last three years has changed all this, and the scope of the service has widened appreciably with each succeeding year as will appear from this brief history.

As the traffic between England and France steadily increased it became necessary to provide two more cables, one a coil loaded cable laid by Great Britain between Gris Nez and Abbots Cliff in 1910, and the other a continuously loaded cable laid between the same points by France in 1912, each containing two pairs. The Belgian traffic also necessitated an addition to the number of lines available for the service, and a continuously loaded cable containing three (two physical and one phantom) circuits was laid between St. Margaret's and La Panne in 1911.

In 1913 a service to certain places in Switzerland was opened via France, but the necessity for switching through each call in

Paris and the prior demands of other traffic had the effect of making the progress of telephony between Great Britain and Switzerland slow and unreliable, a state of things which could only be remedied by the provision of a direct line between the two countries.

At the outbreak of the Great War nine circuits were working between England and France and five between England and Belgium.

Public service was suspended during the war, but between 1914 and 1918 no less than 15 additional channels of communication to the Continent were provided for military purposes. After the Armistice these were gradually brought into use for the public service, and at the beginning of this year (1926) 21 circuits were in existence between England and France, 18 running to Paris, and one each to Lille, Calais and Boulogne. In 1923 a two-pair cable (continuously loaded) providing three speech channels was laid from St. Margaret's Bay to La Panne, bringing the total number of Anglo-Belgian lines up to eight, of which four terminated in Brussels, three in Antwerp, and one at Ostend. By this time service had been gradually extended to all the principal places in Belgium.

This last-mentioned cable was manufactured in 1914 for a proposed Anglo-Dutch service, but was commandeered for naval and military use and laid to Dunkirk on the outbreak of war, and recovered and relaid for the Anglo-Belgian service in 1923 as before stated. After the Armistice the demand for an Anglo-Dutch service again became pressing, and in 1922 a coil loaded four-wire cable was laid between Aldeburgh and Domburg (in Walcheren) providing two circuits (one superimposed) to Amsterdam and one to Rotterdam. The traffic on these circuits grew so rapidly that they were overloaded almost from the first, and the provision of a second cable to Holland had to receive early consideration. As a result a continuously-loaded multiple cable of the modern paper-insulated, lead-covered type, containing four sets of quadruple wires ("quads") and providing eight physical and four superimposed circuits was laid in September, 1924. At the present time seven direct circuits are working between London and Amsterdam and five between London and Rotterdam, whilst a good and rapid service is obtainable between all the principal towns in Great Britain and Holland.

The extension to long-distance telephone working of the thermionic valve repeater (a comparatively new invention developed during the war for use in wireless telegraphy) effected a revolution in trunk line practice at about this time. It not only removed the need for expensive conductors of heavy gauge, but extended the range of long distance communication out of all knowledge. The prospect of satisfactory communication with places a thousand and more miles distant from London came within the range of practical politics.

Preliminary negotiations for service with Germany were interrupted by the outbreak of war, and the question was not reopened until the Anglo-Dutch service had taken practical shape. After consideration of the question of adopting a direct sea-cable route to Germany, which was deferred owing to its greater cost, agreement was reached to provide the service via Holland by means of a third Aldeburgh-Domburg cable, the laying of which was completed last May. The experience gained of the working of the second Dutch cable was so satisfactory that the same type was adopted for the third which will provide 12 circuits in all, and together with the second Dutch cable will carry direct lines between London, Berlin, Hamburg, and the principal German cities. The distribution of the circuits in the two last Aldeburgh-Domburg cables will be such that both will carry Dutch and German lines, so that in the event of a temporary fault in either cable the service will not be entirely interrupted. Underground cables specially provided for the purpose will carry the lines from Walcheren to the German exchanges without any intermediate switchings in Holland. Some spare circuits in the cable will be available for other services, and through circuits to places beyond Germany, such as Sweden, are possibilities in the not distant future. Pending the opening of the new direct Anglo-German circuits in October or November this year, a restricted service between 5 p.m. and

8 a.m. was inaugurated in the spring between London, Berlin, Hamburg, Cologne and Frankfurt via the existing Anglo-Dutch and Dutch-German circuits. Continuous service by the same route was provided between London and Berlin and London and Hamburg later in the year. The results obtained in these provisional routes are most encouraging.

The year 1926 has been a notable one in the annals of Anglo-Continental telephony. In addition to the cable for the German service, a still larger Anglo-Belgian cable containing seven "quads" providing 14 physical and seven phantom circuits was laid in July. It is of the same type as the two latest Anglo-Dutch cables, and like them will be served by underground cable routes provided in the repeater stations at both ends. Furthermore, a cable of the same type and capacity is about to be laid between Sandgate and Audresselles. These two submarine cables and their connecting land cables are expected to be brought into use early in the New Year and will provide a rapid and reliable service between Great Britain, France and Belgium second to none in the world. Moreover the Franco-Swiss land cable is approaching completion, and as it will provide direct lines between London and Switzerland, the Anglo-Swiss service will at last be placed on a satisfactory footing. The ample number of circuits in these cables will afford spare wires for extension to countries beyond France and Belgium and the claims of an Anglo-Italian service will receive attention in due course.

The present position may be summarised as follows:—

Anglo-French circuits.

18 London—Paris	} With a considerable number of additional circuits of the most modern underground type throughout early in New Year.
1 " Lille	
1 " Calais	
1 " Boulogne	

Anglo-Belgian circuits.

4 London—Brussels	} do.
3 " Antwerp	
1 " Ostend	

Anglo-Dutch circuits.

6 London—Amsterdam	} Four spare circuits in reserve in the Anglo-Dutch cables will be available either for additions to Anglo-German or Anglo-Dutch services or for extension later to Sweden, etc.
5 " Rotterdam	

Anglo-German circuits.

4 London—Berlin	} Will shortly afford direct communication between the principal British and German cities.
4 " Hamburg	
1 " Cologne	
1 " Düsseldorf	
1 " Frankfurt-on-Main	
1 " Bremen	

Anglo-Swiss.

Two or three circuits in the latest Anglo-French cable are to be extended to Switzerland as direct Anglo-Swiss lines, and it is hoped that a direct Anglo-Swiss service (*i.e.* without intermediate switching in France) will be available early in the New Year.

Telephone services with Austria and Czecho-Slovakia are contemplated at a later date.

An international body (known as the "International Consultative Committee" and composed of representatives of the majority of Telephone Administrations in Europe) now assists—in an advisory capacity—in the co-ordination and development of international telephony in Europe, and in the standardisation of apparatus and materials, &c., and of the methods of operating.

The International Consultative Committee is in close touch with the International Chambers of Commerce and is well informed of the needs of the commercial communities in various countries. There is thus every hope that the difficulties, technical and otherwise, which have tended in the past to retard the development of international telephony in Europe will largely disappear.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of stations working at July 31, 1926, was 1,426,056. During July 19,469 new telephone stations were added to the system counter-balanced by 12,593 cessations resulting in a net increase of 6,876 stations, a relatively small figure owing to the fact that under the present quarterly method of accounting cessations are heaviest in the first month of the quarter.

An analysis of Telephone statistics as at the end of July is given below:—

Telephone Stations—	London.	Provinces.
Total at July 31	500,893	925,163
Net increase	2,283	4,593
Resident Rate Installations—		
Total	102,622	170,972
Net increase	1,036	1,589
Exchanges—		
Total	110	3,954
Net increase	1	14
Call Office Stations—		
Total	4,534	16,218
Net increase	11	92
Kiosks—		
Total	306	1,924
Net increase	16	51
New exchanges opened under Rural Development Scheme—		
Total	—	924
Net increase	—	13
Rural Party Lines—		
Total	—	9,908
Net increase	—	—
Rural Railway Stations connected with Exchange System—		
Total	—	773
Net increase	—	5

The number of inland trunk calls dealt with during June—the latest statistics available—was 8,084,774, an increase of 952,363 or 13% over the figure for the corresponding month last year.

Calls made to the Continent during June numbered 24,212 and those from the Continent 27,072, representing an increase of 5,711 and 4,260 respectively on the totals for June, 1925.

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

PROVINCES—Beaconsfield.

And among the more important exchanges extended were:—

LONDON—East, Hendon, Maryland, Museum, Wanstead, Wimbledon.

PROVINCES—Carlisle, Chorlton-cum-Hardy, Jesmond, Oxford, Parkstone, Staines, Walsall.

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

Braintree—Marks Tey (portion of the Brentwood—Marks Tey cable).

while 81 new overhead trunk circuits were completed, and 92 additional circuits were provided by means of spare wires in underground cables.

WIRELESS BROADCASTING.

FOUR short years ago there was no such thing as a broadcasting service in this country. True, there had been occasional disturbances in the ether from Writtle, where the broadcasting idea was germinating, but those efforts were crude and erratic, and few of us realised that we were listening to the birthpangs of what was to prove one of the most extraordinary scientific booms of modern times. Here and there a few enthusiastic amateurs pursued wireless experiments—a relic of their war-time experiences. Their number was small although their enthusiasm was obviously great, as none would listen to Morse signals as a pastime: and they were no doubt regarded by their intimates as cranks who spent time and money in creating muddles in their homes, to the distress of their order-loving sisters or spouses.

But what a change has taken place in the interval, largely through the brilliant and sustained efforts of those directing the fortunes of the British Broadcasting Company. That company, as the pioneers of broadcasting in Europe, encountered difficulties which the less persistent might have regarded as overwhelming. They were told there was no real demand and that obstacles such as the warring interests in and out of the electrical industry and the ingrained prejudice of the great British Public to all innovations must cause disaster to the undertaking. How well they succeeded in overcoming all obstacles is now a matter of history, and the evidence is everywhere around us. Why even our babes and sucklings now babble learnedly in terms of valve amplifiers, super-sonic receivers, heterodyne effects and statics: and the atomic theory ranks with whooping cough and measles as an early nursery epidemic. Gardens are neglected, men spin like spiders nets of aerials to catch their prey. Would that the nets were as sightly as those of their prototypes?

Three years ago the sceptic prophesied a six months' boom and then rapid dissolution: two years ago he gave it twelve months more of life and now, having gone over to the "enemy," he clamours for better and longer programmes, and the utter annihilation of all sources of interference. At the end of 1922 there were 36,000 licensees: 1923 brought the number to 597,000. Sir Henry Bunbury told the Broadcasting Committee of 1923 that he considered the number would ultimately reach two millions—an estimate then regarded as unattainable if not fantastic. But it has been more than borne out by facts. The total number of licensees passed the limit of two millions in April last, and at the end of August last had reached the figure of 2,101,000—5% more than the "fantastic" estimate. The increase has been steady and there is no show of decline—other than seasonal—at present, the average increase for the past year having been 50,000 a month, and this without reckoning the "pirates" who have so far escaped detection and prosecution—stated in some quarters to exceed a quarter of a million.

In these post-war days the country is said to be impoverished and overtaxed. Yet each one of those licensees must have spent on the average £5 for apparatus—in the aggregate a mere bagatelle of ten and a half million pounds. The cost of living is still 70% above that of July, 1914: we are paying millions a year to America: trade is said to be depressed: but there has never been such a year for motor cars and wireless sets, doles, and silk stockings. Where has the money come from? It cannot all have been saved on the clothes that the ladies do not wear, or the coal that we do not get.

Yet in spite of the alleged money shortage, wireless broadcasting has secured a mighty hold on all classes of the community. Why is this? Laziness, lack of entertainment, general restlessness, wider education, snobbishness, and human sympathy with the sick, may all have contributed their quota: but is it not that there is something more subtle in the very nature of the art of wireless itself. Carlyle would have described wireless broadcasting as thaumaturgic, and here perhaps lies its chief attraction. Magic, mysteries, magicians, and wonder-workers have ever appealed to mankind throughout the ages: and what can be more wonderful than the instantaneous and faithful reproduction of one wee small human voice in every home.

REVIEW.

"Radiotechnique Générale." By C. Gutton, Professor of the Faculty of Science at Nancy. (Librairie J. B. Baillière et fils, 19 Rue Hautefeuille, Paris. 572 pp.)

This volume is one of a series forming the Encyclopédie d'Electricité Industrielle.

It is a complete account of the present-day position of wireless telegraphy. The whole subject, from the discharge of a Leyden jar to the latest developments of wireless telegraphy and telephony, is fully treated, both in its theoretical and its practical aspects.

The first chapter deals with the oscillatory discharge of a condenser through a spark gap, and the second with the methods of charging a condenser for a subsequent oscillatory discharge, together with the various types of spark gap used in practice.

In the third chapter the production of oscillations by means of the arc is discussed, and in the following chapter the various methods of obtaining high frequency currents from alternators, either directly or by means of frequency multipliers, are described.

The fifth chapter deals with the general theory of the three electrode valve, and the sixth with the application of the valve to the production of oscillations.

In the next chapter is discussed the theory of resonance and of coupled circuits.

The theory of the actions in an aerial, and the various forms of aerial in use are the subject of the eighth chapter, and the ninth is devoted to a discussion of the theory of the propagation of electromagnetic waves, the effective height of an aerial and its radiation resistance, and the part played by the atmosphere in the propagation of the waves.

In the tenth chapter the high-frequency resistance of conductors of various geometrical forms is considered, and also the various methods of forming the earth connexion of a station, the resistance of an earth connexion, and methods, such as the Alexanderson multiple aerial, by which this resistance can be reduced.

In the next chapter are described the connexions and general arrangement of various transmitting sets, for damped waves, for continuous waves with arc, with alternator and with valves, and the special transmitting arrangements used for the emission of short waves.

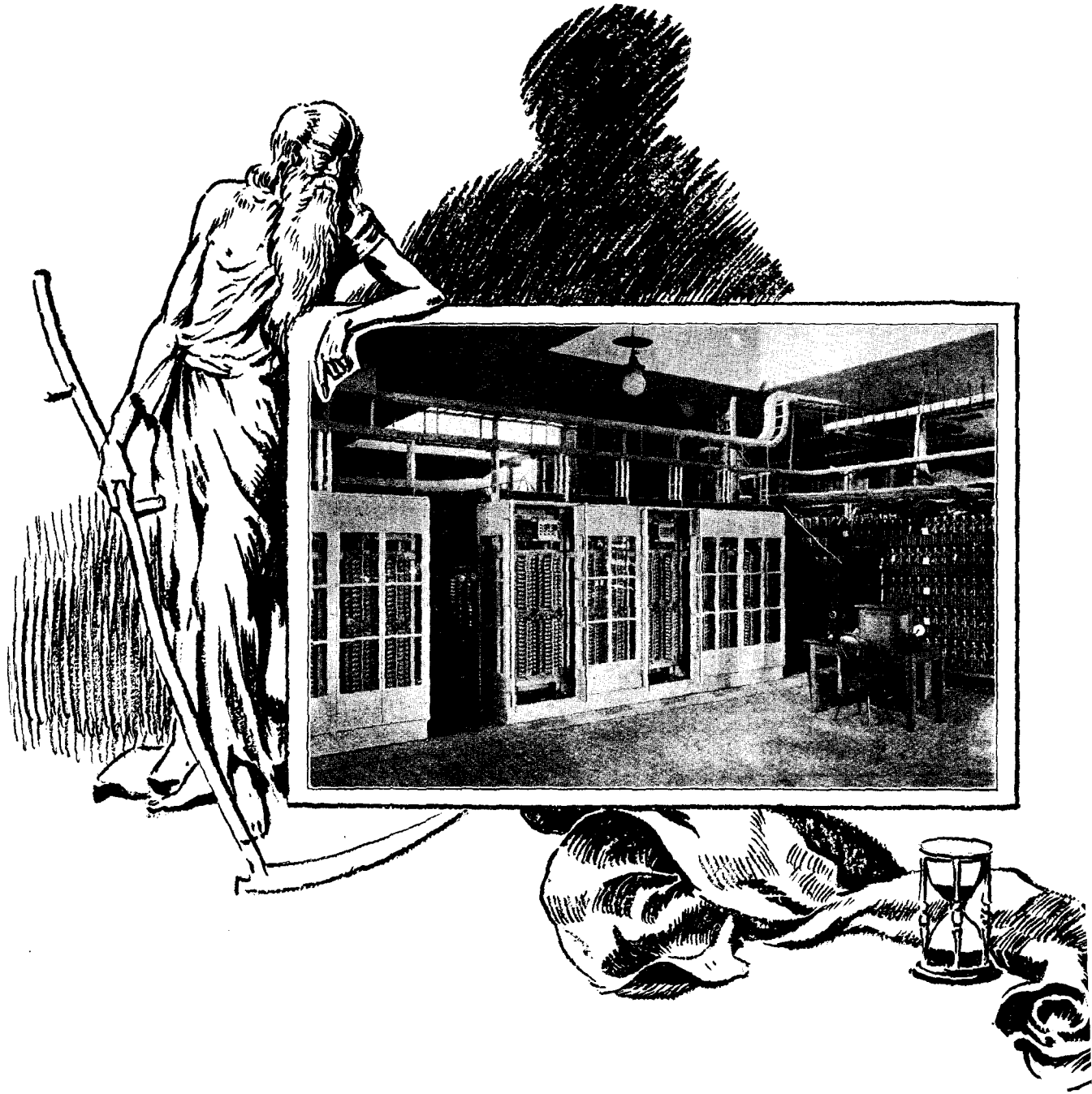
The twelfth chapter deals briefly with the various detecting arrangements which either have been used or which are actually in use at present, from the coherer up to the heterodyne, and with the different arrangements of the connexions of the sets in which they are used. In the following chapter the subject of detection by means of the three electrode valve is considered in greater detail, from the simplest methods in which the valve is employed up to the superreaction and superheterodyne systems. The next chapter deals with the use of the valve for low-frequency and high-frequency amplification, and also for the amplification of a continuous current.

In the fifteenth chapter various receiving arrangements are described, including the Beverage aerial, the neutrodyne, anti-atmospheric receivers and recording receivers.

The following chapter deals with frame reception and direction finding, the next with radio-telephony, including the modern methods in which the carrier wave and one of the side bands are suppressed, and the final chapter with wavemeters and the various other high-frequency measurements necessary in radio-telegraphy.

At the conclusion of each chapter a lengthy list of references to original papers dealing with the subject matter of the chapter is given.

The quality of the paper and of the printing, as in most French books, leave something to be desired, but these are minor defects, and the book can be recommended as a thoroughly complete and up-to-date treatise on the art of radio-communication.



Strowger Automatic Equipment

in

Havana, Cuba.

AMONG the many successful Strowger Automatic Installations, that at Havana is worthy of special mention. Since 1911 this installation has been rendering the residents of Havana the highest type of modern telephone service, and its amazing growth is proof of its appreciation. Not only in Havana, but throughout practically all of Cuba, this equipment, developed and made by Automatic Electric Inc., the pioneer automatic telephone manufacturing organization, is daily establishing standards of rapidity and accuracy that are unsurpassed anywhere in the world to-day.

Automatic Electric Inc.

FACTORY AND GENERAL OFFICES : 1033 W. VAN BUREN ST.
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The Telegraph and Telephone Journal.

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

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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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THE LAST TWO COUNTIES.

WE said last month, on the opening of the Dornoch Exchange, in Sutherland, that we believed that telephone exchanges now existed in every county in England, Scotland, and Wales. We can not only say so quite definitely, but can add Ireland to the list, for with the opening of an exchange at Ballyhaunis by the Irish Free State administration in June, telephone service was extended to Mayo. The year 1926 has thus the distinction of seeing the exchange system extended to the only two counties in the British Isles which it had, until then, failed to penetrate.

The boundaries of telephone districts have, of course, little in common with those of geographical counties. Telephone systems develop on economic lines, and spread afield, in the first instance, to meet commercial requirements. The county, nevertheless, affords a convenient standard by which progress can be measured, it is interesting to see the gaps on the map gradually fill up. In an article which we published in 1915 on the geographical distribution of the telephone in Great Britain, our contributor pointed out that the telephone had then reached every county in the British Isles save Sutherland and the Orkneys in Scotland, and Longford, Leitrim, Roscommon, and Mayo in Ireland. An exchange was opened in Longford soon after that date, but Leitrim and

Roscommon had to wait for the telephone service until it was provided by the Free State authorities within the last few years. Exchanges were opened in the Orkney Islands in 1923, and, as we have seen, in Sutherland and Mayo during the summer which has just closed. The tale is thus complete.

As was to be expected, Middlesex, when the Coleman Street (London) Exchange was opened in 1879, was the first county in the British Isles in which a telephone exchange was established. In the same year Lancashire (with Manchester and Liverpool), Warwickshire (with Birmingham), Lanark (with Glasgow) and Midlothian (with Edinburgh) received their first exchanges. Yorkshire (with Leeds), Staffordshire (with Wolverhampton), and Gloucestershire (with Bristol) followed in 1880. The last English counties to be reached by the exchange system were Hereford (Hereford) 1898, Huntingdonshire (Huntingdon) 1899, and Rutland (Oakham) in 1905. Montgomery, the last Welsh county to do so, received its first exchange in 1910 or 1911.

The opening of exchanges in two remote counties is, perhaps, not an event of the first telephonic importance, but it has something more than a sentimental interest and significance, and, along with the extension of the trunk system to Caithness and the Orkneys, constitutes a gratifying rounding-off of the system as a whole. It affords further evidence, moreover, of the activity of State organisations in providing for public needs in districts which offer little temptation to commercial undertakings.

HIC ET UBIQUE.

A LUTON paper, after enlarging on the superiority of America's telephone development, goes on to say that Germany has twice as many telephones as England, and is adding to them at a more rapid rate. As a matter of fact the British system is increasing at the rate of 9% per annum, and the German at 8%.

A champion of private enterprise, writing to the *Birmingham Daily Mail*, says:

The telephone in New York is also under a trading company, in competition with other companies except so far as local calls are concerned, with the result that the service is so efficient, and the cost so low compared with the general cost of living, that most private houses have it installed.

The American Post Office handles the telegraph service in open competition with private companies such as The Western Union, thus having to bring the service up to the top hole of efficiency, and the price down to rock bottom.

The assailants of nationalised services have usually a lordly disregard for exactitude, or a woeful ignorance of facts. The above-mentioned writer is no exception. The New York Telephone Co. has no local or other competition to face, and as for the American Post Office telegraph service, it exists only in the writer's imagination, and is about as useful in stimulating efficiency as a misinformed "letter to the Editor" would be.

It is reported, says the Greek Journal *Elephtheron Vima*, that the Minister of Communications has requested the Minister of Foreign Affairs to take the necessary steps with the Serbian and Bulgarian Governments to establish

telephonic connexion between Athens-Belgrade and Athens-Sofia. This will be easy to arrange seeing that the telephonic lines are already extended up to the frontiers.

In the event of this being arranged, Athens will then be connected by telephone with Bucharest, Budapest, Vienna, Rome and Paris through Belgrade.

Athens, in this event, could equally truly be said to be connected with Cork or Wick. But a great deal more than the mere provision of a circuit from Athens to Belgrade will be necessary before the former city can talk to Paris.

According to the *Investors' Chronicle*, this week's American advices indicate that plans are being prepared for a large French loan with a mortgage of the Paris Telephone system as security. The proceeds would, it is understood, be used for meeting some of the Government's most pressing needs for stabilisation.

Should control of the Paris telephones be granted to the International Telephone and Telegraph Corporation—for whom Messrs. J. P. Morgan, who normally arranged any French loans are bankers—it will add another link in the series of European cities in which an American network has been installed.

A *Times* New York message (Aug. 4) states that President of the International Telephone and Telegraph Corporation, M. Sosthenes Behn, is in Paris at the moment, and that financiers who have been carefully investigating the situation are stated to have returned to New York with a favourable report. The message also states that some "already envisage the establishment of a network of American telephone and telegraph lines across Europe, similar to the efficient private services prevailing in U.S."

We have heard something like the above before, and were not altogether surprised to see the following disclaimer in the *Financial Times* :—

The rumours recently current that the French telephone system would soon be acquired by a foreign firm was denied to-day by the Ministry of Posts and Telegraphs. The Ministry says that the news that the Government has been studying foreign automatic systems is responsible for this rumour, which is absolutely false.

We learn from the *Electrical Review* that automatic telephones will be in operation in Dublin by December next. The first step will be the changing over of the Ship Street relief exchange, and it is proposed to convert the Central Exchange also to automatic working, as well as the major exchanges on the outskirts of the city, such as Drumcondra, Rathmines, Ballsbridge, and Clontarf; in addition, a new exchange, called Merrion, will cover the area around Merrion Square; it is already acting as a relief exchange, and dealing with over one thousand lines. The automatic system will be used only for local calls. For trunk and junction calls the attention of an operator at the main exchange will be necessary.

With the completion of the new telephone exchange in Berlin it will be possible for subscribers in Berlin and Hamburg to obtain immediate connection with each other without using the "trunk" exchange. This, of course, is the same thing as the "Toll" service in force in this country between London and Brighton, Edinburgh and Glasgow, Liverpool and Manchester, &c.

A new automatic telephone service at Santander, Northern Spain, says the *Morning Post*, was blessed by the Bishop of Santander at its inauguration in the presence of the King.

Here you have the difference in the customs of two nations. In one the opening of a new exchange is blessed by a bishop or archbishop; in the other it is usually cursed by some arch-humorist.

It is interesting to note that in the cricket match at Chiswick between the Australian team and the Civil Service, a Post Office man, Mr. W. T. Cook of the C.T.O., was the highest scorer for the Service with 34.

Arrangements have been made for a Birmingham and District Civil Service Dinner to take place at the Grand Hotel, Birmingham, on Oct. 30. Mr. J. T. Horner, Divisional Controller, Ministry of Labour, will preside, and Mr. Neville Chamberlain, the Lord Mayor of Birmingham, and Sir Evelyn Murray will also be present.

NATIONAL RADIO EXHIBITION.

OLYMPIA, SEPTEMBER 4TH TO 18TH.

FOR the first time this really was a national exhibition, as hitherto internal trade politics have resulted in the holding of two separate exhibitions, neither of which was complete. But these differences have now been overcome and the 1926 exhibition was opened to all British wireless manufacturers and dealers. There were some 200 stands installed and there was plenty of room at Olympia; another change from former shows.

The two main points which were emphasised in the exhibition were simplicity of control and elimination of batteries. Several multiple valve sets which had only one or two tuning adjustments were noticed, amongst these the Solodyne, a five-valve set with screened coils; an arrangement due to Mr. Reyner of the Radio Press, late of the Engineer-in-Chief's Office. A large number of firms showed devices for using the lighting mains in place of or for charging high tension and low tension batteries, but these devices are still comparatively costly.

Cleartron Radio, Ltd., were showing the Lodge "N" Circuit which has caused a good deal of talk recently. The chief object of the arrangement is to get rid of re-radiation. The circuit consists of a variable condenser in shunt with an inductance and is a resonant circuit, the aerial being non-resonant and heavily damped. Owing to the long wave length and heavy damping of the aerial system, it is claimed that re-radiation from the aerial is impossible.

The Radio Society of Great Britain were showing some historical valves and coherers, and the B.B.C. showed a replica of the main studio at Savoy Hill, at which many thousands saw the routine work of broadcasting. The B.B.C., too, did not fail to hand round a pamphlet with the usual "Don't do it" slogan of Captain Eckersley.

Of the technical improvements, apart from simplification of control, it was interesting and satisfactory to see the tendency to supplant transformer coupling by resistance and choke coupling for loud speaker amplification.

Loud speakers of every description were to be seen in profusion, but nothing strikingly new was apparent.

It was an appropriate year for the first real national exhibition, as it is now just a quarter of a century since Senatore Marconi first signalled across the Atlantic, and the scene at St. John's, Newfoundland, was reproduced by the Marconiphone Company in honour of the occasion. At this scene we were pleased to renew our acquaintance with the evergreen Mr. Kemp who told us once more what had been done by himself and Mr. Marconi in the early days of wireless.

TELEGRAPHIC MEMORABILIA.

At times one receives shocks, other than those of the electrical genus, when engaged on telegraph duties, but we of the C.T.O. were quite unprepared to read in the middle of a particularly successful morning's cable-work over the London-Penzance-Halifax, N.S. circuit at 11.45 B.S.T. on August 31, and in the middle of a cablegram the following arrestingly terse words from the Fayal repeater office in the Azores, "earthquake serious"—then silence. Further information reached us via New York to the effect that considerable damage had been done and that the apparatus had all been put out of gear. Fortunately the British staff escaped injury or the worse fate of some of the inhabitants of Horta, and great credit is due to all our telegraph colleagues in that volcanic centre of the Atlantic that despite the chaos which such an upheaval must have caused alike to material and nerves, —ceilings had fallen down, batteries smashed, &c.,—yet within eight hours of the disaster temporary repairs and re-adjustments had been made and signals were once more speeding their sinuous course homewards and outwards.

Fayal has been more than once described in this Journal as the Clapham Junction of submarine cables, and one cannot but hope, with all one's heart, that no more serious seismic disaster may befall this important cable centre or any of its sister islands where American, British, German, Italian and Portuguese cable interests meet, in their united endeavours to link up the Old and the New Worlds.

Still on the subject of submarine long-distance cables the following paragraph, issued by a press agency and published by one of the most reputable of the London daily press, appeared on the 2nd of last month:—

34,000-MILE CABLE.

New York, Wednesday.

"The Western Union Cable Company has completed a three months' task in the landing of the cable connecting the United States with England, which measures over 34,000 nautical miles."

We frequently read that the telegraph annihilates distance, but America does seem a long way off at times. It is also known that a cable is not always laid in an absolutely straight line from point to point, but *this* particular cable must have been taken right round the globe before it landed on our shores. Either the time taken to lay these thirty odd thousand miles or the number of miles must be incorrect!

A propos of cables, as these lines are being written we learn that the cable ship *Faraday* has set out to lay part of the new Pacific cable, which will connect Vancouver with Australia and New Zealand.

The 2,145 miles of cable which form the section between Fanning Island in the North Pacific and Suva, Fiji, will also be carried by the *Faraday*, which will thus lay that part of the cable which will link the Dominions and complete an all-British route.

The cable has been manufactured by Messrs. Siemens Brothers and Co., Ltd., at Woolwich. It will be laid at the rate of about 10 miles an hour, and as laying will be carried on continuously day and night, the whole length should be completed in about 10 days from the time that the work begins.

Over a year ago, records *The Electrical Review*, three Frenchmen invented electrical apparatus, to be attached to a telescope, for the purpose of recording the exact instant at which the image of a star crosses the centre line of the field of a telescope. Now a young Danish engineer has perfected the work of the Frenchmen, reports a London evening paper, which explains that the method is, roughly, as follows: At the eye-piece end of the telescope is a photo-electric cell, in front of which is a plate with slits in it, so that only at the moment when the star is in the centre of the telescope's field will its light reach the photo-electric cell. The current which is then generated loads one grid of a special valve, with two grids, by means of which the slightest alteration in the potential of the grid connected to the photo-electric cell is highly magnified. It is further magnified by a 4-valve amplifier, so that it will work a relay, which makes the record on a tape. As the star passes each of the slits in the plate between the telescope and the photo-electric cell dots are recorded on the tape so that the exact mid-point can be read with fine accuracy. There is a certain time-lag, caused by the pause while the current loads the grid of the 2-grid valve, but this is a fixed factor of about one-tenth of a second, and can be allowed for. It is stated that Mr. B. Stromgren, son of the director of the University Observatory at Copenhagen, has so perfected this apparatus that a star of the eighth magnitude, far too faint to be visible to the naked eye at all, records its passage. The importance of the invention is that it secures increased accuracy in the measurement of time.

Captain P. P. Eckersley, M.I.E.E., Chief Engineer of the B.B.C., recently gave an interesting lecture in which the lecturer emphasised the policy of national broadcasting developed in England as contrasted with the policy in America, "which national policy had become the admiration of the world, including America."

Naturally the position of the B.B.C. and the Government Committee's report thereon and regarding the present policy he said that as a matter of fact a chairman had not yet been appointed. He had been told that in future he would be a Government servant, but reading the report as any member of the public would read it, he could not see that they would necessarily be under Government control; in fact, he should say that the undertaking

would be less under Government control than at present, because the idea underlying the future of broadcasting was that there should be no privileges and also no restrictions. In his opinion, only on that idea could broadcasting go ahead. If Mr. Bernard Shaw was to be forbidden to speak because he might be controversial, that would be restricting a new art which was being very carefully watched by those in charge of it. Moreover, in the past, there had been the excuse that the income of the B.B.C. had been restricted, and he hoped that in the future the very simple idea would be adopted by the Government that money subscribed towards a service should go towards that service. The Company could deal with an income many times greater than its present one efficiently in the public interest, and it was difficult to understand why a new and growing thing like broadcasting should be restricted in that manner.

Regarding the technical policy of the B.B.C., Capt. Eckersley said that the aim had been to increase the area of the crystal user (what he then called the "crystal area," a term he has now abandoned in favour of "service area"). In order to carry out this idea to the full, the obvious thing was to increase the present number of 21 main and relay stations; indeed, to erect 42, but that was not a simple matter. At present, however, the urban areas had been covered in such a manner that 85% of the users could get an uninterrupted programme, and the next step was to deal with the country areas, work upon which was proceeding.

The Geneva Conference allocation of wave-lengths meant considerable sacrifice on the part of all countries, but he regarded it as extremely satisfactory that such an arrangement should have been come to.

Captain Eckersley visualised a future for wireless in which a combination of wireless and line telephony would enable the whole of the world to be linked, so that public men speaking in any part upon world topics would be heard simultaneously all over the world, which would be a great factor in maintaining world peace. This prospect might be possible in 10 or 15 years, but why stop at linking various parts of one country; why should not countries be linked in the same way? It was there that one of the great possibilities of wireless in conjunction with line telephony was to be looked for.

We understand that a new edition of *Herbert's Telegraphy* is in course of preparation and that its well-known author is hard at work in bringing this standard work absolutely up-to-date. This will be no mean feat in these days of rapid changes in the design of high-speed machine telegraphy.

The struggles of our colleagues at the other end of the foreign telegraph circuits are no less intense when it comes to languages than are our own at times, especially if, as happened recently, a launch is made into the grandiose, thus: "We are already considerably amassed assist please" or on the same day, "We used urgently four arms and are in a scrape owing of much work aid please."

Needless to say extra staff was hurried to the scene!

Our foreign colleagues will pardon the insertion of the following delicious extract from an article on "Lighting the Village," by V. C. Sampson, contributed to *The Electrical Review*, which story could not but be puzzling to our Continental friends, written as it is in the Derbyshire *patois*.

"Tramping across a wild stretch of moorland one recent afternoon, a call for refreshments was made at a well-known hostelry which is situated at the crest of one of the magnificent peaks.

The inn is an interesting old place. The interior is low-ceiled and oak-panelled, and extremely picturesque, a reminder of the long-distant past. However, an excellent and very modern meal was served. Amid such surroundings satisfaction should have been complete, but one factor marred the enjoyment. Autumn dusk had descended over the land, and mine host obligingly "lit up" a very foul, although elaborately-ornate, oil-lamp.

Watching the thin clouds of black smoke belching against the fine old oak rafters, we could not forbear saying—"What a pity that you have to put up with a light of that description; that lamp must ruin the decorations in a week."

"Aye," agreed the landlord, "it tak's some fettling doan in t' spring, I'll 'low! But what maun I do? Theree's noa gas raand here, mon."

"Electricity," we said, enthusiastically, "will do the trick for you easily."

He looked at us suspiciously. "Theree's bin monny a felly," he said, slowly, "raand here wanting to sell me one of them generating sets, as they calls 'em, but I'm noan having onny! Ingines is noan in my line! I'll use 'lectricity—and be glad to do it!—when they brings it raand on a caart, same as old Hawky brings us t' paraffin."

On the recommendation of the Radio Research Board of the Department of Scientific and Industrial Research, waves of accurately known frequency have been transmitted during the past three years from the National Physical Laboratory (5 HW) in order to provide means of checking the calibration of wave-meters and other apparatus. In order to increase the usefulness of this service, the present transmissions of eight waves covering a range of from 360 to 60 kilocycles per second (833 to 5,000 metres wave-length) between the hours of 15.00 and 16.00 G.m.t. on alternate Tuesdays are to be greatly augmented. The new transmissions commenced on Sept. 7, and includes 16 waves, transmitted in two sections, each once per calendar month between the above-mentioned hours. On the first Tuesday in each month the short-wave (960 to 260 kilocycles per second) programme will be radiated, and on the third Tuesday the long-wave (200 to 30 kilocycles per second) programme will be sent out.

The *Morning Post* recently gave particulars of a proposal put forward by Mr. J. D. Chisholm for the broadcasting, to consumers of electricity, of concerts, &c., by way of the supply mains. Mr. Chisholm pointed out that towns could be connected just as they are to-day for the purpose of relaying B.B.C. programmes. All that the recipient would require would be a loud-speaker or a pair of headphones, used in conjunction with a special attachment which ought not to cost more than 20s.; this would be connected to any electric lampholder or socket, d.c. or a.c. No tuning would be necessary; the apparatus could be used in any room, and would be set in operation by turning on a switch.

Mr. Chisholm stated that all the technical difficulties had been overcome, and it only remained to make arrangements with the electricity supply authorities and to set up studios in the principal towns, each controlled by a committee. He said:—"A group of bungalows is being supplied with broadcasting through an electric light power station, and wireless sets in these buildings have been put on one side. The reception is superior to that of any wireless set. It is unfortunate for the wireless manufacturers, but this system has got to come now that it has been perfected."

In *The Electrical Review* of September 21, 1923, a precisely similar system was described at some length and was also mentioned by the *T. and T. Journal*. It was there also stated by our contemporary that for 18 months the North American Co., through its subsidiary, Wired Radio, Inc., had been experimenting with a system of wired-radio broadcasting over electric light and power lines, under the patents of Major-General G. O. Squier. The system was being developed in co-operation with a number of large lighting and power companies. The sending apparatus was connected to one phase of the three-phase lines at the power house, and the receiver was plugged into a lampholder or other socket. Apparently the transmission was done at low power, as the receiving apparatus included an amplifier.

It is said in connexion with the Baird system of television that the inventor conducted many of his experiments, that is to say both transmitting and receiving single-handed despite the fact that the former apparatus was installed in the centre of London and his receiving set at Harrow. My informant maintains that by means of an automatic transmitter he set the London apparatus going, then dashed by motor car to Harrow where he was able to make the necessary adjustments to his receiving arrangements.

It is noted that a set was on sale at the recent Radio Exhibition at Olympia, London, and one of his first experimental sets have been presented to the Patent Museum, South Kensington.

An interesting incident, by-the-by, is related as having happened at Olympia during the above-mentioned exhibition, which is probably unique.

The thousands of visitors to the National Wireless Exhibition at Olympia were startled to hear a child's whimper come from the direction of the lofty ceiling, where the loudspeakers hang.

Then a tiny voice called, "Daddy, Daddy."

The Announcer followed with the information that if anybody present had lost a small boy, he could be found in the studio on the gallery.

The parents claimed the child within two minutes.

As an old telegraphist who commenced his career in the C.T.O., in 1881 and who, winning a position on the Engineering Staff until he became a Staff Engineer at the E.-in-C.'s headquarters, we offer our congratulations to Mr. F. L. Henley who retired well and hearty last month upon reaching the age limit. May your shadow never grow less, my dear Henley!

Maybe the fact that the International Telegraph Conference which took place in Paris this time last year is now considered by most of our readers as a completed fact. A fact no doubt, but its works surely follow it as witness the little noticed but nevertheless important Comité which sat at Cortina a month or two ago, which committee was actually a branch of the Conference proper. There is yet another offshoot of the Conference to be held next month in Berlin at which a number of specialised subjects will be dealt with, interesting alike to telegraph engineers and those responsible for the disposal of telegraph traffic. One very interesting item is likely to be the working of telegraph circuits in telephone cables. A subject particularly necessary as one for international discussion nowadays, at home and abroad.

I am afraid this month's notes will stretch themselves out beyond the patience of my colleagues on the Managing Committee not to speak of the Managing Editor. Anyway risks must be taken, and I would ask my readers what they would think of electrical facilities such as those which are afforded by the Electric Light Association of North Wales, North Dakota, at least one can only judge by the following letter sent out to its clients:—

"Regarding electric power on Tuesdays—the plant will put out only 20 amperes. An iron pulls about five amperes and a motor for washing about two amperes. The plant will thus handle only four irons at one time. There are eight who have them and the four to use it in the morning are: Mrs. Geo. H. Johnson, Mrs. Geo. Lachner, Mrs. J. Levin and Mrs. Platz. The four in the afternoon are: Mrs. Fischer, Mrs. Fraser, Mrs. Nelson, and Mrs. Wareburg. If any others want to use power at this time they will have to see the engineer. It is for your own good to observe these rules. If more go on than the plant will handle, you will not get the power you want, and besides, you might hurt the engine by overloading." It is probable adds *The Electrical Review* ironically, that this station is maintained to enable America to claim to have the smallest, as well as the largest undertaking.

And now to more serious matters!

AUSTRIA.—The international Law Association Conference opened in Vienna, Austria, on August 10. Lord Phillimore presided. According to *The Times*, the report of the Aerial Law Committee, of which Mr. H. F. Manisty, K.C., Recorder of Berwick, was chairman, pointed out that next spring a conference of the Powers would be held in Washington with regard to technical matters arising out of the use of the ether for wireless messages in peace time, and the Committee came to the conclusion that any concrete proposals on the problem of "interference" would be premature. It recommended that the principle of control of the ether should be incorporated in any wireless convention; that sanctions should be laid down, to be adopted in the municipal law of each contracting country, for enforcing obedience to international regulations embodied in the convention; and that any international dispute arising out of such convention be justiciable by the Permanent Court of International Justice at The Hague. Upon the doctrine of air sovereignty *usque ad coelum* as applied to the use of the ether for wireless, the Committee was divided. As regarded wireless in war, it came to the conclusion that it would be premature to make any recommendations in view of the rapid development of wireless.

The recommendations of the Committee were adopted with unanimity, with the amendment that the principle of air sovereignty as laid down in the 1919 Aerial Navigation Convention should in any future drafting embrace wireless also.

AUSTRALIA.—It is officially announced from Melbourne that the "beam" wireless-telegraph station in Australia will commence testing operations in October, and general working soon afterwards at rates not exceeding 2s. per word.

The Electrical Review states that satisfactory progress is being made in Melbourne city with the construction of pneumatic tubes between the various branch post offices and the new central telegraph office, and the tubes should be operating when the new electric telegraph office opens for business about March, 1927. The tubes will carry telegrams handed in at the branch offices direct to the central telegraph office.

In conjunction with Amalgamated Wireless (Australasia), Ltd., the Commonwealth Lighthouse Service proposes to experiment with wireless-telephony as a means of breaking down the isolation of some of the more distant lighthouses. Owing to the high cost of land and submarine cables, many lighthouses have at present no means of communication with the mainland whatever. The first experiments are to be made at the lighthouses on Clifty Island and Deal Island, in Bass Strait. A third station will be erected on Wilson's Promontory, and communication will be established through this station. The wavelength will probably be about 800 metres.

In July last, the Premier (Mr. Bruce) had a long conference with the Postmaster-General (Mr. Gibson) with regard to requests for an alteration of the existing wavelengths and alleged excessive charges for patent royalties and copyright. The wavelength question was being examined, and a definite pronouncement was to have been made by the Government before the end of last month. The patent royalty question, he said, was being taken up with the Government directors on the Amalgamated Wireless Board, and with regard to copyright charges, a conference was being convened by the Government.

Broadcast radio receiving licences issued in June numbered in: New South Wales, 2,582; Victoria, 8,525; Queensland, 1,742; South Australia, 969; Western Australia, 318; Tasmania, 109; the total for the Commonwealth being 14,245. The number of licences held in Australia at the end of June was 125,047, of which 63,494 were held in Victoria; those held in other States were: New South Wales, 36,929; Queensland, 8,100; South Australia, 12,105; Western Australia, 3,886; Tasmania, 1,170. The totals at the end of June, 1925, were: New South Wales, 35,209; Victoria, 20,491; Queensland, 1,328; South Australia, 3,399; Western Australia, 3,621; Tasmania, 588; the total for the Commonwealth being 64,636. At present there are 3.8 licences in Victoria per 100 of the population, the Commonwealth average being 2.1. The figures for other States are: New South Wales, 1.6; Queensland, .9; South Australia, 2.2; Western Australia, .1; Tasmania, .5.

Suggestions emanating from Sydney and Brisbane that there should be a variation of the wavelengths of the "A" class broadcasting stations in Australia have been investigated by the Postmaster-General's Department, and it is almost certain that a widening of the margins between the various stations will be agreed to. Another report says there is every possibility of the wavelengths of the stations being so varied that all will be brought under 600 metres.

Reuter's Trade Service, Melbourne, reports that a proposal was discussed at a meeting held at Ballarat (Victoria) which was called to consider a proposed relay station in the city. It was eventually agreed that a public demand under the wireless regulations be made to the Postmaster-General for an additional "A" class station at Ballarat to relay the 3LO (Melbourne) service. One speaker said it would not be long before there were 250,000 licences in Australia. Victoria had 60,000 licences now which, after the payment of royalties and administrative fees, meant £60,000 a year to the broadcasting services. Melbourne had a wireless installation to every 17½ people; Ballarat had approximately one to 90. He added that a 500-watt station could be established for approximately £1,000.

BELGIUM.—It is announced from Brussels that an official wireless-telegraph service will be opened shortly between Belgium and the Congo, and vice versa.

CANADA.—According to *Commerce Reports* the total Canadian production of radio apparatus, accessories, and batteries during 1925 was valued at \$5,548,660. The statistics for the year show a steady development of the industry and a tendency toward production of complete sets rather than parts. About 48,500 complete sets, valued at \$2,196,000, were made. The production of valves was double that of the previous year, and amounted to \$1,299,680, the value of all other parts being lower than in 1924. Of firms manufacturing radio apparatus and equipment, six engage solely in that production, nine make them in conjunction with the manufacture of other electrical goods, and 12 battery manufacturers report production for radio service. Imports of radio apparatus and parts into Canada during 1925 totalled \$3,552,530, of which the United States supplied \$3,358,300. As exports were practically negligible, the apparent consumption of radio apparatus amounted to \$9,101,200.

CHINA.—Reuter's Trade Service, Shanghai, reports that the wireless telegraph station at Kalgan which has been transmitting commercial messages for a number of years, is encouraging the use of wireless by the public. Notification has been issued to the effect that the station will charge the same rates as the Telegraph Administration, with a free service for coding and decoding. The latter probably refers to the necessity for translating the Chinese language into figure groups before it can be transmitted by the telegraph instruments, with the necessary sequence of reversing the process before it can be delivered to the public, a service for which a fee is generally exacted both from the sender and the receiver!

CUBA.—(See Mexico).

CZECHO-SLOVAKIA.—*The Gazette de Prague* says that for two years the radio-telephone industry has been well represented at the Prague Fair and that this section is extending more and more as the Czecho-Slovak industry develops. In the radiophonic section of the Prague Autumn Fair, which was held from August 29 to September 5, more than 60 Czecho-Slovak, French, British and Italian radio firms were represented.

FERNANDO PO.—From Madrid, Reuter's announce that the Director-General of the Colonies and Morocco (Madrid) has been authorised to invite tenders for the construction and erection of a radio-telegraph station at Santa Isabel, Fernando Po, or in the vicinity.

GERMANY.—According to the *Tägliche Rundschau* (Berlin) employment in the German radio industry has been very favourable during the past few weeks, in spite of the fact that in former years August has usually brought with it a slackening in demand. The increase in the number of users has led to a considerable improvement in sales, in crystal sets especially. On the other hand, business in valve sets has been somewhat smaller than was expected, mainly owing to the reserve of country buyers. The difference in business in crystal and valve sets is particularly clearly illustrated by the fact that the number of firms manufacturing crystal sets and parts has further increased during the past few months, while a decrease has taken place in the number of firms manufacturing valve sets owing to bankruptcies and suspensions of activity. Export business is said to be but small on account of the patent licences which have been granted to foreign firms by the Telefunken-Gesellschaft. Great hopes are entertained regarding the results of this year's wireless exhibition.

The new high-power station which is being erected at Langenberg is expected to be in a sufficiently advanced state to commence test transmissions towards the end of the year. Its power will be 60 kw.

HOLLAND.—Perhaps the most astounding situation that has yet arisen in connexion with broadcasting is that related by *The Electrical Review* which writes as follows:—"The Netherlands station at Hilversum, one of the oldest stations in Europe, has always belonged to a private technical enterprise and was intended to advertise amateur activities. As this method turned out to be very expensive, it was proposed to close the station; thereupon a committee of listeners collected subscriptions among Dutch radio amateurs to pay the programme costs (fees, copyright, &c.). Meanwhile the organisation has still to bear all technical expenses, a situation that cannot last. More than once the Committee urged the Government at The Hague to regulate the matter by law, and *The Times* explains that Ministers in succession created Royal Commissions, composed mainly of political leaders, but the reports have been of so little practical use that the Government has been unable to base a Bill upon them. The matter, however, has become urgent in view of the International Radio Conference to be held at Washington in 1927. If (so it is urged) Holland does not adopt at once wavelengths of between the margins allowed for broadcasting purposes by the Geneva conference, then the Netherlands will be unable to claim any useful wavelength. Wishing to rally enthusiasm for the sake of a really national service, the former Minister of "Waterstaat" (the Government office for dyking, posts, telegraphs, and telephones) composed his Royal Commission of representatives from all political and religious quarters. The Commission's report, recently published, has been severely criticised by the Press, yet it is the only base upon which his successor can found the Bill which he will introduce for regulating broadcasting in Holland. Last year the manager of the Hilversum station, yielding to pressure from the orthodox Christian (Protestant) group, consented to allow it a weekly transmission, which stimulated at once the formation of a Roman Catholic radio association and of a Social Democratic broadcasting group, each of which obtained one special sending evening a week. In consequence tendentious programmes are forced on the Dutch listener, and the lesser social, political, and religious sects are besieging the management with demands and requests."

The Dutch Minister in Vienna, Jonkheer Van Nispen tot Sevenaer, officially inaugurated on August 9, a wireless-telegraph service between

Vienna and Amsterdam. A few minutes after communication was established, Vienna transmitted its first telegram.

HUNGARY.—*World Radio* relates that the unexplained explosions which occurred some weeks ago on Csepel Island, in the Danube, a few miles south of Budapest, have damaged the transmitter erected on the island, and a new station will therefore be erected of sufficient power to enable anyone in Hungary to listen with the simplest crystal set. The new plant should increase the popularity of broadcasting in Hungary, which country is backward as compared with western Europe.

IRISH FREE STATE.—The Free State Department of Posts and Telegraphs recently announced that the licence fee for the use of wireless receiving apparatus, both valve and crystal sets, had been reduced from 20s. to 10s. a year. The new licences can now be obtained at any Post Office in the Free State at which money order business is transacted.

MEXICO.—A treaty has been signed, but not yet ratified, between the Governments of Cuba and Mexico, providing for connecting the telegraph systems of the two countries by wireless and instituting a system of transmission for public and private purposes.

POLAND.—All restrictions hitherto in force have been abolished, except that the authorities still reserve the right to withdraw or refuse permission to grant licences to foreigners living within the frontier. The procedure for obtaining licences has been made simpler; nevertheless, registration remains compulsory, and "piracy" will be dealt with by fines, or imprisonment.

PORTUGUESE EAST AFRICA.—According to a communication from Mozambique, via Lisbon, there has been constructed on the island of Bazaruto a wireless-telegraph station working on a wavelength of 600 metres and with a range of 100 miles, which is open for public service and for navigation.

SCOTLAND.—In the annual report of the Fishery Board of Scotland for 1925, it is suggested that to reduce the costs of herring fishing a greater use should be made of wireless, so that trawlers might be saved the trouble of steaming for, sometimes, 100 miles in search of fish.

SOUTH AFRICA.—The Radio Act, 1926, includes, among other things a schedule of licence fees for transmitting and receiving sets, ranging from £1 for an experimenter to £6 5s. for a hotel, or other premises licensed for the sale of liquor. It is reported that the financial position of several broadcasting stations in the S.A. Union is not as satisfactory as might be desired.

According to the *Daily Mail's* Johannesburg correspondent, broadcasting is in jeopardy in South Africa. In the year just concluded a private broadcasting company in Johannesburg lost more than £4,000, and the Durban (Natal) municipal station nearly £9,000; the Capetown station was also run at a loss. A conference is being held to discuss nationalisation, or, alternatively, a Government subsidy. In this connexion the Editor of the *British and South African Export Gazette* says: "Because the Union imported wireless sets, parts, &c., to the value of only £102,375 in 1925, as compared with £284,565 in the previous year, a lot of nonsense is being talked about the trade being no longer worth the serious attention of the larger merchant houses who have concerned themselves with it during the past year or so. My personal belief is that we have not yet experienced the full strength of the demand which exists in South Africa for wireless apparatus of all kinds, and I base it on the fact that broadcasting, as such, has never been developed to anything approaching its limits. All credit, of course, is due to the organisations in Cape Town, Johannesburg, and Durban, which have been "on the other" for the past three years or more, but they will be the first to admit that they have not been able to maintain public interest in the programmes to the fullest possible extent. This latter point is obviously the governing factor in the wireless trade, and it remains to be seen whether the complete reorganisation of the broadcasting services in the Union which the public are demanding will bring about a revival. I think it will, for the basic interest in the science is undoubtedly there, and the sales saturation point is far distant. Meanwhile, although the imports of British apparatus were affected by the marked decline in the total value of the Union's purchases from overseas, some other countries actually did more business in 1925 than in 1924. True, the entire amounts done by such countries were not comparable with the £84,000 which went to British manufacturers, but the indication that competition is increasing is obvious."

Another phase of the question is to be found in a letter to the *Wireless Trader* in which a member of a Durban firm of radio apparatus dealers draws attention to the size of the Union of South Africa and the futility of appointing an agent in, say, Johannesburg, to deal with business for the whole of the country. He says that Americans, who have studied the market, do not make this mistake. Again, it is pointed out that distributors' costs in South Africa are so heavy that the ordinary English retail prices provide an inadequate margin; these prices should therefore not be printed in catalogues &c., for public information.

SOUTH AMERICA.—Marconi apparatus is part of the equipment of British settlers who left England early in September to open up tracts of country in Bolivia, South America, in accordance with an agreement recently made between the Bolivian Government and Bolivian Concessions, Ltd. They fitted it up on the vessel in which they sailed, the 600-ton *President Seevedra*, and will thus enjoy all the advantages of wireless communication throughout the journey. The 500-watt telephone and telegraph transmitter (type YC5) is to be used under normal conditions as a land station; the receiver (type RP4b) mounts five valves, one for reaction, two for high-frequency amplification, one for rectification, and one for low-frequency magnification. Its all-round utility either as a portable, or "semi-portable" model should make it very suitable for the purpose of the settlers.

SPAIN.—Reuter's Trade Service at Madrid says that a radio club has been formed at Almeria. It will meet the cost of running the transmission station installed at the port. Trials at the new station, it is reported, have yielded excellent results.

The Union Radio, which recently celebrated its first birthday, has taken over the control of the Cadiz station and the two stations in Seville, which is a step further towards the long-desired aim of a single broadcasting company in Spain, which will put an end to the existing conflict of interests, says *World Radio*. Radio-Castilla has applied for the necessary official permission to introduce various technical improvements, and while these are being carried out, it will be necessary for transmission to be temporarily suspended.

SWEDEN.—The new broadcasting station owned by the Radio Club of Helsingborg, which has commenced operation with a wavelength of 235 metres, will serve as a link for relaying Stockholm and Malmo programmes. Sales of radio materials have been good during the winter months, says *Commerce Reports*, especially large sets which permit reception from European stations. An increased number of radio licences was issued during the first quarter of 1926.

SWITZERLAND.—During last year the Swiss Marconi Co. transmitted 411,000 wireless telegrams, or about four times as many as in 1924. It is noteworthy that 61% of the messages were despatched to London. A special department has recently been opened at the central telegraph office in Zurich where business men may telephone wireless telegrams to the transmitting station at Munchen-buchsee.

U.S.A.—PATENT INFRINGEMENT.—The United States District Court for the Eastern District of Pennsylvania has found for the plaintiff in the case of the De Forest Radio Telephone and Telegraph Co. v. Westinghouse Electric and Manufacturing Co., a radio patent suit concerning alleged infringement of the plaintiff's patents on the so-called "feed-back" or "regenerative" circuit arrangement employed with a three-electrode vacuum valve. The question of priority as between the De Forest and the Armstrong patents was at issue, and the effect of conflicting decrees of the District Court for the Southern District of New York, affirmed by the Circuit Court of Appeals of the Second Circuit, and of the Court of Appeals of the District of Columbia was squarely raised, says the *Electrical World*. The two courts first named sustained the Armstrong claims, and the defendant maintained that the question was, therefore, *res adjudicata* and could not be reopened. The court in Pennsylvania refused to accept this view, holding that these decrees were interlocutory in nature and that the decision of the Court of Appeals of the District of Columbia must control, unless additional testimony carried conviction that that court was in error. After analysis of such testimony, the Pennsylvania court held that this was not the case, and declared that De Forest was the first and original inventor of the feed-back circuit and the oscillating audion, and that claims Nos. 1, 2, 3, 5, 8, 9, 12, 14, 15, 16, 17, and 18 of Armstrong patent No. 1,113,149 are invalid.

Autumn.—Ye storm-winds of Autumn !
 Who rush by, who shake
 The window, and ruffle
 The gleam-lighted lake :
 Who cross to the hill-side
 Thin sprinkled with farms,
 Where the high woods strip sadly
 Their yellowing arms—
 Ye are bound for the mountains !—*Matthew Arnold.*

J. J. T.

THE POST OFFICE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

SESSION 1926-1927.

The opening meeting of this Society takes place on Monday, October 18, at 5.30 p.m. at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, when the Chairman for the Session, Mr. E. H. Shaughnessy, O.B.E., M.I.E.E. (Assistant Engineer-in-Chief, G.P.O.) will give an address on "Developments in Wireless Telephony." Tea and light refreshments will be provided prior to the meeting in a convenient room adjoining the Lecture Hall.

The other meetings and addresses during the session are as follows:—

<i>Date</i> 1926		
Nov. 15	"Some considerations of the possibilities of Automatic Telephony in London as foreseen from a traffic viewpoint."	Mr. Horace Dive, M.B.E. (Superintendent, London Telephone Service).
Dec. 20	"Overseas communication—its origin and development."	Mr. H. G. Sellars (Overseer, Cable Room, Central Telegraph Office).
1927		
Jan. 17	"The design and erection of Post Office buildings."	Mr. H. G. Warren, A.R.I.B.A. (2nd Architectural Assistant, G.P.O.)

Date 1927

Feb. 21	"Telephony from many viewpoints."	Miss A. E. Cox (Superintendent, Exchange Staff, London Telephone Service).
Mar. 21	"London Postal Service."	Lt.-Col. W. T. Brain (Assistant Controller, London Postal Service).
April 25	"The Telegraph Service Past and Present."	Mr. A. W. Edwards, O.B.E. (late Deputy Controller, Central Telegraph Office).

We should like to remind our readers that all members of the Staff of the Post Office are eligible for membership of this Society on approval by the Committee and that by permission of the governing bodies members of the Society may attend the meetings of the Post Office Institution of Electrical Engineers and of the London Telephonists' Society. Particulars of such meetings can be obtained on application to the Agents.

The subscription is, Women 1s. 6d., Men 2s. 6d. per annum, payable in advance, and membership booklets may be obtained on application to any Agent in the following list:—

	OFFICE OR DISTRICT	AGENT
Secretary's Office	- - - -	Mr. G. Bowthorpe (Offl. 211), Mr. A. J. Wadey (Offl. 681), Mr. F. Kemp (Offl. 414).
Accountant-General's Department	-	Miss K. A. Boulding (T.B.E.) Regent 6600).
Central Telegraph Office	- -	Miss A. J. McCarthy (Offl. 324), Mr. W. G. Hodgson, Mr. F. Mitchell, Mr. F. J. Symes (Cable Room), Mr. W. G. Wood, Mr. A. J. Rowlands.
Engineer-in-Chief's Office	- -	Mr. William Day (Offl. 811) and Mr. R. Greenstreet (Offl. 634), Mr. A. Hansard (Willesden 3376) P.O. Engineering Research Station, Dollis Hill, N.W.2.

LONDON ENGINEERING DISTRICT.

- Mr. E. Tidd (Victoria 101), Centre External: 116, Victoria Street, S.W.1.
- Mr. E. H. Robins (Gerrard 101), Centre Internal: 34, Gerrard Street, W.1.
- Mr. C. E. Griffiths (Willesden 101), N.W. External: Willesden Exchange, St. Andrew's Road, Willesden Green, N.W.10.
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- Mr. S. Copp (Park 101), West External: Park Telephone Exchange, Portobello Road, W.11.
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- Mr. F. J. Paine (Hop 101, Extn. 73), City External: Denham Street, S.E.1.
- Mr. A. J. Gardner (Paddington 101), West Internal: 77, Market Street, W.2.
- Mr. G. C. Geisler (Clerkenwell 9601), N. External: Dalston Exchange, Kingsland Green, Dalston, E.8.
- M. A. Wright (Hop 101, Extn. 150), S.E. Internal: Denham Street, S.E.1.
- Mr. J. H. Gwyer (Battersea 101), S.W. External: 66, North Side, S.W.18.
- Mr. P. J. Garrett (Battersea 101), S.W. Internal: 66, North Side, S.W.18.
- Capt. F. Bruton Haywood (Official 631), Superintending Engineer's Office: Denham Street, S.E.1.
- Mr. H. Deaves (East 101, Extn. 22), East External: 17, West India Dock Road, E.
- Mr. J. Paddon (Maryland 1101), N.E. Internal: Maryland Exchange, Jupp Road, E.15.
- London Postal Service: Mr. W. H. Cripps (Offl. 570) (Cont. Office).
- London Telephone Service: Mr. M. C. Pink, Cont. Office (City 2000, Extn. 278).
- Metropolitan Power District: Mr. H. W. Fulcher (City 6607).
- Stores Department: Mr. J. Mairs, Studd Street, N.1. (Offl. 634), Mr. J. K. Waters, 17, Bedford Street, W.C.2. (Offl. 638), Mr. W. H. Shinn, Holloway Factory, N.7. (Offl. 619).

or from the Registrar Treasurer, Mr. W. K. Cherry, London Telephone Service, G.P.O. South, London, E.C.4. (Telephone: City 2000, Extension 276) and the Hon. Secretary, Mr. D. H. Thomson, Secretary's Office, G.P.O. North, London, E.C.1. (Telephone: Official 298).

The latest editions of the undermentioned books have recently been added to the Society's library:—

Elements of Statistics	... ..	Bowley
Herbert's Telegraphy	... ..	...
"Telephony	... ..	...
Modern Finance and Industry	... ..	Wade
An Introduction to Practical Mathematics	... ..	Savelby
The Internal Combustion Engine	... ..	Wimperis
Modern Electricity and Magnetism	... ..	Shackel
Elementary Practical Mathematics	... ..	Perry
The Inspection and Testing of Materials, Apparatus, and Lines	... ..	Henley
A Course in Practical Mathematics	... ..	Savelby
The Admiralty Handbook of Wireless Telegraphy	... ..	...
Technical Electricity	... ..	Davidge and Hutchinson

Application for books should be forwarded to the Hon. Librarian, Mr. H. Booker, Wireless Telegraph Section, Secretary's Office, G.P.O. North, E.C.1.

CORRESPONDENCE.

"THE FUTURE OF TELEGRAPHY."

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

SIR,—I should like to tender my congratulations to Mr. Archibald for his paper on "The future of the Telegraphs."

The facts of the existing situation are faced quite boldly and there is no attempt to ignore them, unpleasant as they are to all old telegraph men. But, what I wish specially to direct attention to, is the fact that Mr. Archibald has arrived at the same conclusion which I reached in my paper on "The problem of the Telegraphs," namely, that the way of progress lies in the formation of Local Study Circles. Personally, I believe that the telegraphs have a future, and I will even venture to prophesy that the problem can, and will be solved, and I wish to call special and earnest attention to the judgment pronounced by Mr. Archibald.—Yours faithfully,

T. E. HERBERT.

Manchester, September, 1926.

[We have very much pleasure in publishing these few appreciative and optimistic lines from our esteemed friend.—Ed. T. & T. Journal.]

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

SIR,—I was much amused to read Mr. Archibald's paper on "The Future of Telegraphy" and am wondering how many of his audience realised he was "pulling their leg?"

"I can see no better means of displaying our interest than in taking pride in putting forward any suggestion, however unimportant it may seem," is a real gem.

As one who has put forward many suggestions to the department, and received varying rewards from "mind your own business" to the "Secretary's thanks," I can claim to have a fair idea of how suggestions are received. Experience of the reception of suggestions over a period of years has convinced me that unimportant trifling suggestions are rewarded but all others turned down. If on engineering matters—a mere telegraphist cannot teach an engineer anything. If the suggestion touches administration—again turned down. (The idea of a telegraphist suggesting improvements in administration!) In fact, there is hardly a suggestion possible that would not be condemned by someone interested in turning it down.

My suggestion that before a suggestion was finally turned down, the one who suggested it should be allowed to see the comments and reply to same has also found the W.P.B.

The present Baudot typewheel emanated from the traffic section, an improvement on it was submitted by me before it reached the galleries. This was not only turned down with thanks, but the papers were lost so that when it was referred to after the wheels had been in use and found fault with, I had to supply a copy.

The author also says "Our circulation arrangements are not yet perfect and they are expensive. Can anyone offer a suggestion." My reply is "If you refer to the C.T.O. the answer is in the affirmative."

In conclusion. If the department wants suggestions it must treat them with more respect. If an impartial tribunal were appointed with power to override departmental chiefs and others who object to fresh methods, then the suggestions will be forthcoming.

C. YOUNG, C.T.O.

[We insert this letter gladly. Our own belief is that suggestions of all kinds are carefully considered, and more than that, in some of the larger offices special organisation exists for considering suggestions. It may be the case that from the point of view of an officer making a suggestion there may at times appear to be an undue conservatism, an impression which it is very difficult to remove. There is also the undoubted fact that individuals making suggestions cannot always see the "cons" as well as the "pros" of the case.—Ed., T. & T. Journal.]

PRESENTATION TO MR. PRATT, HIGHER CLERICAL OFFICER.

On leaving the North Midland District for the position of Chief Clerk at St. Albans, Mr. Pratt was the recipient of a handsome gold Albert chain and a silver cigarette box, the gift of the staff.

The presentation was made by Mr. Haley, the District Manager, who expressed on behalf of the staff regret that Mr. Pratt was severing his connexion with the North Midland District, and stated that he would carry with him the good wishes of the whole of the staff in his new sphere.

Mr. Pratt suitably replied.

C.T.O. AMATEUR GARDENING ASSOCIATION.

THE Central Telegraph Office Amateur Gardening Association held their 19th annual Autumn Show on Sept. 15. The exhibition showed that the high standard of excellence usually to be noted was, on this occasion, too, well maintained. Owing, no doubt, to the unfavourable season the exhibits were not so numerous as usual, but the freshness of the exhibits and skill shown by the competitors in staging their produce, made the exhibition a notable one. The chief interest of the show was the remarkable

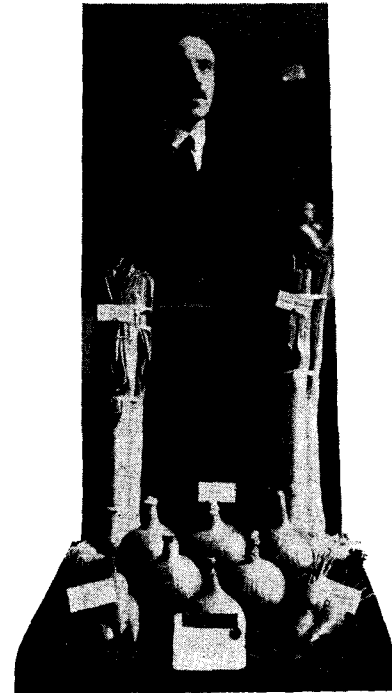


exhibit of Mr. H. Savage (of the Cable Room) in the class for a Collection of Vegetables. Each of the various vegetables shown, leeks, onions and carrots, displayed evidence of the highest culture. The judges themselves were delighted both in the superlative quality and the excellent method of staging of the exhibits. In the opinion of many competent old-time members and exhibitors, it was the finest exhibit ever seen at the C.T.O. Shows.

During the day the exhibition was visited by the Controller and the Assistant Controllers, who always show a lively interest in these competitions.

"FLUTE" FOR "FIFE."

A correspondent writes to the *Westminster Gazette*:—

Sir,—As there seemed to be the greatest difficulty in distinguishing "five" from "nine" on the telephone the Post Office adopted the expedient of substituting "fife" for "five." In actual practice, however, this is no improvement. Numbers with "nine" in them still come through for those with "five," and vice versa.

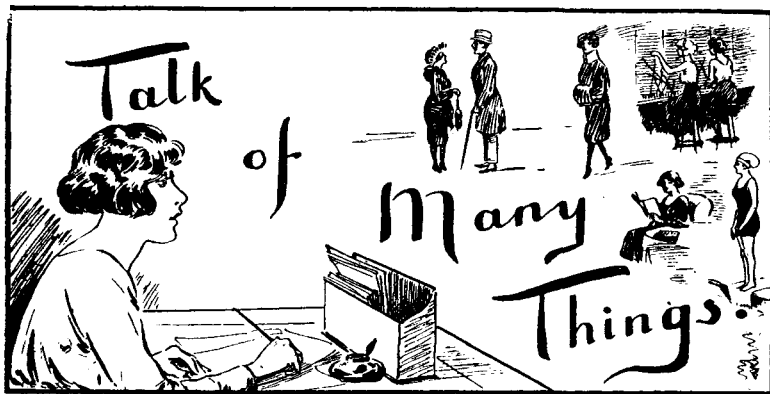
May I suggest an easy way out of the quandary? "Fife" is present in everybody's mind as a musical (more or less) instrument, rather than the name of the constituency for which Lord Oxford and Asquith sat for so many years. The twin brother to the fife is the flute.

Why not substitute "flute" for "fife"? To call up 5,205 you would say, "Flute two oh flute," and there could be no mistake. The nines would cease to be troubled and the weary telephonist would have a little rest from the complaint, "Wrong number, Miss." Perhaps if you give publicity to my suggestion the Post Office will be induced seriously to consider it.—Yours, &c.,

F. O.

[Seeing such luxuriant humour in the full glory of print might tempt even the most sober-minded to wallow in soul-destroying puns. We are moved to remark that "flute" does not seem to us a particular good "cymbal" for "five."]

WE TELEPHONISTS



"If that one Ship. . ."

Slowly, majestically, relentlessly the ship sailed. The excitement and confusion of the last few moments died down. She had been with us—a part of us, indivisible as it seemed—but now she had become suddenly and horribly a thing apart, bearing away, away, and severing grievously the ties of affection. Dark fear gripped the soul; memory surged and we were pierced with the pain of its sweetness. The heart beat wildly and the hand reached out involuntarily but unavailingly. Each throb of the engine, each beat of the screw added immeasurable distance and intensified the feeling of separation. The great adventure, the supreme trial, so often and so fearfully rehearsed in imagination was now an inevitable and irrevocable fact—no going back, no turning from the plough in unworthiness. And she—was she regretful, would she even now return if she could? No! How proud and how calm and dignified she had been at the last. Will she return or shall we never meet again? Will mere distance become instead the vaster separation of time and will that lengthen again into the unbridgeable infinity? Still the ship bears on. The stimulus of excitement is gone and there is left only a loneliness filled with phantom fancies and vain regrets.

The news spread from mouth to mouth with the fleet wing of evil tidings the ship had sunk in a collision in a raging waste of waters: she went down like a log, a total loss. Poignant grief succeeds a numbed stupefaction, the heart bursts, manhood is forgotten in stifled sobs.

"Hard luck, old chap, that swan sinking your new steamer! Never mind, old boy, father will buy you another. The swans ought to be kept off the boat pond." And so a tearful lad went home to tea with a sympathetic pal of a father—stopping en route for one of Mr. Wall's solacing creams.

PERCY FLAGE.

"Oh, Wad some Power the Giftie gie us, to see Oursels as Ithers see us."

True for you, Rabbie Burns! I wonder how many of us can read those lines and remain smug and complacent; how many can look round smilingly and say "Aha, my friend—if there's one thing I am sure about it's what others think of me!"

Take a business man—a bank manager, for instance—He strides into his office—looks round importantly and waits for the junior clerk to rush over and open the door of his private sanctum. The cashier and other clerks stand respectfully to attention until the august gentleman is safely in his room.

"Just as it should be," thinks the bank manager, if he thinks about it at all.

What of his staff?

"Old boy late again," says the cashier.

"Doesn't his tie shout!" grins another, while the junior is trying on the "old man's" hat, and comparing it unfavourably with his own.

However, the bank manager doesn't know all this, and so his self-respect remains unshaken.

A well meaning and charitable young lady goes down into the slums to brighten the lives of the inhabitants. She provides woollen comforters for the women, boots for the children, tobacco for the men: then drives off in a perfectly justified glow of satisfaction at having done something for her poorer neighbour.

Those people—who should be saying, "Ah, the dear young lady, bless her bonny, bright face—" What are they saying?"

"If I'd her money, I'd buy myself a decent hat!"—from the girls.

"Fancy her trying to teach me how to cook!" says the mother of a family.

"Boo-hoo!" cry the little ones, "Can't climb up de lamppost wiv dese boots on!"

Still, the young lady doesn't hear all this and she also retains her self-satisfaction.

But, Rabbie, those lines of yours do not apply to the telephonist, do they?

That young person labours under no delusions as to her brains, capabilities or personal appearance. If she never reads the newspapers, then the subscriber obligingly keeps her *au fait* with the latest about herself. Trips she to work in the morning happy as a lark and at peace with the world, speedily is she brought back to normal with the words, "Don't be ridiculous—they *must* answer—I'm a Director!" Says she in a voice of honey, "I am sorry the number is engaged"; she is crushed with "Give me the supervisor—they've been engaged one and a half minutes."

She is seated in the train, weary after an afternoon of "rushy" work. What is the man on her left saying?

"I tried to get you this afternoon, old chap. Couldn't! Suppose the exchange girl was having a cup of tea. Ha! ha! ha! I cleared off to Lyons without you—was thirsty, b'jove." She wonders vaguely why it should be humorous for her to go to tea and not for him.

On reaching home, she props a newspaper up against the teapot. The word "telephone" catches her eye and she reads that owing to a telephonist's cockney accent, an address is taken as "Clothes Line" instead of "Cloves Lane." Her mind wanders back to that first interview, when she had to read a long passage from a book before she was considered as a candidate, and she wonders if "Cockneyism" is catching and if this "Clothes Line" telephonist has to deal with subscribers whose accent perhaps is not that of Oxford!

To cheer her drooping spirits she goes to the "Movies," and there, to her horror, she sees a "Hello Girl." A gum-chewing, frizzle-headed damsel with roving eyes and a mania for dealing (telephonically) with anybody's business but her own.

You have all seen her—oh, my sisters—this travesty of an exchange girl—the like of which was never seen in an exchange! Where does the outside world get its ideas? Does a small and frivolous minority let us down, or do we have too many apologies made for us! Whatever the reason, adverse criticism seems to have agreed with us. Where in London will you find healthier, jollier, wittier girls than in the L.T.S.? Where will you get such a quick response to a charitable appeal? Without trying to set up a Mutual Admiration Society I venture to state that we are of business London's best and that if the Press does criticise us it is because we are interesting enough to be criticised.

W. M. G., Albert Dock Exchange.

We print below extracts from a poem in an American paper *The Christian Science Monitor* :—

The roads of "Merrie England"
Are the loveliest I know—
They lie across the moorland
Where gorse and heather grow.
They creep between the hedges,
They twist and turn, and here
They race up to the sky-line
And pretend to disappear.
And if you follow quickly
You find they still are there,
Leading onwards, ever onwards,
Through the villages and towns
Like an endless ribbon stretching
Over honey-coloured downs;
Rough and stony on the fell-lands,
Scrambling up the mountain steep,
Curling in between the boulders,
All among the mountain sheep. . . .
They may beckon through the beeches,
Silver beeches in the sun,
On through pine trees, scented pine trees
(Like a sentinel each one).

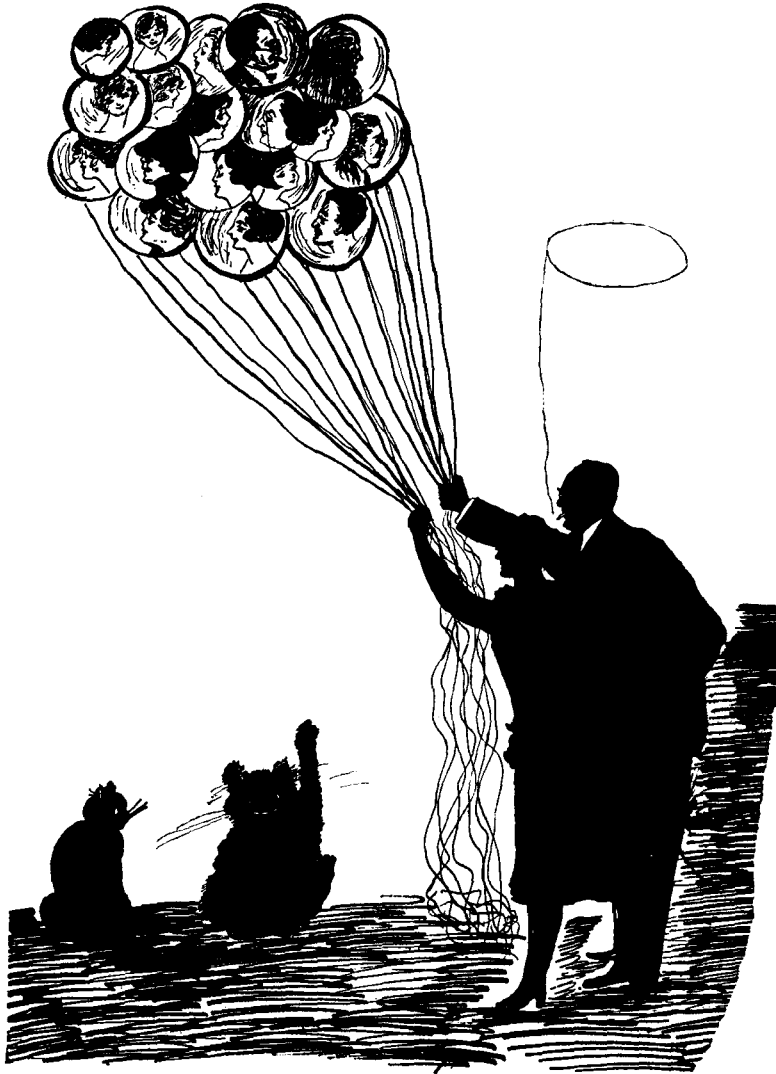
The roads of "Merrie England"
Are like a motley throng—
For some are rather short roads,
And others rather long—
Then some are soft and sandy
Wandering to and fro,
As if they feel uncertain
Of just the way to go.
Some roads are black and shiny
And new as new can be,
But other roads are old roads
O'erhung with mystery,
All peopled with the shades
Of Britain's ancient history.

The roads of "Merry England"
Are never twice the same,
And every time you follow them
You thank the Lord you came.

Coming Events ?

[" Rehearsals are shortly to take place at Gerrard. . . ."]

Then up and spake the Gerrard cat,
 " Oh, girl, say, what a brain !
 Oh, gee, now can you beat it,
 They've hauled them in again.
 Our chief must be told in news concise
 That they'll ruin our trade with the Gerrard mice." C. A. S.



Mr. P. (log.): All I ask is a long, clear "call,"
 And Thou beside me at St. George's Hall.

[Drawing by M. C.]

Popesgrove Exchange.

It is fitting that Twickenham, now a borough, should have its own telephone exchange, and this, under the name of Popesgrove, was opened on September 11 last. The first call was made by Councillor J. Mitchell, M.A., J.R., Chairman of the Council.

Owing to phonetic difficulties it was not possible to name the exchange Twickenham, and Popesgrove was decided upon as appropriate to the borough, inasmuch as Alexander Pope, poet and satirist, lived in Twickenham for 25 years. He is interred in a vault in Twickenham Church.

Steadily the old-world charm of the Twickenham that he knew is vanishing, never to return, before the onward march of the material Progress of to-day ; but, as Pope himself says :—

" . . . Still to-morrow's wiser than to day ;
 We think our fathers fools, so wise we grow ;
 Our wiser sons, no doubt, will think us so."

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.

TELEPHONE NOTES.

ACCORDING to a Reuter's Trade Service report quoted by *The Electrical Review*, the conversion of the telephone system to automatic working is being gradually effected by the German postal authorities. At present the transition is being made or prepared in about twenty towns.

* * * * *

Passengers crossing the Atlantic Ocean in the United States liner *Leviathan* can, through the ship's high-power radio-telephone outfit of the duplex type, carry on a conversation with friends on shore. Thus, when the liner is 2,000 miles east of New York on her way to Southampton, connexions can be obtained with towns and cities as far distant as Los Angeles and San Francisco, 5,000 miles away, says the *Daily Mail*, which explains that the ship's operator gets into communication with Deal Beach, New Jersey, the shore station, and the usual land line connexions are made. For the facility afforded a passenger who speaks from mid-Atlantic to someone in New York, the caller has to pay £2 for three minutes, while for every additional 1,000 miles roughly another £1 has to be added for the minimum conversation.

* * * * *

According to a report in *The Electrical Review*, it will be possible on completion of a new telephone exchange in Berlin, for subscribers in Berlin and Hamburg to obtain each other on a "no delay" basis.

* * * * *

The following extract from a report on "Electric Communication" by a committee of the American Institute of Electrical Engineers gives an interesting résumé of the position with regard to machine switching telephony in the United States.

MACHINE-SWITCHING TELEPHONY.

With the continued steady growth in the application throughout the country of machine-switching telephone apparatus have come further developments in this form of apparatus. In the panel system, which is the type of system used for large cities, a simplified form of tandem switch has been developed by which, after one selection at the calling office, the final selection of the called office can be made by apparatus located at a distance from the originating office, and used to collect traffic from a number of offices routed over common groups of trunks. This results in a material saving in the trunk plant.

A more efficient method of associating a sender with the calling subscriber has been developed. This results in an appreciable saving in the number of senders required, uses more economical apparatus, and reduces the number of types of apparatus required in an office.

In the step-by-step system, which is the type usually used for the medium and smaller sized cities, a line-finder system has been developed which is similar in principle to that being used with success in panel offices. This employs the same selector that is used in the rest of the switching train, effects an improvement in service to the subscriber, and lends itself more readily to efficient equipment layout.

A machine-switching tandem system, employing step-by-step equipment, has been developed for completing toll calls within a 50-mile radius of any given central office area. All calls completed through this system are handled directly by the originating operator over dialing trunks. A tandem system of this kind probably will find its principal application in areas employing step-by-step machine-switching equipment. An installation of this type recently has been put into service in Los Angeles and serves some 75 central offices having a total of approximately 400,000 subscribers. The principal new engineering feature of this system is the means which was developed for dialling and signalling over phantom toll lines.

New types of frames for mounting step-by-step equipment have been developed which take advantage of the ceiling heights ordinarily found in central office buildings, thus effecting a material reduction in floor space requirements.

A cordless "B" switchboard has been developed for completing calls from manual offices to machine offices where the number of manual offices involved makes the use of dialling devices at the manual offices prohibitive in cost. This switchboard employs new trunking principles which result in very efficient and simplified operating equipment.

* * * * *

The special correspondent of *The Electrical Review* reports that, owing to a number of disadvantages now disclosed in the working of the automatic telephone system, the Government of India has abandoned its intention of extending the system to places where it has still to be introduced. The principal defect found is that the system requires intelligent operation and mishandling is likely to result in wrong numbers being obtained, the subscriber having to pay for his mistake. On this account the system is not considered to be quite suited to India. The care needed to "dial" a number often proves too exacting for the average native. It is further stated that they are unpopular and that the anticipated economies in the reduction of the number of operators are counterbalanced by the necessity of employing highly-paid experts to adjust the apparatus. We seem, however, to have seen this statement flatly contradicted elsewhere, and we are inclined to believe that the automatic is the ideal telephone exchange for Oriental countries, where many languages are used by the subscribers.

H. J. E. S.

LONDON TELEPHONE SERVICE NOTES.

Telephonists' Society.

By the time these notes appear the first meeting of the new session will have been held and an account of the proceedings will be given in the next issue. It is not too early, however, to give a reminder regarding the annual competitions. They are three in number. First, there is the usual papers competition divided into three classes with awards of two and a half guineas in each class. Competitors may choose any subject they please. Secondly, there will be a repetition of the "Happy Holiday" photograph competition which proved so popular last year. The third competition is a new one and will appeal to budding dramatists. A prize of three guineas will be awarded for the best short play or sketch which should take not less than half-an-hour to perform and its main interest should be telephones. A point to be noted is that the competitions are only open to members of the Society.

* * * *

Swimming Gala.

The Annual Gala will be held at the Pitfield Street Baths on Friday, October 8. The "Pounds Cup" will be competed for by teams from many exchanges, the "Prossor Cup" competition will take place and the diving championship and many other events will be decided. An account of the contests with the results will be given in these notes next month.

* * * *

Sports Association.

The Sports Association has commenced its work by bringing together the various cricket clubs in the service with a view to arranging regular inter-club matches on the Chiswick Sports Ground. It is the intention to arrange representative games with other departments, and dates will be reserved for trial matches to be played in order that the best possible L.T.S. team can be built up. It is hoped that a real interest will be created by these games and that they will attract a fair measure of support. Arrangements are in hand for the game of tennis to be dealt with on similar lines.

* * * *

Visitors.

From time to time it is the pleasant duty of the writer of these notes to conduct visitors on a tour of telephone exchanges, and it is always a matter

of great interest to observe the features which impress the different visitors. Recently, an American lady who is connected with the commercial side of telephony in the United States was shown over some exchanges, and when asked what impressed her most, referred to the floral decorations in the switchrooms. She thought that the introduction of Nature's colours and form into workrooms was a stroke of genius, and her admiration increased when she learned that the staff themselves provided the decorations.

Within a few days of this visit a German professor was conducted round some exchanges. He observed the flowers but said that he was most impressed with the air of alertness in the switchrooms, and remarked on the speed with which the calls were dispatched yet with an absence of flurry.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Resignations on account of marriage :—

Miss E. L. WHITING, Assistant Supervisor, Class II, of North Exchange.
Miss M. G. SAXTON, Telephonist, of London Wall Exchange.
Miss C. D. A. DEACKES, Telephonist, of London Wall Exchange.
Miss W. COPE, Telephonist, of Mount View Exchange.
Miss ALICE M. WEBB, Telephonist, of New Cross Exchange.
Miss VERA E. FRENCH, Telephonist, of New Cross Exchange.
Miss K. E. CLARKE, Telephonist, of North Exchange.
Miss G. O. MOUNT, Telephonist, of Paddington Exchange.
Miss D. E. HYNE, Telephonist, of Riverside Exchange.
Miss B. G. DURRANT, Telephonist, of Trunk Exchange.
Miss M. L. MCGOVERN, Telephonist, of Trunk Exchange.
Miss F. A. E. K. CHORLEY, Telephonist, of Victoria Exchange.

Traffic Staff promotions :—

Mr. P. W. H. MAYCOCK, Assistant Supervisor of Traffic, Class I, to Superintendent.
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SECRETARY'S OFFICE CRICKET CLUB INTER-BRANCH COMPETITION. FINAL ROUND.

Some sketches of the match between the Telegraph Branches and the Traffic Section.

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

ANNOUNCEMENTS and critiques of productions by "The G.P.O. Players" have now become a periodical feature of Service Journals. Seemingly the Post Office has no intention of leaving the realms of dramatic art entirely to other Government departments—a spirit to be applauded; for friendly rivalry gives birth to good fellowship.

Since their production of "Julius Caesar" in December last, "The G.P.O. Players," confident in the support of Service colleagues, have formed, under their old title, a Dramatic Society independent of The City Literary Institute. They are fortunate in obtaining the services of a very able professional, Major Hodgson-Bentley (founder and director of the Southend Repertory Theatre) to produce "Thomas More," an original play of singular merit, of which a brief outline by the author appears in the October issue of *St. Martins-le-Grand*. This will be the first production of the play in London. Major Hodgson-Bentley has, however, already produced it professionally at the Southend Repertory Theatre, where it was enthusiastically received.

The Society's production of the play will take place at King George's Hall, Caroline Street, Great Russell Street, W.C., on Friday and Saturday, Oct. 29 and 30, commencing at 7.30 p.m. This hall possesses an excellent stage and is furnished with comfortable tip-up seats. Tickets, 5s. 9d., 3s. 6d.,

2s. 6d., and 1s. 6d. (all reserved) may be obtained from any member of the Society, its Secretary (Mr. Cyril Leigh, Mails Branch, Secretary's Office, G.P.O. North, E.C.1), or through local representatives of the Rowland Hill Benevolent Fund, to which (by arrangement with the Secretary of that Fund) the proceeds will be given. Apart from the assured excellence of the production, the Society's desire to assist a deserving Service organisation is commendable.

The Postmaster-General, Sir W. L. Mitchell-Thomson, Bart., K.B.E., M.P., is President of the Society, with Viscount Wolmer, M.P. (Assistant Postmaster-General), Sir G. E. P. Murray, K.C.B. (Secretary to the G.P.O.), Sir H. N. Bunbury, K.C.B. (Comptroller and Accountant-General) and the Chiefs of other Headquarters Departments as Vice-Presidents. The Society is fortunate in having Mr. L. Simon as Working Chairman.

NEW TELEPHONE CABLE IN HUNGARY.

Work is about to be commenced on the erection of a long-distance telephone cable between Budapest, Hungary, and Prague, Czecho-Slovakia. The line will run via Raab, Ung.-Altenburg, and Pressburg.

THE Telegraph and Telephone Journal.

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NOVEMBER, 1926.

No. 140.

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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XXXIV.—

MR. GEORGE HENRY
TAYLOR.

THE absorption of the National Telephone Company by the Post Office at the end of 1911 brought to the service of the State many men whose natural abilities and technical qualifications were assets which have been of no small value in the great telephone development of this country since that time, and of these the subject of our photograph this month is an outstanding example.

Mr. George Henry Taylor, A.M.I.E.E., graduated as M.Sc. (Tech.) in Victoria University, Manchester, in 1908, and entered the service of the Company in the Traffic Department of the District Manager, Manchester, in that year. His marked ability and his high technical knowledge quickly brought his work under notice, with the result that in 1911 he



was transferred to the Headquarters traffic department of the Engineer-in-Chief of the Company, and in that capacity passed to the Post Office service as a member of the little band which was later, in company with the traffic staff of the Department, to become the Traffic Section of the Secretary's Office.

In the course of his duties in the Secretary's Office, Mr. Taylor became widely known and respected for his genial manner, his willingness to help at all times, and his personal efficiency, and it was with great regret that his colleagues at Headquarters said "Good-bye" to him on his recent promotion to the post of District Manager, Edinburgh.

Mr. Taylor has interests in many directions, and his hobbies include photography, motoring, cricket, and, needless to say now that he has crossed the Border, golf.

It is the hope and confident expectation of all who know him that he will travel far in the Service.

EDINBURGH AUTOMATIC EXCHANGE.

FIVE minutes before midnight on Saturday, Oct. 2, the Edinburgh Central Exchange was not at the service of its subscribers for the first time since its opening in 1906. Together with its relief exchange, Museum, its connections were cleared and it was closed at midnight, and the subscribers working on the two exchanges were transferred to the new automatic exchange. By 12.10 a.m. on Sunday, Oct. 3, all lines had been disconnected from their old exchanges and were connected to the new automatic equipment, and the first call over the new system was being made by the Lord Provost of Edinburgh to Col. T. F. Purves, O.B.E., M.I.E.E., the Engineer-in-Chief.

All subscribers who were working on the Central and Museum exchanges now have new 5-digit numbers on the new "Edinburgh" Exchange. For convenience in plant lay-out there are four separate units comprising the new exchange, the main unit in the Central Exchange building in Rose Street, and satellite units at Morningside, Murrayfield and Newington. The Central unit has been equipped for 7,820 lines and the initial installation will be completed by equipment for a further 900 lines on the second floor when the old Test Room is dismantled.

So far, only the inner portion of the city has been dealt with. In addition to the two exchanges which have been closed, the complete scheme provides for the conversion to automatic working of all exchanges within a 5-mile radius of the centre of the city, viz.: Colinton, Corstorphine, Davidson's Mains, Granton, Leith and Portobello. These exchanges will be closed and replaced by sub-exchanges on the Edinburgh system as it becomes necessary to replace the existing equipment. In the meantime, it will be possible for subscribers working on the automatic plant to obtain direct communication with the telephonists at these exchanges by dialling the code numbers assigned for the purpose. For calls to all other exchanges the subscribers are requested to dial "O" by which means they are connected to telephonists at the Manual Board associated with the automatic system. Other dialling codes are:—

- 90—for passing telegrams by telephone.
- 91—for making enquiries or complaints.
- 92—for Service calls.

In addition to the automatic service given to subscribers, nearly 50 exchanges which have direct communication with Edinburgh have been provided with dials, and the telephonists at these exchanges can dial direct to subscribers on the automatic system without the intervention of a telephonist at Edinburgh.

The adaptation of the telephone exchange building in Rose Street has already involved considerable structural alteration and strengthening, and further alterations will be put in hand to complete the lay-out of the building under the new conditions. The District Manager's and the Sectional Engineer's offices were removed to other quarters in order to clear the ground floor for the first instalment of the automatic equipment, which is now being used. Alterations on the second floor were made to accommodate a temporary Manual Board, and a temporary Monitors' Desk is accommodated on the first floor. The old Test Room on the second floor will now be dismantled and as soon as the space can be prepared the installation of additional apparatus will be begun. The third floor, where the Central and Museum switchboards are placed, will be used for the new permanent Manual Board. Recent estimates indicate that the building, large as it is, will not be large enough to house the total plant required for the Central unit, the Manual Board and the necessary staff quarters. Negotiations are taking place with a view to the acquisition of a building at the back of the exchange to augment the accommodation.

The restrictions on the Manual Board due to its temporary character in their turn gave rise to a pressure of work on the board which is unusual in transfers from one method of operating to another, and the experience of the first working day led to the improvisation of means to relieve the "A" positions of a portion of their work. The temporary Manual Board consists of the following:—

- 1 Cordless key-sender order wire position.
- 7 Trunk signalling positions.
- 2 Special control positions.
- 5 Jack-ended junction positions.
- 15 "A" positions.
- 1 Service P.B.X. position.

—
31
—

Of these, three trunk signalling and the two special control positions were not equipped with working lines and it is interesting to note that the remaining 26 positions compare with 87 staffed positions at the old Central and Museum exchanges. The cordless key-sender position equipped with five sets of digit keys is used for direct traffic between Glasgow Central Exchange and Edinburgh Automatic Exchange.

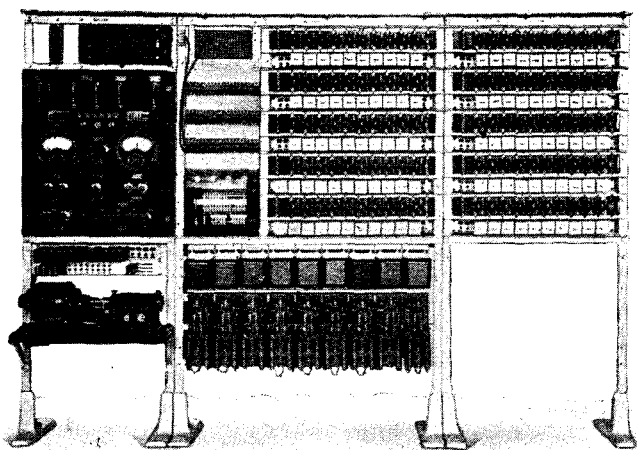
All service P.B.X.'s, with the exception of that at the G.P.O., have been replaced by direct exchange lines and members of the public are instructed to dial "92" when requiring connection to a service number. The telephonist at the service P.B.X. position, which is part of the Manual Board, ascertains the department or officer required and completes the call by dialling over one of the junctions to the automatic plant. This position is connected to the G.P.O. P.B.X. by tie lines. Service callers are provided with a list of service numbers and dial direct to service lines.

The Edinburgh transfer is the largest simultaneous transfer that has yet been undertaken in this country, and the fact that the percentage of faults revealed was well below the average for previous transfers reflects the quality of the engineering preparations.

Hall multi-coin prepayment boxes have been introduced on all call offices within the area which is being served by the automatic plant. Callers can obtain connection to a subscriber on the automatic system by dialling direct, and can obtain a junction or trunk call by dialling "O" and passing the call to the answering telephonist. For the first few days instructors were stationed at the busy suites of call offices to assist callers, if necessary, in the new methods.

The traffic preparations were on a scale commensurate with the rest of the work. A maximum of about 50 visiting officers were employed in calling on subscribers before the transfer to explain the system and demonstrate the method of dialling. For this purpose the subscribers' lines were connected temporarily, as required, to the automatic plant and typical calls were passed; a demonstration of the various tones introduced was given at the same time. In order that the visiting officers should be trained and acquainted with the equipment and operation of all kinds of subscribers' installations, a hall was rented and typical sets of all kinds were exhibited. In addition to personal visits to subscribers, a demonstration automatic set was installed before the transfer in the public office at the G.P.O., and a lively interest in the new system was shown by members of the public. The passing of a test call as soon as possible after the transfer to all subscribers to ensure that their lines were in working order was a task which engaged the surplus operating staff on the Sunday and the Monday. The visiting officers had ascertained from subscribers whether there would be anybody in attendance at the telephone on the Sunday, in order that as many tests as possible should be made on that day. Well over 3,000 successful tests were made before the Monday morning and by Monday evening 9,600 lines had been tested successfully.

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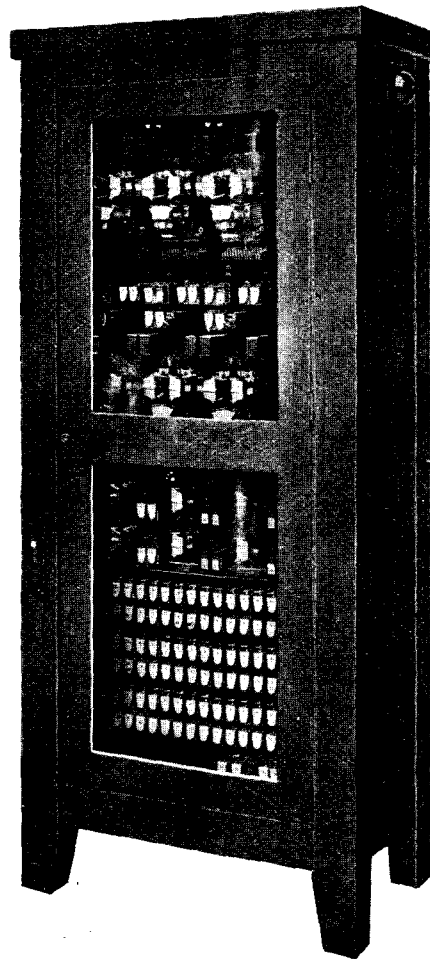
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Telegrams: "Peelcontel, Westcent, London."

The Edinburgh automatic system, with its 11,750 working lines, is now the largest automatic system in operation in this country. A fresh survey of the area has been undertaken with a view to determining the telephone requirements of the whole area in the future, and it is expected that the system will have to provide for a total of 40,000 lines within the next 20 years.

The installation work was carried out by Messrs. Siemens Bros. & Co., Ltd., employing their No. 16 system, which embodies a number of features which have been introduced by them and are peculiar to their systems. Ten-point first and second preselectors are employed, and at the satellite units discriminating selectors and repeaters are used to discriminate between local and other calls. At the Central and Murrayfield units, certain blocks of 100 numbers have been provided with special final selectors of the Siemens pattern to enable auxiliary working to be provided over more than one level of 10 lines. The equipment installed includes 13,740 first preselectors and multiple banks for 14,600 lines.

On Monday, Oct. 4, when the new equipment stood its trial under the searching conditions of a busy day, all the preliminary estimating and calculating, and the actual design and erection of the equipment reached their fulfilment, and the fact that the equipment stood such a test so well indicates the care and forethought which had been given by everybody who had to do with its design, erection and operation.

SOUTH AFRICAN TELEPHONES THIRTY-SIX YEARS AGO.

BY OLD TIMER, IN THE "LIVE WIRE," JOHANNESBURG.

THE telephone system in South Africa thirty-six years ago would be viewed by the telephone workman of to-day as something in the nature of a museum. Only two towns in the Cape Province could boast of a telephone system—namely, Cape Town and Port Elizabeth. Cape Town had three switchboards (Siemens), each of fifty line capacity. The phones were of Gower-Bell and the Hunnington cone types, and Karl Lithman (the Swedish Consul) had a magneto Ericsson which he imported from Sweden as a sample.

The system was earth return and battery ringing, wet Leclanchés No. 2 being used. Copper wire and phosphor bronze were used as conductors, most routes consisting partly of both, and all wires of whatever gauge were terminated on shackles. Four wire oak arms were used, and in the central area 28-ft. poles of the cemented type were general.

The exchange at Cape Town was located in the old Dutch Stock Exchange, a flat-roofed building which stood on the site of the present Post Office.

There was only one operator, the late Mr. Bassett. During the later months of 1892, having just returned from the Free State, I was entrusted with the shifting of the exchange to temporary premises (now the Wellington Fruit Store) to enable the old building to be demolished, as the site was required for the present G.P.O.

During the process of demolition I was walking over one of the partition walls, which was 3 feet thick, to cut away a temporary earth we had been using, when I felt the wall sway. I ran and reached the other side just as the wall collapsed, killing three workmen.

Kimberley had no telephone system, but Messrs. E. W. Tarry and Peach & Co. had phones from their business premises to their workshops, and the Waterworks had a phone from their offices to the mid-pumping station, with an extension to the Vaal River. These phones were maintained by the G.P.O.

Johannesburg was canvassed for subscribers early in 1893, and the net result was 127. Owing to this the Volksraad would grant only £60,000 for material and accessories. The plan was to erect a tower on the Market Square, on the site of the present Town Hall; the Fire Brigade was to have the basement with the use of the stairway for lookout purposes: and wires were to radiate from the tower to the top of buildings, as the business portion of the town centred round the Market Square. The Market Co. had a concession, and would not agree to the tower. The Government had no site except where the tower now stands, which was then a public park.

In September, 1893, the material began to arrive. I had to check it and clear it at the Customs, and see it transported to an open space, afterwards the Market Street Compound. I had a tent there, and tons of copper wire under my care. There was not even a wire fence round the place, but nothing was stolen.

From Sauer Street West the town had no lights, and the blocks in the neighbourhood were inhabited by some of the most desperate crooks in the world and ladies of all colours and easy virtue by the hundred. Policemen never ventured west of Sauer Street after nightfall, until about 1895, and then only in pairs and fully armed. Nearly every door was a bar, and dancing was always going on. I had perforce to go up town for my meals or amusement, and it was a nightly occurrence to be grabbed by the arms and have a revolver pressed behind my ear. On a match being lighted I was recognised as one of the residents and allowed to pass unmolested.

Often I would be dragged into a bar and have to waltz with one of the "ladies." Drinks were not asked for, but you had to dance and smile, otherwise it would have meant oblivion. I always treated this as a good joke. It was safest.

Woe betide the stranger who went sightseeing in those parts after nightfall. Murders were of nightly occurrence, and even during the day it was none too quiet. I have seen shindies on a Sunday that would have made a Portuguese revolution look like a Bethel Mission.

But to return to the construction which was in charge of Mr. Hugh Smith, and began about January, 1894. Before the work was half finished the main routes had to be telescoped owing to the number of applications for phones. Joubert Street route alone carried 278 wires. There were 32 wires on each arm, 16 standing and 16 hanging insulators.

Prior to the Boer War, it became a matter of difficulty to bring a pair of wires to the exchange owing to the wires being below the regulation height at street crossings. A survey for U.G. cable was made, but the war intervened.

When I was in Pretoria in 1893 that town had the most modern telephone system in South Africa, but I was on telegraphs so I do not remember the class of instruments used.

Before 1898 none of the mines on the Reef was connected by phone. The construction began about December, 1897, and the East Rand to Van Ryn was completed the following June. Work was then begun on the West Rand, the furthest mine being the Princess Estate.

The mines were debited with construction costs according to distance, that of the Van Ryn being £500. Two instruments were supplied to each mine. They were of French make, and cost approximately £30 each. Berthon was the maker's name. In the event of an instrument becoming faulty the other could be switched in.

NOTES ON TELEGRAPH PRACTICE.

BY G. T. ARCHIBALD.

*(Continued from page 7.)*XXI.—*Concerning the Treatment of Press Traffic.—(Continued.)*

THE convenience of newspaper editors has always been the prime consideration in the treatment of press telegrams. In an instruction to the staff, issued in 1870, operators at the sending and receiving offices were enjoined "always to come to a clear understanding with regard to the manner in which the work is to be divided between the different wires. If this is not done" continues the instruction, "there is some risk of the messages being received and delivered out of order, a result which must necessarily cause a considerable amount of trouble and annoyance to the newspaper editors. . . . It is most essential that press messages should be delivered in batches containing not more than 200 or 250 words at a time, as the work of preparing a newspaper for the press is always performed under pressure: and it is, therefore, absolutely necessary that the news should be handed over to the editors in small quantities. Nothing so much annoys and irritates an editor as to have a large quantity of copy delivered to him just as his paper is going to press, when he knows that it might have been delivered to him little by little throughout the evening. Of course, the annoyance and irritation thus created are sure to recoil on the department."

It may truthfully be said that although this instruction disappeared from the regulations many years ago it is still faithfully observed. Early issues of the press regulations abound with similar references to the need for the rapid transmission of press telegrams, yet some of the rules regarding the treatment of such telegrams were, to use a well-known official expression "calculated to defeat rather than promote the object in view."

The treatment of press telegrams at the handing-in stage does not differ greatly from that of ordinary inland telegrams. The time of handing in is recorded on the "A" form and is signalled as part of the message. The number of words is not signalled; the office of origin is sent at the end of the message and not in the preamble, and all press telegrams passing through the Central Telegraph Office, London, are serially numbered with the object of facilitating the tracing of forms, &c.

The order of signalling of press telegrams laid down in 1870, and which has never been amended, is:—

- Time of handing in.
- TS serial number (if any).
- Name of sender.
- Class of news (if classified).
- Letter of section of report (if any).
- Number of page.
- Address (if not classified).
- Text of message.

It has always been the practice to divide into small sections, for convenience of disposal, long messages concerning events at which two or more reporters are employed by the same sender. The sections are indicated by the letters A, B, C, &c., AA, BB, CC, &c., which precede the number of the page, the words "End of Section . . ." being signalled at the end of the last page of each section of the message.

Printed matter handed in in large quantities is divided for signalling purposes into pages of about 100 words in length. In all cases where a news item consists of more than one page the words "End of page . . ." are signalled at the end of each

page except the last; in this case the words "End of Message" are signalled, followed by the name of the office of origin.

In the preparation of punched Wheatstone slip contractions "hitherto peculiar to certain circuits or to particular clerks"—the quotation is from the original Post Office press regulations—were prohibited in 1870. When two or more items of news were punched on the same slip it was customary to allow a space of about six inches of "dots" between each item so that the different offices might be able easily to distinguish between them and be assisted in looking out for the items proper to the offices concerned. With the growth of press traffic and the increased working speed of Wheatstone circuits, the practice of handing consecutive pages to punchers was abandoned and as a general rule it now seldom happens that more than two inches of "dots" or reversals appear between two pages.

At the outset press traffic was dealt with largely at the ordinary commercial circuits, but it was ultimately found necessary to provide separate news wires between the Central Telegraph Office, London—which deals with the major portion of the forwarded press traffic—and provincial towns taking a large amount of press matter from news agencies, &c. Three, four or five offices may be included in a news circuit fitted with automatic Wheatstone apparatus.

Continuous attention was given at news circuits at the receiving offices. The telegraphist in charge of a circuit at the sending station was responsible for seeing that all offices required to take items of news included in any batch about to be transmitted were included in the call signal. The procedure to-day is that laid down in the 'seventies. If every office is concerned, the terminal office alone is called. On receiving the signal "G" the sending operator signals "CQ" (all stations) three times before proceeding to feed Wheatstone slip into the transmitter. If, on the other hand, all offices are not wanted, the key clerk, after receiving the signal "G" from the terminal office required, signals "YQ" followed by the code indicators of the offices included in the batch, and then proceeds to feed the slip into the transmitter.

Continuous attention is still the standard method of operating news wires, but the heavy reduction in press traffic since the war has rendered it uneconomical, except during peak pressure periods, and it is not now unusual for stations to be called as required at other times.

The telegraphist at the sending station was also required to record on a slip the particulars of each item transmitted; this procedure is still followed at the Central Telegraph Office, London.

A Wheatstone-punched slip which had to pass through two or more transmitters, was placed first at the fastest running circuit so that no time might be lost in serving all the circuits concerned. Not more than 500 words was transmitted without a break, in order that the most distant office should signal "G," but a second or two were allowed in case any intermediate office required a repetition.

Immediately after each batch had been completed the key clerk at the sending office signalled by Morse the "TS" numbers and description of each item included in the batch and the codes of the stations for which they were intended. Thus, in the case of a batch of seven items sent on the London-Birmingham-Manchester-Liverpool news wire, containing:—

P.A. Nos. 41 and 42 for	BM, MR, LV.
P.A. „ 43 „ 44 „	MR, LV.
C.N. „ 25 „	MR, LV.
P.A. „ 45 „	BM, MR, LV.
S.P. Code EA „	LV.

the key clerk was required to signal the following summary:—

P.A. 41, 42 CQ :	P.A. 43, 44 :	CN 25 MR LV :
P.A. 45 CQ :	SP EA, LV.	

The receiving clerk was required to check the description against the entries recorded on his "RD" slip as the items were received and to call attention to any discrepancy. Acknowledgments were sent on a regular and uniform system which is still in operation. The most distant station on the YQ news circuit gives the "RD" signal first, followed by the code "RQ" if a correction is required, the last office to give the signal being the one nearest the sending office. When all the offices concerned have acknowledged the batch they proceed in the same order to ask for corrections if only one circuit is available: if two news circuits serve the offices concerned, all corrections are asked for and given on the second circuit.

In 1883, by which time fast-speed Wheatstone working had been extensively developed (*see* Chapter XII) the elaborate system of checking the "sent" items was ripe for modification, and it was decided that receiving offices should be held responsible for the reception of every message signalled over continuously-worked news circuits: the summary signalled by the sending office at the conclusion of each batch was, therefore, abolished.

Abstracts were used at receiving ends of news wires until 1876, when they were replaced by "RD" slips, upon which skeleton particulars only were recorded. The abstract contained spaces for the number of the message, handing in time code, TS serial number (if any), time of receipt, office from which the message was received, sender's name, time message sent out for delivery, name of addressee and the nature and class of news.

At offices dealing with a large quantity of received press work it was arranged to make up in advance sets of news flimsies of quarto size, interleaved with carbon paper, in order to avoid the delay which would necessarily arise if the writers were called upon to prepare the requisite number of sheets. This work has always been performed by messengers.

At the receiving offices the items for transcription are dealt with by one or more writers. As far as possible the work is dealt with strictly in code time order; the key clerk passes the first item received to the transcriber farthest away from him and then to each of the other writers in rotation. Every effort is made also to deliver at approximately the same time all news items addressed to more than one newspaper.

At the larger offices where it was frequently necessary to prepare from six to ten copies of a news item the work of transcription was formerly a very heavy tax on the writers, and, although the use of typewriters afforded some relief, it was not until the Creed perforator and printer came to be developed that telegraphists were enabled to deal with press work in an easy and convenient fashion. Slip transcription has now been reduced to a minimum at offices where printing apparatus can be justified, the work being dealt with on Creed apparatus. During the slacker periods one telegraphist gums the printed slip to a form and checks the matter before releasing it for delivery; at other times one telegraphist gums the slip to the forms, the matter being checked by a second telegraphist.

Normally, the Creed printer produces only one copy, and it was at first necessary to re-run the perforated slip to obtain additional copies. A simple device, invented by a telegraphist at the Central Telegraph Office, London, which enables three printed slips to be obtained at one and the same time has, however, been fitted to the Creed printers at offices where multiple address news telegrams are frequently received. The arrangement has had the effect of greatly expediting the disposal of the traffic. When a press message for onward transmission is received over a Creed Wheatstone circuit, the perforated slip is enclosed in a suitably headed form and transferred to the forwarding circuit after the required number of copies for delivery, &c., has been made on the printer.

An office copy of each received news item was prepared until the successful abolition of office copies of ordinary telegrams showed

that they might be dispensed with (*see* Chapter XVI), and in 1919 press telegrams were brought within the scope of the arrangement.

At the larger offices the news traffic is dealt with in a self-contained section or division. At the Central Telegraph Office, London, which deals with about 50% of the forwarded press of the country, the news division is a position of some importance. News circuits serving every important newspaper-publishing centre radiate from this office, and the Controller is consulted by surveyors and postmaster-surveyors on the question of the disposal of press traffic handed in at offices in their districts.

The news divisions are usually fitted with their own addressing table and separate tubes to the delivery room, and many newspapers are connected with the news divisions by means of tubes in order to avoid the delay occasioned by hand delivery.

Until quite recently press traffic was an important feature of telegraph business and, as had been shown, the Post Office, notwithstanding the unprofitable nature of the traffic, left no stone unturned in order to provide a first-rate service.

Under the Telegraph Acts, 1863 to 1921, and the Acts of Parliament, charters, grants and agreements therein referred to, the Postmaster-General has power to grant licences to news agencies for the distribution of news by telegraph to the proprietors of newspapers, clubs, newsrooms, &c., in London and in the Provinces, and agreements of this kind have been concluded with three news agencies.

The licensee may be empowered:—

- (i) to erect, maintain and work between their distributing office in any town and the offices of subscribers within the municipal boundaries of the same town, telegraph wires and apparatus for the purpose of transmitting licensed news simultaneously to such subscribers and for no other purpose, and
- (ii) to connect telegraphically by means of private wires, provided by the Postmaster-General on rental terms, the distributing offices of the agency and subscribers in other towns.

The News Agencies concerned pay royalties under various headings. Service messages may be transmitted between them and their subscribers, but, with this exception, no message or signal other than the news messages may be sent over the Companies' systems.

The Postmaster-General is also empowered to provide on rental terms private telegraph circuits, and many provincial newspapers are connected by this means with their London editorial offices. The Postmaster-General reserves the right to take possession of rented lines on account of the interruption of public circuits or of national emergency; the renter is entitled to a return of the equivalent portion of the annual rental should a private wire be taken for public purposes.

The steady growth in the number of private news wires is reflected in the volume of press traffic dealt with by the Post Office. The daily number of pages of press has fallen from 9,000 in 1919, to 3,500 in 1925, and the traffic continues to decline.

(To be continued.)

NEW BROADCASTING STATION FOR DENMARK.

The Danish Telegraph Administration have just placed an order for a 5-kw. broadcasting station equipment to be erected at Kallundborg.

It is interesting to note that the equipment will be manufactured in England by Standard Telephones & Cables, Limited, at their works in London.

TELEGRAPHIC MEMORABILIA.

THE "Beam," as applied to short-wave telegraphy is with us and will have to be reckoned as a considerable rival to long-distance cable telegraphy. The results of the trials between this country and Canada, of which the writer has been a privileged witness, were from the personal point of view and without exaggeration—one may write the word—"thrilling"! To see the revival of the old days of Wheatstone wire-working at anything up to 200 words per minute and over, with mixed code, cypher, figures and plain language on "clean" blue slip, or to examine critically the undulator signals at the same rate, to an old telegraphist, could not be less than a thrill.

Of course, there were R.Q.s., but they were not unduly heavy and were not by any means attributable to electrical causes. In fact as attempts were made to raise the speed, it was at times quite evident that the refinement of the mechanical apparatus will be one of the future necessities. When one comes to study the matter with the knowledge of certain fundamental principles of radio transmission, one can quite calmly affirm that the speed of transmission and reception through the medium of the ether is only limited at the moment by the mechanical fineness of construction and adjustment of the apparatus. This should cause no surprise when one ponders over the fact that with radic transmission there is no attenuation. The "lag" of an ordinary submarine cable is in fact absent from wireless at whatever may be the speed. Nevertheless, lest readers should be overcautious regarding the millions of capital sunk in the submarine telegraph cables of the world, expert opinion, even of wireless engineers, is still prepared to declare that, "where satisfactory telegraph communication from an economic point of view is obtainable by metal conductors, it is to be preferred to radio communication for stability, every time.

The result of the coming rivalry between the two systems can only be one of discovering the economic spheres of each.

To say, however, as some of our friends in the daily press have apparently recently been declaring that the "Beam" is immune from "atmospherics" is simply not in accordance with facts.

This is quite apart from incidents such as the recent sun-spot effects which stopped both wire and wireless communication in Canada for hours and hours together—simply blotting-out both! It is not, however, to be inferred from this that the "Beam" may not eventually solve the atmospheric disturbance difficulty, and all that may be said at the present stage is that, at the moment, no one has evolved a remedy.

Returning to my more jubilant note, one feels impelled to say that October 1926 marks an historic event when the C.T.O. London opened the direct wireless two-way communication with Montreal, no human hand intervening in that long stretch of land and ocean. Evidence of the effective closeness of this touch was witnessed at the Press demonstration whenever it became necessary to interrupt Montreal's transmission for a few seconds. Just the word S T O P once signalled by London, and Montreal's transmitter was immediately shut off.

Telegraphy is supposed to be a dying industry in certain quarters, and those quarters are not confined to our own little island. Recently reading through certain official documents, the following sentence struck this same Cinderella note concerning the poor sister of the Communication family:—"la télégraphie n'est pour ainsi dire qu'une étrangère dans les cables téléphoniques." Telegraphy, the unwanted foreigner in the land of the Telephone! Turning to another administration the same idea was expressed, though in less unkindly terms, thus, "Die Telegraphie im Fernsprechkabel gleichsam nur zu Gast ist." This time my readers will note, Telegraphy has become a guest, but in our own tongue I was recently briefly and bluntly told that, "Telegraphy is in fact an intruder in Telephone cables."

Here again is an economic question which scientific development and time should settle. The interests of both Telegraphy and Telephony are decidedly difficult to meet at times when both are packed in the same cable, especially when the former requires high speed and comparatively high voltages. The possibilities of the question of interference of Telephone efficiency by the Telegraphs would appear to be well within sight, and although these matters move slowly, the time may be envisaged when it will be an everyday event, part of the daily routine, for Telegraph circuits to be working at 100 w.p.m., or more, with voltages which would now appear as ridiculously low, but a state of affairs, however, which would permit the Telegraph lamb to work without the slightest interference or disturbance beside the Telephone in the same paper lead-sheathed bed.

The following much condensed account of Mr. Baird's "Popular Talk" in aid of King Edward's Hospital Fund should prove interesting:—Mr. Baird maintained that "seeing by wireless at a distance was no more strange than hearing at a distance, and went on to describe how sound waves were converted into fluctuating electric currents, and reconverted into sound waves at the receiving station, he said that television involved very much the same process; all that passed through the wires or the ether was a fluctuating current of electricity, in either case. Mr. Baird showed a photograph of an image seen on the screen of the first televisor that he had made, and proceeded to review the history of the subject, pointing out that selenium was too sluggish in its reaction to light, and too insensitive, to be of service in television, which consequently remained at a standstill for 30 years. The invention of photo-electric cells, instantaneous in their action, aroused renewed interest in the problem, and for the past four years he had

devoted the whole of his attention to its solution. The first public demonstration of his process was given in 1925; since then his apparatus had been entirely remodelled, and the clearness of the images had been greatly improved, but although much more sharp and distinct, they still remained mere black and white effects, without detail and without gradation of light and shade. He made many attempts to improve the light-sensitive cell, including the construction of a cell made from "visual purple" out of a human eye. This cell when first constructed gave an appreciable reaction to light. He was not at liberty to give technical details of the device finally developed, but towards the end of 1925 the difficulties were successfully overcome, and the images of various objects, including the living human face, were transmitted with half-tones and details. The images were at that time very defective, comparable with the earliest kinematographs, but the defects, chiefly due to mechanical and electrical imperfections, were being steadily eliminated, and he expected to place on the market a commercial machine within the next twelve months.

I have been asked the question many times: "How does the crystal detector work? What happens in the crystal? What does it do?" and my own slow brain has been much put to it at times to vocalise my own conception of the business to the satisfaction of the layman. Therefore it was with some avidity that the writer seized upon the following reply to similar enquiries in the *Westminster Gazette*. It is *multum in parvo* with high efficiency of information. Here it is:—

"The received signals travel up and down the aerial at a speed of around one million times a second. The current is called 'positive' when it travels in one direction, and 'negative' when it travels in the other direction. If these impulses were applied directly to the headphones the diaphragm would not be able to respond, since the velocity or speed of the impulses would be too great for the diaphragm to follow.

"The detector has the peculiar property of being a conductor of electricity when the current is passing one way through it, and an insulator—a non-conductor—when the current is applied to it in the opposite direction.

"In the wireless set, therefore, all the positive, say, impulses, pass through, and the negative impulses are stopped. The result is that of every train of oscillations sent out by the transmitter only the positive impulses reach the telephones of the receiver, and being all in the same direction, and following one another so rapidly, the result is one big positive impulse in the telephones per train of oscillations in the aerial. This positive impulse causes a single click in the telephones, but the rate of the trains of oscillations is perhaps 1,000 per second, so that for one click per train, or 1,000 clicks per second, the telephone diaphragm produces quite a musical note."

Quite appropriate at this historic juncture are some of the most recent observations of Dr. W. H. Eccles at the first meeting of the 1926-7 session of the Radio Society of Great Britain on long and short waves.

They had now had 20 years' experience of long waves and four years of short waves in long-distance radio-telegraphy, said the doctor. In the case of very long waves, say, over 15,000 metres, the facts were relatively simple: such waves travelled almost equally well by day and night, and the distance to which good signals could be transmitted depended merely on the power employed, but waves of medium length, say, 1,000 metres, were different, for they travelled much better by night than by day. In both cases the strength of the signals fell off steadily as distance increased, at any rate, after the first few hundred miles, and so a thousand kilowatts power was needed to send signals to the Antipodes for 24 hours in the day. As a broad rule the number of hours of service could always be increased by increasing the horse-power.

Their four years' experience of short waves, that was, waves shorter than 200 metres, had been crystallised in the recent writings of a number of technical men, chief among whom might be mentioned Hoyt Taylor (of the American Navy), and Heising, Schelleng, and Southworth (of the Bell Telephone Co., of New York). Taylor had classified the reports which hundreds of amateurs sent to him about his station; his results with a power of five kilowatts might be summarised as follows: In the daytime a wave 100 metres long could be picked up so far as 200 miles away; a wave 50 metres long, at 100 miles; a wave 30 metres long could be picked up at all distances up to 50 miles, but was often inaudible at points between 50 and 500 miles, yet was readable again at all distances between 500 and 1,500 miles. The space over which signals were inaudible formed a circular silent zone over which the signals jumped; it was called the "skip." Shorter waves had a longer skip; for instance, 15-metre waves ceased to be audible at 10 miles, skipped 1,500 miles, and were then audible with some uncertainty up to 3,000 miles. All the above data related to daylight transmission.

At night time in winter 100-metre waves with 5 kilowatts output had been heard at all distances up to 8,000 miles; 50-metre waves up to 10,000 miles, while 40-metre waves skipped 500 miles and went to all distances beyond; 30-metre waves skipped 4,000 miles, 20-metre waves skipped 7,000 miles, and both could be heard at all distances beyond; but the 15-metre wave, after travelling a few miles, skipped off the earth for good!

ALGERIA.—The French Colonial Post and Telegraph Administration has established a broadcasting station in Algiers. The plant operates on 310 metres and 100 watts, and, in addition to a local programme, will relay the Eiffel Tower transmission.

AUSTRALIA.—There is some concern, says Reuters, Melbourne, among amateurs lest experimental work will be curtailed by the "Beam" wireless

service between Australia and Great Britain. At present Australian amateurs have allotted for their use, with others, the wave-length band extending from 32 to 37 metres and, though no definite announcement of the wave-length to be used by the "beam" stations has yet been made, it is understood that an application will be made for a wave about 30 metres long.

After having been in use since 1912, reports the same agency, the wireless station in Melbourne, known as the "Domain" station, whose call letters are VIM, is to be closed down. Amalgamated Wireless (Australasia), Ltd., which took over the station some years ago from the Post Office, intends to build a new station at Braybrook, near Melbourne.

AZORES, THE.—Various new wireless stations are being erected in Madeira and the Azores. Hitherto these islands have maintained communication with the mainland and with each other by submarine cable and inadequate wireless. On some occasions both these means have broken down, and some of the islands have been completely isolated until repairs could be carried out. Both *Commerce Reports* and Reuter's Lisbon correspondent confirm this news.

CZECHO-SLOVAKIA.—The *Trade Service* of Reuter states that a new broadcasting station is being constructed at Satalice, near Prague, to be reserved exclusively for the emission of speeches, lectures, agricultural reports, &c.; it will have a power of 5 kilowatts and will be managed by an experienced staff from the Kbely station, which will now be exclusively reserved for military use. The equipment used at the Satalice station will be that at present in service at the Podedbrady station.

DENMARK.—The Commercial Secretary at Copenhagen has forwarded to the Department of Overseas Trade a translation of a decree which reduces the tax to be paid during the period April 1, 1926, to March 31, 1927, to the Radio Broadcasting Fund for use of receiving sets. The amounts are for apparatus acquired or constructed after Oct. 1, 1926:—For a crystal set, 5 kroner; for a valve set, or set in which valves are used as amplifiers, 7.50 kroner. Formerly the amounts were kroner 10 and 15, respectively.

EGYPT.—The Egyptian Government has voted a sum of £52,000 towards the cost of linking-up Cairo and Alexandria by means of an underground telephone cable: the total expenditure of £250,000 will be spread over a period of several years.

FRANCE.—*New Radio-Telegraph Apparatus.*—The French postal authorities are conducting tests at the Croix d'Hins wireless station, near Bordeaux, of telegraph apparatus which, it is claimed, will, if successful, effect a considerable reduction in rates. The preliminary tests are being made with Antananarivo, Madagascar, and they are described as having so far given excellent results. It would appear that the apparatus is an application of wireless to the existing Baudot system; transmission by the new apparatus is said to be fifteen times faster than is possible by present methods, while none of the present security or secrecy is sacrificed. The messages are automatically transmitted and printed at the receiving end.

The experiments are the result of the investigations of a Strasburg engineer, M. Verdan, who is using ordinary Baudot apparatus, with a special arrangement by which messages may be repeated two or three times to ensure correct reception. The postal administration proposes to use the new mode of transmission for communication between France and the French colonies. The speed of a wireless Baudot is slightly less than that of a telegraph Baudot, but is more than wireless transmission by the old method; moreover, interruptions due to atmospheric and other disturbances are eliminated. The first experiments with M. Verdan's apparatus were carried out between Nice and Corsica, and the post office engineer at Nice has been sent to Madagascar and is conducting the experiments from that end. M. Verdan has just been awarded the Legion of Honour for his "services in the cause of progress."

The International Congress of Postal, Telegraph, and Telephone Workers, which opened at Paris, France, on Sept. 20, was attended by 69 delegates, representing fifteen countries and half a million employees. Since the last congress was held Ireland, Australia, Austria, and Esthonia have become affiliated, while the United States and Canada were represented for the first time. The sittings were presided over by Mr. J. W. Bowen, general secretary of the British Union of Post Office Workers and president of the Postal International.

GERMANY.—Although the new station on the fairgrounds just outside the city of Leipzig has a maximum input power of 9,000 watts, but 2,000 to 3,000 watts on a wave-length of 452 metres will be used for general broadcasting. Leipzig ranks third among German cities in the number of listeners, 121,423 having been registered by the post office.

The official length of the Berlin short-wave transmitter has not yet been determined: for the time being it is operating on 52 m., and *World Radio* finds it difficult to express an opinion about the efficiency of the plant.

The masts of new Langenberg station are 100 m. high and 220 m. apart; its power will be 20kw. in the aerial, the largest in Europe, and it will possibly use a 468.8-m. wave.

The Minister of the Interior, taking advantage of a safeguarding clause in the contract permitting the wireless stations of the German Post Office to be used for broadcasting, has set up what amounts to a political censorship, says *The Times*. He has appointed an official of his Ministry and two members of the Prussian Diet to act as a "Political Committee of Supervision," whose duty it will be to keep an eye on all political items in the broadcasting programmes, both news and lectures. This Committee alone apparently will decide whether any particular broadcast verging on the political, shall be permitted.

HOLLAND.—As a possible solution of the present difficulties with regard to political and religious differences, the Katholieke Radio Omroep and the Nederlandsche Christelijke Radio-vereening have made a joint application for a licence to acquire, or erect, a new transmitting station. The application has been granted for a preliminary term of one year, and the new station will have the call letters PX9; it will probably be situated at The Hague.

INDIA.—One is afraid to say that wireless broadcasting is looking up in India, but amongst the wireless dealers in Bombay there is evidence of a more optimistic feeling than has been the case for many months past, writes our correspondent in India. Actual sales are at the moment almost nil, but since the publication of the prospectus of the Indian Broadcasting Company, with its entire initial issue of capital underwritten by responsible people, traders have received a steady flow of inquiries regarding wireless sets, and it is noteworthy that a very large proportion of the potential buyers are hankering after powerful apparatus which will enable them to tune in not only the new station at Calcutta, but also the programmes broadcast in England and America. There is also a distinct boom in orders for the overhaul and repair of sets which have been put "on the shelf" during the past few months. The immediate effect is a reorganisation of selling methods, a typical example of which is the announcement that Messrs. Fazalbhoy & Sons are separating their wireless and motor-car departments and are housing the former in new premises; it will be operated as a separate concern to be known as the Bombay Radio Co., Ltd., with showrooms wherein wireless apparatus can be demonstrated. Simultaneously, another well-known firm is negotiating for showrooms, and a British firm hitherto unknown in India has similar ideas.

ITALY.—A regular radio-telegraph service between Italy and Austria was inaugurated on the 4th of last month, says *The Electrical Review*.

JAPAN.—Through the Department of Overseas Trade we learn that the three independent broadcasting associations hitherto existing at Tokyo, Osaka, and Nagoya have been merged in the Shadan Hojin Nihon Hoso Kyokai (Incorporated Japan Broadcasting Association) as from Aug. 20. The three stations already in use will henceforth be operated by the Incorporated Association, under the title of the Tokyo, Osaka, and Nagoya Central Broadcasting Bureaux respectively. The arrangements established with subscribers are being continued by the new Association, and for the present the broadcasting services are being conducted as before. The amalgamation was organised by the Ministry of Communications with a view to the exercise of closer supervision.

LATIN-AMERICA.—Reuter's Trade Service in Mexico City states that the Governments of Mexico and Cuba have entered into a reciprocal arrangement for the connection of their respective telegraph systems by wireless and the institution of a transmission service for public and private purposes. All messages must be transmitted in Spanish, no use of code being permissible. The revenues derived from the services are to be divided equally between the two States, and accounts are to be kept in United States currency.

LONDON.—It is reported that the traffic receipts for the past year fell by £81,416 to £453,596. The decrease is attributed to the loss of United States business and to rate reductions.

MOROCCO.—New apparatus, devised by G. M. Carrat, Inspector of Telegraphs, of Paris, has recently been installed in connexion with the telegraph cable between Brest (France) and Casablanca (Morocco), a distance of 1,600 miles, by means of which it is stated that the efficiency of the line has been increased 80%.

SOUTH AFRICA.—The demise of radio-broadcasting in the Union has lately been prophesied in some quarters. *World Radio* states that the expenditure of the Johannesburg station, which is operated by a private company, amounted to £17,139 last year, the orchestra absorbing £7,596 while the revenue was £12,973, so that there was a loss of £4,166. The number of licenses dropped from 8,281 to 5,268. Durban's position is worse. The station is run by the municipality, and the deficit for the current year is estimated at no less than £7,600. Hitherto this state of affairs has been attributed to the "pirates," and there has been an outcry for their prosecution under the new Radio Act. The fees now range from 7s. 6d. to 35s.

SWITZERLAND.—A report lately issued shows that the length of the telegraph and telephone wires in use in Switzerland at the end of last year amounted to 567,365 miles, of which 434,375 miles are underground. The number of telegrams dealt with last year, excluding transit messages, amounted to 5,100,000; the use of telegraphy is, however, declining, while there is a growing use of the telephone, the number of instruments in use increasing last year from 189,429 to 200,211.

TRINIDAD.—The Finance Committee of the Legislative Council of Trinidad recommends the sale of the wireless stations belonging to the Government to the Pacific Cable Board, but advises that the price be raised to £7,000, says *The Times*, failing which that a minimum royalty of £1,000 per annum be paid by the Board for five years.

UNITED STATES.—Senator Dill, of Washington State, when asked about the National Broadcasting Co. announced by the Radio Corporation of America, said, according to the *Electrical World*: "I welcome such an undertaking because if it is properly directed the public in general will benefit by better radio service. Provision is made in both the Dill Bill, which has passed the Senate, and the White Bill, which has passed the House, that wave-length licenses can be revoked should there be any earmarks

of monopoly." Senator Dill expects radio legislation to be passed before Christmas. He points out that, despite the decision by the Department of Justice that Secretary Hoover has no authority under existing laws to regulate wave-length, power output, and "time on the air," the self-control of the broadcasting stations, stimulated by the nature of the radio business, compels stations to remain on the wave-lengths assigned by the Department of Commerce.

The "Radio World's Fair" opened at New York on Sept. 13 and closed on Sept. 18. Three hundred manufacturers displayed their wares. The general tendency in design was toward the batteryless set, and in cabinets the trend was toward the console pattern. More than 140,000 people had visited the show by Sept. 17 according to semi-official estimates. An English boy, William Tricker, of Andover, won the first prize in a competition for the best one- or two-valve sets made by amateurs: four other English boys won prizes for skill in building receivers.

It cannot be said whether the writer of the following paragraph, culled from the columns of a London paper, has had any personal experience of the Telephone Service in France, but in any case he is not, apparently, an ultra-optimist!

"The proposed institution in France of urgent telephone calls at three times the ordinary rates, which are to take precedence over all others, is not welcomed by telephone subscribers. For it is suspected that in practice it will simply mean that the cost of the telephone will be trebled.

"Anybody unfortunate enough to have experience of the French telephone system must share that suspicion. It will become impossible to get any communication that is not urgent, and in a very short time the telephone subscribers will find that they are paying three times as much and getting through no more quickly than before."

The development of cable-making, whether of the overhead, underground, or subaqueous type, and whether for high or low-power transmission, have for years been worth following, and the following piece of news regarding a high-power type constructed for submarine use is a recent example of what can be done in this direction. A New York correspondent of *The Times Trade and Engineering Supplement* says that three 33,000-volt submarine cables have recently been laid under the Mississippi River between the Cahokia plant of the Union Electric Light & Power Company at East Street, Louis, Ill., and the west bank of the river. A "record" for length, size, and weight of high-voltage lead-covered and armoured submarine cable manufactured and installed in single lengths is believed to be established by this installation. The cables, which were manufactured by the Standard Underground Cable Company in lengths of 2,500 ft., weigh over 27 tons and are approximately 4½ in. in diameter. Shipment was made on specially constructed iron reels weighing 5 tons each, making the gross shipping weight for each length in excess of 32 tons. Before the production of these cables the maximum length that could be manufactured was approximately 1,200 ft. A splice in midstream was accordingly necessary, and 21 cables of two lengths each had previously been installed at this point. The company proposes to lay 24 more of the 2,500 ft. single-length cables during the next three years, making a total of 48 cables at the Cahokia crossing.

We regret to announce the death of Mr. Neasmith, formerly of the old Foreign Gallery, C.T.O., and later Overseer in the Cable Room, who retired quite a number of years ago. The respectful sympathy of those of his colleagues who still remain is tendered to his relatives.

The C.O.D.O.C. again! The Centels Operatic, Dramatic and Orchestral Club were no less successful with their performance of Gilbert and Sullivan's "Iolanthe" on Oct. 18 and 19, at the Cripplegate Institute, than they were with that of "The Gondoliers" twelve months ago. There was the same whole-heartedness and enthusiasm, the same co-operation, and the same appreciation of the atmosphere in which he or she had to play their part.

Mr. Bertie Figg was inimitable as The Lord Chancellor; Miss Winifred Lenthall made a sweetly sympathetic Iolanthe. Having written so much, it seems invidious to have picked out anyone where everyone did so well. The male choruses came well across the footlights, but it rather seemed to the writer that the orchestra was a wee bit too strong for the ladies. Maybe the defect was due to the stage itself, and this may possibly be remedied, so I am given to understand, by a change of address for their next musical item.

I hear that dear old Tom Charter is leaving the C.T.O. next month on pension, and the genial atmosphere which has always surrounded one of the most retiring and conscientious of the supervising staff will be missed by not a few. To leave a huge office such as is G.P.O. West, with the affection of men and women with whom you have been associated in at times, the very trying duties of the Telegraph craft is a reward that can only be bought by something much rarer even than hard cash! That he may long retain his present health and soon be relieved of his present family anxieties is the heartfelt wish of us all.

The Elizabethan Barber.—The barber's shop was a favourite resort and debating place, where a guitar lay always ready for use. An interesting variety of styles were for the customer's selection. The poor man had his head trimmed round like a cheese; the courtier could select from the Italian style, the French cut, the Spanish, or the Dutch cut, the bravado fashion, the mean fashion, the gentleman's cut, the common cut, and the Court and the county fashions. The habit of smoking tobacco was greatly on the increase. Silver tongs were treasured accessories of the fashionable smoker who often attended a professed master to learn the art of blowing rings.—"Shakspeare's London," by John Munro. J. J. T.

REVIEWS.

"*First Course in Wireless.*" By Robert W. Hutchinson, M.Sc., A.M.I.E.E. (Published by University Tutorial Press, Ltd., London. 262 pp. Price 3s. 6d.)

During the last few years the market has been flooded with elementary books on wireless, to meet the demand for information on that subject which has been created by the advent of broadcasting. Most of these books have been frankly popular, dealing little, if at all, with the theory of the subject, and confining themselves to descriptions of apparatus, and to simple instructions designed to enable a person entirely without knowledge of matters electrical to construct and operate a receiving set.

The present book is of an entirely different class. Its object is to give a reader, starting with absolutely no electrical knowledge, a clear insight into the fundamental scientific principles of wireless telegraphy and telephony, and the practical working of wireless apparatus.

The whole ground is covered. The first six chapters are devoted to simple electrical theory as far as the elements of alternating currents.

Then follows a chapter on the production, propagation and detection of electromagnetic waves, after which are given chapters on the theory of crystals and valves, aerials and earths, and crystal and valve receiving sets, with a final chapter on valve transmitters, directional work and television.

The printing and paper are good, the diagrams are very clear, and we can confidently recommend the book as one of the cheapest and best of the elementary books on the subject at present on the market.

"*Junior Technical Electricity.*" By Robert W. Hutchinson, M.Sc., A.M.I.E.E. (Published by University Tutorial Press, Ltd., London. Second Edition. 385 pp. Price 4s. 6d.)

Many of our readers are probably acquainted with "Technical Electricity," by Davidge and Hutchinson. The present book, by the second of these authors, is an introduction to the larger work. The general arrangement of the subject matter is the same, but the ground covered is not so wide, the fundamentals are dealt with in somewhat greater detail, and the treatment is more elementary and experimental.

The first four chapters deal with elementary magnetic theory and its practical applications, and the next with terrestrial magnetism.

In the following two chapters the fundamental phenomena of electrostatics and their elementary theory are described, and in the next three the subject of current electricity is similarly dealt with.

The eleventh chapter deals with the magnetic effects of a current, and the next two with its chemical and heating effects. In each case various practical applications of the phenomena are described.

The fourteenth chapter is devoted to simple electrical measurements, the next three to electromagnetic induction and its practical applications in connection with generators and motors, and the following one to commercial measuring instruments.

The last two chapters deal respectively with transmission, distribution and indoor wiring, and with telegraphy and telephony, both wired and wireless.

In an appendix are given a few miscellaneous points in electrical theory which could not conveniently be included in the text, and also a few simple notes on alternating currents.

The treatment of the subject throughout is lucid, the diagrams are well drawn and clearly printed, and the book can be recommended to anyone who wishes to obtain a good elementary knowledge of modern electrical engineering.

“Advanced Text-Book of Magnetism and Electricity.” By Robert W. Hutchinson, M.Sc., A.M.I.E.E. (Published by University Tutorial Press, Ltd., London. Two volumes: Vol. I, 372 + xii pp.; Vol. II, 511 + xii pp. Price (both volumes), 12s. 6d.)

In these two volumes a clear and comprehensive account is given of the main principles of electricity and magnetism, up to the standard of the Final B.Sc. examination. The mathematics involved are elementary, but the notation and first principles of the calculus are introduced whenever a distinct advantage is to be gained thereby. Students unacquainted with the calculus, however, would have no difficulty in acquiring the necessary knowledge to enable them to follow the discussions in which calculus methods are employed.

The first volume deals with magnetism and electrostatics, the second one with current electricity, electrical measurements, alternating currents, electro-magnetic waves, discharge through gases, radio-activity and electronic theories and the new physics.

The style is very clear throughout, and anyone desirous of obtaining a good general and up-to-date knowledge of electricity and magnetism would find the volumes under review very suitable for their purpose.

“Intermediate Text-Book of Magnetism and Electricity.” By Robert W. Hutchinson, M.Sc., A.M.I.E.E. (Published by University Tutorial Press, Ltd., London. 630 pp. Price 9s. 6d.)

This book covers the same ground as that covered in the Advanced Text-Book of Magnetism and Electricity, of which a review appears above, but, naturally, in a more elementary manner.

The paper and printing are of a similar high quality, and the text is in Mr. Hutchinson’s usual lucid style.

The book can be recommended to the reader who desires to obtain a general view of the modern position of electricity and magnetism, including the recent advances in radio-activity and atomic physics, without going into the detailed mathematical treatment accorded to the subject in the advanced book.

WIRELESS AT THE FAIR.

DAILY BOOKING OF SPACE DESPITE HANDICAPS.

DESPITE the holiday season and the serious effects of the coal stoppage, applications for space in the London Section of the British Industries Fair, which is to be held at the White City from Feb. 21 to March 4 next, have been reaching the Department of Overseas Trade daily. The total area applied for already considerably exceeds the whole area occupied at the last Fair, and there is every indication that additional buildings will have to be linked up with those previously used. Early arrangements will have to be made for any such extension, however, and firms are advised to make their requirements known at once.

Among firms who have applied for space in the Wireless section are:—

- Harold Ashton, A.M.I.E.E.
- Beard & Fitch, Ltd.
- Sydney S. Bird & Sons.
- British Electrical Sales Organisation.
- British General Manufacturing Co., Ltd.
- S. G. Brown, Ltd.
- Brownie Wireless Co. (of Great Britain), Ltd.
- J. J. Eastick & Sons.
- The Ever-Ready Co. (Gt. Britain), Ltd.
- The Formo. Co. (Arthur Preen, Ltd.).
- R. F. Graham & Co.
- The Halyon Wireless Co., Ltd.
- Hart Accumulator Co. Ltd.
- Kemps Mills, Ltd.
- J. W. See & Sons, Ltd.
- Spauldings, Ltd.
- Technical Agencies Co.
- Telegraph Condenser Co., Ltd.
- Tungstone Accumulator Co., Ltd.
- Watmel Wireless Co., Ltd.
- Western Laboratories, Ltd.
- Whittingham, Smith & Co.
- M. & A. Wolff.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations working at August 31 last was 1,434,617. During August 16,338 new telephones were added to the system, counterbalanced by 7,777 cessations.

The growth for the month is summarised as follows:—

Telephone Stations—	London.	Provinces.
Total at August 31	503,558	931,059
Net increase	2,665	5,896
Residence Rate Installations		
Total	103,574	172,706
Net increase	952	1,734
Exchanges—		
Total	110	3,980
Net increase	—	26
Call Office Stations		
Total	4,579	16,328
Net increase	45	110
Kiosks—		
Total	328	1,981
Net increase	22	57
New exchanges opened under Rural Development Scheme—		
Total	—	948
Net increase	—	24
Rural Party Lines—		
Total	—	9,925
Net increase	—	17
Rural Railway Stations connected with Exchange System—		
Total	—	784
Net increase	—	11

The number of inland trunk calls made during July—the latest statistics available—was 8,359,489, an increase of 578,540, or 7% over the figure for the corresponding month last year.

Calls made to the Continent during July numbered 22,985, or 4,348 (23%) more than in July last year. Calls from the Continent numbered 25,752, an increase of 2,982 (13%) over July, 1925.

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

LONDON—Popesgrove (Twickenham).

PROVINCES—Cheltenham (opened in August)—Automatic.

Chesterfield—Automatic.

Staveley „

Hartlepool „

West Hartlepool „

Churchtown Manual Ex.

And among the more important exchanges extended were:—

LONDON—Avenue, Hayes, Molesey, Mountview, Park, Sloane, Sydenham, Wallington.

PROVINCES—Folkestone, Belfast, Erdington, Windsor.

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

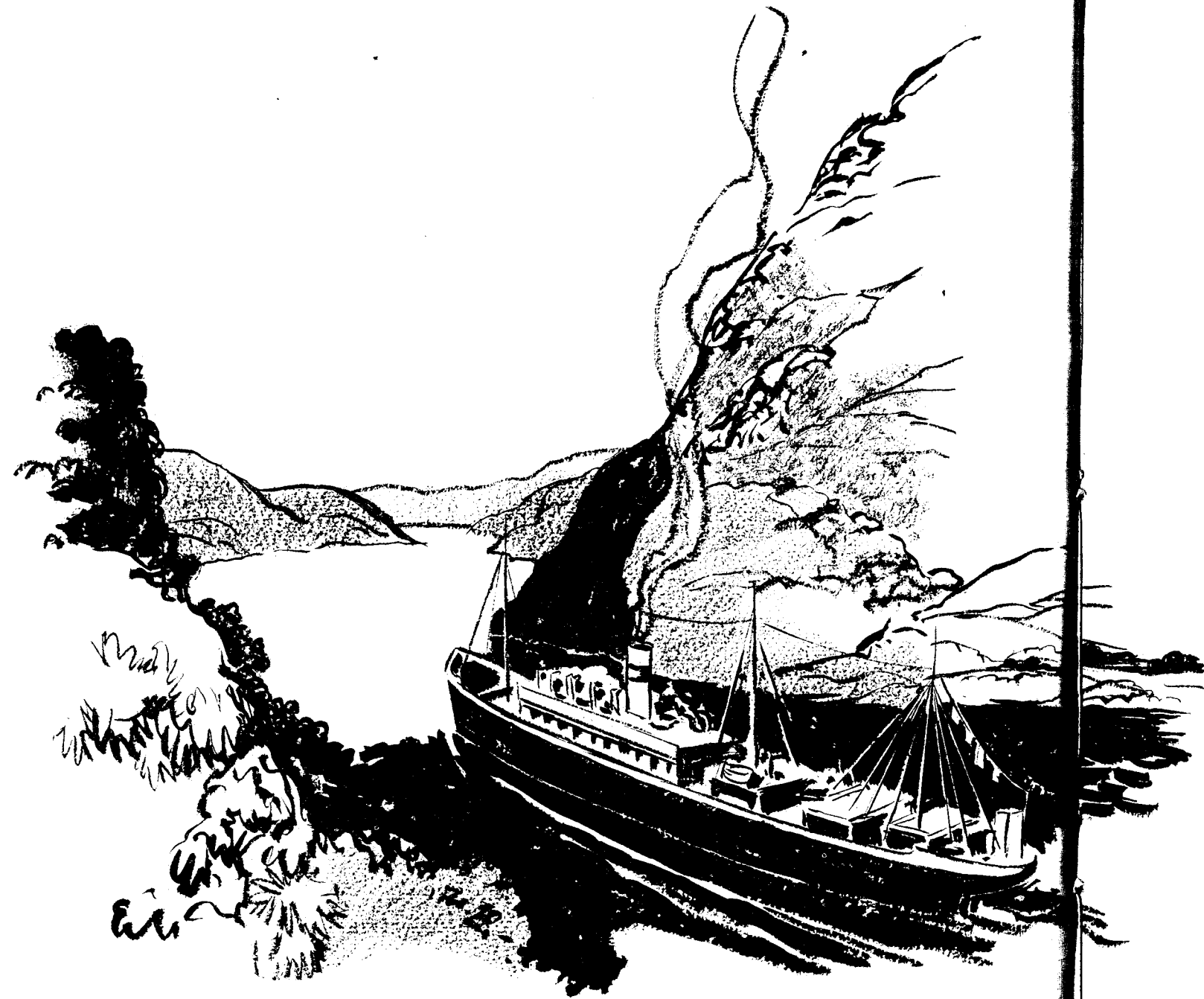
Brentwood—Marks Tey—Ipswich.

London—Dartford—Farningham.

Swansea—Ammanford.

Leamington—Warwick.

while 80 new overhead trunk circuits were completed, and 91 additional circuits were provided by means of spare wires in underground cables.



Where Atlantic meets Pacific



THE Panama Canal is the world's greatest time saver. Ships now pass from ocean to ocean in a few days where in times past weeks and months were consumed in making the long and arduous journey around Cape Horn.

It is entirely fitting that Strowger Automatic equipment, the most effective time saver in the realm of telephonic communication, has been installed by Automatic Electric Inc. for all exchanges of the Panama Canal Zone.

That Strowger Automatic equipment meets the high standards and rigid requirements of the Panama Canal Zone Commission and, in spite of unusually severe climatic conditions, is now operating in a highly successful manner, adds increased weight to the reputation this equipment has established as the most efficient means of meeting present and future telephone requirements that it is possible to obtain.

Automatic Electric Inc.

FACTORY AND GENERAL OFFICES : 1033 W. VAN BUREN ST.
CHICAGO, U.S.A.

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.
		JOHN LEE.
		J. J. TYRRELL.
		W. A. VALENTINE.
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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NOVEMBER, 1926.

No. 140.

"LOOK ON THIS PICTURE AND ON THAT."

PEOPLE interested in the progress of long distance telephony who glean their information from the lay press must often suffer strange bewilderment from the varying accounts which are put before them. On the one hand we find widely disseminated paragraphs stating that the habit of using the telephone for swift long-distance business communication (which is commonplace in America, we are told) is almost exceptional in Europe, that the average delay between Zurich and Milan is three hours and a quarter and between London and Paris seventy minutes. This, we believe, is only too true, although it is perhaps an unfavourable time for enlarging on the theme when an increased number of direct underground circuits between London and Paris are on the eve of being put into operation, and when the French Government have just finished laying their new Paris—Strasbourg cables, and new cables are nearing completion on many other important trans-European routes. On the other hand (and on the same day), a flamboyant article in a large provincial paper informs us that a "call of the distance from Manchester to London is child's play on the Continent, where politicians, business men and journalists hourly speak not only from one city to another, but from one country to another, and often across two or three frontiers to remote capitals." Deep calls, as it were, unto deep. Antwerp calls to Madrid, Brussels to Poland, and all is so clear and bell like

at a hundred words a minute that every word has been recorded in shorthand!

"Nor," we are told, "are these calls mere experimental freaks. They are part of the daily life of a Continent where you can 'say' it by telephone across such long distances that the man at the other end may not even guess what language you are speaking."

The courteous reader who has paid his money for his newspaper can take his choice. If he suffers from one of those "headaches for historians," of which *Punch* so often gives instructive examples, who shall wonder! It may, perhaps, occur to the reflective to ask himself what is the underlying principle or idea which inspires these two contradictory types of article. We think it is this. The first school of thought wishes to disparage European telephone conditions by a comparison with those existing in America, cocking a benign eye on the introduction of American methods into Europe: the other school of thought wishes to disparage this country at the expense of the Continent. Possibly it casts an unbenign eye on State telephone systems, forgetful that they prevail on the Continent also. This, however, is all *vieux jeu*, and is losing some of its novelty. As regards long distance telephony we are hopeful that in a few months' time such criticism will also lose what point it ever had.

WIRELESS BROADCASTING.

THERE were approximately 2,104,000 licensed wireless receiving stations in Great Britain and Northern Ireland at the end of September last, but that number, large as it is, does not of course represent more than a fraction of the potential listeners. When the public interest is aroused, as for instance at a general election, huge crowds assemble in the streets to hear the results, even though the roads be muddy and the heavens overflowing. May we not assume that a similar effect is produced when the broadcasting services present, in the comfort and cosiness of the home fireside, a great personality in music or song, fact or fiction, thought or action? Is it not natural that whole households should listen on their wireless receiving sets?

A wireless licence covers only the use of apparatus in the premises occupied by the licensee, but there is no restriction on the number of receiving sets or on the number of telephones or loudspeakers used. It is proven fact that few sets are fitted with only one pair of headphones. Moreover, in the case of hospitals and other similar charitable institutions, one licence covers any number of installations in the same building, and full advantage is taken of this concession, many hospitals having been equipped throughout with wireless receiving gear. The fitting of loudspeakers is common in cafés, restaurants and cinemas, and in many private houses two distinct sets are fitted so that the "parlour" (if I may use that term) can listen to a concert

party or a "jazz" band while the kitchen seeks its recreation by taking "highbrow" music or an "uplift" educational course. You can put it the other way round if that is more to your liking!

According to the 1911 statistics, the average number of persons in each family was 4.50 for England and Wales, 4.58 for Scotland and 4.82 for Ireland. The housing difficulty has certainly not reduced the number of persons in each house or helped married sons and daughters to set up separate establishments, and we are therefore erring on the safe side in suggesting that there are at least $4\frac{1}{2}$ potential listeners, on an average, at each licensed station, an audience of 9,500,000 in this country alone, and we know that the British programmes are heard in many other countries, especially in Western Europe.

The population of Great Britain and Northern Ireland in 1921 is estimated at approximately 44,100,000, and may now be nearly 46,000,000. So that more than one in every five persons is a potential listener. Small wonder that we hear so much talk of wireless gadgets in the morning train or bus.

There are, of course, those others who listen by stealth in their pirate's caves. We might leave them unnumbered to the enjoyment of their stolen delights with the full knowledge that sooner or later they will be dragged into the unsympathetic atmosphere of the local police-court and deprived of their petty cash.

HIC ET UBIQUE.

MR J. J. TYRRELL, who has contributed the column known as "Telegraphic Memorabilia" to this journal since June, 1915, is due to retire at the end of this year. At their last meeting, the Editing Committee of the *Journal* passed the following resolution:—

"The Editing Committee desire to record their appreciation of Mr. Tyrrell's services, and especially of his invaluable monthly column in the *Journal*. They hope he may be prevailed upon to contribute this popular and widely-read column."

Since the above resolution was passed, the Editing Committee has heard from Mr. Tyrrell that he is prepared to accede to the Committee's request.

When a new exchange was opened, the humourist formerly looked upon it as a new storehouse of wrong numbers. The opening of "Rodney" and "Reliance" exchanges in Walworth, however, inspired the *Evening News* reporter with the caption: "More R's to roll." We are glad, however, of a change.

A gentleman at Havering-atte-Bower, Essex, writes thus to the *Daily Express*:

Sir,—With reference to advertisements periodically booming the telephone service, is it not time that the Post Office took steps to serve outlying villages more adequately?

A "service" which entirely cuts off outlying communities from the rest of the country for at least fourteen hours out of twenty-four on every day of the week cannot be considered a credit to the department concerned.

We wonder what this gentleman would write if he lived in a country where not only outlying villages but even fair-sized provincial towns only enjoyed the service from 8 till noon and 2 p.m. till 8, 9 or 10 p.m. (according to its size), as in the case of many European countries. England and America are the only countries where over 99% of the subscribers obtain a full day and night service all the year round.

A modiste (or firm of modistes) in London sent the Postmaster-General the following notice:—

"We wish to exterminate the use of our extension, from this date."

Last month we rashly quoted a paragraph from a daily paper about a certain high-power radio-telephone outfit on the United States liner *Leviathan* which afforded telephonic communication between the vessel and places 5,000 miles away. This outfit appears, on enquiry, to be non-existent, and the whole story, like so many other interesting tales of wonder, the figment of some bright journalistic brain.

The *Sporting Times*, or "Pink 'Un," has lately been consulting the new telephone directory, and does not like it as well as the old style. "True," it remarks, "there is something to be said for the plan of printing the first three letters of the name of the exchange in thick heavy type, so as to catch the eye readily. But, no doubt to economise space, very few occupations of subscribers are given. Calling up a man you do not know very well, you have no indication as to whether he is a butcher, a baker, or a candlestick-maker."

It must be decidedly awkward to ring up a perfect stranger and ask him to make a fourth at bridge, or come out for a round of golf, or put a fiver on a horse for you, and not to be able to learn whether he is a candlestick-maker, cordwainer or loriner, taxidermist, cubist or revivalist.

According to *Reuter's Trade Service*, a project has been approved by the Italian Government for the laying of a telephone cable between Naples, Rome and Milan. The cable, which will be composed of 400 circuits placed underground, is estimated to cost 500,000,000 lire, including construction work, which is expected to take between four and five years.

At the present time the Jugo-Slavia telegraph system extends to 13,030 miles and the telephone system to 9,295 miles of line. Automatic telephone exchanges are to be established in the towns of Zagreb, Ljubljana, and Novi-sad. A number of new telephone cables are being laid, and one is to be established between Belgrade and Soiebotissa.

From a recent article in a Manchester paper about the interesting French experiments with Baudot apparatus for wireless transmission, we learn of the French engineer that "his aim was to eliminate parasites."

Very laudable and very useful as a general proposition. We have, however, Capt. Eckersley as an authority for the view that the chief parasites afflicting wireless are oscillators and—except perhaps to the gallant captain—elimination seems rather a drastic remedy.

On second thoughts perhaps our contemporary has erred in its rendering of "des courants parasites."

ARTHUR BINGHAM WALKLEY.

THE Editorial Board of this Journal permits me and encourages me to write of Arthur Bingham Walkley. He retired from the Post Office, holding the position of Assistant Secretary, Telegraphs, at the end of June, 1919. I could claim intimate friendship with him, one of the proud things of my life. We were thrown together, as may be said, at the time that he became assistant secretary. It was of the irony of things to me that I became Controller of the Central Telegraph Office the day after he retired, keeping up afterwards, so far as the exigencies of our very different lives permitted, the old intimacy. Of his indisputable brilliance, his wide reading, his insight, his swiftness and surety of judgment in the art which he made his own, others have written. I would venture to say that one of the most brilliant of his contributions appeared in this Journal. It was a paper which he read at a meeting of the Telegraph and Telephone Society of London, in which he castigated, in his own delightful fashion, the excessive use of technical language in the description of aspects of our day-by-day work.

Therein lay his contribution to official life. Familiarity with technical words and phrases leads us to forget, at times, that we are dealing with pros and cons which must be weighed in other scales, the scales of trained judgment. He brought us to earth. It was he, I think, who first used the phrase "machine telegraphs" to indicate the departure from the manual formation of signals. He passed through the minute studies of the High Speed Committee, never tempted to miss the wood in the trees. He kept the issues from complexity and where the minds of those to whom they are familiar hugged the technical formulæ he directed them to the appropriate end. It was a salutary lesson. It was salutary, too, to put our judgments of our own craft into relation with the outer world. There are many insularities possible to human minds and he protested against them all. It has been said, on the other hand, that he invented the word "dirigeur." On the contrary he regarded it, in English, as an unfortunate choice. He tried to find a more suitable word, but I never heard him announce it.

It fell to my lot to travel with him on inspection work. I remember a train journey once on which we worked out a complicated diagram—a severe exercise for me under the judgment of such an acute mind. His dual capacity sometimes brought humours of its own. On one Saturday we stayed at Ambleside on the way from Liverpool to Glasgow. The hotel was crowded and a kindly Lancashire lady took pity upon us. "Tha' should see t' film o' 'Grumpy'": she said to Walkley, "it is at t' Victoria Hall. It wer' a play i' London." With ineffable charm he thanked her for the suggestion. It had its influence though, for in Edinburgh we went to a film. It was, I think, his first film. He passed no comment on it, so far as I can remember, but in Aberdeen he suggested another visit. It was a Wild West affair not in the least likely to appeal to him, but he confessed that he "loved the Sheriff."

There was a curious shyness about him in his technical work as if he thought that no-one would give him credit for mastering it. It was this and not boredom (I hope the Editor of the *Post* will let me add this to his kindly notice) which affected his mind. Those of us who have grown up on what I will call the operative side will do well to remember that on the administrative side there is often a shyness, *vis-à-vis* the technique of the work, which is born of the sense of a different angle of knowledge. We shall do well also to remember that there are on the administrative side those who shrink from the apparent dichotomy, not out of fear or indifference, but simply because it is a dichotomy. They would fain understand and fain would they sympathise, but the very organisation itself checks, and must check, articulation and even self-realisation. When the bomb fell on the C.T.O. in July, 1917, he stood by his window, seized by anxiety, as the stretchers were carried into the C.T.O. He turned and spake his devout thanks when they came out again empty. For to him these colleagues of his, men and women, were real human units with lives of their own of which he wished to know more. To him (if I may be allowed

to say so) it was Life which mattered. He has said so in his writings, but I think it was more deeply true than he realised. Arts of expressing Life engrossed him but as vehicles only. So the young men in his branch learned to know that he cared for them and in all the wealth of precious things which came to him he treasured nothing more than the carefully-chosen books they gave to him on his retirement.

The day has come, I think, when his rich gifts would find a more appropriate place than formerly in our system. I say this in no sense of criticism, for times have changed, the pace is more eager, the great institution demands of all of us—the corporate life demands of all of us—that whatever it is that we may have to offer in public service it is ours to offer it and it is the rôle of the public service to require it. The older conception of Civil Servant is passing and so far as we can fit into the mosaic there is no richness of colouring (if happily that richness be ours) which we may not bring. It had its tragedy, perhaps, that ever this should not have been so, but we will do well not to judge the past; we know as little of it as of the future. The vast changes of the past ten years have affected the whole round of our citizen life and it is not alone the Post Office which has burst some of the older bonds. We are coming to the time, I think, when we shall regard our own calling as in itself an opportunity for the exercise of every talent which any of us may possess, and when it will be first in interest because, paradoxically, there will be no first and last.

But of this I am sure. He taught me, in birth and education and in career so different from him as I was bound to be, that there are sympathies and desires for understanding of which we never dream. If, towards the close of a long career, I should be tempted to lose faith in men and women either to the left of me or to the right of me, I shall think of Arthur Bingham Walkley and of what I believe he would have been proudest to have his brethren know of him, and I shall arise rebuked and refreshed.

JOHN LEE.

HOW IT STRUCK A CONTEMPORARY.

Freeling's Railway Companion, published in 1839 or 1840, on the opening of the London and Birmingham Railway, gives the following enthusiastic description of the newly-invented electric telegraph, in terms which we are sure will find an echo in the hearts of our telegraphic confrères:—

To the spirited enterprise of this Company is the public indebted for the introduction and *practical use* of the electro-magnetic telegraph, which has been established on the London terminus for several months—an obligation, indeed, which will not be estimated until all the advantages it offers become known—until the security and certainty it will impart to railway travelling has been experienced. By means of this instrument, the situation of every train may be instantly known at the most distant station. If a train has not arrived at its proper time, a communication is made to know the reason; if it has left the last station, and still does not arrive, it is a presumption that assistance of some sort is wanted, which can immediately be sent off by another engine. The train which is succeeding it on the same line is also warned and thus the possibility of collision avoided. Thus, all the delays arising from accident, which have attended the infant state of this mode of travelling, will be avoided. The electro-magnetic telegraph will in fact enable the heads of the coach or carrying departments at both London and Birmingham to have a constant communication with the trains—it will enable them to have an actual superintendence of their progress; and this fact being known to the subordinate officers, will insure that attention and regularity which alone will give confidence to the public.

As this is a work not only interesting to the British public, but to the world—as it must become a political and commercial agent

of the first importance, the following slight sketch may not be considered either irrelative or uninteresting.

The ELECTRO-MAGNETIC TELEGRAPH is the joint invention of Wm. Cooke, Esq., of Hastings, and of Professor Wheatstone, and was patented by them in June, 1837: shortly after which, the attention of the chairman of the London and Birmingham Railway Company (George Carr Glynn, Esq.) and the secretary, was directed to its importance as applicable to railway purposes: and they at once requested the engineer-in-chief (Robert Stephenson, Esq.) to afford Mr. Cooke every facility in testing the invention on that railway, to such an extent as might satisfy him (Mr. Stephenson) of its *practical* efficacy. Under Mr. Stephenson's superintendence, the new telegraph was tried to the extent of nineteen miles, with results which far exceeded the most sanguine expectations. Orders were subsequently given that the wires, by which the electro agent acts on the telegraphic instruments, should be permanently laid down between the Euston and Camden Town stations. This was executed towards the close of the autumn of 1837, and they have ever since been in action. The season of the year being unfavourable to laying down the permanent wires, the telegraph is for the present limited to this distance: but the fact of its being the medium of *facile* communication at any distance is established beyond a doubt.

This instrument gives all the letters of the alphabet, the numerals, and a vast number of conventional signals; which follow each other with perfect distinctness at the rate of about thirty-five per minute, and can be read off with the greatest facility even by an unpractised eye.

Before the operator is placed an instrument, which gives the exact signals which he is conveying to a distance; if therefore, through carelessness, an error is committed, it is immediately perceived, and corrected by the succeeding signal. These signals are communicated from either terminus with equal facility, and *literally* with the speed of lightning, both instruments being synchronous in their action.

When the telegraph is about to be put into action, the person communicating rings an alarm bell by striking a key, or by the same motion he may release a weight, which can be attached to the wrist of the person who has the working of the instrument at the distant point. This, perhaps, will be the most effective mode of attracting attention, particularly at night, or if deaf and dumb persons were so employed.*

By this simple contrivance, the unceasing vigilance necessary for every other description of telegraphs is dispensed with; whilst by night as well as by day, sunshine or rain, fog or storm, the electro-magnetic telegraph performs its silent mission, uninfluenced by those disturbing causes which render the ordinary telegraph useless during four-fifths of the year.†

To what may not this power of instantaneous communication lead! How invaluable will it prove to distant friends in sickness! how necessary to a great commercial nation! how essential an accompaniment to a railway! By its rapid warning, accidents will be avoided. The person at the head of the principal station will be possessed of a positive knowledge of the position and circumstances of every train along the far-extended line—of the arrival of each at every station. What expenses will it save the Company! how many journeys will be rendered unnecessary! what valuable

* This idea may become of some national importance, if these telegraphs (as they, no doubt, will) obtain general adoption in the political and commercial world, as it offers a responsible employment to a class of persons particularly adapted for its performance, and who hitherto have been confined by their infirmities to the most ordinary occupations.

† As an illustration of the facility with which a fracture in a wire may be discovered and repaired, I record the following fact. When the telegraph line, which is now established, was about half completed, and the conducting trough with its wires was buried in the ground, one wire was discovered to be broken! To the uninitiated it appeared necessary that the whole line should be opened. Not so, however, for by a simple but unfailing method, applicable alike to the greatest or shortest distances, the fractured part was discovered and repaired in a few minutes, without disturbing more than three feet of the completed work.

time will be spared! The heads of the most remote departments (say Birmingham and London) may converse with almost the same facility as though face to face. This must become as certain an adjunct to a railway of any extent as the rails upon which the carriages pass: as soon as the public is convinced of the safety and certainty it assures, it will be imperious in this demand. By the introduction of Messrs. Cooke and Wheatstone's Telegraph, the Directors of this Company have secured to the public the acme of advantage of which this all-but-perfect mode of travelling is susceptible: its advantages, we are convinced, will not be overlooked by the directors of the other great works which are in progress.

OPENING OF BEAM WIRELESS SERVICE TO CANADA.

THE Canadian Beam Service—the first of the new Imperial Wireless Services—was opened on Monday morning, Oct. 25. The new service, which supersedes the former Marconi Wireless service between London and Louisburg (Nova Scotia), is operated on an improved system directly between the Central Telegraph Office, London, and Montreal, thus eliminating any delay due to landline retransmission between the Atlantic coast and Montreal and reducing to this extent the transit time between the principal business centres in this country and in Canada.

The service is available for telegrams for all parts of Canada and also for Newfoundland, the West Indies, the United States and other countries reached through Canada. Telegrams intended for transmission by the new Beam route should be marked "VIA EMPIRADIO."

At the outset the rates of charge by the Canadian Beam Service will (except as regards Post Letter Telegrams which are referred to below) be the same as the rates previously charged by the Marconi Service which it supersedes.

In addition to the usual services with telegraphic transmission throughout, special facilities are offered "via Empiradio" at the exceptionally low rate of 1½d. a word (subject to a minimum of 2s. 6d. per telegram of twenty words or less) for Post Letter Telegrams, which are handled as telegrams between London and Montreal, but are collected and delivered as letters. The conditions governing this service are as follows:—

- (a) Post Letter Telegrams must be written in plain language and must bear the indication "PLT," chargeable as one word, prefixed to the address.
- (b) They may be either handed to the counter clerk at any Postal Telegraph Office or posted by the sender himself in an envelope marked "Urgent" to the Superintendent on Duty, Central Radio Office, Central Telegraph Office, London, W.C.I." Stamps to the relative amount (2s. 6d. or more according to the number of words) should be affixed to the form by the sender before posting.
- (c) The Post Letter Telegram service is limited to telegrams addressed to places in Canada and Newfoundland, delivery being effected by post from Montreal.
- (d) Registered abbreviated addresses, prepaid replies, and other special facilities are not admissible in connection with Post Letter Telegrams.
- (e) No guarantee can be given regarding the time of delivery; the transit times will vary with the postal transit times at each end.

All the supplementary facilities offered by other routes are available to users of the Empiradio Service—free receipts, credit accounts, abbreviated addresses, repetitions, &c.

AUTOMATIC TELEPHONES AT CHELTENHAM.

There has just been completed for the British Post Office at Cheltenham, Gloucestershire, a new trunk and local telephone exchange embodying A.T.M. (Strowger) automatic telephone equipment for the service of Cheltenham telephone subscribers who will henceforth enjoy the amenities of dialing their required numbers instead of invoking the aid of an operator.

Cheltenham has an interesting if unexciting history, dating back to 863 when it was the site of a British village and burying ground, and boasted a church of its own even then. At that time the Manor belonged to the Crown. It was granted to Henry de Bohun, Earl of Hereford, late in the 12th century, but in 1199 was exchanged for other lands with the King. In 1219 it was granted to William de Longespee, Earl of Salisbury, who in 1223 leased the benefit of the markets, fair, and hundred of Cheltenham to the men of the town for three years. The lease was renewed by Henry III in 1226, and again in 1230.

Cheltenham remained an insignificant market town until early in the 18th century, when a saline spring was discovered in 1716 and proved the key to its future prosperity. In 1738 a Pump-room was erected, and the fame of Cheltenham as a Spa soon rendered it a fashionable resort. It reached the zenith of its prosperity in 1788 when the benefit derived by George III from its waters virtually established its reputation as the premier Spa of the Georgian era. To-day, Cheltenham has four Spas—the Royal Old Well, Mountpellier, Pittville and Cambay. The first three are saline, the last, Chalybeate. The Mountpellier and Pittville Springs supply handsome Pump-rooms, standing in public gardens and are the property of the Corporation.

In addition to its reputation as a health resort, Cheltenham is also an educational centre, Cheltenham College (1842) providing education for boys in three departments, classical, military and commercial. Its Ladies' College (1854) is one of the most successful in England. There is also the Normal Training College (1846) for training male and female teachers, and a Grammar School, founded in 1568 by Richard Pate, Recorder of Gloucester.



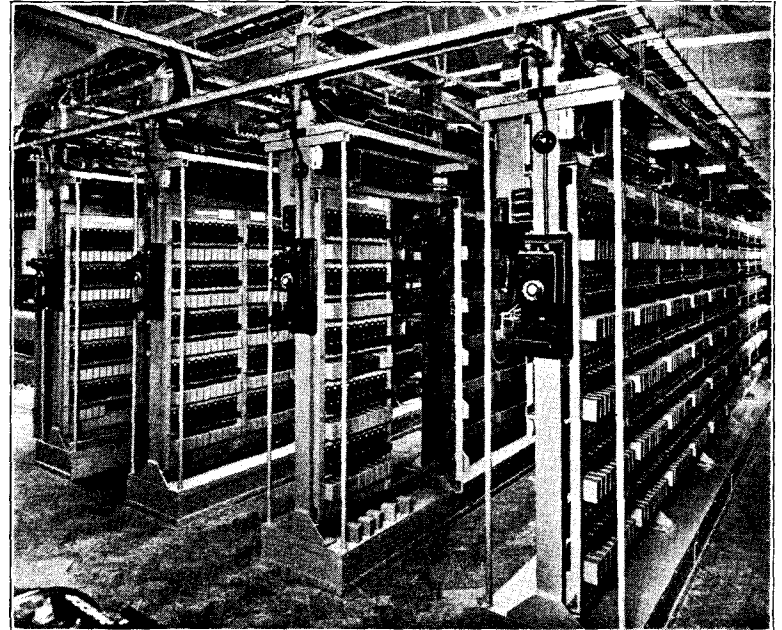
SELECTOR TRUNK BOARDS.

Cheltenham boasts a race-course and is the headquarters of the Cotswold Hunt.

The new Telephone Exchange is located at Wolsey House, Oriol Road, and both automatic and manual equipment was manufactured and installed for the British Post Office by Automatic Telephone Manufacturing Co., Ltd., Strowger Works, Liverpool. The present equipment of the automatic switchroom on the ground floor serves 1,520 subscribers' and 200 P.B.X. lines, with provision for ultimate extension to 2,000 lines.

There are 16 regular and two P.B.X. rotary lineswitch units of the usual standard type, the line switches being mounted on gates to facilitate inspection and adjustment. The final selectors are mounted on shelves at the opposite side of the lineswitch units, whilst the group selectors are accommodated on three selector trunk boards, each mounting six shelves per bay and accommodating 240 switches.

Auxiliary equipment includes an M.D.F. link distributing frame, and a 7-bay meter rack with capacity for 300 meters per bay. There is also a one-bay meter rack for traffic meters, comprising congestion, overflow, total traffic and time unit meters.



LINESWITCH UNITS.

The system at Cheltenham is 4-digit; subscribers numbers lying between 2100 and 2999, 3100 and 3299, 3300 and 3799; whilst P.B.X. lines are numbered from 2000-2099 and from 3000-3099.

Special numbers are as under :—

- 0.— Trunk Records and Junction Calls.
- 90.— Phonograms.
- 91.— Enquiries.
- 93.— Rural Party Lines.
- 99.— Test Clerk.

Calls from manual subscribers in outer areas are extended to Cheltenham automatic subscribers by the manual operators, whilst outgoing calls to the neighbouring Cleeve Hill district reach the manual operators there via auto to manual repeaters, the Cheltenham subscriber requiring a Cleeve Hill number dialing 5.

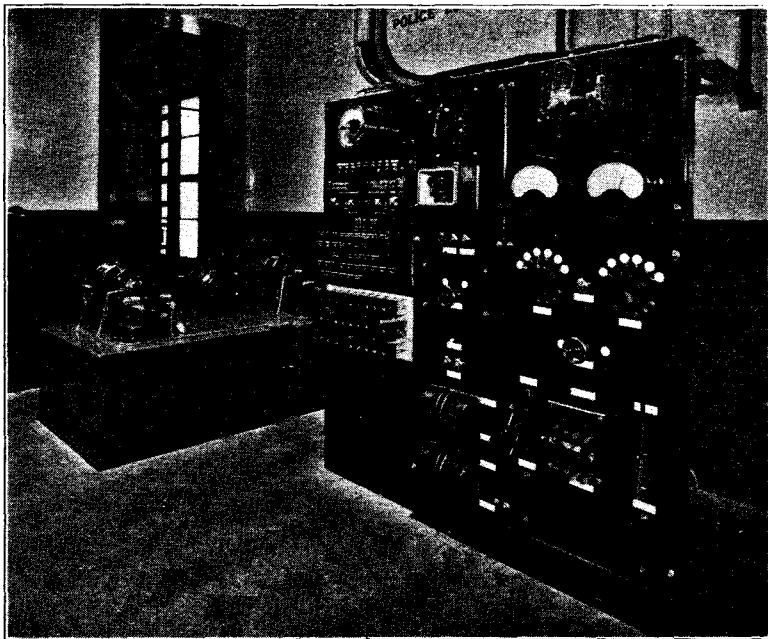
The manual equipment at Cheltenham, still necessary to maintain communication with other areas not yet converted to automatic working, comprises a suite of eleven 2-panel sections of which nine are at present equipped.

Commencing with a cable-turning section there are three Trunk signalling positions, each with 7-cord circuits; one jack-ended junction position, with 17 cord circuits; three regular "A" positions, with 14 cord circuits, and two enquiry positions with 8 cord circuits. Auxiliary manual equipment includes an I.D.F. special apparatus rack, a fuseboard and fuse alarm mounting board and a meter cabinet for manual and dial-in junctions and peg count meters. Current for operating both automatic, local and manual trunk exchanges at Cheltenham is controlled by a two-panel power board, one panel of which carries the supply-driven ringer starter, auto-control change-over switches and circuit breaker for controlling the duplicate ringing machines as described below. On the other panel are mounted the ammeter and voltmeter with associated multi-way switches, generator field rheostat; S.P. circuit breaker, and switches for controlling the charge and discharge of the main and booster meter batteries.

The main batteries are of Chloride Electrical Storage Company's manufacture and comprise two sets of 25 S.B.9 Chloride type elements in S.B.W. 15 lead-lined wood boxes. The present capacity of each battery, which is arranged on a single-tier rack, is 486 A.H. at the nine-hour rate, but the boxes provide for additional plates, when needed, to bring the capacity of the battery up to a maximum of 610 A.H. Burnt-in lead partitions at present limit the acid space in each cell to that required for the lower capacity.

The batteries are charged from the supply mains through the medium of a motor-generator having an output of 100 amps. at 57 volts with regulation between 50 and 68 volts. The motor is a protected type single-phase, slip-ring induction motor, designed for 200 volts S.P. 100 cycle A.C. supply and is direct-coupled to the shunt-wound generator. The normal speed of the set is 1440 r.p.m.

The ringing dynamotors are in duplicate and are mounted on a pier. One machine is designed to run off the supply mains and will normally run continuously, furnishing the exchange with the requisite current for ringing wanted subscribers and supplying the various "tones" which are a feature of automatic working.



CHELTENHAM AUTOMATIC EXCHANGE: POWER BOARD.

It will be appreciated that even a temporary failure of the ringing current and tones would seriously disorganise the working of an automatic exchange and to provide against such a contingency the duplicate ringing dynamotor, is provided as a stand-by, designed to run off the exchange battery, so that should the local electricity supply service fail the telephone service would be uninterrupted.

Moreover such a failure of the supply-driven machine is immediately and automatically compensated by the ingenious mechanism provided on the first panel of the power board, and previously referred to.

Failure of the ringing voltage immediately switches in the duplicate battery-driven machine and gives an alarm, calling attention to the breakdown. When the supply has been restored, normal conditions are brought about by re-set switches, also mounted on the power board. This is one of many of the highly ingenious features which render an A.T.M. (Strowger) Automatic Exchange practically infallible.

With a population of close upon 50,000, Cheltenham well merits improved telephone facilities, and we may confidently look forward to an appreciable growth in the number of subscribers in that area as soon as the advantages of the new system have had time to be appreciated.

G.P.O. NORTH CHESS CLUB.

THE opening of the Chess season was rendered memorable by the visit to the Club of Mr. F. D. Yates, the British champion. Mr. Yates contested 22 games simultaneously against members of the Club and made the excellent score of 20 wins, 1 loss and 1 draw. The one win for the Club was secured by Mr. J. Y. Bell, and Mr. F. W. Viney, playing very steadily, secured the draw.

The G.P.O. North Chess Club meets on Wednesdays from 6 to 9.30 p.m., in the Refreshment Room, G.P.O. North Building. All members of the Post Office interested in the game will be heartily welcomed.

TELEPHONE NOTES.

IN an interesting article in *Telephony* on the subject of "Science and Research in Telephony," there is striking evidence of the importance which the American Telephone & Telegraph Company attach to research work.

The Bell Telephone Laboratories occupy a 13-storey building, covering almost an entire city square. The personnel numbers about 3,600, of whom approximately 1,700 are members of the technical staff. Some 600 or 700 of the technical staff have college degrees.

In these Laboratories are undertaken investigations, research and experimentation in the development of plans, methods, systems, ideas and inventions designed to secure safety, economy, and efficiency in the equipment, construction, and operation of telephone or telegraph or other electrical plants and systems.

In comparing the organisation with that in existence in this country, it must be borne in mind that so far as coordinations of procedure and general research work are concerned, the Bell Laboratories occupy in respect of the numerous telephone and telegraph companies throughout the United States a somewhat similar position to that which Headquarters Departments occupy in the British Post Office.

* * * *

According to the *Electrical Review*, two direct telephone lines between Berlin and Paris have just been inaugurated. Instead of the cable passing via Strasburg, it is linked up via Frankfort, which reduces the distance by about 125 miles. The two new circuits have cost more than 20 million francs, but it is considered that the expenditure was well worth while, as urgent calls can be obtained within a minute.

* * * *

Commerce Reports states that the Soviet Government plans to consolidate into one Federal service the telegraph, radio, and telephone systems of the U.S.S.R., according to the Commissar of Posts and Telegraphs. The development of communication by telephone will be given primary consideration. On April 1, 1926, there were only 171,000 telephones in the Soviet Republic. At present, 67% of these are under the Commissariat of Posts and Telegraphs, and 33% are under local authorities. Telephones represent the most profitable branch of the Commissariat, but they are in a deplorable condition. In some towns telephones have not been repaired for 10 years, and the equipment of nearly all stations is out of date. In rebuilding these stations it is planned to install the automatic system. Inter-urban telephone lines are increasing rapidly. At the close of the fiscal year ended Sept. 30, 1925, they extended for 17,000 miles; on April 1, 1926, their length had reached 22,000 miles. Telephone connexions exist between Moscow and Rostov-on-Don, Moscow and Kiev, and Moscow and Kharkoff. During the coming year it is planned to extend lines to Tiflis and Baku.

* * * *

According to the *Electrical Review*, The Allmänna Telefonaktiebolaget L. M. Ericsson has recently received an order for the construction of an automatic telephone station at Rostov (Soviet Union) for 10,000 subscribers. No fewer than eighteen automatic telephone stations on the Ericsson system are at present under construction, namely, one at Gothenburg, two at Stockholm, eleven in Italy, one at Rotterdam, one at Johannesburg, one at Cracow, and one at Kristiansund (Norway).

H. J. E. S.

THE HOLY ISLAND CABLE.

AN element of adventure marked the completion of the laying of the new telephone cable between Holy Island, off the Northumbrian coast, and the mainland; the work has taken several weeks to complete. The cable provides two wires for the Post Office and two for the coastguard; the single wire that previously served the island is being retained for emergency purposes. The trench to hold the cable was cut across the sands at Holy Island by two horse-drawn ploughs at low tide. The cable was wound on four drums, and had to be joined up in position. The tide comes in with a rush at this point, and it was often necessary for the men engaged in that operation to continue their work up to the last minute in order to get all clear and in position before the tide swept in. They were then picked up by motor-cars which raced for the land.—*Electrical Review*.

CORRESPONDENCE.

"THE FUTURE OF TELEGRAPHY."

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

SIR.—The subject of suggestions, mentioned by Mr. G. Archibald, and the letter from Mr. C. Young, touches a subject which the Staff regard with justifiable suspicion.

Although I have not received the treatment spoken of by Mr. Young—my suggestions being submitted through the proper channel—one reply received was the usual typed rejection, "It is regretted, however, that the usefulness of the suggestion does not warrant its adoption, nor an award being made."

A considerable period later the suggestion was embodied in an instruction to the Staff without acknowledgment.

Personally, I think that the official form for submitting a suggestion is unsatisfactory.

Why is it necessary for the officer, when reporting on a suggestion, to have at the head of the suggestion form—prominently displayed—the name, rank, office employed, and length of service of the suggester?

By a careful watching of the results of suggestions forwarded to the Awards Committee, it can safely be concluded, that if the suggestion is to be reported on outside the suggester's department it will be unsuccessful.

Detaching the officer's name, &c., and circulating the suggestion for observations, under its number only, would, I think, remove some of the suspicion that the Staff hold towards submitting suggestions.

F. C. CHIDLEY (Telegraphist).

C.T.O., Oct. 17.

"FIVE AND NINE."

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

DEAR SIR.—May I thank you for reminding everybody that the "Five versus Nine" competition in Telephony is no laughing matter, really. There are three quite effective remedies for this alleged transposition already in being, without saying "Fife" or even "Saxophone."

During the War, a native interpreter of the Camel Transport, who 'phoned long-figure telegrams for daily rations of disinfectant, skin wash, scented sprays, and anti-gurgling mixture, never once caused this distressing error. He always said clearly "Fide, widda curly tail," or "Nine, widda straight 'ook."

The second remedy is to abolish the thing "Five" from mathematics altogether, as it is frequently misread as "Three" or "Six." If this suggestion is turned down by certain influential officials concerned, perhaps a Society for Prevention of the Use of the Figure "Nine" may be started forthwith. This awkward digit often looks like "Seven" and "Nought." Anyway, so many associations exist for prevention of nuisances, one more cannot matter.

The last remedy and, I think, the real solution, is to use the *Telegraph*.—

CHARLIE TOMMY, OLIVER.

Yours faithfully,

C.T.O., Oct. 18.

REDUCTION OF TRUNK CHARGES IN AMERICA.

ACCORDING to the *Telephone Engineer* of Chicago, important rate changes on messages to interstate points involving a general readjustment in long-distance rates, and in the evening and night periods, during which reduced rates apply, were announced by the Bell companies to take effect on Oct. 1. The net result will be a saving to the telephone users of America of approximately three million dollars a year. To points 150 miles or more distant the rates are substantially reduced. The greater the distance, the greater the reduction. For example, from Chicago to Detroit, the basic station-to-station rate will be \$1.35 instead of \$1.60; to St. Louis, \$1.45 instead of \$1.70; to Pittsburgh, \$2.10 instead of \$2.70; to New York, \$3.40 instead of \$4.65; to San Francisco, \$8.25 instead of \$11.90. New York to Pittsburgh will be \$1.70 instead of \$2.10, and New York to San Francisco \$11.30 instead of \$16.50. Long-distance cables, carrier systems, vacuum tube

repeaters, loading coils and other improved devices and methods, resulting from continuous scientific research and development applied to the telephone industry, have effected economies on the longer circuits, and have a share in making these reductions possible. A few rates for distances between 24 and 110 miles will be adjusted to make the schedule constant throughout, but in these cases the increase of the basic station-to-station rate will be only five cents.

One of the interesting changes from the public's viewpoint is that by which one and a half hours have been added to the reduced rate period. Reduced rates on station-to-station calls will begin at 7 p.m. instead of 8.30 p.m., as formerly. Between 7 p.m. and 8.30 p.m., the discount will be approximately 25% of the day station-to-station rates, and from 8.30 p.m. to 4.30 a.m. about 50% of the day rates. These discounts will apply where the day station-to-station rate is 40 cents or more, with a minimum reduced rate of 35 cents.

Because of the unsatisfactory service conditions which it brought about, the existing midnight discount, we learn, has been discontinued.

CHESTERFIELD AUTOMATIC AREA.

CHESTERFIELD and Staveley exchanges were converted from Magneto to Automatic working at 2 p.m. on Saturday, September 25. The installations are Siemens No. 16 type, and equipment has been installed at the outset for 900 and 100 subscribers' lines respectively.

Claycross (Dial 5), Dronfield (Dial 6) and Old Whittington (Dial 8) are other exchanges included in the Chesterfield Automatic Area, but, as they are not due for conversion for some years, provision has been made to enable the Chesterfield and Staveley subscribers to dial those exchanges direct.

The manual switchboard associated with the automatic installation consists of three jack-ended junction, five "A" and two enquiry positions.

The whole of the equipment is "housed" in the head post office, where extensive structural alterations and additions have been carried out for this purpose.

Hall multi-coinboxes have been fitted in all the call offices.

An official opening ceremony, presided over by Mr. J. Tattersall, Postmaster of Chesterfield, took place on Tuesday, September 28, and the large company present included Alderman H. Cropper (Mayor of Chesterfield), Sir Ernest Shentall, Miss V. Markham (representing the civic and business interests of the town), Mr. A. Sirett (Postmaster-Surveyor), Mr. E. Gomersall (Superintending Engineer), Mr. S. C. Smith (District Manager), Mr. W. Lomas (Sectional Engineer), Mr. J. G. Ferguson (Traffic Superintendent), and Mr. E. Siddall (Headquarters Traffic Section).

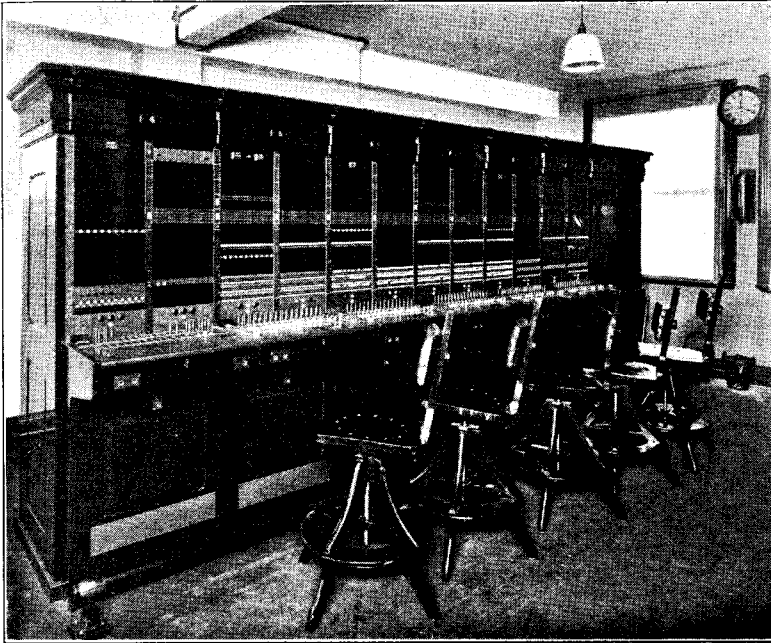
After an extremely interesting series of short speeches had been delivered, the Mayor formally opened the new exchange by completing the final link in the transfer from the old system to the new. The visitors were then conducted round the equipment and power rooms and the new manual exchange, before partaking of light refreshments.

Much satisfaction was expressed by the visitors at the entire absence of confusion and congestion in effecting the main transfer, and they admitted that they were proud to feel that Chesterfield was the first town in Derbyshire to be given an automatic telephone installation.

NEW TELEPHONE EXCHANGE AT UPTON, BIRKENHEAD.

A New Manual Telephone Exchange at Upton, Birkenhead, in the Liverpool Telephone Area, was cut into service by the Post Office on Saturday, Oct. 9. The equipment, which is of the No. 10 C.B. type, is housed at "Inglefield," Church Road, Upton, and was manufactured and installed for the British Post Office by Automatic Telephone Manufacturing Co., Ltd., Strowger Works, Liverpool.

The decision to instal manual equipment in this instance was controlled by the fact that the main Liverpool area has not yet been converted to Automatic working, although a comprehensive scheme which will enable this to be accomplished is in course of preparation by the Post Office Engineering Department. The switchroom equipment at the new Upton



MANUAL SWITCHBOARD, UPTON EXCHANGE, BIRKENHEAD.

Exchange comprises six two-panel switchboard sections and a cable-turning section, affording accommodation for six operators in all. The equipment of the sections, from right to left, is as follows:—

- 1—two-panel Subscribers' Section, equipped with 20 jack-ended junctions.
- 1—two-panel Subscribers' Section equipped for 60 subscribers and 20 jack-ended junctions.
- 3—two-panel Subscribers' Sections, each equipped for 120 subscribers.
- 1—two-panel Subscribers' Section equipped for plugging-up circuits.

There is also a one-position Supervisor's Desk.

Auxiliary equipment in the apparatus room comprises a main and intermediate distributing frame; two-bay relay and meter rack; special apparatus rack; repeating coil and condenser rack; test case; fuse board, and fuse alarm mounting board. The present equipment of the new Upton Telephone Exchange is approximately 300 subscribers, and its initiation in a growing district affords additional evidence of the progressive spirit which now animates the Post Office Telephone Department in its endeavour to overtake the arrears of telephone construction and development work with which it is faced.

RETIREMENT OF MISS JEFFRAY, GLASGOW.

A PLEASING ceremony took place in the Kirkintilloch Exchange, Glasgow District, on Friday, Sept. 10, when Miss E. Jeffray, telephonist, on her retiring under the age limit, was presented with a purse of Treasury Notes, by the Staff and friends in the Glasgow area, coupled with their heartiest good wishes for many happy years of retirement after so long and faithful service. Miss Jeffray, during her service of 38 years—all of which have been spent at Kirkintilloch—has seen the service grow from 6 or 7 subscribers to about 100.

In private life Miss Jeffray takes an active interest in the Mission and Temperance matters of her native town.

ELEGY IN A BRADFORD SWITCHROOM.

(With Apologies to Gray's "Elegy.")

The Town clock tolls the hour of opening day,
The eager girls walk quickly up the stairs,
The duty-clerk then plods her weary way,
And holds the watch, while they come up in pairs.

Now fades the glimmering landscape seen last night,
And all the air a noisy bustle holds,
Save, where the "dial" wheels its droning flight
While calls for Leeds subscribers come in shoals.

Now from yon busy section, looking "glum,"
A "moving girl" does to her chum complain,
Of leaving her old board—until there come
The welcome words of "Your relief" again.

The first-clerk, looking round her carefully
To make sure all telephonists are there,
Now draws her brows together fearfully,
She sees that some positions still are spare.

The fourth-clerk then begins her troubles too,
A patient super. reads the lunch-list long,
The name of one who has a day "in lieu"
Is entered there, and that is very wrong.

Let not ambition mock their youthful toil,
The little "docket" girls work bravely on.
What if the indian ink their hands must soil,
Their busy feet n'er cease the whole day long.

There by the table stands with watchful eyes
The Supervisor, on whose shoulders strong
Is borne with cheerful patience (though some sighs),
All things this very erring staff do wrong.

Far from the madding crowd's continuous strife
The observation-clerk remains all day,
Leading a concentrated, serious life,
Wishing attention some slack girls would pay.

Full many a gem of purest ray serene,
Those serviceable hard high chairs do bear
And by the subs. are heard but yet unseen,
And waste their sweetness on the switchroom air.

So when at last "off duty" comes to them
And to their bright retiring-room they roam,
Their listless lengths upon the chairs they stretch,
And pore upon the books they brought from home.

The duty-clerk, through that part of the day
(No matter how her head with counting whirls),
Must watch the clock, or else you hear her say
"Oh, dear! Oh, dear! I did forget my girls."

All afternoon, the staff, to work a prey,
Some very happy, others just resigned,
But most are glad to go at close of day,
Nor cast one longing, lingering look behind.

The Town clock tolls the hour of parting day,
The busy herd wind quickly home to tea,
The "late staff" onward plod their patient way,
But sometimes wish that they had "changed" to-day.

PRESENTATION TO MR. RIDD.

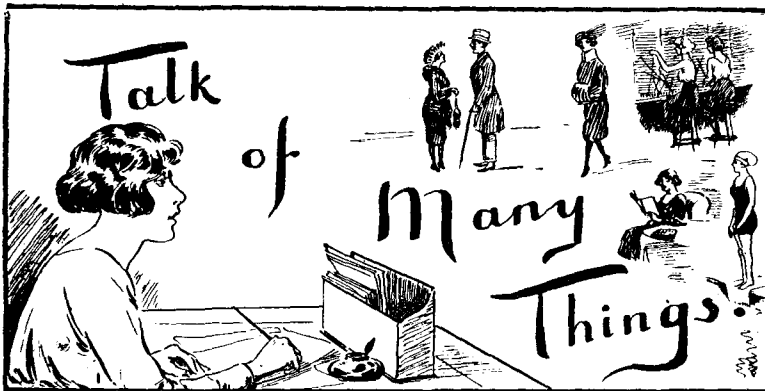
A HAPPY and interesting function took place at G.P.O. South on the evening of Oct. 5, when Mr. P. J. Ridd, late Sectional Engineer, City Internal Section, was presented with a handsome sectional bookcase, as a mark of appreciation, upon his promotion and transfer to the Research Section of the Engineer-in-Chief's Department.

The parting gift was from all grades of the City Internal Section, and quite a family gathering assembled to express regret at his departure, and to congratulate him upon his well-merited promotion.

In making the presentation Mr. W. Deane, Assistant Engineer, referred to the happy relations which had always existed between the Sectional Engineer and his staff, and his remarks were afterwards heartily endorsed by other members of the staff.

As an engineer, a chief and a friend, it has been a privilege for the staff to work under Mr. Ridd. They wish him every success in his new sphere, and will watch with interest his future career.

WE TELEPHONISTS



Exchange Names!

It is remarkable how many extraordinary things we accept as commonplace, and how disturbed we are at a departure from the usual in even the simplest items of daily life. No one is amazed at the sight of a postman in his individualistic uniform, but if anyone other than a postman were to wear a postman's hat what a fuss there would be. The postman's hat is peculiar—no other hat is quite like it. It could not be called a picture hat, except possibly by a neo-artist. Its design is apparently strictly utilitarian and is no doubt admirably suited to keep off the sun and the rain. It is indeed quite an excellent hat and one worthy of general adoption. But the ordinary man could not wear one because to wear an extraordinary hat is a crime even worse than that of wearing no hat at all. Custom has decreed that particular hats shall be worn by particular people and peculiar hats by peculiar people. The convention which forbids that "never the twain shall meet" is only flouted on Hampstead Heath on Bank Holiday, and then liberty rules joyously, gloriously and scandalously. No one knows quite why men should not wear dainty hats, flowered and feathered, or why women should not assume toppers and trillies. No one knows who first decreed that bowlers should be masculine, and toques* feminine. Nevertheless, the distinction is observed and may not lawfully be altered except by special sanction for particular purposes.

In the same way we have always accepted as established beyond question that names such as Mary and Jane are the strict monopoly of the ladies and that Thomas and William can never be allotted to other than men without a serious upheaval of social custom. It is, of course, convenient and reassuring to know that whenever the name John is mentioned the reference is to a man and that if one speaks of Susan one has a woman in mind. Names have hitherto had no voice in their allocation—they have been distributed willy-nilly on conventional lines by god-parents. From the point of view of the names themselves this seems rather unfair. Thomas, Henry and William, for example, may never find themselves attached to persons who are dainty and charming, while such as Mary, Alice, and Jane may usually count upon association with grace and beauty. The name of Percy has for too long been coupled with wit, brilliance, and the virtues—let it take its chance of a place under a feather in the Old Kent Road. Let custom depart, therefore, and convention be ignored, and let us exchange names. The inconvenience would only be temporary and not a little amusing.

PERCY FLAGE.

[* What are "toques" ?—ED.]

When Autumn Comes.

B-z-z-z-z goes the alarm. Seven o'clock. Time to get up! But no, wait a minute, to-day is a holiday, one of those "odd days" which we store up, and partake of at intervals, during the year. What a relief! A whole day to do as one likes.

Our thoughts turn countrywards, and we find once more healing from the fret and jar, out in the open among the trees and fields.

The ripe autumn tints of the leaves and the freshness of the air cast their charm upon us.

As we walk along, we come suddenly upon some horse-chestnuts, or "Conkers" as we called them in our childhood. How they bring back memories, and as we pick some up we admire their beauty afresh.

All sense of boredom vanishes, and every breath we take seems to give us new life.

Once more we can take the long look; everywhere the eyes can behold beauty, and one can walk free and untrammelled.

The trees sway in the breeze, and hundreds of leaves come scampering through the air, seeming to enjoy their freedom.

Then the long ride home again on the top of a 'bus, happy in the knowledge that we have made the best of our "day." L.R.

From Far Japan.

The impression which our service makes on the minds of our visitors from overseas is always a matter of interest, and we therefore make no apology for printing the following letter recently received by a London Traffic Officer from a Japanese visitor:—

"I am very happy to inform you that I am now here in Japan all safe after four months' tour of the Continent and the United States. Words fail me how to express adequately my gratitude for your kind attention and guidance extended to me during my long stay in your esteemed land for the study of the highly advanced British telephone system. The precious knowledge I could obtain through your courtesy will, I am sure, prove greatly useful for the improvement of the Japanese telephone service, for which my hearty thanks are due to you.

"Availing myself of this opportunity, I am to ask that you will be good enough to help me further in the study of the service, when occasion arises in future.

"Thanking you again and with kind regards,

Ever sincerely yours."

This is typical of the well-known courtesy of the great and ancient island Empire of the East, whose progress will always be watched with keen interest by Britons. Though East is East and West is West, nevertheless, the twain do meet in the brotherhood of Service.

P. D'A.

[Vide Post Office Circular.]

A Lay of Malay.

Big Willy Flight and his smaller pal Wally
Discovered a stunt which they thought rather jolly,
To go to Malaya as great big white chiefs
And confound the critics and all their beliefs.
The pay wasn't bad, so the circular read
And a nice motor-car was a thing, so they said,
To consider, along with the servants so many
Who do all the work for less than a penny.
So they rang up the King, the bargee, the tailor,
The dustman, the vicar, and even a sailor
To ask of these various people "Oh, please,
What do you know of this place overseas?
And is it a fact that when I get there
All I shall do is to sit in a chair
And watch all those natives so wiry and brown
Toiling away from sun-up to sun-down?
And would you tell me if a twelve or a ten
Is the bore for my gun when I'm shooting a hen?
I want to know whether the Rhinoceroow
Should be caught in a mousetrap or killed with a bow?
There is also the question of joining the club,
Is it like Lyons' "Pop" or more like a "pub" ?
Do the members drink scotch or do they like water,
Or both, and some others that they hadn't oughter?
When I've treated 'em all till they're full to their collars
Will much be then left of my four hundred dollars?
When this information they'd gathered together
They started collecting some books on the weather,
The people, the pictures, the roads and the trees,
The trains and the sewers, the food and the fleas.
Their Traffic Branch colleagues soon learnt in a maze
All there was to be known of Malay in two days.
And even the two gallant gents, so it seems,
At the close of the day spent the long night in dreams
Of centipedes longer than any hose-pipe
With millions of legs and mouths full of tripe,
Of snakes red and blue and elephants singing
And gnats with false teeth and boats that were swinging,
Till poor Mrs. F. and poor Mrs. O.
Asked themselves daily if they ought to go,
But Willy and Wally had already mentioned
"Provided we live, at fifty we're pensioned."

So all you young fellows who will stay behind,
I put it to you—please bear it in mind,
If ever they offer a job at the "Pole"
Put in for it quickly and pack up your coal
For I'm sure that the Service need men of your sort
And they'll give you your pension before you leave port.

H.A.

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.

LONDON TELEPHONE SERVICE NOTES.

Telephonists' Society.

THE new president, Mr. J. Hinshelwood, gave his address, entitled "System," at the opening meeting of the session, on Oct. 1. The main theme of the speaker was that success can rarely be won by the unmethodical, and in the development of the address way and means were indicated by which methodical habits could be acquired. It was emphasised that there could be no "get-rich-quick" means of becoming methodical and systematic in thought and deed. This would only be achieved, said the speaker, by constant application to detail and by unswerving purpose.

Mr. Hinshelwood advocated the cultivation of the art of conversation, the study of mathematics, participation in games of chess, reading and writing, all of them assisting in the acquirement of method. Particular stress was laid on the necessity for concentrating always on the immediate matter on hand.

Another phase given prominence was the need for individuals to use their powers of observation to the fullest possible degree.

A discussion followed the address.

The second meeting of the session will be held on Friday, Nov. 5, when Mr. C. W. Brown, of the Engineer-in-Chief's Office, will give a lantern lecture entitled "Automatics in Being." As both the lecturer and his subject are very popular there is bound to be a good attendance and early arrivals will be entertained with music.

* * * *

Swimming Gala.

The Eighth Annual Gala of the L.T.S. Swimming Association was held at Pitfield Street Baths on Oct. 8, before the usual packed and enthusiastic attendance. The Association is probably the largest of its kind and it certainly sets a high standard as regards organisation and performance. This year

the gala attracted the attention of members of the Civil Service Sports Council, Miss Constantine and Mr. Curtis Bennett being present to witness the sport.

The contests resulted as follows:—

LEARNERS' RACE (1 WIDTH). "MISS COX" CUP.

Miss Willbe (Gerrard)	1
Miss Poppleton (Clerkenwell)	2
Miss Lyons (Royal)	3

The most striking feature of this race was the sight of a learner with less than a year's experience swimming a double over-arm stroke. She did not win.

TEAM RACE. "POUNDS" CHALLENGE CUP.

Victoria (Misses Fern, Bailey, Amos and Drinkwater)	1 min. 44½ sec.	1
Regent (Misses House, Williams, Amos and Brooms-grove).	1 min. 45½ sec.	2
Gerrard (Misses Burt, Hayter, Farey and Davis).	1 min. 47½ sec.	3
Avenue (Misses Willmott, Cates, Stevenson and Brinsdon).	1 min. 49½ sec.	4

Seventeen teams contested the heats, the fastest time being returned by Gerrard at 1 min. 43 sec. Regent were only ½ sec. longer and Victoria took 1 min. 45½ sec. Students of form had decided that Gerrard would win the final. The Victoria Team did not appear to be reconciled to this view and deservedly won a most exciting race.

SEALED HANDICAP (TEAMS).

Bishopsgate (Misses Lloyd, Luxton, Long and Bowers).	2 min. 14 sec.	1
Regent ... ..	...	2
Gerrard ... ..	...	3

The handicap was decided on the times returned in the heats for the "Pounds" Cup. The official handicapper publicly commended the teams on the fact that their performances so closely approximated to the times they submitted.



When the "growler" was in its heyday

ERICSSON'S were already firmly established. By elaborate experimental work in the science of telephony allied to very careful attention to manufacturing details they built up a business which is known and appreciated wherever the telephone is used.

When you next consider your equipment ask the firm with an experience as old as the industry to quote. Write for further particulars.

ERICSSON TELEPHONES LTD.
67/73 KINGSWAY, LONDON, W.C.2.



Ericsson
TELEPHONE
EXCHANGE
EQUIPMENT

TEAM RACE (MEN).

Argent (Messrs. Brenton, Warren, Skates and Creighton).				
1 min. 24 ¹ sec.	...	...	...	1
Lotos (Messrs. Waghorne, Frier, Thompson, Gregory).				
1 min. 31 ¹ sec.	...	...	...	2

L.T.S. HANDICAP (33 YDS.).

Miss Long (Bishopsgate). 15 sec. start	...	...	...	1
Miss Thirwell	...	...	...	2
Miss Hardingham (Clerkenwell). 12 sec. start	...	...	...	3
Miss Hayward (Sydenham). 26 sec start	...	...	...	4

There were 121 entrants for this race which had to be swum off in 15 heats and a semi-final before the final was reached.

SUPERVISORS' CHAMPIONSHIP (33 YDS.).

Miss L. K. Davies (Trunks)	...	...	...	1
Miss Mc-Nee (Avenue)	...	...	...	2
Miss D. A. Jones (Clerkenwell)	...	...	...	3

L.T.S. DIVING CHAMPIONSHIP.

Miss McBirney (Trunks). 56 ¹ pts.	...	...	...	1
Miss Williams (Regent). 53 pts.	...	...	...	2
Miss Amos (Victoria), 47 ¹ pts.	...	...	...	3

There were 25 competitions for the championship title and the diving was of a very high order.

Other items were, an obstacle race won by Miss S. Wilson (Gerrard), a display of high and fancy diving by Messrs. A. S. Coombs, D. H. Fairman, W. C. T. Burne and S. Mercer, and finally a water-polo match between City of Westminster and Cygnus.

The prizes will be presented by Miss A. Cox during a dance to be held at Westminster Palace Rooms on Friday, Nov. 12.

FATAL ACCIDENT AT RUGBY WIRELESS STATION.

WITHIN a few hours of leaving his home at Folkestone, where he had been spending the week-end, a young electrician, Ralph Leang Oldfield, was electrocuted at the Radio Station at Hillmorton on Monday afternoon, Oct. 11.

At the inquest at Rugby the mystery of why Oldfield was inside the high-tension machinery enclosure, where he was found, was not cleared up satisfactorily.

It was stated that he had climbed inside by a ladder, although well aware of the risk he ran.

The inquest was attended by Mr. H. Faulkner (engineer-in-charge of the station), Mr. E. R. Marshall (solicitor for the Post Office), and Mr. Cackley (H.M. Inspector of Factories).

Amos William Oldfield, of 16, Dalvinghurst Road, Cheriton, near Folkestone, Kent, said his son was twenty years of age, and was in lodgings at 88, Murray Road, Rugby. He had been spending the week-end at home, and appeared to be in his usual health. He returned to Rugby on his motor-cycle on Monday. He had been interested in electricity for four or five years, and was previously employed by the Folkestone Electrical Supply Co., and at South London Power Station. He was fully cognisant of the danger attaching to the work.

Charles Edward Dunkley, of Hillmorton Wharf, Rugby, employed at the radio station, said about 3 p.m. on Monday he saw deceased, who had come on duty about an hour previously, inside the enclosure surrounding the high-tension machinery in the power-house. A ladder was placed against it.

The Coroner (Mr. E. F. Hadow) here explained that the room is roughly rectangular and the engines are ranged in the middle, guarded by a fence five feet high and about three feet distant. At one end there is a gate, which is always locked, the keys of which are kept in the office. If anyone wanted to get inside they had to apply for the keys at the office. The mere fact of opening the gate switches the current off. If this young man had any business inside the enclosure he would have had to fetch the keys from the office.

Continuing his evidence, Dunkley said he saw Oldfield in a crouching position under the handle of the earth switch. Witness advised him to come out, and then started to walk away. He had only gone two or three yards when he looked back and saw him kneeling down a few feet from his original position. He could see that he had had a shock. Witness switched off the

power and fetched assistance. Oldfield was found to be either unconscious or dead. Artificial respiration was tried without success, and he was taken to Rugby Hospital.

Answering the Coroner, witness said the ladder was kept a few feet away, and he understood it had been left there by a contractor.

Would his business take him at any time inside the enclosure?—No.

Did you ever see other people inside the enclosure?—No, never.

By the Foreman (Mr. Overton): He had no idea why he went inside.

The Coroner: He might have wanted to put a drop of oil somewhere?—

Witness: No; the machine is shut down periodically for that purpose.

Cyril Onslow Horne, assistant engineer-in-charge, explained that Oldfield's duty was to answer signals given by an inspector, his next superior officer. In the case of this particular machine he would either have to stop it or raise the voltage, and that was quite a safe undertaking, because he merely had to operate handles outside the cage. These were on about six feet of insulation. His work would not take him inside the enclosure, but was concerned solely with the handles outside. A hot bearing in the machine was indicated by a red lamp and a bell ringing, and Oldfield's job in that case was to shut down that machine and start up another one. One machine was always kept idle.

Witness was informed of the accident, and found deceased lying inside the enclosure, face downwards and with both arms outstretched. He got him out of the enclosure and the ambulance was sent for. Artificial respiration was attempted without success, both on the spot, on the way to the hospital, and after he was admitted.

In reply to questions, witness said they were "on traffic" at the time, and if Oldfield had applied for the key it would not have been given to him.

The Foreman: Did he have any conversation with anyone as regards any little matter?—Not with regard to the station. The only thing he was known to say was, What a good time he had had at the week-end.

Witness added that there was a notice up in red: "Danger, 18,000 Volts." Artificial respiration was commenced within about three minutes of the discovery.

The Coroner: You know no reason why he should be there?—None whatever. He had no business there.

How was the building heated?—There was a radiator on that particular machine. Witness agreed it was possible that he might have gone in to make an adjustment to that.

But to do that he should have come to the office for the key?—If he had come, it would have been refused. It would have meant shutting down the machine and losing traffic.

But this might be a possible solution?—It is a surmise.

Mr. Marshall: I suppose that the notice, "18,000 Volts" would be sufficient warning?—I think that the non-technical person would be frightened by 200 volts.

Are the precautions taken to prevent anyone getting near the machine good, in your opinion?—I don't think they could be bettered. It is absolutely fool-proof.

Detective Tame said he examined the scene of the accident, and was shown a plate about two feet from the ground holding up the spark-gap. The plate was three feet from the enclosure. It bore certain marks which corresponded with the marks on deceased's shoe, which was burnt in one place. Apparently the edge of the plate had cut along the sole of the shoe. There were also burns on three fingers of the left hand, and witness thought that Oldfield, in attempting to reach the ladder on his way out, put his right foot on the plate and his hand on the top of the earth enclosure, thus making a circuit of 3,200 volts.

In answer to Mr. Marshall, it was explained that the enclosure was not charged with electricity, but would act as a conductor when the circuit was made.

Mr. Marshall: I just wanted that made clear for the layman.

The Coroner: Oh, the people of Rugby are brought up on electricity. I think it was invented here.

Dr. W. S. Morgan, senior resident medical officer at the Hospital of St. Cross, Rugby, said he had no doubt that Oldfield was dead when admitted, but artificial respiration was applied for some time afterwards. It was quite probable that death was instantaneous. In America it was found that 500 volts were sufficient for the lethal chair.

After hearing further evidence as to Oldfield's condition, the Coroner agreed that death was probably instantaneous.

Summing up, the Coroner said there was a slight mystery as to why the boy went inside the enclosure, but he thought it possible he was not quite satisfied with one of the heating radiators.

In recording a verdict of "Death from electric shock," the jury said they were quite satisfied with the precautions taken by the Post Office to protect employees. They expressed sympathy with the relatives, and with this Mr. Marshall associated himself on behalf of the Postmaster-General, Mr. Faulkner, and the staff of the radio station.—(Rugby Advertiser.)

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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XXXV.—MR. A. L. DE LATTRE.

MR. A. L. DE LATTRE, the senior Assistant Engineer-in-Chief of the Post Office, entered the service as a telegraphist at Birmingham in July, 1886, and, five years later, transferred to the office of the local Superintending Engineer as a Junior Clerk. In May, 1893, he was promoted to the office of the Engineer-in-Chief, and he has since remained at Headquarters with the exception of an interlude of about four years—1903 to 1907—at Leeds as Assistant Superintending Engineer.

Mr. De Lattre is pre-eminently the Trunk Line Engineer of the Post Office. If he was not concerned with the first beginnings of the Post Office trunk system—of the men who built the first trunk lines in the far-off days of over 40 years ago there are probably none left in the service—he was at least very much in the forefront at the re-birth of the system in the early '90's, when the trunk lines of the National Telephone Company were acquired by the Post Office. He did yeoman service then and he has continued to do so for 30 years, for it is largely owing to his energy, judgment, and technical knowledge that the trunk system is



the wide-spread and highly efficient organisation that it is to-day.

Mr. De Lattre, however, has not confined himself to trunk line development, even though that has been his chief care and joy. He had much to do with the Hanbury Committee of 1897, a Committee, perhaps, nearly forgotten now but responsible for the setting-up of a telephone system in London by the Post Office and for the Municipal telephone systems which have since disappeared, with the exception of that at Hull. And he was in the front line in connexion with the inventory and other proceedings preliminary to the acquisition of the National Telephone Company's system in 1912, and with the subsequent arbitration case, where his work evoked special mention from the Solicitor-General.

Despite the passage of years, Mr. De Lattre's energy shows no abatement, and his zest for the development of the telephone service on sound but economical lines remains undiminished. Upon problems of the chess-board he brings the same keen intuition and certainty of solution that characterise his dealings with the complexities of official duties.

NOTES ON TELEGRAPH PRACTICE.

BY G. T. ARCHIBALD.

(Continued from page 25.)

XXII.—Concerning Phonograms and Telephone-Telegrams.

It is not uncommonly supposed that the treatment of telegrams by telephone dates from the transfer in 1912 of the National Telephone Company's undertaking to the State. Such, however, is not the case. The truth of the matter is that telegrams have been dealt with by telephone since 1884 as the result of the introduction of the old Post Office local telephone system. Extensive use was made of the facility, the telegrams being treated as private wire telegrams.

In 1896 the service was extended to subscribers to the National Telephone Company's system, and although the traffic grew steadily year by year, development was not seriously encouraged until 1912, when clerical and accounting work was reduced to a minimum. Nevertheless, the number of telegrams dealt with by telephone had assumed such proportions in 1910 that it became necessary for official convenience to give the traffic a distinctive title, and "Phonogram" was the name selected.

In order to prevent confusion it may, perhaps, be desirable to explain why some telegrams dealt with by telephone are called "phonograms" and others are described as "telephone-telegrams." The distinction is mainly an administrative distinction; there is no difference in the method of signalling, but there are variations in the non-operating details of the treatment of the two classes of traffic.

A phonogram is a telegram either received or dictated over a telephone subscriber's circuit; a telephone-telegram is a telegram dealt with by telephone between two postal telegraph offices; thus whilst a phonogram must be either a forwarded or received telegram, a telephone telegram may be a forwarded, a transmitted, or a received telegram.

What advantages does the phonogram service confer upon the public? It enables a telephone subscriber and the user of a call office to pass telegrams to a Post Office without leaving their offices or homes in the one case and without travelling a considerable distance to the nearest Post Office in the other, and it is provided that they may be connected to the nearest Post Office open for telegraph business when the local office is closed. It enables subscribers to the telephone service to receive by telephone, free of charge, telegrams which would take appreciably longer to deliver by hand, and it ensured delivery at night of telegrams which would otherwise be held over for delivery on the following morning, and it also enables telephone subscribers to have their telegrams addressed to their telephone number, e.g. :—Jones, Coventry 2514, instead of to the full address—e.g. Jones, 249, Higher Clapton Road, Coventry, a concession which results in a saving to the sender of a telegram.

The charge for phonograms is included in the subscriber's quarterly telephone account, he thus avoids the necessity for a cash transaction in each separate case.

A confirmatory copy of each delivered phonogram is posted to the addressee and special "received" forms are provided for the use of subscribers at their telephone positions.

The subscriber on gaining the attention of the local exchange asks for "Telegrams" and is immediately connected to the appropriate phonogram room. He is charged the usual local fee for each call but there is no limit to the number of telegrams he may dictate during a single call.

It is clear, therefore, that the phonogram service is a great convenience to the telephone subscriber and to the public who take advantage of call office facilities. What then are the advantages from the Post Office point of view?

An examination of traffic at a number of representative offices showed that about 55% of the phonograms dealt with were tendered by subscribers whose addresses were nearer to a sub-Post Office than to the office at which their phonograms were written down, and it is reasonable to suppose that practically the whole of these telegrams would have been handed in at the nearest sub-Post Office if the telephone service had not been available. It is less costly to accept a telegram over the counter than to accept it by telephone and later, to render an account and collect the charges through another department; the Post Office must, therefore, gain some compensating advantage if the phonogram service is to be maintained on an economical footing. Fortunately there is a very real financial gain to the Post Office, an advantage which lies almost wholly in one direction. The service affords the Department the opportunity of concentrating the phonogram work of any given area upon one larger office and a considerable number of telegraph transactions between small sub-offices and that office and other offices is avoided. Studies of the costs involved indicate that the saving on the 55% of the phonograms more than covers the loss on the other 45%, and it has been established that the phonogram service would only cease to be economical if transmissions were saved on less than 20% of the traffic.

The position as regards delivered phonograms is more difficult. At first delivery by telephone was given in all cases where subscribers were willing to accept delivery by telephone. Later, however, as the result of a study of the question it was found that delivery by telephone was uneconomical only if a telegraph or telephone retransmission is saved, and if the addressee's premises are at least 440 yards distant from the delivery office.

In the early days of the phonogram service the messages were written down at the nearest office provided with telephone facilities. It became evident from the studies mentioned above that a considerable step forward might be taken with advantage to the public and to the Post Office, and in 1924 comprehensive standard regulations were laid down.

It was provided that, as a general rule, an office authorised to accept phonograms should be a Head Office, designated the "Appointed Office," the intention being to concentrate phonogram traffic upon group centres (see Zone Routing chapter) in order to save intermediate transmissions. It was not possible to lay down any hard-and-fast rule, as it was held to be desirable that a group centre should be the appointed office for phonogram traffic originated at places within 20 miles radius from that office and are telegraphically served, exclusively or mainly, by the group centre. As an illustration of the effect of this arrangement it may be mentioned that the Central Telegraph Office became the appointed office for telephone subscribers in the Croydon area, and Sheffield performs a similar service for subscribers in the Barnsley, Chesterfield, Mexboro, and Rotherham areas.

A certain amount of local prejudice against a change of appointed office were met with. These objections were sometimes due to a misapprehension that the name of the appointed office

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Telegrams: "Peelcontel, Westcent, London."

would appear on the delivered copy as the office of origin. Arrangements were, however, made for the name of the town in which the local exchange was situated to appear as the office of origin followed by the code letters of the appointed office, e.g., Chesterfield SF. The use of the code letters of the appointed office is merely to facilitate inquiry in case of complaint or mis-treatment.

The advantage of the telephone-telegram service touch the public less intimately but just as effectively as the phonogram service. Prior to 1912 comparatively little use was made of the telephone as a means of linking up Post Offices, although a few such circuits were in use as long ago as 1892. When the Post Office became the responsible authority in 1912 for local telephone communication, call offices were demanded at very small Post Offices, and when it became evident that a single circuit would carry the combined telegraph and telephone load, large numbers of lightly loaded Morse telegraph circuits were converted to telephone working and telegraph facilities were provided by means of new joint circuits at many places where the telegraph or telephone traffic alone was insufficient to justify the provision of a route of communication. Moreover, many small Sub-Postmasters had found it increasingly difficult to obtain qualified Morse operators, especially in the smaller villages, and the advent of the telephone enabled them to deal with the relatively small amount of telegraph work at their offices with greater ease and less expense.

The arrangements for dealing with telephone-telegrams follow closely those laid down for the treatment of phonograms. At the present time upwards of 6,000 offices—more than 50% of the total—dispose of their telegrams by telephone, and many other telegraph circuits are likely to be converted to telephone working in the near future. No branch of the British telegraph service is more interesting from a development point of view than the phonogram and telephone-telegram service. Its growth in recent years has been so remarkable that the student of telegraph practice cannot fail to ask himself why progress should have been so slow until the European War of 1914-1918 compelled the conversion of large numbers of lightly-loaded circuits to telephone working owing to the withdrawal of telegraphists, men and women, for service in the British Navy, Army, and Air Force.

It may quite fairly be said that, on the whole, telephone subscribers were slow to realise the manifold advantages of the phonogram service, especially in so far as they affect the delivery of telegrams. It has to be borne in mind, however, that a telegram had always been regarded as a confidential communication, and there was at first, not perhaps unnaturally, some reluctance to the adoption of a system which might at times necessitate the acceptance of a telegram by an employee. A well-established tradition could not be broken down in a week, or even in a year, but gradually subscribers began to realise that acceptance of their telegrams by telephone expedited delivery and the service has now achieved a large measure of popularity.

Statistics relating to phonogram traffic were not collected before 1907-08. In that year 4,000,000 telegrams, representing 3% of the total forwarded traffic were accepted by telephone and 2,000,000 telegrams, representing 2% of the total received traffic were delivered by the same means. In 1918-19 the forwarded traffic rose to 9,000,000 telegrams and received telegrams to 8,000,000, representing 5.75% and 5% respectively of the total traffic. In 1925-26 there was a slight increase in the number of forwarded phonograms, but in the same year delivered phonograms fell to 7,000,000, largely because delivery by telephone to addresses within 440 yards of delivery offices had been abolished.

Telephone-telegram statistics were not prepared before 1925. In that year upwards of 15,000,000 telephone-telegram transactions were recorded, and the figures for 1926 are likely to show a fairly large increase.

(To be continued.)

THE FIRST MEETING OF THE INTERNATIONAL CONSULTATIVE COMMITTEE OF TELEGRAPH COMMUNICATIONS.

THE above Committee met in Berlin last month and did some useful work in deciding certain questions vital to international telegraphy, and in placing several other vexed matters upon sounder bases for decision. The chaos into which Telegraphic matters had drifted, owing to the long period which intervened between



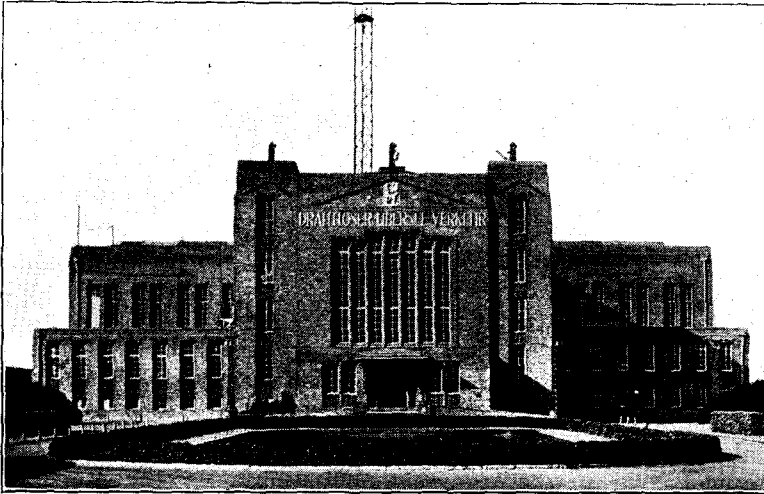
THE FIRST MEETING OF THE COMITÉ CONSULTATIF INTERNATIONAL DES COMMUNICATIONS TÉLÉGRAPHIQUES HELD AT BERLIN, NOVEMBER, 1926. HALL OF THE INSTITUTE OF GERMAN ENGINEERS WHERE THE CONFERENCE WAS HELD.

the International Conference at Paris last year and that held in Lisbon in 1908, the development of long-distance telephony, and the demand for an improved International telegraph service, as also the advance made in long and short-wave Radio communication



THE CONFERENCE IN FULL SESSION.

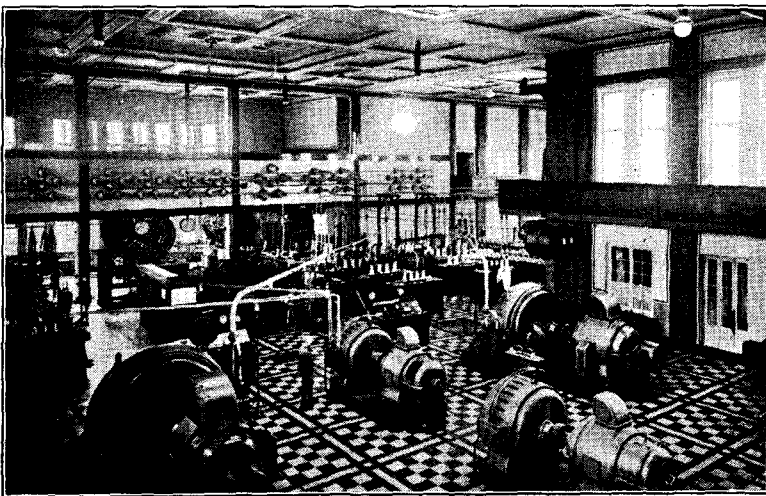
have all tended towards a demand for greater standardisation in apparatus, lines and methods of working. The progress and the trend of the progress of telegraphy in the direction of high speed working, multiplex, carrier-wave, tone frequency, keyboard perforation and type-printing reception have made more urgent the need for a common ground upon which each of the European countries could



FRONT, WIRELESS STATION OF THE TRANSRADIO CO., AT NAUCEN. THE POND IN THE FOREGROUND IS THE COOLING TANK. THE PLATFORM SEEN AT THE TOP OF THE MAST IS EXACTLY THE SIZE OF THE TANK.

work, and upon which inventors could with more certainty utilise their genius.

The recognition of these facts, therefore, induced the Paris Conference to authorise the formation of the above Committee, which commenced its proceedings on the 3rd of last month at Berlin, when in the magnificent building of the German Telegraph



MACHINE HALL OF THE WIRELESS STATION OF THE TRANSRADIO COMPANY AT NAUCEN, GERMANY, VISITED BY THE WHOLE OF THE DELEGATION BY THE KIND COURTESY OF THE DIRECTORS.

Museum the Minister for Posts and Telegraphs, Dr. Stingl, welcomed the sixty odd delegates from Austria, Belgium, China, Denmark, Danzig Free City, France, Germany, Great Britain, Hungary, Dutch E. Indies, Italy, Japan, Mozambique, Norway, Holland, Poland, Portugal, Rumania, Kingdom of the Serbes Croates and Slovenes, Siam, Sweden, Switzerland, Czecho-Slovakia, Turkey, the

Union des Républiques Sovietistes Socialistes, and the International Consultative Committee on long-distance Telephony.

Besides these there were many representatives from the private cable and radio companies. The manufacturers of all the chief telegraph instrument makers were also represented and gave most valuable information when opportunity was afforded.

Upon the election of Ministerial Councillor Arendt as President to the Berlin Committee, the roof of the German Engineer's magnificent hall in Friedrich-Ebert Strasse echoed again and again with the spontaneous applause of a gratified gathering.

This vote of confidence in the powers of the much-respected Herr Arendt was fully justified, and the more so as day after day and hour after hour he patiently, quietly and yet firmly guided the feet of the delegates through the thorny maze of the most intricate of technical points.

One felt as the last day of the Committee's proceedings came to a close that here at least had we found an ideal President who could hold the scales with absolute impartiality, and one who by the force of a personality which not only commanded the respect, but what is more the affection, of those whose privilege it was to sit beneath his aegis.

J. J. T.

TELLING THE WORLD.

It is inevitable that such a far-flung medium of disseminating requests as wireless broadcasting should, at times, be misunderstood, and Mr. R. D. Green (assistant director of the Leeds-Bradford wireless station), who lectured last night before the members of the Bradford Y.M.C.A., showed that this often happens.

Not long ago, he said, a man asked if the British Broadcasting Company would send out the description of a man whom he wanted to find as a co-respondent in a divorce case. Another request came from a dear old lady who, having missed her train, asked if the B.B.C. would broadcast the fact, and ask her relatives not to wait tea for her!

Once, a young man wished to tell the world by wireless that he was collecting tinfoil for the purpose of making a huge ball of it. He thought many listeners would like to help him in this gigantic task.

Curious compliments often came to the staff at the studio, said Mr. Green. One man wrote saying how much he appreciated their afternoon programmes. "I love to get in my armchair at home when they are on," he declared. "I sit there with a pint of beer, all nice and comfortable, and then fall off to sleep!"

Mr. Green also referred to the amazing popularity of announcers—especially in the early days of broadcasting. He recalled an incident which occurred at the London station, when an important figure in the national life of the country, only a little beneath the Prime Minister himself, had been speaking before the microphone.

The great man was met on the steps outside the building by two young ladies, who implored him to give them his autograph. He willingly complied with their request, but was astonished to see the look of dismay on their faces as they read what he had written.

"Well, what is wrong?" he asked. "That is what you asked for, isn't it?"

"Yes," they replied despondently, "but we thought you were an announcer: but, never mind, we can easily tear that page out!"—*Yorkshire Observer*.

LONDON ENGINEERING DISTRICT FOOTBALL CLUB.

THIS Club held a very successful dance at the Cannon Street Hotel on Tuesday, Nov. 30, at which about 150 members and friends spent an enjoyable evening. A Carnival Dance will be held at the same place on Jan. 5. Tickets 2s. 6d. each may be obtained from Mr. J. W. McCoy, P.O. Engineering Dept., Denman Street, S.E.1.

TELEGRAPHIC MEMORABILIA.

As all the world knows, the Beam Service between this country and Canada was successfully opened on Oct. 24 and has since continued in daily use.

One of the first telegrams to be exchanged was the following, from a body of journalists assembled in London to a similar group in Montreal, contact being absolutely direct and simultaneous:—

"The Journalists of London send their greetings through the new wireless beam service from London to Montreal to their colleagues throughout the Empire with their wishes that this new means of communication may foster further closeness of communion and intimacy within the Empire."

We have seen some very recent reports from Melbourne stating that, "the work of erecting the Australian 'Beam' Station is being delayed pending definite results of the Canadian Beam trials." It is further stated, by a financial newspaper that the Australian trials which had been fixed for October will now be considerably delayed, and that "in view of the experience in Canada it is considered improbable that the Australian stations will be able to compete with the cables for some time."

How far the latter is probable cannot, of course, be confirmed or contradicted, but it would be interesting to ascertain the degree of exactitude between the actual facts of the present daily working of the Canadian Service—admittedly still under trial but working well—and the delayed Australian opening!

Let us see what Dr. Eccles has been saying on the peculiarities of short wave and long wave working and from which we can reasonably gather that whatever difficulties have been experienced in Australia are rather those inherent to phenomena concerning which the last word is far from having been spoken. The learned doctor, among other things, referring to the work of Heising, Schelleng, and Southworth, which had consisted of actual measurements of strength at various distances: "Thus, they found that the strength varied from season to season, from hour to hour, and even from second to second. In the daytime the strength of all waves between 111 metres and 16½ metres fell off with increasing distance as fast as, or faster, than that of long waves, but at night time short waves of 111 metres and 66 metres travelled much better. What happened to still shorter waves at night was complicated by the skip, but, as a broad rule, after the skip the signals became stronger the farther they went—an amazing conclusion. It was to be noted, however, that there was usually a time in the middle of the night, say, from midnight to 3 a.m., for waves of 33 metres and distances of 1,000 miles, when the signals would not get through. Remembering that midnight occurred at different instants at different places on the globe, it would be appreciated that the reception of such signals at distances of thousands of miles was complicated very greatly by their midnight vagaries."

"The writers of the very valuable paper referred to laid stress on the instability produced by those various conditions; they had made special observations on fading and found that the rate of fading might be very slow, or as quick as one hundred times a second. Sometimes one wave faded, while another of slightly different length increased in strength. Some of those phenomena occasionally made radio-telephony possible, because of distortion. Nevertheless, very useful service could be rendered in both telegraphy and telephony by short waves, but it was important to choose the wave-lengths carefully for any given task and to suit the hour of day and other conditions. For telephony to 200 miles distance one could use 100 metres; for 500 miles, 50 metres, and then it might be possible to maintain almost a 24-hours service. For a thousand miles one could use 30 metres in the day and about 60 metres at night; for transatlantic work the wave-length should be altered between 100 and 20 metres from time to time in order to maintain reasonably continuous touch."

"From the whole mass of scientific observations now available in the technical literature of the subject, it may therefore be concluded that short waves were certainly more useful than long waves from stations of equal power for distances up to 1,000 miles. Beyond that distance the relative utility of short and long waves depended upon the kind of work to be done and the time when it was done. Amateur investigators would always find short waves vastly more interesting and much cheaper to employ than the long waves for the purpose of international communication. For commercial purposes, countries that needed to be in touch with one another for only a few hours daily would also adopt short waves. On the other hand, a commercial firm which was running a long distance service in competition with cables would find long waves more trustworthy. In such a service it was often necessary to ensure the delivery of messages within a very limited time of their being handed in; in that case long waves were best during certain hours of the day and would be used even though the plant was more costly; but there was the possibility that in the course of time methods of changing from one short wave to another exactly as atmospheric variations demanded might be developed, and such a development would put the short wave on a level with the long wave, but might, of course, at the same time, make the short-wave plant as costly as the long-wave plant."

The Sydney correspondent of the *Daily Telegraph* reports that the cable ship *Faraday* on Nov. 20, at Suva (Fiji Islands), spliced the ends of the new duplicated section of the Pacific cable from Fanning Island to Suva, a distance of 2,043 miles. The vessel started her journey from Fanning Island on Nov. 1. It was expected that the *Domina* would complete on Nov. 22 at Fanning Island the splicing of the northern section of the cable from Bamfield (British Columbia) to Fanning Island, 3,048 miles, the largest single cable

in the world. These new sections, which are of the "loaded" type, are guaranteed to work at 700 letters per minute simplex, as compared with the present 135 letters duplex. The speed will probably be greater, as 900 letters simplex are expected. If duplex working is effected, as is anticipated, the capacity will be doubled. The contract price for the Bamfield-Fanning section with the Telegraph and Construction Maintenance Company was £1,607,000, and that for the Fanning-Suva section with Siemens Bros. was £716,900. With the Southern sections duplicated in 1923, the total cost of the duplication is about £2,800,000, as compared with under £2,000,000 for the original cable. The whole cost of the duplication will be met from profits. Commercial communication will not be effected for a month, as the contractors will test during that period.

JUST IN TIME! As we go to press we learn that the new cable has quite fulfilled expectations in dealing with actual traffic.

The following, from the *Sydney Morning Herald*, is placed under the heading of "Telegraphic" in order to emphasise the use of "carrier waves" and the spread of teletype forms of apparatus in the Antipodes, and not to accentuate the loss upon both telephone and telegraph services "down under"!

Mr. H. P. Brown, secretary to the Postmaster-General's Department, recently stated that the telephone was becoming an increasingly important item in the development of country districts. Last year the Department lost £275,000 on country telephone services, and this year it might amount to £300,000, but the value of the services to people living in rural districts was immeasurable, and it was the Government's intention to continue the policy of decentralisation. He announced that important alterations and additions would shortly be made to the Goulburn post office, which, he said, had become a most important centre for telephone and telegraph business. Equipment to amplify the current for all the long-distance southern trunk calls, which come through Goulburn, will be installed here. Six new branches are to be formed, the other five being in Newcastle, Lismore, Wagga, Dubbo, and Armidale. The Goulburn station will be equipped with apparatus to amplify and relay the new telegraph system by means of carrier wave wireless, the wave-length being greater than that used by broadcasting stations. At present 10 different telegraph messages can be sent at the same time over one wire, which is also used at the same time for telephone messages. The improvements will enable this number to be increased. A special teletype machine will be used for the reception of messages. The Department has been for some considerable time considering the zone system of charging for telegrams, though so far no definite decision has been arrived at. The loss on the direct mileage system of telephone calls was £100,000 last year. The wages paid by the Department amounted to £500,000 more last year than previously.

AUSTRALIA.—The *Electrical Engineer of Australia and New Zealand* says that the new broadcasting station, 7ZL, which is to be built by the Tasmanian Radio Pty., will soon be under construction. The studio premises have been secured at Hobart, and the transmitting station will be on the higher levels out of the city. Mullard air-cooled transmitting valves will be used, each of 1,000-watt rating. A relay station is to be installed at Launceston to relay 7ZL programmes for northern listeners.

BRAZIL.—From Rio de Janeiro, through *Reuter's Trade Service*, we learn that the Brazilian Government has given permission for an organisation called the Brazilian Press to be formed for the purpose of receiving and distributing messages, as well as maintaining and utilising a radio station exclusively for this purpose.

CANADA.—There are now 543 wireless transmitting stations in Canada, says *Reuter's Ottawa correspondent*. Of that number 67 are broadcasting stations, 356 are amateur and experimental, and 67 are code stations, while 46 are operated on the coasts and Great Lakes for the benefit of shipping. All broadcasting and other wireless in the Dominion is under the direction of the Dominion Government Department of Marine and Fisheries.

The production of radio apparatus in Canada during 1925 reached a total value of \$5,548,659.

The number of licences issued during 1925 was 134,486.

CZECHO-SLOVAKIA.—By *Reuter's* and other agencies it is stated that, the new Pressburg (Bratislava) station will begin operations on Nov. 1, using a wavelength of 300 metres, that there are 4,000 registered listeners in Pressburg town, and 1,400 more in the surrounding district, that the announcer will be a woman, and that the number of wireless subscribers increased by 700% between Jan. 1 and Sept. 1 this year. Several training schools have installed stations, the use of which is shared by the other establishments. The Ministry of Education is beginning to interest itself officially in the development of broadcasting, and has included in this year's Budget a sum of 100,000 crowns for the purchase of apparatus.

FRANCE.—An autographic telegram office on the Belin system has been opened at Marseilles, which town will now be able to communicate by "belinogram" with Nice, Paris, Lyons, and Mulhausen, where similar offices exist.

GREAT BRITAIN.—In September, 1926, the number of broadcast radio receiving licences in force in this country was 2,105,000, an increase of 459,793 since December, 1925. The *Radio Times* points out that 34,230,000 of the population (in Great Britain only), or 79.74%, are living within "crystal" range of a station. In three years the service areas have been extended so as to cover twice the population served in December, 1923, and the number of licences has increased three and a half times in the same period.

The wave-meter of the London broadcasting station, which has been made in Belgium, consists merely of a coil with a variable condenser in parallel with it, and there are two methods of operating it. The engineer can watch a little electric lamp, which glows when the instrument is tuned to the exact wave-length on which 2LO is transmitting; or, if greater accuracy is desired, he can watch the needle of a galvanometer connected with a thermo-couple, which is heated when 2LO's wave-length is found. The instrument measures to an accuracy of 300 parts in a million.

A luncheon was given on Nov. 2, at the Mansion House, by invitation of the Lord Mayor, to celebrate the completion of the equipment of London hospitals with wireless installations through the funds raised by the *Daily News*. Since the fund was instituted in May, 1925, a total of 122 hospitals have been equipped, and 13,456 headphones and 479 loudspeakers provided at a total cost of just over £25,000. In addition, advice and technical assistance has been given to 173 funds in the provinces.

Mr. Newcomb Carlton, president of the Western Union Co., recently arrived at Southampton from New York. He is attending a conference of various cable companies in England, the purpose of which will be to discuss means to expand business.

The Marconi International Marine Communication Company states that it has recently come to an arrangement with its principal competitor, the Radio Communication Company, and that it should enable both companies to effect substantial reductions in expenditure and to improve the service to shipowners. Each company will continue to develop and supply its own types of marine equipment.

A meeting of the Pacific Cable Board was convened by Mr. Amery, Colonial Secretary, in London on Oct. 19, and was attended by the Dominion Premiers, who are taking part in the Imperial Conference. Other meetings have taken place since.

The cause of the delay in the introduction of the new European wave-lengths, as allotted to the different countries by the Office Internationale de Radiophone, Geneva, is the desire to ensure accuracy, without which the plan would be useless. Capt. P. P. Eckersley, chief engineer of the B.B. Co., points out that, theoretically, and to avoid stations using the same wave-length heterodyning each other, the accuracy of adjustment of individual stations should be of the order of 20 parts in a million; actually, however, the wave-meters will be accurate to 300 parts in a million, a higher degree not being practicable. The metres were designed by the International Technical Committee and worked out in detail by MM. Brailard and Divoire, of the Belgian administration; the master wave-meter and other instruments (which will be sent to every European country) will be calibrated with it, are being constructed in Belgium and have taken longer to make than was anticipated; hence the delay.

A new wireless station is, it is understood, to be established at Mablethorpe, Lincs., for ordinary naval and shore work. When complete it will replace the present temporary Humber station.

The *Electrical Review* learns that a general meeting of members of the Radio Manufacturers' Association has been convened for Wednesday, Dec. 8. The Association is now functioning as a properly-constituted body with a steadily increasing membership. The appointments of president, chairman and other officials have been delayed in order that every member may have a voice in these elections. The important matter of exhibitions is included in the Association's programme of activities, and already the New Hall at Olympia has been booked for next year's show, while negotiations are proceeding for securing that building for 1928, 1929, 1930 and 1931.

GREECE.—*World Radio* says that at present there is no broadcasting service in Greece, and, owing to the severe conditions imposed with regard to the erection and working of wireless sets, there are very few private stations. The wireless laws of February and December, 1924, embody two forms of permits, one for amateurs for tests with transmitting and receiving sets working under 300 metres with a range of 30 kilometres, issued by the naval authorities, who subject the set to a thorough examination. The cost of such a permit amounts yearly to 50 francs. The second kind of permit refers only to receiving sets, and only plant which does not oscillate is allowed; only frame aërials can be used, and the set must not go beyond 2,000 metres wavelength. Permits can only be held by Hellenic citizens.

HAYTI.—The following is an extract from the August *Bulletin* of the Republic of Hayti, which has been forwarded to the Department of Overseas Trade by His Majesty's Chargé d'Affaires at Port-au-Prince: "One of the most interesting projects undertaken by the Direction Générale is the radio broadcasting station which was completed in August with gratifying results. The Direction Générale is in receipt of a very great number of complimentary communications from receiving stations which have been able to hear station 'HHK' at Port-au-Prince. The station is of 1,000 watts capacity, and it has been heard in Colorado, Florida, Georgia, Connecticut, Porto Rico, Dominican Republic, Venezuela, and many other places. The work of installing receiving sets at various places throughout the Republic is now under way and, although regular programmes have not as yet been arranged, it is expected that within a very short time they will become regular."

HOLLAND.—According to Reuter's Rotterdam Correspondent, the much-discussed scheme of relaying wireless programmes by ordinary telephone, which was initiated some months ago by The Hague Municipal Telephone Service, was successfully inaugurated there on Nov. 1. It is claimed that this is the first occasion on which the ordinary telephone subscriber has been enabled to listen to wireless programmes without the assistance of a special wireless set. So far, arrangements have only been concluded with the Paris,

Daventry, and Hilversum stations for the "transmission" of broadcasting programmes. A novel feature of the new service is that the ordinary telephone service is not in any way interrupted; as soon as a listener is called on the telephone, the wireless broadcasting connection is automatically disconnected.

Commerce Reports informs us that regular wireless connection between the Netherlands and Curacao, Dutch West Indies, will be accomplished soon by means of short-wave transmitters. Experiments conducted by the Technical Bureau of the Department of the Colonies have met with unusual success at night, and endeavours are now being made to establish satisfactory connection during the day. The Bureau is conducting similar experiments with a view to establishing communication between the Netherlands and the Netherlands East Indies. Other information reaches us to the effect that 90% of the normal daily traffic is already and frequently being dealt with by this means.

The Government Telegraph and Telephone Authorities contemplate the erection of a radio-telephone transmitter which will be at the disposal of business people who wish to make announcements, at a moderate tariff. Tests have been made from Scheveningen Harbour, from which it appears that with 3 kw. aerial energy sufficient power can be generated to reach all parts of Holland without disturbing other stations on a 1,950-metre wavelength,

INDIA.—To establish a broadcasting station in Calcutta, which the Indian Broadcasting Company proposes to do, the company requires an area of five *cottahs* of land as a site for the erection of two masts or towers and a transmitting station, and a further area for the construction of an "earth" system. Negotiations are now pending for a site in the Cossipore-Chitpore Park, which the Improvement Trust is constructing. It is understood that if the scheme matures, the broadcasting station will be of similar capacity to that of London. The transmission masts will probably be 150 ft. high, and of graceful structure so that they will not be likely to detract from the amenities of the park. It is proposed that the transmission station shall be of ornamental and approved design. Terms between the company and the Improvement Trust have not yet been definitely arranged, and even if the scheme is carried through it will be of a purely experimental character, its permanence depending upon its success as a commercial venture.

JAPAN.—*Commerce Reports* states that the Government has appropriated 525,187 yen for the construction of radio stations at the following towns:—Taihoku, Tamsui, Giran, Taito, Karenko, and Itabashi, work on some of which is about to begin. The Bureau of Communications and Transportation of the Taiwan Government General has charge of all matters connected with radio installations and operations, excepting such as are under the control of the Imperial Navy. The apparatus used in home installations in this district is almost exclusively of American make.

Reuter's Tokio agency adds that an agreement has been reached between the American Radio Corporation and the Japanese Government for lower transpacific wireless press rates, to become effective on Nov. 1. European companies concerned have not yet replied to Japan's proposals.

With further reference to radio matters in Japan, and according to the British Commercial Secretary at Tokio, "the establishment of broadcasting stations in Tokio, Osaka and Nagoya during 1925 met with immediate popular support and radio quickly became the vogue; at the end of April, 1926, 300,000 licences had been issued. It is reported that the three stations mentioned will shortly be amalgamated into one large corporation, which will operate seven main stations and four relay stations. Receiving sets are subjected to an examination at the Electrical Laboratory, and subject to special sanction the wavelength range is restricted to 400 metres. The market for radio apparatus was soon heavily overstocked, and importers became extremely cautious in placing new orders, while prices slumped. A recent report states that the market is still congested; dealers expect at least a 20% margin, but very few are able to work on this basis. There are no fixed prices, since dealers dispose of their stock as best they can. Low-priced sets and accessories, including loudspeakers, still find a market, but expensive outfits move very slowly indeed. There is an opening for loudspeakers which could be retailed at not more than 20 yen (about £2); at present one or two are offered, but they are not satisfactory. Equally a market exists for receiving sets giving reasonable results at a moderate figure; the average Japanese cannot afford to pay much for a luxury such as a receiving set. The simpler types of receivers, as also cabinets for more expensive sets, are made in Japan. In imported goods, American, and in a lower degree German, apparatus offers the principal competition to be faced by British manufacturers."

Reference has already been made to the institution of broadcasting in Japan. In connection with another branch of the radio art, long-distance telegraphy, the same report says that a company was formed in November, 1925, with the title the Japanese Wireless Telegraph Co., Ltd., and a capital of 20 million yen. One quarter of the capital is paid up, and the object of the company is to supply and erect for Government use equipment for handling radio telegrams. It is under Government control and has taken over the whole business of radio-telegraphic communication with foreign countries. In return for a proportion of its shares the Government station at Iwaki has been transferred to the company, which will in course of time erect stations for communication with Europe (one), America (two), China, Australia, India and Siberia (one), and a central receiving station.

A law passed in November last requires all vessels of 2,000 tons gross or over, and those carrying more than 50 persons, to be equipped with a radio-telegraphy installation. The law applies to foreign shipping entering or clearing ports within the area over which the law is enforced.

LITHUANIA.—Reuter's Trade Service learns that the Kaunas wireless station is trying to place its working on such a footing that it will cost the Treasury less. To that end a measure is being prepared for the introduction of a wireless monopoly in Lithuania, i.e., the Government organs themselves will undertake to popularise broadcasting, to supply subscribers with the necessary apparatus, &c. It is proposed even to manufacture wireless apparatus in Lithuania and to import wireless parts from abroad, though wireless experts declare that a wireless industry is impossible at present in Lithuania. Generally speaking, it is intended to organise wireless in Lithuania on the model of Latvia, whither M. Jurkis, superintendent of the Kaunas wireless station, is going to study the wireless situation there. The exchange of private wireless telegrams with foreign stations is in the experimental stage; private telegrams are transmitted by both the Morse and Hughes apparatus. The Lithuania wireless station will be registered at the International Wireless Bureau and begin officially to operate only when a proper daily programme has been fixed. In the meantime material for programmes is being collected. A chamber installed with microphones suitable for speeches and music has recently been arranged.

LONDON.—The figures which appeared under this heading in our last issue referred to the Pacific Cable Board.

PERU.—From official sources we learn that the Peruvian Broadcasting Co. has liquidated, and its selling rights and property have reverted to the Government. Broadcasting is to be administered by the Marconi Co. for the Government, and expenses will be paid by licence fees of £1 semi-annually on each receiving set. The monopoly is now void, and anyone may import and sell radio apparatus.

SIERRA LEONE.—The annual report for 1925 on the Sierra Leone (West Africa) railway includes an account of the operation during the year of the telegraph system of the country and the telephone exchange in Freetown, both of which are under the management of the railway. The total mileage of telegraph and telephone lines at the end of the year was 1,244, an increase of 40 miles as compared with the preceding year, due to the extension of telephone lines in Freetown. Reconstruction of the Songo-Port Lokko line was completed during the year, and work on the rewiring of a number of stations commenced. Excluding messages on railway service, the number of telegrams dispatched during the year by the public increased by 7,225 to 52,431, and Government messages decreased by 1,210 to 17,089. The number of electric train-staff instruments was 78, the number of telegraph instruments was 43, and the number of telephone circuits on the Freetown exchange was 97, or nine more than in 1924. The number of subscribers, excluding the railway, connected to the telephone exchange was 34 public and 17 Government. The revenue from the telegraph service decreased by £235 to £5,265, and the income from the telephone system increased from £1,334 to £1,440. The European telegraph section, which had been under the supervision of an African telegraph inspector, was taken over by Mr. G. Cresswell, of the Nigerian Posts and Telegraphs Department in March, 1925.

SWITZERLAND.—The American "Teletyp" telegraph printing system has just been adopted in connection with the telegraph service between Berne and Biel, Switzerland. It is stated that the system enables 230 words per minute to be transmitted and printed over a distance of several hundred miles, and possesses several other advantages over the older Hughes system.

UNITED STATES.—The Department of Commerce continues to grant licences for new stations. Five were announced recently within one week, and the total for the country is now close to 600. *World Radio* wonders where wave-lengths are found for them all. Fortunately, some of the stations are inactive and others "go on the air" only at fixed intervals, or on special occasions.

URUGUAY.—Reuter's Trade Service in Montevideo says that the Government of the Banda Oriental has invited tenders for the erection of a new station near Montevideo for broadcasting. Tenders should be addressed to Señor Gilberto Lasnier, Director of the Radio Communication Service, Montevideo, Uruguay.

VENEZUELA.—Reuter's Trade Service, Caracas, informs us that a broadcasting station has been erected at Caracas and put into use. The range of the station, designated AYRE, is 2,000 miles. Preliminary tests have proved that signals can be heard in many of the large towns of the Republic, in some parts of the neighbouring State of Colombia, and as far as the West Indian islands of Trinidad, Barbados, and Puerto Rico.

YUGO-SLAVIA.—The regulations governing the use of private radio stations were amended on July 1, 1926. A comparison with those originally issued in 1923 shows much fuller elaborations, but the essential features remain almost unchanged, and the new rulings are not less restrictive than the old ones.

The following cutting from *The Chatham and Rochester News* will interest those still remaining in the C.T.O., London, who recall Mr. W. R. Williams. Says the journal just mentioned: "There are many of his old friends in this district who will be interested to learn of the celebration of his golden wedding on the 11th instant, of Mr. Walter Richard Williams, of Channel View, London Road, South Benfleet, Essex. Mr. Williams is an old Strood boy, being the elder son of the late Mr. John Williams, of Strood, and brother to Mr. A. E. Williams, Chief Officer of the City of Rochester Fire Brigade. He was educated at Strood St. Nicholas Church of England School and on leaving there entered the S.E. & C.R. Railway service in the telegraph department at Strood Station.

On the Government taking over the telegraph service in 1870 he was removed to Faversham Post Office, and in 1871 transferred to the central telegraph office at St. Martin le Grand, London. From [there he was subsequently appointed Postmaster at Godalming, Surrey, and retired on pension

at the age of 60. Mr. Williams married a Hoxton lady, Miss Caroline Jane Baker, at the Parish Church of St. John the Baptist, Oxton, on Oct. 11, 1876. I am pleased to learn that Mr. Williams is still in the best of health, but unfortunately his wife is an invalid."

When one is leaving the Telegraph Service one's thoughts turn to one's relics of the past in connexion with the interest which has occupied the greater part of one's working life. Turning over some old papers the writer has come across one or two documents the description of which may prove as interesting to my readers as to myself, and I make no apology therefore for describing a telegraph form of the Submarine Telegraph Company which the compositor will perhaps be able to set out as far as possible, per copy, thus:—

PREAMBLE.		<i>Government or (Embassy) Despatch Form.</i>
Inst.	SUBMARINE TELEGRAPH COMPANY.	
Foreign No.	in connection with the	
No. of Words	BRITISH AND IRISH MAGNETIC TELEGRAPH CO.	
No. of Groups	No.	
	CENTRAL STATION	
	58, THREADNEEDLE STREET, LONDON, E.C.*	
	<i>(removed from 30, Cornhill).</i>	
	At m. on day the day of 1867.	
	RECEIVED THE FOLLOWING TELEGRAM IN LONDON.	
	Sent from on at m.	
	To	
	Address	

On one of the outer edges of the form was printed the following information:—

"Direct Submarine wires to France, Belgium, Hanover and Denmark, via Calais, Boulogne, Dieppe, Ostend, Emden and Tönning."

On the other: "Direct wires to Berlin, Vienna, St. Petersburg, Paris, Brussels, Hamburg, Copenhagen, &c., via Calais, Boulogne, Dieppe, Ostend, Emden and Tönning."

On the back of the form appeared the conditions of acceptance of the telegram from which it will be gathered that the companies did not take much of the risk, for:

"The Company will not be responsible for Mistakes in the transmission of either repeated or unrepeated Messages, from whatever cause they may arise.—Nor will they be responsible for delay in the transmission or delivery, nor for non-transmission or non-delivery of any Message whatever, whether repeated or un-repeated.—No Message that is unintelligible can be transmitted to the Continent in consequence of the regulations of the Foreign Governments.—These Companies reserve to themselves the right of refusing all those Despatches which in their opinion are unintelligible.—All Persons sending more than one Message as a Single Despatch will be held liable to pay such further sum in addition to the amount paid on transmission, as would have been charged by these Companies if each Message had been sent separately."

With this same form I found another relic. It was an original letter sent to the Superintendent of the Transmission Department of the Company from the Secretary of the same instructing the former of certain staff changes which were to be made. The letter was written throughout by the hand of the then Secretary of the Company, and my readers will doubtless wonder what must have been the Secretary's estimate of the intelligence of the head of the Transmission Department when he wrote as follows to his subordinate, "for his guidance."

It should be stated also that the Secretary and the Superintendent were in the same building, that the letter was written on the company's usual letter paper, was neatly folded in a small envelope, and commenced as follows:—

"Dear Sir, " 11th April, 1867.

"Referring to my letter of the 29th March and the enclosure which accompanied it, I beg to inform you that I have made some alterations in the Rota therein laid down for your guidance, and communicate them to you below:—

"In future there are to be—

9 Clerks and 2 Boys coming on duty from	8 a.m. to 4 p.m.
12 " " 1 Boy " " "	11 a.m. to 7 p.m.
1 Boy " " " "	1 p.m. to 9 p.m.
8 Clerks and 2 Boys " " "	4 p.m. to 12 p.m.
6 " " " "	12 p.m. to 8 a.m.
Total, 35 Clerks and 6 Boys.	

The effect of this arrangement will be that you will have 6 Clerks on duty between midnight and 8 a.m., 9 Clerks and 2 Boys between 8 a.m. and 11 a.m., 21 Clerks and 4 Boys between 11 a.m. and 4 p.m. (One of these boys coming on at 1 p.m.), 20 Clerks and 4 Boys between 4 p.m. and 7 p.m., and 8 Clerks and 3 Boys between 7 p.m. and midnight (1 Boy leaving at 9 o'clock).

"I am,
"Dear Sir,
"Yours truly,
"..... Esq.,
Superintendent,
Transmission Dept."
"Secretary."

* The site is now occupied by the present new building of Threadneedle Street B.O.

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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DECEMBER, 1926.

No. 141.

FARTHER AND FARTHER STILL.

WHILST the imaginative or credulous grope dimly after wireless communication with Mars (though possessing but the slenderest grounds for believing that planet to be inhabited, and ignorant whether, if inhabitants there be there, they are of subhuman, superhuman, or totally inhuman nature, whether their mode of communication is by speech or some sort of sign unconceived or inconceivable by us on earth, or whether if any Martian signs or signals did reach the earth it would be possible for linguistic or telepathic genius to interpret them), the British Post Office and the American Telephone and Telegraph Company are concerted in the more prosaic endeavour of exploring the possibilities of telephonic communication across the Atlantic. And yet we think the adventure which involves the successful transmission of speech through the ether over more than 3,000 miles of ocean and considerable lengths of land-line at each end is the feat which stirs the imagination the more strongly of the two. *Sic itur ad astra* rather than by wayward flirtings with an unresponsive Mars. Our readers will have learned from the Press that representatives of the American Telephone Company have lately visited this country to arrange the details of a radio-telephone service by means of which subscribers in London will be able to be connected with subscribers in New York and *vice versa*, and although it is yet too early to forecast

the date by which all physical difficulties will be overcome, all complex details settled and a commercial service offered to the public, the knowledge that successful transmission of speech has been obtained in prolonged and repeated tests is very encouraging, and opens up a vision of the widest and most interesting possibilities.

To be able to call up at will a correspondent from amongst the million and more subscribers on the New York exchanges, and to hear his voice transmitted as clearly as over an inland trunk circuit, is an experience which provides a thrill even in these days of ever-increasing scientific marvels. What ultimate developments may arise from this initial experiment in trans-oceanic speech it is impossible to conjecture; we only know that the wonders of to-day become the commonplaces of to-morrow.

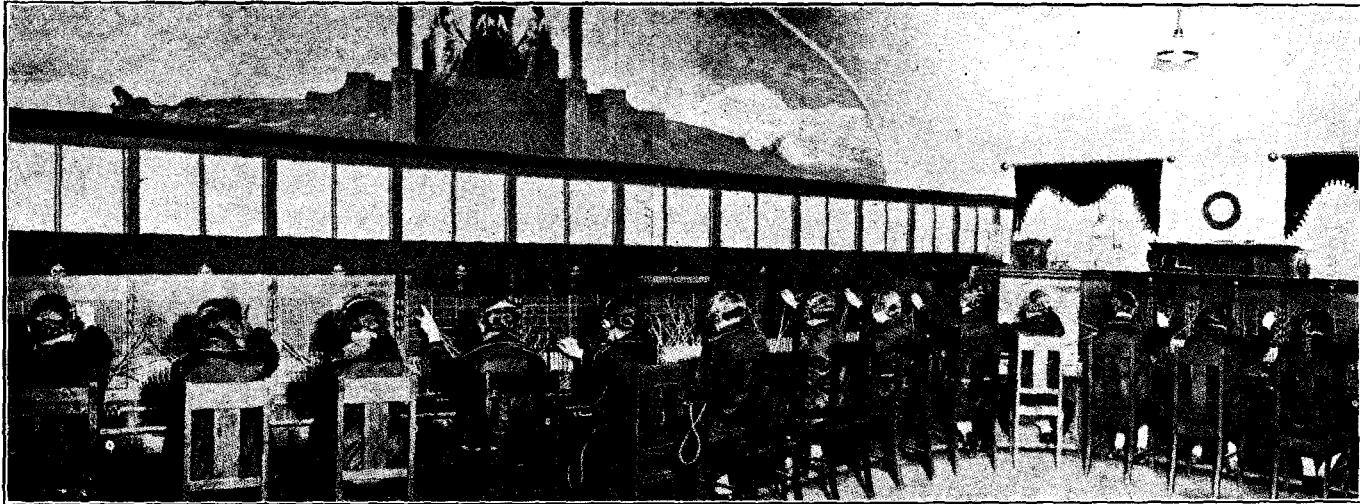
In the more explored field of ordinary cable telephony great progress is also in view. The recently established service with Germany has demonstrated that speech with Königsberg, over a thousand miles distant from London, is in every way satisfactory. The inauguration of services to Sweden, Austria, Denmark, and Czecho-Slovakia is the subject of preliminary tests and discussion, and direct communication with these countries will undoubtedly come in due time. Altogether 1927 promises to be an epoch-making year in long-distance telephony.

SUGGESTIONS AND AWARDS.

It is always difficult to allay suspicion on the part of those who consider they have been unfairly treated, but we should like to take this opportunity of assuring the writers of the letters appearing in our October and November issues of the impartial character of the Awards Committee which deals with suggestions received from the staff. This Committee consists of representatives of the various branches of the service, and carefully considers and adjudicates upon suggestions which come before its notice. As most of our readers are aware, suggestions may be sent to the Committee direct or through a superior officer, as the originator may prefer.

It is quite conceivable that a suggestion referred to the Committee some years ago may have been unsuitable for adoption at that time, but may, in present-day conditions, become desirable and be introduced quite independently of the original suggestion. In such cases the proper course would obviously be for the originator to draw the attention of the Committee to his earlier suggestion when his case would doubtless receive sympathetic treatment.

The consideration of suggestions involves an enormous amount of work in weighing the pros and cons, and the relation of each case to its predecessors, and only those who have had experience of the methods of the Committee can fully appreciate the time and care spent on its deliberations. As a human institution it may have made an occasional error of judgment, but we can at least claim for it freedom from partiality or prejudice.



TELEPHONE EXCHANGE, REYKJAVIK, ICELAND.

HIC ET UBIQUE.

In *Iceland* they are celebrating the twentieth anniversary of the opening of the telephone and telegraph service in that country, and our contemporary *Simibladhíð* devotes a special number to the occasion. In 1906, also, the telegraph cable connecting Iceland with the rest of Europe was laid by the Great Northern Telegraph Co. The inland telegraph service is largely of what we call a 'phonogram' character. The telephone system has developed very rapidly and now contains 3,642 stations, or 1 for every 27 inhabitants, thus giving Iceland sixth place in telephone development amongst European countries. We reproduce a picture of the Reykjavik telephone exchange.

The Standard Telephones & Cables Company recently sent us the following interesting notice:—

The steady improvement in Irish conditions is reflected in the announcement that STANDARD TELEPHONES AND CABLES, LTD., of London, have been commissioned by the Irish Post Office to supply a Broadcasting Station for Cork, and this will be located in the Gaol, now fortunately unrequired.

The station will be of a similar type to that now in operation at Birmingham, but of an approximate 3-k.w. Geneva rating.

The notice was headed

FROM GAOL TO BROADCAST STATION,

and our first horrid suspicion was that "Uncles" were in future to be recruited from the criminal classes!

Sir Ernest Benn, at an after-luncheon speech in Manchester, took us all to task for our conservatism in matters mechanical. The *Manchester Guardian* is moved to say, "Evidently our passion for the patent potato peeler is not what it might be nor can we be persuaded to 'tell it by telephone.' It is not by their fruits, then, but by their gadgets that ye shall know them. Efficiency, I am glad to note, has at last its index number for 'the number of telephones per 1,000 people in 1924 was in America 145, Canada 115, Denmark 89, New Zealand 80, and Great Britain only 25.' I am afraid, however, that like other index numbers this one leaves me wondering of what tendency it is really the index; is it necessarily a mark of efficiency or merely of peculiar necessity, or does it show a social habit which has little relation to these?"

Of course, as telephone men, we in the service ought to agree that a plethora of telephones should indicate the highest efficiency in any given country. But we agree that the index wants adapting to the temperament and to the business and social habits of different nations.

The following unsolicited testimonial was recently received from a subscriber in Rossendale:—

We are accustomed to complain when the service is not all that we think it should be, and it is, therefore, only right that we should express our satisfaction when we are well served.

Owing to the serious illness of our son, who was away at School at Cross Hills, near Keighley, it was necessary for us to do a lot of telephoning on the night of Saturday, Oct. 9, and on Sunday, Oct. 10, arranging with surgeons, nursing homes, &c., and communicating with the doctor at Cross Hills.

The storm during the night of the 9th interfered with the working of our own telephone, but owing to the help and cheerful assistance at the Rossendale Exchange, we were able to carry on as if nothing had happened, and we desire to express our gratitude to the officials and to call your attention to the excellent service they rendered at a very trying time.

"I went to an hotel this morning," says a writer in the *Morning Post*, "to see a French friend, who, though not well acquainted with London, talks English moderately. I found him in travail with the telephone in his room. "Twelve thirty-four," he shouted, and after the numbers followed strange sounds, which after several repetitions I transliterated as "moontvuf."

The telephone girl understood the figures expressed in the Paris fashion, but could make no more out of the mysterious exchange than I could. At last my friend turned to me in despair: he pointed to the telephone book and showed me MOUNTVW 1234.

Personally we consider Moontvuf a very creditable French pronunciation of so characteristically Anglo-Saxon a word as Mountview.

According to a further report in the *Electrical Review*, Dublin's first automatic telephone exchange, to serve about 1,600 subscribers but with a capacity for 4,000 lines, will be opened early next year. The new exchange will give relief to the Central exchange, which has found great difficulty in meeting the increasing demands on its services. Six months later the Merrion exchange will be completed, and a third, to include all the centre of the city with Drumcondra and Clontarf, will follow. The authorities expect that in due course about 50,000 telephones will be working in the Dublin area. So far as is possible, Irishmen only are being employed in the work of installation.

Trunk telephone communication has, according to *Indian Engineering*, been established between Mussoorie and the principal stations in Bombay, Punjab, and the United Provinces circles, as far as Bombay, Peshawar, and Benares respectively.

South of the Equator.

THE original walls of the City of Buenos Aires were built by Don Pedro de Mendoza in 1535. On this ancient site stands modern Buenos Aires, the "Paris of the Western Continent," a city of beautifully designed buildings, extensive parks and wide boulevards.

With a population of over two million this great city is the central point for varied commercial and industrial activities. Early in 1919 the United River Plate Telephone Company began the installation of Strowger Automatic equipment in Buenos Aires, realising, largely through their own experience, that the telephone traffic needs of the future could be met satisfactorily only by automatic means.

Even before this, many other exchanges in the Argentine operated by the same Company, including Cordoba, La Plata and Rosario, were supplying their telephone users with modern service through the use of Strowger Automatic equipment, furnished by the Automatic Electric Inc., the originators and pioneer manufacturers of Strowger Automatic telephone equipment.

Automatic Electric Inc.

FACTORY AND GENERAL OFFICES: 1033 W. VAN BUREN ST.
CHICAGO, U.S.A.



THE NEW BROADCASTING ORGANISATION.

THE Post Office licence to the British Broadcasting Company will expire on Dec. 31, 1926, and last year the Government appointed a Committee under the Chairmanship of the Earl of Crawford and Balcarres, to advise as to the proper scope of the Broadcasting service and as to the management, control and finance thereof after that date. As the result of the advice of that Committee the Prime Minister proposes to recommend that a new corporation entitled the British Broadcasting Corporation shall be established under a Royal Charter, and that five Governors shall be appointed for the initial period of five years. The names of these Governors are given in another column.

The draft Charter and licence to the Corporation were presented to Parliament on Nov. 10 as Command Paper No. 2756, together with an agreement of Nov. 9 setting forth the conditions of the final settlement between the Post Office and the British Broadcasting Company [Command No. 2755]. To take the latter document first, the effect of the agreement may be briefly summarised as follows:—

The Postmaster-General will pay the Company—subject to Parliamentary approval—the sum of £620,000 to cover (a) the cost of programmes during the nine months ended Dec. 31, 1926; (b) any expenditure on capital construction during the rest of the year; (c) repayment of share capital at par; (d) dividend at 7½%; and (e) the cost of liquidation. The Company will hand over to the Postmaster-General, or his nominee, without charge, the whole of their plant and assets, lock, stock and barrel, the accounts of revenue and expenditure being divided as at midnight on Dec. 31. The surplus, if any, after liquidation will be surrendered to the Post Office.

The Charter contains a recital of the powers which may be exercised by the Corporation in the furtherance of their business, and in this respect it practically coincides with the Memorandum and Articles of Association of the Company; it appoints the first Governors and settles their remuneration, it provides for the issue of a Post Office licence for 10 years, and it authorises the raising of capital to the extent of £500,000, subject to the establishment of suitable sinking and reserve funds. The draft licence follows closely the lines of the Company's licence. The financial provisions are, however, somewhat different. The Post Office Royalty is fixed at £10 per annum for each station instead of £50; and, after deduction of 12½% for administration and collection (including enforcement of the Statutes) the Corporation will receive out of the revenue from wireless receiving licences the following percentages, viz.:—

	Per cent.
First million licences	90
Second „ „	80
Third „ „	70
All additional „ „	60

It is the understanding that this percentage is open to reconsideration at the end of two years if the Corporation find the revenue insufficient. The Postmaster-General retains the control of the broadcasting service, but it is his expressed intention to allow a wide discretion to the new Corporation.

It will be seen that the new authority will not be a Government Department, and its staff will not be civil servants. It is contemplated that the plant and staff of the British Broadcasting Company will be taken over *en bloc*, and it will be for the Corporation to decide what, if any, staff alterations or additions may be necessary and what rates of pay, &c., shall be offered to any new entrants.

The cost of carrying out these proposals and the policy involved was submitted by the Postmaster-General to the House of Commons in the form of a supplementary estimate on Nov. 15. He explained fully the proposed arrangements, and, although the debate lasted four hours and various criticisms were made, there was no strong opposition, and the motion was agreed to without a division. The debate occupies 87 columns of *Hansard*, which is somewhat heavy reading, but there were lighter touches here and there, some of which we propose to mention.

Some heat was generated by ribald laughter at a demand for the use of the Welsh language in programmes, and a later speaker suggested in that connexion that Scotland and even Southwark had also languages of their own.

A broadcasting service “differs fundamentally and essentially from almost any other enterprise that can be imagined. The only analogy, I think, is a racecourse, and that is a bad analogy.” The speaker explained that the view of a race could be restricted to customers only, even if it were necessary to plant trees round the course, but that nothing on earth could confine wireless waves to properly licensed receiving apparatus.

“The hon. Member . . . announced that his intention was to make the passage of the Postmaster-General rougher, but he can hardly be satisfied with his performance. If I may say so, he combined all the unpleasantness of boreas with the undulating efficiency of the gentle zephyr.”

The formation of the Board of Governors came in for some hostile criticism, and widely divergent views were expressed. One Member thought that no Board is more likely to give worse results than a committee of experts. Another was an exponent of competition in broadcasting, and instanced America, “where managers sit up of nights with wet towels round their heads thinking of what the public want.” [This may be an attractive amusement in a dry country, but the mere suggestion brings cold shivers to the backbones of Britishers suffering from a wet November and a coal shortage.] While yet another Member suggested that were the scheme for an independent and impartial Board logically sound, then if forsooth the coal industry were nationalised, it should be administered by a body of portrait painters or doctors. There seems, indeed, to have been some confusion between the relative functions of administration and executive management, and a thorough determination to ignore the fact that the Company's staff, other than the Board of Directors, would remain unaltered and that there would consequently be no lack of practical experience. Here history repeats itself, as our older members will remember similar misunderstandings in connexion with the transfer of the telephone service to the State in 1912.

On the question of broadcasting Parliamentary debates, it was hinted that some Members did not realise the horrors of the possibilities. It was suggested that speeches “can very often lose seats as well as win them, and that the result might be to purge the House of a good many Members which would (*sic*) be highly desirable. . . .”

A “tulchan” was defined as “an orphan animal, and they put another skin on it and pass it on to another mother. She smells the hide and it deceives her.” The speaker added “this is a ‘tulchan’ corporation.” [Evidently it was thought that this rose under another name departs from the general rule and does not smell the same.]

In conclusion, we must not overlook the description of certain criticisms on legal phraseology as “a whole bevy or bouquet of mares’ nests,” a phenomenon all knowledge of which the next speaker was most careful to disclaim.

TELEGRAPHIC MEMORABILIA.—(Continued from page 47.)

One other item of interest which accompanied these documents was the wages sheet—a sheet which would make our A.G.D. of to-day shiver as regards its appearance, its utter unsuitability and its general dishevelled mien. It was made out on two telegraph forms, and was probably somewhat ashamed of itself, for was not the highest-paid telegraphist awarded the princely sum of £1 15s. 0d. for his skill, standing alone with five shillings more to his credit than the next rank, which tapered down to twelve shillings and sixpence. Those Good Old Days!

One little very personal note in which I would thank the many friends who have so kindly expressed their generous appreciation of my monthly scribbles in these columns and who have followed me into my retirement with so many good wishes. To my colleagues, also, on the Managing Committee who have made it so easily possible to serve both them and the readers of the *T. and T. Journal* yet some time longer—I know not *how* much longer. In the meantime, A Merry Xmas and the happiest of new years to all.

“If the stars should appear but one night in a thousand, how would men believe and adore!”—Emerson. J. J. T.

THE G.P.O. PLAYERS.

"*Thomas More, an imagined story founded on History. By Ralfe Davies, M.A., Oxon.*" King Georges' Hall, Oct. 29 and 30, 1926.

It is all to the credit of the G.P.O. Players Dramatic Society that, instead of relying on a well-tryed and popular play as a "draw," they undertook, with the aid of Major Hodgson-Bentley, the production of a new drama of serious and poetic character. The choice, we venture to think, was a good one, for "Thomas More" is emphatically one of those thoughtful, interesting, and well-written plays of sustained interest which ought always to be able to obtain a good hearing, but which, under the unfortunate conditions which govern our commercial stage, would please an insufficient number of theatre-going public, mainly out for a couple of hours' light amusement, to ensure a run of fifty or a hundred nights. It is an impressive and moving fragment of history, drawn from an epoch-making period, which passes before our eyes; and although the author disarms any criticism of his historical accuracy by calling the play "an imagined story, founded on history," he keeps fairly close to the excepted facts and deeds of that troubled age. The sincere yet humorous character of More, faithful unto death, is well brought out. The scenes in which he pleads with his loyal but wavering daughter, touchingly played by Miss Kathleen Emery, were admirable. Mr. John Cahill, as More, who with Mr. Jack Scott (Henry Tudor) sustained the chief burden of the evening, was remarkably easy and natural during the second act, and throughout the whole play most successfully depicted the light-hearted gallantry which could meet death with a jest and maintain a brave, humorous bearing amid the lurking treacheries of that grim age. The scene on Tower Hill was solemn and affecting, and the device of dropping the curtain and then raising it again after the sharp wailing cry of More's daughter has signalised the consummation of the tragedy, was dramatically conceived. The brief introduction of the importunate litigant at the beginning of the scene was a skilful touch of light relief. The author seemed to have rather a "down" on the Boleyn family. Anne's father, the Earl of Wiltshire, played in a very spirited manner by Mr. Cyril Leigh, was drawn as a purely comic character, and was somewhat unconvincing. We cannot imagine an imperious Tudor suffering with patience the tone adopted at times by him or his daughter. Anne, played to perfection by Miss Margaret Henniker, who looked and lived the part as conceived by the author, was frankly a shrew. She means to be Queen at all hazards, alternately pleading with and threatening More, but we take leave to doubt whether she would have dared tell him, even in her most Protestant moments, "the King is God!" Nor can we quite imagine that Henry, wavering between orthodoxy and desire, would have stomached her threat, "Wait till I get you home!"

A happy inspiration was the introduction of the mariner, Hythloday, with his suggested acquaintance with Utopia, and his robust devotion. This sympathetic character was played in finished style by Mr. Wilfred Sellars. The jailor, John o' Wood, however, seemed to come from the realms of farce, and the easy manner in which the Tower guards were immobilised and rescues were arranged was reminiscent of the technique of the cinema. In fact the scene in the Bell Tower wavered between the impressive and the comic in a disconcerting manner. The author might, perhaps, plead a precedent for it in Shakespeare, but not, we think, quite validly. It recalled rather Androcles romping with a comic lion in the circus scene of Mr. Shaw's jestingly-earnest play. Mr. Leslie Dawe, however, fully entered into the spirit of his part.

We are anxious, however, not to convey by these few criticisms an impression that the passages referred to seriously marred a play of great promise and most efficiently acted. Mr. Cahill, as we have indicated, deserves a high meed of praise, and his laurels were shared by Mr. Scott as Henry VIII, who conveyed admirably the unstable King's changes from generosity to suspicion, from fondness to tyranny, from weak subjection to passion to hasty and ill-considered masterhood. Mr. Alfred Doust interpreted the well-drawn character of Cromwell with wonderful effect, and if

at first it seemed cast on somewhat melodramatic lines, it speedily developed into a convincing and purposeful remorselessness. The lesser characters were well sketched in. Mistress More (Miss Cowan), Margaret Gigs (Miss Howe), Latimer (Mr. Gerald Storr), and the Vicar of Croydon (Mr. Hudson), all were good. "All is dark to me," said the latter, when pressed to take the new oath. "It is darker in the Tower" he was reminded. We cannot speak too highly of the piquant and passionate Queen of Miss Henniker, whilst the sympathetic tenderness of Miss Emery as More's daughter ensured a charming rendering of the part.

It remains to be said that the play was most artistically produced by Major Hodgson-Bentley, and that an interesting programme of music was provided by an orchestra under the direction of Mr. Will Harrison.

CORRESPONDENCE.

AUTOMATICS IN ORIENTAL COUNTRIES.

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

WITH reference to the concluding paragraph of Telephone Notes, published on page 18 of your October issue, the statements made by the Special Correspondent of the *Electrical Review* which you quote were also made at greater length in an article in the *Times of India*. The statements have been most emphatically contradicted and, in writing to the *Times of India* to this effect, I was able to quote the authority of the High Commissioner for India for the statement that the intention attributed to the Government of India was entirely without foundation.—Yours faithfully,

Oct. 30, 1926. H. E. POWELL JONES, Secretary.
The Telephone Development Association.

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

I WAS interested in the last paragraph of the Telephone Notes of your October issue, where the question of "Automatics" in Oriental countries is discussed.

I note that the Sub-Editor of the Notes is "inclined to believe that the automatic is the ideal telephone exchange for Oriental countries, where many languages are used by the subscribers." I, also, was of this opinion when I was in England, but have changed my mind since coming East.

In polyglot countries there is generally a supply of candidates available who understand several languages sufficiently well to operate the majority of telephone calls which they may be required to handle. Palestine has, in addition to the three official languages, English, Arabic, and Hebrew, several other languages in common use, such as French, Greek, Spanish, Italian, German, Russian, Armenian, and Roumanian. This is a formidable list but a caller in any of these languages can be served without much trouble in Jerusalem Exchange, where each of the telephonists speaks at least three languages well, and can deal with simple demands for numbers passed in five or six different tongues. In the few cases of language difficulty the caller is put into communication with the Supervisor who, if unable herself to deal with the call, is generally able to select a telephonist to whom the language of the caller is familiar.

When it is considered that it is only necessary to memorise certain standard expressions and the numerals of the other languages to be able to deal with the majority of calls, it will be appreciated that the problem is simpler than would, at first sight, appear.

I agree with the correspondent referred to in the Notes, that savings effected by reducing the amount of comparatively cheap telephonist labour would be more than counterbalanced by the employment of trained mechanics whom it would be necessary to engage for a number of years, and who would require high rates of pay to tempt them from their home countries.

Further, the Eastern temperament which causes subscribers to change their minds regarding the order in which they want calls, while actually passing the numbers to the operators, would be responsible for alarming "wrong number" percentages on a system where this trouble appears to be surprisingly frequent on even the "best regulated exchanges." When I recollect the state into which many English subscribers have worked themselves when, perhaps, they have been held up on a faulty auto-trunk or, in place of an expected "ringing tone," hear a "tone" somewhat similar to the sound of a hen clucking, I extend my sympathy to any "Complaints" officer in an Oriental country blessed with automatics, where the "language" problem must indeed be terrific!—Yours sincerely,

General Post Office, Jerusalem. LESLIE M. SMITH,
Oct. 27, 1926. Superintendent of Telephones, Palestine.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of stations working at Sept. 30, 1926, was 1,444,302, a net increase of 9,685 over the total at the end of the previous month. During the first six months of the current financial year new telephone stations numbered 108,256 and cessations 54,107, resulting in a net addition of 54,149 stations.

The table below 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, 1926.
London	507,127
England and Wales (excluding London)	782,856
Scotland	135,502
Northern Ireland	18,817

The growth for the month of September is summarised as follows :—

Telephone Stations—	London.	Provinces.
Total at Sept. 30	507,127	937,175
Net increase for month	3,569	6,116
Residence Rate Installations—		
Total	104,961	174,742
Net increase	1,387	2,036
Exchanges—		
Total	111	3,997
Net increase	1	17
Call Office Stations—		
Total	4,592	16,428
Net increase	13	100
Kiosks—		
Total	345	2,048
Net increase	17	66
New exchanges opened under Rural Development Scheme—		
Total	—	962
Net increase	—	14
Rural Party Lines—		
Total	—	9,941
Net increase	—	16
Rural Railway Stations connected with Exchange System—		
Total	—	787
Net increase	—	4

The number of inland trunk calls dealt with during August—the latest statistics available—was 7,495,096, an increase of 701,576 or 10.3% over the figure for the corresponding month last year.

Calls made to the Continent during August numbered 21,024, and from the Continent 23,564, representing increases of 4,505 and 3,004 respectively over August last year.

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

LONDON—Battersea, Reliance, Rodney.

PROVINCES—Farnworth.

And among the more important exchanges extended were :—

LONDON—Brixton, Croydon, Hounslow, New Cross, Riverside, Romford, Sutton.

PROVINCES—Arbroath, Bournemouth, Broadstairs, Mansfield, Nelson, Northwood, Rusholme, Trafford Park, Wallasey, Watford.

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

Manchester—Burnley,

Sheffield—Worksop (section of Sheffield—Mansfield cable),

while 73 new overhead trunk circuits were completed, and 86 additional circuits were provided by means of spare wires in underground cables.

TELEGRAPHS AND TELEPHONES IN GERMANY.

THERE was not much progress in telegraphic traffic and a thorough revision of the whole system is being undertaken with a view to utilising the latest technical improvements and to ensuring profitable working. The average monthly number of telegrams sent during November, December and January was 2,700,000.

The telegraphic communication between Germany and several foreign countries has been extended. Thus at the end of October, 1925, a direct wire between Berlin and Moscow was put into service and in October, 1926, a direct connection with the United States will again be established by the laying of the cable between Emden and the Azores.

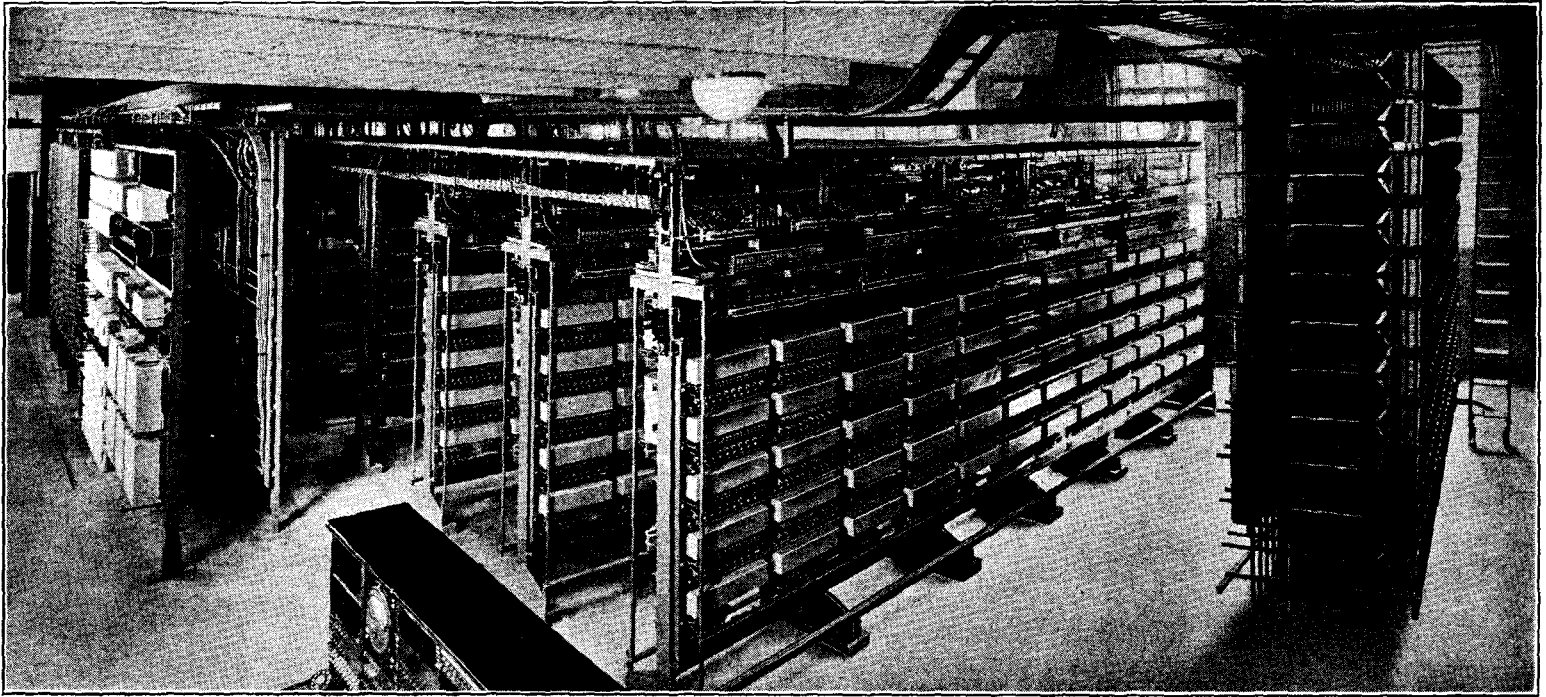
The chief stations for long-distance wireless telegraphy, Koenigswusterhausen and Nauen, are being constantly improved. There is regular connection with the United States, the Argentine and Java, and messages can be transmitted to, though not received from, China, Japan and Africa. The main receiving station is at Zehlendorf, a suburb of Berlin.

The telephone is becoming an increasingly serious rival of the telegraph, and is expanding. The demand for new connections is very heavy, and in spite of every effort having been made to satisfy applicants, 29,000 are still on the waiting-list. At the end of January, 1926, the number of call stations, main and subsidiary connections amounted to 2,500,000, which represents an increase of 11.2% compared with the year before; by the end of March another 50,000 had been added. Progress is being made with the installation of the telephone in trains.

In March, 1926, direct telephonic communication between London and Berlin was opened; since 1st July a continuous day and night service has been in operation.

A rapid development is noticeable in the adoption of broadcasting, the number of subscribers having passed the first million in December, and amounting to 1,205,310 on April 1, 1926. There are twenty sending stations in operation, and the whole system has been reorganised and placed on a new basis by the creation of the *Reichsrundfunkgesellschaft*, formed by the Reich in conjunction with a great majority of the broadcasting companies in Germany. It is not known what proportion of the capital was furnished by the Reich, but it has reserved for itself 51% of the votes.

On Jan. 31, 1926, the German Ministry of Posts and Telegraphs employed 251,307 officials and 41,829 non-official permanent personnel, included in the latter being 31,187 telegraph workmen. At the same date, 28,121 persons were employed as substitutes for those on leave and ill, and as supernumeraries. By the end of March there had been a reduction of 2,245 in staff, compared with December, 1925. During the year 2,700 new dwellings were built for the personnel and 1,000 delicate children of postal officials cared for.—*Department of Overseas Trade. Report on Economic and Financial Condition of Germany, 1925-6.*



COVENTRY AUTOMATIC EXCHANGE.—GENERAL VIEW.

COVENTRY'S NEW AUTOMATIC TELEPHONE SYSTEM.

THE City of the Three Spires is one of England's oldest towns and contains many fine architectural examples dating back to the XVth Century. Industrially Coventry has had many ups and downs. Before the factory system became general it was famous for its watchmaking and silk manufacture. These were carried on in the houses but have now become practically extinct. The City then became the centre of the cycle making industry and since the boom in cycles and the advent of the motor-car it has adapted itself to the manufacture of these modern commodities to such a degree that "made in Coventry" is now the hall-mark of British motor-car quality in the Empire.

Coventry is not the smoky type of manufacturing town, a general use of electric power making it a very modern industrial city. The telephone system, however, was out of date, the economies due to the war and the difficult times immediately following having made it necessary for Coventry to persevere with a worn-out and obsolete plant which was of the magneto type.

The installation of the most up-to-date automatic system is therefore a very welcome innovation to the subscribers. Coventry is further the possessor of a thriving telephone industry in having the Peel-Conner Telephone Works of the General Electric Company situated in one of the suburbs. This firm have supplied and installed the whole of the equipment in the new Telephone Exchanges. They removed their manufacturing shops from Manchester to Coventry five years ago and now employ 3,500 workpeople in the best equipped and most up-to-date works of its kind in the kingdom.

The change over from the old to the new system was effected at 2.0 p.m. on Saturday, Nov. 20. The formal opening of the new Post Office, complete with the new telephone exchange, was the occasion of a civic ceremony afterwards.

The Coventry Telephone area now contains two automatic exchanges—the central or main exchange at the head Post Office in Hertford Street, and a satellite at Foleshill. Ultimately there will be another satellite at Walsgrave.

Equipment is installed at the central exchange for 3,300 lines and at Foleshill for 700 lines, and provision is made for expansion within the area to 8,000 lines.

The system employed is the Strowger step-by-step, embodying the latest features for provincial non-director systems.

All subscribers have now four digit numbers, the Coventry group numbers ranging from 2000 to 5299, and those at Foleshill from 8000 to 8699.

Thirty-three of the Standard P.O. type automatic line units are installed. These units carry 100 rotary line switches on one side and the necessary

number of final selectors for traffic into that hundred-line group on the other side. Six selector units with capacity for 240 group selectors each are provided to carry the 1st and 2nd selectors, 3 units being allotted for each rank of switches. Two of the 1st selector units carry the switches dealing with Foleshill and Coventry inter-exchange and local calls, and the third 1st Selector unit is equipped with the switches on dial-in junctions. These dial-in junctions are from towns as far distant as Derby and Chester and the operators in these towns obtain the Coventry subscribers direct.

There is a seven-bay subscriber's meter rack—one bay for traffic meters—and an S.A.R. and I.D.F. for apparatus in connection with the manual board and miscellaneous automatic circuits. The equipment at the Central Exchange includes a 19-position manual board for dealing with calls to and from other areas. Similar to the C.B. No. 10 type, this board consists of two-panel one-position sections, the positions being allocated as follows:—

- 1-2—Keysender B.
- 3-6—Trunks
- 7-8—Jack-ended junctions.
- 9-19—Trunk record.

A six-position monitor's desk is provided for dealing with enquiries, complaints and miscellaneous services.

Subscribers dialling "0" are routed to the trunk record positions, and the following two-digit dialling codes are provided:—

- 90.—Phonograms (telegrams by 'phone).
- 91.—Enquiries and complaints—to Monitor's desk.
- 92.—Service P.B.X. calls.
- 93.—Calls for rural party lines which require special ringing.
- 99.—Calls for test clerk by faultsmen.

Rotary preselectors with a normal position are used with graded outlets to the first selectors.

The keysender equipment presents several interesting features. A single strip of digit keys is used in place of one strip per digit required, which has been fitted on previous equipments. Any call which may involve more work by the B operator than the actual setting up of the number is immediately transferred to another position; enabling the service on these Birmingham junctions to be very fast and efficient.

The power plant is situated in the basement of the building, duplicate motor generators, batteries and ringing machines being provided. Two 25-cell chloride batteries with a box capacity of 1,719 amp. hours are installed.

Prior to the opening the P.O. officers made house-to-house visits to demonstrate the working of the subscribers' instruments and the meaning of the various tones, while a demonstration set installed in the head Post Office aroused considerable public interest.

MR. ALFRED MAGNALL.

THE British telephone world has lost one of its best-known figures in the official passing of Mr. Magnall, who retired from the Service on Oct. 17. His career is indeed remarkable and exemplifies the power of grit and character in the achievement of success.

Mr. Magnall commenced his service with the National Telephone Company in 1883 and rose rapidly to the post of Inspector and then to District Manager, Warrington. His engineering abilities were somewhat wasted in this capacity and he was very shortly promoted to the position of Engineer, Manchester, to succeed Mr. Watts, who had been transferred to the Headquarters Staff. Mr. Magnall entered on his new duties with an enthusiasm which



MR. A. E. MAGNALL.

[Photo by Jerome Ltd., Manchester.]

has never diminished. During his tenure of office he delivered many instructive and valuable lectures to engineering societies. He did much pioneer work in the development of external plant construction—one notable example being the investigations into the tension on aerial wires.

In 1911 Mr. Magnall was responsible for the layout of the new telephone system in Constantinople, and it is interesting to know that his forecasts have been fully justified in the years that have elapsed. Incidentally Mr. Magnall brought back with him a most remarkable and interesting series of views which has, on many occasions, served to illustrate his lecture on the Orient.

With the transfer of the telephones to the State, Mr. Magnall joined the South Lancashire District as Sectional Engineer, and

was responsible for the administration of the Manchester West Section. Mr. Magnall has often told us that for some time he did not love the Post Office, but that later he came to realise that there was wisdom in our madness. Be that as it may, we all learned to revere and to respect him. His transparent, honest, and absolute straightness in all his dealings with his chiefs and his subordinates was very soon recognised. It would, indeed, be difficult to differentiate between the regard which he won from his former staff and that which he won from those with whom he first came in contact in 1912.

On Oct. 18 1926 a meeting took place to express the feelings of every one towards him. Mr. W. J. Medlyn occupied the Chair, and in one of his delightful little speeches, gave a *resumé* of Mr. Magnall's career. After a number of tributes from every section of the staff of the Post Office Engineering Department and from the District Manager's staff voiced by Mr. Elliott, the Chairman called upon Mr. T. E. Herbert to make the presentation which owing to Mr. Magnall's uncertain plans had perforce to take the form of a wallet of treasury notes to a very considerable sum. Mr. Herbert said that he had been proud of a friendship extending over 30 years, and paid tribute to Mr. Magnall's kindly heart and his remarkably vivid personality. A large contingent of the Withington Bowling Club attended to honour their former President, and in his reply Mr. Magnall remarked that his was the third occasion on which the Club had honoured him. First in 1910 when they had presented him with a gold watch and chain. In 1923 when he was made a Honorary Member of the Club, and thirdly on the present occasion.

Mr. Magnall was deeply and visibly affected by the tributes paid to him and by the wonderful atmosphere of enthusiastic goodwill so eminently manifested. He had a kindly word for all his old staff, and finished with an old-fashioned but none the less sincere "God bless you."

Nov. 15 was yet another remarkable day for our old friend. He delivered a most interesting lecture before the South Lancashire Centre of the Institution of Post Office Electrical Engineers entitled "Reminiscences." This dealt with the early days of telephone engineering, remarkable incidents, accidents, defects, his Constantinople experiences, and many other matters. The lecture was interesting and valuable, and was very fully illustrated by a selection from his large collection of lantern slides, the bulk of which he has been good enough to present to the Centre.

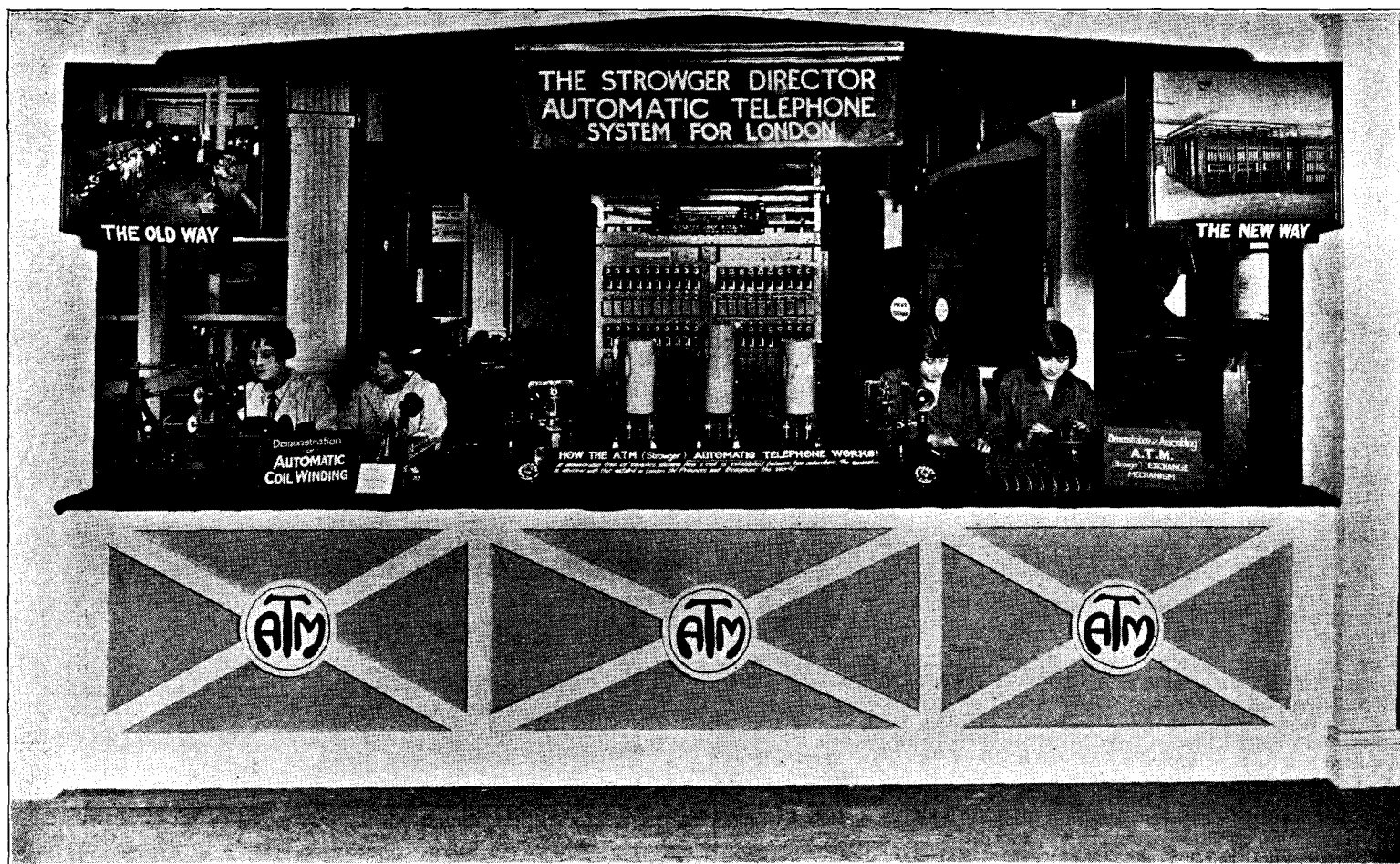
The vote of thanks was proposed by an old friend, Mr. J. M. Shackleton, and was seconded by Mr. A. E. White, his former deputy.

Little remains to be said of our friend; we shall miss his kindly cheery personality and his vast knowledge of the Manchester plant, but we wish him every happiness in his well-earned retirement. It is understood that he contemplates a long trip abroad with the object of visiting his son in Central America. His other son is well known to most of us, since he is on the Secretary's Traffic Staff in London. His daughter is married to a Manchester Post Office official, and it is, therefore, clear that this indirect link with the Post Office and its people will still survive the severance of his official connexion with the South Lancashire District. T. E. H.

STERLING TELEPHONE AND ELECTRIC CO.

The Sterling Telephone & Electric Co. inform us that they have acquired the Phonophone business of the Radio Phonophone & Electricals Ltd. (in liquidation) and that they will welcome enquiries for complete telephones and spare parts.

They are offering a special service for spare parts to present users but desire that samples should be sent with all enquiries for spares.



LIVERPOOL CIVIC WEEK EXHIBITION.

THE above is a photograph of one of the exhibits of the Automatic Telephone Manufacturing Co., Ltd., dealing more particularly with the Strowger Director System, showing how the system works and giving a demonstration of automatic coil winding and the assembling of A.T.M. exchange mechanism. Other exhibits showed such widely different electrical appliances as kitchen outfits, railway signalling, telegraph apparatus, mining telephone systems, and fire alarms.

So diverse is the character of this exhibit, entirely representative of local industry, that Automatic Telephone Manufacturing Company's Stand has been the centre of attraction to the vast crowds who have daily passed through the Exhibition Building.

30 years. The invention of photo-electric cells, instantaneous in the ir action, aroused renewed interest in the problem, and for the past four years he had devoted the whole of his attention to its solution. The first public demonstration of his process was given in 1925; since then his apparatus had been entirely remodelled, and the clearness of the images had been greatly improved, but although much more sharp and distinct, they still remained mere black and white effects, without detail and without gradation of light and shade. He made many attempts to improve the light sensitive cell, including the construction of a cell from "visual purple" out of a human eye. This cell when first constructed, gave an appreciable reaction to light. He was not at liberty to give technical details of the device finally developed, but towards the end of 1925 the difficulties were successfully overcome, and the images of various objects, including the living human face, were transmitted with half-tones and details. The images were at that time very defective, comparable with the earliest kinematographs, but the defects, chiefly due to mechanical and electrical imperfections, were being steadily eliminated, and he expected to place on the market a commercial machine within the next twelve months.—*The Electrical Review*.

* * * *

The Electrical Review states that after the last Ministerial Council it was announced that automatic telephones would be adopted for Paris. The Secretariat-General of Posts, Telegraphs and Telephones now announces that, in conformity with a report of M. Bokanowski, the Government has decided that work in connection with the conversion shall be begun immediately. The first part of the programmed includes the supply of apparatus to serve 40,000 subscribers; five new buildings have already been constructed, and it is expected that this first section will be inaugurated in 1929. The work will be carried on until the whole of the Paris telephone system has been transformed, which will take ten years. The new apparatus will be constructed entirely in France and installed by French workers.

* * * *

TELEPHONE NOTES.

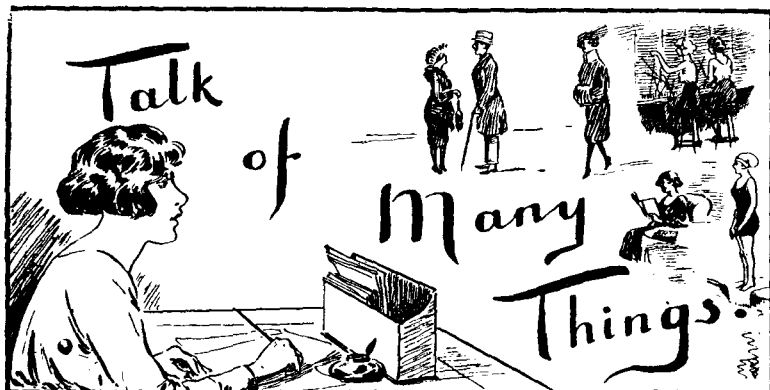
THE first of a series of "popular talks" in aid of King Edward's Hospital Fund for London, was given at the Royal Institute of British Architects on Thursday last week by Mr. J. L. Baird, on "Seeing by Wireless." Sir Richard Gregory, D.Sc., occupied the chair, and expressed the hope that the elementary apparatus which Mr. Baird had evolved for effecting television would develop into a practical form more rapidly than the telephone had done.

The Lecturer remarked that seeing at a distance was really no more strange than hearing by telephone, with or without wires. After explaining how sound waves were converted into fluctuating electric currents, and reconverted into sound waves at the receiving station, he said that television involved very much the same process; all that passed through the wires or the ether was a fluctuating current of electricity, in either case. Mr. Baird showed a photograph of an image seen on the screen of the first televisor that he had made, and proceeded to review the history of the subject, pointing out that selenium was too sluggish in its reaction to light, and too insensitive, to be of service in television, which consequently remained at a stand-still for

The Government Telegraph and Telephone Authorities contemplate the erection of a radio-telephone transmitter which will be at the disposal of business people who wish to make announcements, at a moderate tariff. Tests have been made from Scheveningen Harbour, according to *World Radio*, from which it appears that with a 3-kw. aerial energy sufficient power can be generated to reach all parts of Holland without disturbing other stations on a 1,950-metre wave-length. The tests are to be resumed at the beginning of November.

H. J. E. S.

WE TELEPHONISTS



Ann Hath Her Way.

My lady readers, during their short life, will doubtless have forgotten more about bazaars than I, who am grey and full of years, ever knew. Ladies seem possessed of a particular attitude of mind towards bazaars. They appear to accept them as one of the natural and inevitable phenomena of life, like cold meat on Monday and the drop in bonus in September. Just as no Spring would be normal without sales, so no Winter is quite proper without bazaars. It is useless, therefore, for me to expect sympathy when I tell of a catastrophe which recently befell me. On the contrary, I anticipate nothing but derision, although there may perchance be one endowed with a soft sweet nature who will allow her eye to be dimmed momentarily with a tear of pity.

It all happened as the result of a trustful appeal made by a sister, and the fact that I succumbed is all the more remarkable since I was her brother. She had apparently bought largely at a bazaar and someone had to be found to carry home the multitude of parcels. What more natural, therefore, than that she should turn to her brother for help? For my part, I could think of nothing more unnatural, but if you had been subjected to the same persistent and artful pleading you would have fallen even as I. She has a way with her too, and anyhow I have always endeavoured to be kind to sisters and other dumb creatures.

Accordingly I presented myself at the door of the hall in which the bazaar was being held and I was met by a man who demanded sixpence admission. Now it was the day before pay-day, and economy was thus absolutely imperative—need I say more? I explained airily that I had merely come to see my sister and to fetch some parcels. "I'm not stopping a moment, you know," I said. He passed me in with a Monna Lisa smile. Once inside I felt like Daniel—only the lions didn't bite *him*. I was besieged by young persons in pink with raffle tickets for pinafores and pineapples, perambulators and pincushions. It was only with difficulty that I extricated myself from the mob and escaped with my cash balance intact. I gazed round anxiously for the siren who had lured me on to the rocks of financial destruction. There she was in the far distance at the top end of the hall and on each side of me were stalls with importunate saleswomen lusting for my wealth. I glanced behind and beheld reinforcements of rafflers approaching at great speed. I judged it expedient to move rapidly. I ran the gauntlet, trampling many under foot and dislodging at least one stall. My misguided relative had charge of a men's stall, full of startling ties, shocking socks, anaemic gaspers and all such things as long-suffering men have thrust upon them for the good of the cause. "About those parcels," I began. "Oh, I can't leave the stall yet, you must wait—what are you going to buy?" "Look here," I said, "I'm not going to buy anything. I didn't want to come to your bazaar: I only came to collect your parcels like a jolly old beast of burden." She appeared to agree about the beast and then she commenced to appeal to what she called my generous instincts and my better nature. "I tell you I'm broke," I said desperately, and in a perspiration of fear. "Oh, I'll trust you till to-morrow," she said. What could I do? I dare not move from her stall, for my credit wouldn't run elsewhere and flight was impossible without her protective influence. Thus I mortgaged my prospective pay sadly and heavily. The stuff I was persuaded to buy—but then, you know, she has a way with her, and I was badly frayed. Eventually I escaped into the cool night air loaded with parcels of the most inconvenient shape and size. As I departed the man at the door chuckled hoarsely.

PERCY FLAGE.

A Greeting from the Telephone Staff at Benenden Sanatorium.

Hallo, Everybody,

We are calling up to say how grateful we all are to those friends who so kindly sent us gifts and good wishes on Sept. 5. We hope all enjoyed their visit to Benenden, but think really the pleasure was very much ours, as it



BENENDEN.

was delightful to see so many colleagues interested in our welfare. Glad to say we are making good and our thanks are due to the P.O.S.S. and the Doctors, Matron and Staff, all of whom are exceptionally kind.

We hope, before we leave, we may again have the pleasure of seeing you all.

Closing down now,

Good-bye, everybody,

Good-bye.

Sydenham Exchange.

A Social Evening was held at the Hamilton Hall on Oct. 26, 1926, in aid of the Kirkdale Lending Library. The organisers were extremely fortunate in obtaining the personal assistance of Mr. Raison, who, as M.C., ministered so well to the comfort and needs of all present that the success of the evening was assured.

Musical items were arranged and excellent talent displayed. Songs were rendered by the Misses Cleave, Mash, Arnott, Evans, Lewis and Mr. C. Arnott, all of which were greatly appreciated by the large audience.

Miss Brereton showed herself to be a real artist in her solo dance, and the Staff at Sydenham hope to see more of her exceptional talent.

The Sketch entitled "The Society for Worn-out Wives," written, produced and performed entirely by the Sydenham staff, was a huge success. The principal characters were taken by the Misses Arnott, Hammond, Evans, Payne, Songhurst and Whordwell, all of whom possess considerable stage ability. The "Moonshine Quartette," by the Misses Mash, Bennett, Lewis and Whorwell was well done, while the "Darkies" and the "La Pim Posh Band," performed by the Misses Mathews, Lewis, Hollands, Rowland, Masters, Martin, W. Smith, White, Whitney and Beauchamp, was equally creditable.

Thanks to the hard work put in by Miss Mash and Miss Songhurst the Social came up to expectations financially, a gain of over £5 resulting. One much needed bookcase can now be purchased for the Library.

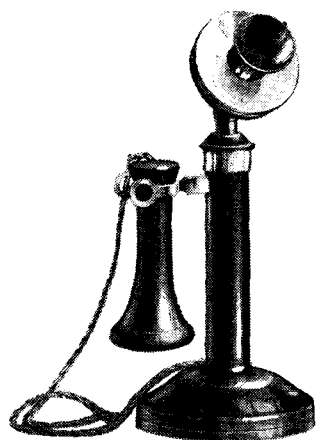
Those interested in the Library take this opportunity of thanking Miss Bowley for the interest and co-operation which she has given in the organisation of the Social.

G. M. T.

Toll Exchange.

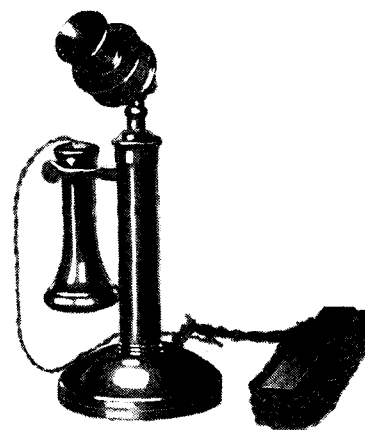
The Annual Prize Distribution and Concert, arranged by the Renown Swimming Club, was held in the Toll Exchange Dining Room on Wednesday, Oct. 20.

Mr. Rooney, Service Superintendent, presided, assisted by Mr. Donovan, and a large gathering enjoyed the interesting items provided. A hearty welcome was extended to Miss Epps and Miss Pond (who had left Toll during



T M C

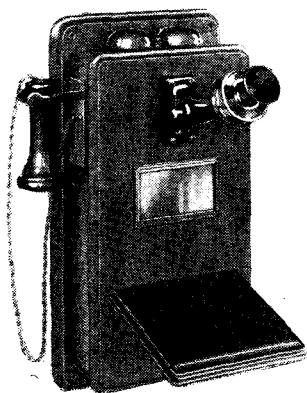
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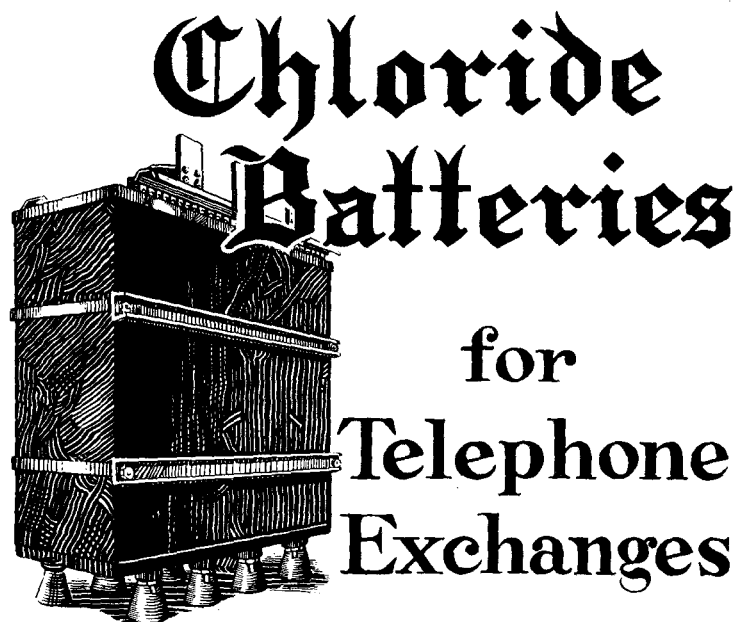
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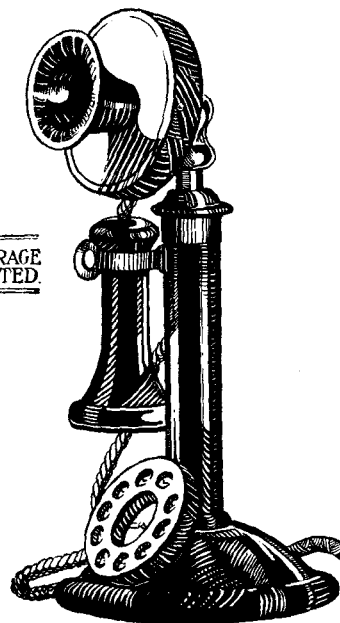
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the year). The Chief Supervisor, Miss Bailey, distributed prizes to the following successful swimmers:

Club 100 yards Championship	1. Miss Sutton.
	2. .. Northwood.
Diving Championship	1. Miss Cowper.
	2. .. Salter.
	3. .. King.
Learners' Race	Miss McKlow.
Club Handicap	1. Miss Woolcott.
	2. .. Saunders.
	3. .. King.
Old Clothes Race	Miss Salter.
	Funniest—Miss McKelvie.
Glove Race	1. Miss Woolcott.
	2. .. Cleall.
Fancy Race—Water Derby	(Sergeant Murphy—i.e., Misses Saunders and King.

after which Miss D. A. Davies presented Miss Bailey with a bouquet of scarlet carnations. A presentation was also made to Miss Cowper, the Secretary of the Club, "as a small token of appreciation and regard from the Committee." In a few suitable words of thanks, Miss Cowper referred to the loyal support she had received, and warmly thanked the members, artists and friends who had so kindly given their services.

The Concert—as on previous occasions—proved both entertaining and amusing, and the audience responded with enthusiasm, frequently calling for encores. The programme included—

Pianoforte Solos by	Miss Warren.
Songs	Misses Bateman and Bowen, Messrs. Harrison, Collins and Roberts.
Humorous Songs	Miss Peacock, Messrs. Willis, Birch and Waight.

The Misses Allan and King were able accompanists. The concluding sketch—"A Tragedy"—with the Misses McKelvie and Pearce, and Messrs. Willis, Birch and Waight in the Caste, scored an instant success. Miss Pearce, as Ermytrude, the maid, played admirably, and was received with roars of laughter.

Refreshments were prepared and served by the Committee, whose well organised arrangements largely contributed towards the success of a most enjoyable evening.

A. G. T.

1630.

If you've never heard tell of a Sub who can yell
Like the siren that scares Auntie Cleo,
You're in for a treat if you ever should meet
A sub whom we call 1630!
If his number's engaged, he gets madly enraged
And hurls wild abuse at the system—
He blows us sky-high if told "No reply"
They're waiting for him—or he's missed 'em!
If he e'er has to wait, he gets very irate,
"My business is ruined," he reckoned;
Sympathetic we feel, when his chance of a deal
Is missed by the eighth of a second.
Still it cheers us to know that he isn't our foe,
Tho' a tiger he seems in embree-o.
For his curses are meant with most kindly intent,
So here's to profane 1630.

— EXCHANGE.

Extract from a Letter from One of the Staff at — Exchange.

"I am sorry I cannot come to the Exchange to-day. It's because I have still got the bilious attack which you sent me home with yesterday."

Mr. Norman Vennar, in the November *London Soroptomist*, writes that he has nothing but praise for the telephone girl, and "her extreme courtesy, great kindness, and really miraculous forbearance." "Most people," he says, "seem to treat the telephone as a personal enemy and the telephone girl as a malignant fury. I have never known why."

Three cheers for Mr. Vennar,
Who's not as other men are.
Telephonists he praises,
In free and flowing phrases,
Stating—his diction pure is—
They're not malignant furies.

But with forbearance kindly,
Treat others' failings blindly.
And have a subtle brain, too,
Which males can ne'er attain to.
Hats off to Mr. Vennar,
Who's not as other men are.

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.

GOVERNORS OF THE NEW B.B.C.

THE Prime Minister proposes to recommend the following for appointment by the Crown as the original Governors of the British Broadcasting Corporation, which will control broadcasting in the British Isles from Jan. 1 next, viz. :—

The Earl of Clarendon (chairman),
Lord Gainford (vice-chairman),
Sir Gordon Nairne,
Mr. Montague Rendall,
Mrs. Phillip Snowden.

Lord Clarendon, who is 49 years of age, is Under-Secretary for Dominion Affairs, and it is understood that immediately the Imperial Conference has concluded he will give up that position. He has been Captain of the Gentlemen-at-Arms and Conservative Whip in the Lords.

Lord Gainford, of Headlam Hall, Gainford, Darlington, is well known in the North as vice-chairman of Pease and Partners (Ltd.), and a director of other colliery companies. He is chairman of the present British Broadcasting Company. Formerly Mr. J. A. Pease, he has held various official positions, including those of Postmaster-General and President of the Board of Education.

Mrs. Philip Snowden, the only woman on the Corporation, is well known as a publicist, and was formerly vice-president of the National Union Women's Suffrage Society. She is an ardent worker in the cause of temperance, and has given much time to the women's movement generally. Mr. Philip Snowden, her husband, was Chancellor of the Exchequer in the Socialist Government.

Dr. Montague John Rendall, M.A., was head-master of Winchester School from 1911 to 1924. Educated at Harrow and Cambridge, he played for the University football eleven and the Corinthians. He is editor of Freeman's "School of Hellas."

Sir John Gordon Nairne, who is 65 years of age, is a director and late Comptroller of the Bank of England. He is an Officer of the Legion of Honour (France), 1918, and of the Order of the Crown (Belgium), 1919.

Mr. J. C. W. Reith, the managing director of the present B.B.C., has been appointed Director-General of the new Corporation. Mr. Reith was formerly an engineer with Messrs. S. Pearson & Son, Ltd., London, and served in France as a Major with the Royal Engineers, and was wounded. He was general manager of Messrs. William Beardmore & Co., Coatbridge, 1920-1922.

EDINBURGH AND DISTRICT POSTAL TELEGRAPH AND TELEPHONE SOCIETY.

The opening meeting of the current session of the Edinburgh and District Postal Telegraph and Telephone Society was held in the Telegraph School, G.P.O., on Nov. 2, when Lt.-Col. A. A. Jayne, D.S.O., O.B.E., M.C., opened the proceedings.

A paper was read by Mr. A. Y. Moncrieff on "Impressions of Denmark," surveying in turn the various social and administrative departments of that State. Mr. Moncrieff also gave an exhaustive report of his contact with the Danish Postal and Telegraph Administrations, reviewing in detail the various staffing standards employed in the telegraph service. An interesting item of technical news touched upon was that the Danish State Telephone Service was at that time employing high frequency transmission to telephone trunk lines, four conversations being conducted simultaneously on one circuit utilising different wavelengths.

The next meeting will be held on Dec. 7, subject "The Telephone Services of Holland and Denmark," by Mr. G. H. Taylor, District Manager, Scotland East.

LONDON TELEPHONE SERVICE NOTES.

London Telephonists' Society.

THE November Meeting of the London Telephonists' Society, which was held on Friday, Nov. 5, at the City of London Y.M.C.A., 186, Aldersgate Street, E.C., was particularly successful and the three hundred odd members who attended owe a considerable debt of gratitude to Mr. C. W. Brown and his assistants at the Engineer-in-Chief's Automatic Training School for the great pains which were taken to provide such an interesting paper and a really enlightening working demonstration.

Before the more serious part of the evening's programme, there was half-an-hour of musical items which were arranged by the staff at Gerrard Exchange, and were greatly enjoyed.

The paper read by Mr. Brown, entitled "Automatics in Being," was entirely of a non-technical nature and primarily intended to give the Exchange staffs and those others not initiated into the technical details of automatic working a very general idea of the class of switchboard which will be installed under the Automatic System and of the manual operations still to be performed under that system, and also an insight into the procedure to be adopted during the period of transition from manual to automatic. As the lecturer proceeded, all his points were mechanically demonstrated by reference to working models of a series of selectors and a C.C.I. panel, and loudspeaker reproductions of the various distinctive "tones" which will be used under automatic conditions together with a large number of interesting and demonstrative lantern slides. These working models proved to be of especial interest, and for a considerable time both before and after the meeting, Mr. Brown and his assistants gave members of the Society personal instruction as to the manner in which they functioned.

At the termination of the paper all speakers expressed their whole-hearted appreciation and thanks for all that had been done to ensure such a successful evening. Mr. Valentine took the opportunity of expressing his high appreciation of the enthusiastic manner in which the Engineering staff were doing everything possible to co-operate with the London Telephone Service in the endeavour to obtain the 100% efficiency to which Mr. Brown referred at the conclusion of his lecture.

* * * *

P.O. Telephone and Telegraph Society.

The Lecture Hall at the Institute of Electrical Engineers has seldom been so well filled at a meeting of the Post Office Telegraph and Telephone Society as it was on Nov. 15, when Mr. Dive read his paper entitled "Some considerations of the possibilities of Automatic Telephony in London as foreseen from a Traffic viewpoint." Looking round the large gathering one recognised many, using the words of the author of the paper, both from the "Mountain of vision and the valley of lowly duty," who do not habitually attend the meetings of the Society. It was a tribute to the author, as well as an expression of the recognition of the existence of a "Traffic viewpoint" in this gigantic question, which involves the telephoning of London on a machine switching system, and in which the engineering aspects of necessity occupy so prominent a position. Moreover, as they say across the border, "He has a way with him," and it was perhaps as much "his way" as the subject matter of the paper which attracted so large an audience. It is scarcely necessary to say that whichever the motive, those present were not disappointed. The paper was of that literary standard to which the author has accustomed us. It contained good measure of wit so that from his criticism one would not judge him to be a member of a much advertised club. Suggestions, born of that practical sense of which Mr. Dive has given so much evidence, figured largely in the second half of the paper. He appealed most strongly for vision and courage in forecasting the development of telephones in London, and also in the provision of staff to consider the many problems arisen and arising in connexion with automatics. In so doing he has much support, but apparently there are converts yet to be made. From our engineering colleagues we of the traffic side very nearly caught the spirit of intense optimism—only one doubting Thomas expressed himself audibly, but there may have been others whispering in the valley.

* * * *

H.Q. Ladies' Swimming Club.

The Rana Ladies' Swimming Club (L.T.S. Controller's office) held their second Annual Gala at Holborn Baths on Oct. 23, when a large audience enjoyed a very entertaining programme. Among the events were the Rana

Championship for the "Liddiard" Cup, which the holder, Miss B. Taylor, retained; the Civil Service 100 Yards Breast Stroke Championship, which was won by Miss D. M. House, of Regent Exchange; and the Men's Team Race for the Lotos Shield, which the Accounts Branch retained after a close contest.

The majority of the items on the programme were of a humorous character and the many varied costumes donned and worn in the water, the obstacles grappled with—literally and actually—and the unrehearsed developments of some of the incidents kept the audience in continuous laughter.

Miss J. Liddiard kindly distributed the prizes.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Promotions to Assistant Supervisors, Class II :—

Miss A. J. DINGLE, Kensington Exchange.
Miss M. M. PARSONS, Grosvenor Exchange.
Miss L. BROWN, City Exchange.
Miss E. M. GILLMAN, Langham Exchange.
Miss B. L. M. HARVEY, Brixton Exchange.
Miss D. E. R. MANSFIELD, London Wall Exchange.
Miss K. M. CHANDLER, Burgh Heath Exchange.
Miss E. C. COOMBS, Riverside Exchange.
Miss L. DUGNAN, Hampstead Exchange.
Miss L. E. L. SHAPCOTT, Hop Exchange.
Miss A. A. BAKER, North Exchange.
Miss P. M. STEDMAN, Redhill Exchange.
Miss F. M. WILSON, Sidecup Exchange.

Telephonists resigned for marriage :—

Miss E. GOULDING, Trunk Exchange.
Miss V. W. CRUTTENDEN, Victoria Exchange.
Miss M. E. STANNERS, Victoria Exchange.
Miss B. L. M. BAKER, Victoria Exchange.
Miss M. R. LECKS, Victoria Exchange.
Miss I. E. C. MAY, London Wall Exchange.
Miss G. L. FRANKLIN, London Wall Exchange.
Miss G. B. WIGZELL, London Wall Exchange.
Miss C. DEAN, Paddington Exchange.
Miss W. COPE, Mountview Exchange.
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Miss E. G. COLLYER, Victoria Exchange.
Miss E. L. WALKER, Victoria Exchange.
Miss E. V. BROWN, Victoria Exchange.

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JANUARY, 1927.

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TELEGRAPH AND TELEPHONE MEN AND WOMEN.



XXXVI.—"OURSELVES."

[Photograph by Miles & Kaye.]

(Standing)

J. STUART JONES.
W. A. VALENTINE.

W. H. GUNSTON.
JOHN LEE.

J. J. TYRRELL.
J. W. WISSENDEN.

(Sitting)

OURSELVES.

(See preceding page.)

THIS, we consider, is a useful picture. We should be glad to say that it was ornamental also, but that must be for others to say, if they are sufficiently unscrupulous. At any rate, we have a certain pride in the assembly. At first we were a trio only, but we have expanded since then, and the group as it appears has been responsible for the direction of this journal for some years. We have had our ideals throughout and though we are conscious of some failures we are not conscious of downright failure. The middle territory is uncertain, but it is in that insecure land that we find ourselves. The little party is breaking up and those of its members who pass away are proudest of the fact that the journal itself will continue. There will be new things to record, new ventures, new achievements and of these the venerables of the group can only dream. But the journal has kind friends throughout the world, friends of different races and of different tongues, and to all who are bound by the fraternity of telegraphy and telephony Ourselves, in our last corporate utterance, send kindly greeting.

OVERSEAS COMMUNICATIONS.

MR. H. G. SELLARS, of the Cable Room, C.T.O. supervising staff, gave an interesting lecture, illustrated by over fifty lantern slides at the Institute of Electrical Engineers, London, on the 20th ult., under the auspices of the London T. and T. Society.

If Mr. Sellars was not favoured with a larger audience than that which gathered to listen to him it was undoubtedly due to the awkward date of the fixture which happened to fall in Christmas week, with all its Postal, Telegraph and Telephone pressure, not to speak of that other seasonal pressure (upon paterfamilias by materfamilias) to assist in festive shopping. However, some of us managed to escape and were not unrewarded for our audacity!

The lecturer's subject was well arranged, if it suffered a little from a certain amount of overweight in detail, the omission of which would not have detrimentally affected the main theme of his subject, i.e., the development of international, colonial and world-wide telegraphic communication from the laying of the first thin copper thread across the Atlantic up to the present day, with the more modern methods of communication through the medium of the ether.

The discussion which followed was equally interesting, and perhaps the lecturer's success was most pronounced in its thought-provoking effect. If it had done no more than raise the issue, ably voiced by Mr. Stuart-Jones, of the very serious present-day problem of the economic relationship between wireless and long-distance submarine cable working, it was well worth all the trouble of compiling and delivering.

It, however, did more. It must have given thought to those who were not in close touch with the evolution of telegraph apparatus. This feature was quickly seized upon by Mr. Pink, who expressed his personal regret that it had not been possible for a larger number of telephone enthusiasts to foregather so that they might have seen something of the path by which the telegraph craft has had to grope its way.

Mr. Day enlarged on the immense strides which electrical communication had made, practically in a century, and Mr. Shaughnessy, the ever-happy chairman, whose cheeriness no paucity of attendance, no adverse conditions and no criticism can ever disturb, contributed not a little to the brightness and the enlightenment of the gathering.

Mr. Sellars' replies to the critics were generally to the point, never failing to accept correction, but never yielding when on good ground.

J. J. T.

TELEPHONE DEVELOPMENT OF THE WORLD IN 1925.

BY W. H. GUNSTON.

THE telephone development of the world during 1925 followed much on the usual lines. The total number of telephones increased as during the two previous years by about a million and a half, the precise figure (as far as an estimate can be precise) being 1,602,000. Of this increase 846,000 was provided by North America, and 610,000 by Europe—by far the largest increase yet recorded for that Continent.

The total figure is distributed over the six continents thus:—

	No. of Telephones Dec. 31, 1924. (Thousands.)	No. of Telephones Dec. 31, 1925. (Thousands.)
Europe	6,842	7,452
Asia	863	912.5
Africa	153	165.5
North America	17,370	18,216
South America	362	394
Australasia	478	530
	<u>26,068</u>	<u>27,670</u>

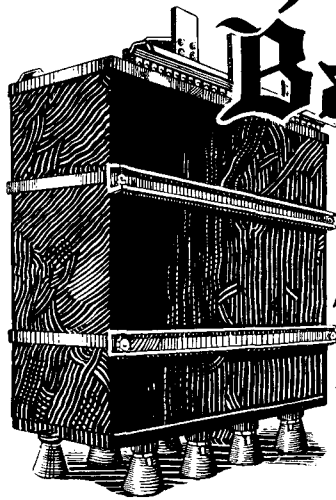
It is interesting to observe that whilst North America is increasing at the rate of 5% Europe is increasing at the rate of 9% and it may be pointed out that as these percentages were rather over 5 and 8 respectively last year, Europe is at last beginning, though very slowly, to gain upon America. It is not unfair to surmise that, with many States so much underdeveloped, Europe will continue for some years to show a rising percentage of growth whilst that of America slightly contracts.

The number of telephone stations per 100 of the population in the chief telephone-using countries at Dec. 31, 1925, was as follows:—

United States	15
Canada	13
Denmark	9.5
New Zealand	9.4
Sweden	7.2
Australia	6.8
Norway	6.6
Switzerland	5.6
Germany	4.3
Great Britain	3.1
Netherlands	3
Austria	2.3
Belgium	2.2
Argentina	1.9
France	1.8
Japan	1

The figures in the following tables are based chiefly on recent official information. In some cases (marked *) estimates have been resorted to (based in most cases on last year's official figures). The statistics for South America are founded on information relating to the previous year obtained from America. As the growth of the telephone in South America is fairly regular, the estimates given may be taken to approximate closely to the actual telephone development. The only other important country in which an estimate has been employed is Japan, where an increase of about 30,000 telephones has been allowed for. In 1924, 40,000 telephones were added, so that the estimate would appear to be a conservative one. The figures in brackets following the names of countries in the annexed tables represent the number of telephones in existence at Dec. 31, 1924.

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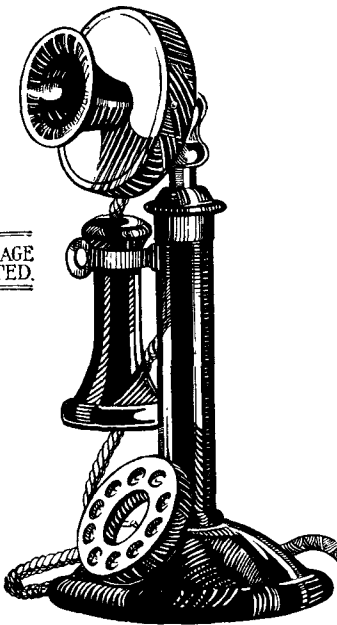
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EUROPE.

The ratio of inhabitants to telephones in Europe is 1 to 64. In order, however, to get a fairer idea of the development of Northern and Western Europe, it is convenient to take an area comprising Scandinavia, Germany, Austria, Switzerland, France, Holland, Belgium, Great Britain and Ireland. It will be found that this area comprises 6,390,000 out of the 7,452,000 telephones in Europe and 183 out of its population of 475 million yielding a ratio of 1 telephone to every 29 inhabitants. The principal increases in growth are to be found in Russia, 48,370 telephones (30%); Belgium, 21,278 (over 15%); France, 75,159 (over 11%); Great Britain, 115,632 (9%); Germany, 202,839 (over 8%); Switzerland, 10,491 (over 5%); Holland, 11,452 (5%); Sweden, 16,276 (nearly 4%).

As is to be expected, the countries with the highest development show the lowest rate of progress. Denmark, for example, had an increase of 7,816 telephones (less than 3%), and Norway about 6,000. Russia, on the other hand, with much leeway to make up, comes first with her increase of 30%.

	No. of Telephones	Population (thousands)	Inhabitants per telephone
Austria (144,884) ...	152,751	6,535	42
Belgium (135,024) ...	156,307	9,077	45
Bulgaria (8,097) ...	8,531	4,861	570
Czecho-Slovakia ...	115,487	13,588	119
Danzig (17,280) ...	17,707	356	20
Denmark (303,754) ...	311,570	3,283	10.5
Estonia (9,926) ...	11,000*	1,250	114
Finland ...	85,000*	3,402	40
France (642,851) ...	718,000	39,209	54.6
Germany (2,385,177) ...	2,588,016	59,858	23
Great Britain (1,275,524) ...	1,391,156	44,173	31.8
Greece ...	5,500*	6,800	1,236
Hungary (79,952) ...	80,058	7,482	93
Iceland ...	3,642	94	26
Ireland (21,540) ...	23,112	3,139	136
Italy ...	175,000	38,500	220
Latvia (15,256) ...	18,411	2,000	109
Lithuania (6,171) ...	6,400	2,000	312
Luxemburg (7,320) ...	7,957	263.8	33
Netherlands (204,676) ...	215,928	7,029	32.6
Norway (167,000) ...	173,000	2,649	15
Poland (119,985) ...	125,000*	13,000	104
Portugal (20,500) ...	21,344	6,399	300
Russia (158,425) ...	206,795	136,000	700
Rumania (34,580) ...	41,675	17,000	408
Spain ...	120,279	21,658	180
Serbs, Croats and Slovenes (27,457) ...	28,600*	11,600	406
Sweden (418,318) ...	434,494	6,036	13.6
Switzerland (186,297) ...	196,788	3,888	19
Saar (15,900) ...	15,900*	—	—
Turkey (9,801) ...	10,325	2,000	194
	<u>7,464,000</u>		
Deduct for Siberia, Tur- kestan, &c. ...	12,000		
Total ...	<u>7,452,000</u>	<u>475,000</u>	<u>64</u>

ASIA.

	Telephones.
Ceylon (6,448) ...	6,500
China ...	110,000*
Dutch Indies ...	41,392
French Indo China (3,361) ...	3,500
Japan (573,144) ...	600,000*
Chosen, Formosa, Quantung, Saghalien, &c. ...	60,000*
India (42,170) ...	44,991
Iraq (731) ...	752
Palestine (1,760) ...	2,227
Persia, 1924 ...	2,445
Phillipines ...	16,000*
Siam ...	1,877
Straits Settlements, 2,038 (includ- ing Singapore, 5,154) ...	7,192*
Federated Malay States ...	4,228
Siberia, Turkestan, &c. ...	12,000*
Total ...	<u>912,500</u>

Population 1,013,000,000 or 1 telephone per 1,111 inhabitants.

AFRICA.

	Telephones.
Algeria (21,582) ...	23,000*
Egypt (33,009) ...	34,950
Tunis (7,091) ...	7,500
Guinea, Portuguese ...	6,000
Gold Coast ...	500*
Madagascar (1,051) ...	1,200*
Mauritius ...	1,165
Morocco (6,042) ...	6,500*
Senegal ...	436
Tripoli ...	367
South Africa (73,825) ...	78,571
Kenya ...	1,391
S.W. Africa ...	1,056
S. Rhodesia ...	1,981
Total ...	<u>165,500</u>

Population 143,000,000 or 1 Telephone to each 885 inhabitants.

(To be continued.)

DEATH OF MR. W. C. OWEN OF BATH.

MR. OWEN had been in failing health for some time, his illness towards the end becoming very painful, and he was latterly almost totally blind. He was well-known in Bath and the surrounding district on account of the position which he held in the telephone service. Born at St. Asaph, in North Wales, he was educated at Liverpool College, and, after holding various appointments in commercial offices at Liverpool, entered the service of the United Telephone Company in 1882. On Nov. 1, 1885, he was appointed local superintendent for the Gloucestershire Telephone Centre of the Western Counties Telephone Company, and was subsequently promoted district superintendent over the combined Gloucestershire, Worcestershire, Herefordshire, and Shropshire telephone centres, with headquarters at Cheltenham. In 1892 the various telephone companies throughout the country were amalgamated. This resulted in a rearrangement of the districts, and Mr. Owen was transferred to Cambridge as district manager for the Cambridgeshire, Hertfordshire, and Bedfordshire centres, and in the following year he was appointed district manager for the whole of Kent, with control of the Canterbury, Margate, Dover, Chatham, and Tunbridge Wells centres. In 1897 Mr. Owen was transferred to the London staff of the Engineering Chief, in which position he gained much valuable technical experience. In 1898 he was appointed district engineer for the North of Ireland, with headquarters at Belfast.

Whilst holding this position he planned and carried out the work of re-constructing the entire telephone system of the city of Belfast, substituting an underground for an overhead plant and organising the removal of the exchange to a new situation.

In January, 1902, Mr. Owen commenced business on his own account as an electrical contractor, and in 1904 he accepted an offer made by the National Telephone Company to rejoin the service as local manager for the Bath, Radstock, and Wiltshire telephone areas. In 1912, when the National Telephone Company's business was acquired by the State, he was appointed to the engineering department as local engineer for the Bath centre. This position he held until Feb. 28, 1922, when he was superannuated after having completed 40 years in the service of the public.

Mr. Owen had a wide knowledge of all matters pertaining to the telephone service, and was the author of a book published in 1903 by Whittaker & Co. dealing with telephone lines and methods of construction. This was the first book of its kind to be published, and had a large and world-wide circulation. He was also a frequent contributor to technical journals on matters relating to telephony and kindred subjects.

TELEGRAPHIC MEMORABILIA.

A HAPPY NEW YEAR!

TELEGRAPHICALLY 1927 should prove a very happy new year for this country for, long before its close the whole British Empire should be knitted more closely by the intangible ties of Radio communication and be in instant touch by day and night with the mother city.

1926 saw the Canadian Beam service a daily working fact, and the Australian Beam full of a promise sure of fulfilment, with South Africa and India well on the way.

But while writing and thinking of the Beam service one is liable to forget the mighty station at Rugby with its

- (1) Long-wave plant of world-wide range;
- (2) Long-wave plant of medium range;
- (3) Short-wave plant of world-wide range;

and its experimental telephone plant of, say, three to four thousand miles range.

The prophecy concerning this station made in May last before the Royal Institution by a distinguished Doctor of Science was to the following effect "the ultimate aim of this experiment is to connect any telephone subscriber in this country to any subscriber in the United States and Canada. By aid of the telephone circuits already constructed between England and the Continent it may be found possible later to connect anyone in Western Europe to anyone in North America through Rugby. The Rugby station when in full swing will probably be able to transmit simultaneously three long-distance telegrams and a telephone message."

On November 22, Viscount Wolmer stated in the House of Commons that the cost of the Rugby wireless station, including the site, building, buildings and plant, was about £480,000.

Huge as this sum may appear to the average reader, it is little more than half the cost of the Bordeaux station, built by the French in 1919, which only gives a single service, against the multiple service of the British station.

The latter has also cost much less even than the new stations of St. Assise, near Paris, and that on Long Island.

Another feature of startling contrast however, is the fact that the estimate for the four Beam stations in this country is actually less than half the cost of Rugby. Nevertheless we come back to the thought that if the developments anticipated in the Beam system should materialise and the modifications and additions necessary for the rapid changing of wavelengths become a working possibility, then will have to be faced the extra cost for these elaborations. As was quoted in our last issue on this subject the very changes necessary to give this pliability to the working of directed short waves, "might at the same time make the short wave plant as costly as that of the long wave plant."

Yet another side of this matter, and that the undirected short wave which is already being utilised by certain ships, as my wireless amateur readers have no doubt already noted.

On an Atlantic greyhound one could hear the traffic spinning out reliably on a low two-figure wavelength and with a power something in the neighbourhood of one thousandth less than that used by long wave stations utilised for the same distance. Thus these three phases of long wave, directed short wave and undirected short waves present an interesting puzzle for the scientists and economists for some time to come.

Great Britain has already commenced to gain what should prove most valuable information with the varying types of radio communication at present in use and to come.

A Special Correspondent of the *Westminster Gazette* appears to have had special facilities for handling the Christmas traffic dealt with by means of the new Anglo-Canadian Beam service judging from the following excerpt from the columns of the above-mentioned London daily newspaper.

One wondered how far the law regarding the divulgence of the contents of a telegram was overcome in this particular case. The latest information, however, is to the effect that the forgiving spirit of Yuletide was extended to the lady or gentleman who had the bold and happy inspiration to prepare this picturesque snap-shot of Christmas, 1926, in the C.T.O., London.

"Cheerio. All the best."

"This was one of hundreds of Christmas greetings sent by cable and wireless across the Empire's seas from the Central Telegraph Office of the G.P.O. yesterday.

"An operator flicked it out on a typewriter keyboard, and it was flashed across the Atlantic from the Bodmin beam station to Montreal. Two people, thousands of miles apart, had shaken hands through the ether and wished each other a happy Christmas.

"I picked up a few of the slips. They were all happy variations on the 'Fondest Greetings,' 'Christmas Greetings,' and 'Happy Christmas, Love' theme, and were bound for out-of-the-way places one had never heard of—Melaval, Fairville, Tranquill, St. Stephen, Coquitlam, Rosedale.

"Where was Coquitlam? Was it on the map at all? Would they have Christmas trees there, and Christmas pudding? Wherever it was, someone in England had said to somebody there: 'Happy Christmas, Love.'"

The "F" Division has again to be congratulated upon the success of Messrs. Johnson and Young in designing and reproducing yet another First Favourite in their Xmas and New Year's Card, which is perhaps at its best in the scene depicting the village sub-postmaster who has "a little difficulty with his Tele-Type," and who, with a fair-sized hammer, a huge oil-can and a tin-opener is evidently more than ordinarily anxious as to the next move.

The skit on the Beam is remarkably well thought out and executed. Altogether an excellent result in black and white.

NEW BEAM STATIONS.—New beam stations for communication with New York and South America are to be erected by Marconi's Wireless Telegraph Co. A station is also to be erected in Portugal to connect Lisbon with Portuguese colonies in Africa.

The W. India and Panama Telegraph Co., Ltd. report that the receipts for the year ended Dec. 31. 1925, amounted to £48,898, and that there is a debtor balance of £18,328. After crediting interest and providing for debenture interest, &c., there is a debit of £28,710, which is being added to the adverse balance of £105,900 brought forward. Considerable economies have been effected and the rates have been changed in certain respects.

The report of the Western Telegraph Co., Ltd. for the year ended June 30 last, records a revenue of £1,541,100 and working expenses amounting to £839,881. The balance, after providing for debenture interest and income tax, is £590,626, and to this is added £300,440 brought forward, making £891,066. Of this, £250,000 has been transferred to general reserve, four dividends of 2½% each, free of tax, have been paid, and a balance of £329,171 is carried forward. The directors have appointed Vice-Admiral H. W. Grant, C.B. (joint managing director of the Eastern Telegraph Co., Ltd., and a director of the Eastern Extension, Australasia and China Telegraph Co., Ltd.) to a seat on the board.

WHO IS RIGHT? CABLES v. WIRELESS.—The Sydney correspondent of the *Daily Telegraph* reports that Mr. J. A. J. Hunter, member for Maranoa in the House of Representatives, has stated that the speed of the new duplicated Pacific cable is 1,000 letters a minute, and contrasted this with 500 letters by the "beam" radio system from London to Montreal. Mr. E. T. Fisk, managing director, Amalgamated Wireless (Australasia), Ltd., retorts that the guaranteed capacity of the beam service from London to Montreal is double Mr. Hunter's figure. In actual practice, in a seven days' continuous test, the average working speed was 1,200 letters a minute for a 24-hours' day. Speeds of 2,500 letters a minute were worked on a complete circuit for many hours. Mr. Fisk states that this shows considerably greater capacity than that claimed for the new cable. Let us leave the two protagonists to continue the debate!

ARGENTINA.—According to the *Review of the River Plate*, the company operating the service of wireless-telegraph communication with Europe recently entered into the enjoyment of several valuable extensions of privileges. On Sept. 17, the Government issued a decree authorising the "Compañía Radio-telegrafica Argentina Transradio Internacional" to establish communication with stations outside of the Republic at a greater distance than 1,000 kilometres from the Federal Capital. The original concession did not permit communication with any country co-terminous with Argentina, but the new ruling only excludes communication with Uruguay. The original concession also only allowed communication with "fixed" stations, but the company may now communicate with shipping outside the 1,000-km. radius from Buenos Aires. The company is no longer restricted to the use of long waves, but may transmit on waves of any length subject to subsequent Government reservations of particular wavelengths. Immediate advantage of the new privileges has been taken. A short-wave transmitter has been added to the Monte Grande station and is now operating. A direct service to Rio de Janeiro and Southern Brazil has been in operation for nearly two months, and the company is to institute a service to ships anywhere in the Atlantic.

AUSTRALIA.—According to the *Electrical Engineer of Australia and New Zealand*, the Associated Radio Co., which operates broadcasting station 3AR, Melbourne, reports a net profit of £3,774 on its operations for the year ended June 30, 1926. This was obtained after a drastic writing down of stock values, providing for contingencies and writing off £452 for depreciation. The company has had an anxious time during the few years of its existence, but the future is distinctly brighter. In accordance with the recommendations of the consulting engineer, Mr. Donald Macdonald, it is proposed to install a new transmitter of about 5 kw. capacity and to make general improvements to the studio, programmes, and general broadcasting.

During the month of September the number of broadcast radio receiving licences issued in the Commonwealth was 19,530, making the total in force 165,436, of which 44,962 and 83,077 were accounted for by New South Wales and Victoria respectively.

Reuter's Agency in Melbourne says that at a conference of the Federal Wireless Institute of Australia at Sydney, Prof. Madsen, professor of electrical engineering at the University of Sydney, emphasised the need for the appointment of a board of wireless research, similar to that which was created in Great Britain in 1920. The conference endorsed the proposal, and it was also unanimously decided that the Institute should appoint three delegates to the world Conference at Canberra at the opening of the Federal Parliament next year.

BELGIUM.—Reuter, Brussels, reports that the National Telegraph and Telephone Co., which the Government has been thinking of establishing on the model of the National Railway Co., will not be set up. A scheme is now contemplated for setting the telegraph and telephone systems on an independent basis both in respect of finance and control, thus putting matters on a business footing and permitting loans to be contracted, secured on the plant of the undertaking.

BOLIVIA.—Five broadcasting stations are to be built in Bolivia, says *The Electrical Review*. According to information received by the Bolivian Legation in London, they are to be erected at Sucre, Potosi, Tarija, Monteagudo, and Azurduy, and the Finance Committee of the Bolivian Chamber of Deputies has voted 150,000 bolivianos, equal to £11,875, to cover the cost. A successful radio club has been in existence for some time at La Paz, and a regular programme is broadcast, but this is a private venture, and is financed by members' subscriptions. The new stations are to be controlled by the Government.

BRAZIL.—Reuter's Trade Service informs us that a radio station has been opened at Olinda, in the State of Pernambuco; Olinda has a population of over 8,000, and other towns within the area of the service are Bezerros (17,500); Bomjardim (40,000); Brejo de Madre de Dios (13,650); Garanhuns (35,000); and the increasingly important port of Victoria (33,000).

BULGARIA.—From the same authority's agency in Sofia we learn that the Bulgarian Cabinet has authorised the Board of the Bulgarian Post Office to erect another wireless-telegraph station in the neighbourhood of Sofia. A credit of 15,000,000 leva has been set aside for the purpose, and the work will be carried out under an agreement to be arranged between the Post Office and a contractor.

BURMA.—The London *Times* reports that the first system of wireless telephony in Burma has been established between the office of the Rangoon Port Trust and the pilot vessel in the Gulf of Martaban. The telephone has a device by which either party can call up, and is capable of communicating with vessels for a distance of 200 miles.

CHINA.—Despite the present disturbances in China there is a decided increase in the interest manifested towards broadcasting in Hong Kong of late, and the Government has introduced a new Bill relating to wireless telegraphy. It is intended to make a fee for a receiving set approximately \$2.50 per annum.

EGYPT.—The Marconi Radio-Telegraph Co. of Egypt is being formed to take over the Abu Zabal wireless station, near Cairo, which was originally built as one of the links in the Imperial wireless "chain," and has been operated by the British Government from the time of its opening in May, 1922, until now. It was the link between the Leaflet station and that at Karachi. Now that the Rugby station has been built and the Imperial system changed, says *The Times*, the Egyptian station is no longer of importance to the Government, which has accordingly disposed of it to the Marconi Co. In addition to communicating with Karachi, this station communicated with Palestine, Iraq, and Abyssinia.

FINLAND.—A plan for the erection of a broadcasting station has been worked out under the guidance of the Ministry of Communications, according to *Commerce Reports*. The project involves a station of 25 kilowatts capacity, with a wave-length of 1,500 metres, and among the sites mentioned the towns of Lahtis and Tavatehus are most prominent. It is estimated that at least two years will be occupied in the preparation of the station.

FRANCE.—In connexion with the new broadcasting station which is to be erected, a Reuter message from Paris states that the Union of Radio-Electric Industries proposes to erect the station at some distance from Paris in order that receiving posts may be caused no inconvenience. The power of the station will be 60 kw., that is to say more powerful than Daventry. It is proposed to transmit performances at the Opera Comique and the Comédie Française, lectures at the Sorbonne, and notable speeches. It was at first proposed to utilise the Eiffel Tower, but the idea was abandoned for several reasons. First, a station within Paris itself would make reception there difficult; secondly, the tower is utilised for transmitting messages in Morse; and finally, it belongs to the State, which is not prepared at present to establish a new station.

The Times reports that there is a very interesting controversy going on just now in Paris, where the three stations, Eiffel Tower, Radio Paris, and P.T.T. derive part of their incomes from broadcast commercial publicity. The trouble at present is due to the fact that the Eiffel Tower is being severely censored for this publicity work, and the Minister of Commerce has gone so far as to commission a special censor with instructions to cut off the transmission when any broadcast is made which might be taken as publicity.

GERMANY.—The Glisoma-Werke Schierstein on the Rhine, formerly known as Landsberg and Ollendorf, of Frankfurt, is manufacturing a new insulating material known under the trade name of "Peralit," says *Commerce Reports*. The new product is intended to replace fibre, hard rubber, and other insulating materials. It is built up of layers of certain materials, the nature of which is not reported, and subjected to very high pressure with application of heat. The insulating material has a high electrical resistance, and is said to keep its shape up to 200° C. It is not affected by oil, air or humidity, and is only affected by certain acids.

The French military authorities have given permission for the erection of a wireless broadcasting station in the Palatinate. The station will be erected in a central part of the province, and the Post Office authorities expect

to put it into operation within the next six months. The wavelength is not yet announced.

Reuter's Agency at Mainz says that the new wireless station for the Rhineland, situated in Elberfeld, near Barmen, has been tested by the Postal authorities and handed over to the broadcasting society. Trials will be made forthwith, and it is hoped to have the station in full operation before Christmas.

GREAT BRITAIN.—The *Daily Mail*, London, reports the following case of a "pirate" wireless offender who had evaded detection for more than twelve months:—"A station which transmitted under the call signals 60K and 5UH having been located by Manchester Post Office engineers after a search lasting more than a year, the owner of the unauthorised "station" Cyril J. Smith, of Timperley, Cheshire, was fined the maximum penalty of £10, with £5 costs, at Altrincham, on a charge of having worked apparatus for wireless telegraphy without having a licence. The magistrates also ordered that his apparatus should be forfeited. Smith said he first applied for a transmitting licence in 1924, but received no reply, and then again in November, 1925. He offered to send prints of his intended patents, but, receiving no reply, he was tempted to carry on his experiments. He had had numerous letters to the effect that his application was being considered."

The Wireless Telegraphy (Blind Persons Facilities Bill) was recently read in the House of Commons. This Bill proposes that when a person satisfies the Postmaster-General that he is a blind person within the meaning of the measure, a licence to establish, maintain, and work a wireless-telegraphy station for the purpose of receiving messages *only* may be granted to him subject to such terms, conditions, and restrictions as the Postmaster-General may think fit, but without payment of any fee.

During recent manoeuvres with the Regular Army, the 23rd (London) Armoured Car Company, a Territorial unit of the Royal Tank Corps, carried out extensive and highly successful tests in radio-telephonic transmission between moving armoured cars. Storage batteries, supplied by Messrs. Peto & Radford, were used for running the 1,000-volt generator and for lighting the filaments of the valves in the transmitting and receiving sets, and though treated with little respect and continually subjected to the jolting motion of the cars, played their part throughout without a fault.

The following interesting particulars were mentioned regarding the British Broadcasting Company recently in the House of Commons in relation to its present and future position by the Postmaster-General, Sir W. Mitchell-Thomson:—On March 31 last there were 1,964,000 licences; on Oct. 31 there were 2,097,000, and it was estimated that if trade revived there would be on March 31 next 2,200,000 licences. It was anticipated that the Corporation would receive in its first financial year £805,000, and if the listeners increased by another 200,000 in the following year, the Corporation would receive £866,000. The State would retain £159,000 this year; next year it would retain £245,000, and the year after £271,000. For the three months from January 1 next to March 31, the Corporation would receive £183,000.

Questions and Answers and the House of Commons.—On Nov. 17, Mr. Pileher asked the Postmaster-General whether he had any information regarding the interference with ordinary wireless receiving which had resulted in Cornwall from the operation of the new beam system of communication with Canada; and whether, if so, he would approach the Marconi Company, with a view to the protection of the interests of owners of private receiving sets.

Sir Wm. Mitchell-Thomson stated that the operation of the Post Office beam station at Bodmin did not interfere with broadcast reception in Cornwall, provided that suitable receiving apparatus was used. Some interference had been experienced by persons in Cornwall conducting experiments in transmission and reception on short waves, but he was afraid that that might be unavoidable.

SOUTH AFRICAN BEAM STATIONS.—On Nov. 23, Sir W. Mitchell-Thomson informed Sir H. Brittain that the beam stations for communication with South Africa were practically completed, and preliminary tests had been carried out by the contractors. The tests indicated that the use of shorter wavelengths than those for which the stations were originally designed would probably give a better and more continuous service, and the aerials were accordingly being adjusted to enable those shorter wavelengths to be employed. The contractors anticipated that the necessary alterations could be effected in about seven weeks. Tests under the new conditions would then be necessary before the service could be opened to the public.

The information in the last reply is particularly interesting in view of the belief by many that the even shorter waves than those at present in use, say well below 30 metres, are likely to prove specially effective.

HOLLAND.—Reuter's, of Amsterdam, gives the following account of the service of broadcast radio-telephone distribution by ordinary telephone and wired wireless which was recently inaugurated by the Municipal Telephone Administration at The Hague and has already afforded daily pleasure to some 200 subscribers, who, it is stated, are loud in their praises of the new scheme. Some thousand applications have been received from would-be subscribers, who are being linked up at the rate of 15 per day. It is declared that the new scheme is working successfully; the only disturbance so far experienced is from the electric tramways, but is negligible. Full agreement has not yet been reached with transmitting authorities, but it is hoped that a definite licence for the receipt of wireless programmes will be secured after the December meeting of the Council of the International Radio Bureau in Geneva. From a juridical standpoint the Hague Municipal Telephone Administration is not committed to anything, but the Postal and Telegraph Administration intends to extend this service in the near future to the Government telephone lines.

Each subscriber has, as an attachment to his telephone installation, a small box containing inexpensive apparatus to which either earphones or a loud-speaker can be connected. The annual charge for the service is 30s.

The Netherlands Postal and Telegraph Administration announces that it has been definitely decided to erect a new transmitting station at Scheveningen, and that it will be available for use at the beginning of the year. The energy and depth of the modulation will not be any stronger than is necessary to make the spoken word easily audible throughout the country with the aid of a valve set and a loudspeaker. The wave-length will be 1,950 metres.

HUNGARY.—Next spring, says Reuter's Agency at Budapest, the Hungarian Postal Administration intends to construct a new broadcasting station which will be much more powerful than the present station. Like the old one, it is to be erected on the island of Csopel. As a result of its construction, an increase in the number of subscribers is expected, particularly in the provincial districts. If necessary, it will be possible to raise the transmitting power of the new station to the level of the largest European stations.

INDIA.—*Indian Engineering* states that the Board of Trustees for the Improvement of Calcutta has considered an application from the Indian Radio Telegraph Co., Ltd., stating that the proposed rental of Rs. 1,000 for the land required for the broadcasting station in the Cossipore-Chitpore open space is prohibitive and asking the Board to make a reduction. After some discussion it was decided to offer the site at a rental of Rs. 250 per month for the first two years of the lease and Rs. 500 per month for the remaining period. The company proposes to establish its station in Bombay next cold weather. The company has applied for the lease of a plot of land in the new public park laid out by the Western India Turf Club.

The Postmaster-General of Burma announces that the wireless station at Victoria Point, the extreme southern tip of the Province of Burma, was to be reopened on Dec. 1, 1926. The discontinuance of this station since February, 1925, has been severely felt by shipping in the Bay of Bengal. There are no land telegraph or ocean cable lines between Rangoon and Victoria Point, and the wireless station is the only means of communication along that part of the Burma coast.

ITALY.—VOLTA CENTENARY.—In connexion with the celebration of the first centenary of the death of Alessandro Volta, an International Congress on Telegraphy and Telephony will be organised at Como. Particulars can be obtained from the Italian Ministry of Communications (Istituto Superiore P.T.T.), Viale del Re 131, Rome.

IRISH FREE STATE.—A manufacturer of batteries is now negotiating for the formation of a company in Dublin for the entire manufacture of these articles there, not alone for wireless, but for all other purposes. Wireless apparatus is being made in the Free State, and is being purchased in preference to imported makes.

MEXICO.—*The Electrical Review* informs us that the Mexican Government has provided over \$8,000,000 for the modernisation of the telegraph and radio-communication services.

PERU.—From Arequipa, Reuter's Trade Service reports that a broadcasting station has been opened at Arequipa (population 37,000), capital of the Arequipa Department, which has a population of nearly 300,000. The station operates under the auspices of "OAX Lima," and transmits on a 275-metre wave. A concession has been granted to Señor Luis Ansiaux for a larger station, which will operate jointly with this one.

From the Lima agency of the same company we also learn that the Government has cancelled the radio monopoly in Peru, and it will now be possible to import and sell radio apparatus without any restrictions. The broadcasting operations have been entrusted to the Marconi Co. for the account of the Administration. The licence fee for each receiving set is £P1.

The monopoly for the importation of radio apparatus into Peru, held for some time by the Peruvian Broadcasting Company, was cancelled by the Government in October. Importation is thus freed from restrictions, apart from a duty of 0.50 sol per kg.

PORTUGAL.—An international radio-telegraph service will shortly be inaugurated, says Reuter's Agency, in Lisbon, by the Companhia Portuguesa Radio Marconi between Lisbon, the Azores, Madeira, Cape Verde, Angola, Mozambique, and North and South America. There will, of course, be connexions with the whole world through the radio centres of Paris and London.

RUSSIA.—An English technical journal says that it is reported that a new broadcasting station is to be built in the Kaschira-Schatura district, the power of which will be 1,000 kw.

SCOTLAND.—NAVIGATIONAL RADIO-TELEPHONY.—CLYDE INSTALLATION.—The Clyde Lighthouses Trustees are to proceed with the installation of wireless-telephone apparatus on the Little Cumbrae to establish communication between the lighthouse on the island and Toward. The cost is estimated at under £700 and the annual expense at between £5 and £10. Instead of a continuous call-bell system, it is proposed to fit clocks to automatically switch in the call-bell every half hour, and with this arrangement it will be possible to make calls every half-hour, day or night.

SWEDEN.—It is reported that the new broadcasting station, which is being erected at Motal, will be completed by next spring. The *Daily Telegraph* states that the masts will be about 380 ft. high and the power used will be 120 kw., according to the German method of calculation. The transmission equipment is being delivered by Marconi's Wireless Telegraph Co.

SWITZERLAND.—An official report lately issued shows that at the end of 1925 the length of the telegraph and telephone lines in operation in Switzerland was 19,296 miles, with a total conductor length of 567,364 miles. During the year 1,144,434 inland telegrams, 1,981,893 outgoing and 1,976,893 incoming foreign telegrams, and 1,200,219 transit messages were handled, the total of 6,303,266 showing an increase of 1.16% over 1924. The report shows that the telephone service is making greater progress than the telegraph in Switzerland. There are now nine first-class exchanges with 11 sub-exchanges, 53 second-class, and 1,015 rural exchanges in the country. At the end of the year automatic exchanges were in operation at Zurich-Limmat (3,000 connexions), Zurich-Tiefenbrunn (700), Lucerne-Emmenbrucke (200), Lausanne-Mezieres (70), and St. Gall-Winkeln (50). On an annual income of £2,140,292 the Swiss Telephone Department showed a net profit of £203,574, whereas there was a loss on the telegraph service of £145,252.

TURKEY.—IMPORT DUTY ON WIRELESS SETS BASED ON THEIR WEIGHT !—Constantinople, says Reuter, is shortly to have a broadcasting company of its own, and considerable progress has been made with the organisation and technical preparations. The studio in the Central Telegraph Office in Stamboul is quite ready, but it has not yet been linked by wire with the broadcasting station at Osmanieh, ten miles outside the town; nor is the latter quite complete, although another fortnight should see the beginning of trial emissions. The local subscription is to be, roughly, one guinea per annum. The company is endeavouring to obtain simplification of the present regulations affecting the installation of wireless sets. At present one has to apply to Angora, and after giving evidence of probity and furnishing various guarantors one may obtain a permit in exchange for an undertaking that the set will be at the disposal of the Government if the latter requires to requisition it. There is apparently no difficulty about importing sets, on which a tax based on their weight only is payable.

UNITED STATES.—Automatic operation of one of its transmitters has been developed by the Schenectady radio station of the General Electric Company of America. The best supervised transmitter is liable at times to go wrong, and there is always the chance that a break will occur during an important programme. At WGY a daily inspection of the valves is made; the 50 kw. transmitter, located about four miles from the control room and studio of the station, has 50 valves of one sort or another, and the failure of any one means a shut-down. Occasionally the cause of trouble is not immediately apparent, and at such times the spare 5 kw. transmitter, located a quarter of a mile from the control room, may be automatically operated by an ingenious series of 15 relays, controlled over three lines between control room and transmitter. The control-room engineer throws a switch, which starts the nine machines supplying the various types of current to the transmitter. A second switch supplies low-plate voltage, and the attendant may then consult an indicating device in the control room to find out if the transmitter is functioning properly before he throws a third switch, which puts the transmitter on full power. There are interlocking relays which automatically control the flow of water used for cooling the power valves, and these relays will automatically shut down the set if any part fails to operate. The switch-over from one transmitter to the other can be made in 15 seconds. While automatic operation may be continued indefinitely, it is customary to assign an operator to the set as soon as possible after the switch-over has been made.

The following much-condensed report of a paper read by Mr. R. Falshaw Morkill, before the Institute of Transport is particularly interesting as showing how modern electrical developments have changed what at one time was the independent department of Signals even on large railways, into part of a huge complex organisation in which the need for co-operation and co-ordination are absolute essentials of successful working and yet how this organisation may differ in different countries and yet give effective service under each of the systems. Said the lecturer:—

"A railway signalling organisation does not cause much inconvenience until the introduction of the modern methods of signalling, power, track circuiting, and automatic. In new countries and on new railways the tendency has been to keep everything that appertains to signalling under the signal engineer, or to combine the duties of the signal engineer and telegraph superintendent. The railway electrical engineer is also concerned, being the medium through which electrical energy is furnished for power signalling, but there should be no duplication of responsibilities in his direction. On the Canadian Pacific Railway the system is divided into two districts, east and west, and a signal engineer for each acts as an advisory officer and prepares plans and estimates for new works. The actual maintenance work is the responsibility of signal supervisors. The signalling staff has no jurisdiction over the telegraphs and telephones, or over the lighting of the stations or yards."

"On the Pennsylvania, U.S.A., Railway, the system is organised on a divisional basis. There is a chief signal engineer and a general superintendent of telegraphs for the system, but the regional signalling officers have also charge of the telegraphs and telephones. In the case of the Queensland Government Railway, the signal engineer is responsible for the general policy of signalling, station, and yard lighting, and for new constructional works. On the New Zealand railways a signal and electrical engineer is responsible for the telegraphs and telephones, electric power and lighting, as well as the signalling.

It is gret harm and certes gret pitee

To sette an irous* man in high degree.—*Chaucer*.

*Bad-tempered.

J. J. T.

RETIREMENT OF MR. T. A. PROUT.

WITH the retirement of Mr. Prout at the end of last year the Post Office loses the services of another telephone pioneer. A short biographical sketch of his career appeared in the *Journal* as recently as last April, and it is sufficient now to record that he entered the service of the United Company in 1881, was with the Western Counties & South Wales Telephone Co. until its acquisition by the National Co. in 1892, after which he was successively District Manager at Bristol, Leeds and Manchester, and Assistant Superintendent of the North-Western Province. On the transfer of the Company's system to the Post Office, he came to Headquarters as Inspector of Telephone and Telegraph Traffic.

The large crowd which gathered in the deputation room on Dec. 13, when Mr. Dalzell, the Director-General of Telegraphs and Telephones, made a presentation to him on behalf of the staff, was an eloquent testimony to the popularity and esteem which Mr. Prout



MR. T. A. PROUT.

enjoys. Amongst those present were the Second Secretary, Mr. Raven; the Accountant-General, Sir Henry Bunbury; Mr. Bell, Mr. Leech and Mr. Wakeley, Assistant Secretaries; Mr. Valentine, Controller of the London Telephone Service; Mr. Grant, Mr. Weston, Mr. Townshend, Major Sambrook, Mr. Waters, Mr. Scholes, Mr. Hawker, Mr. Napier, Mr. Edmonds, Mr. Trayfoot and numerous other colleagues and friends.

Mr. Dalzell, in making the presentation, which took the form of a bankers' draft in favour of Messrs. Hampton, referred in happy terms to Mr. Prout's long association with the telephone service, to his pioneer work in the West of England, to his successive promotions (to which we have already alluded), to his sporting activities at lawn tennis, golf and football (he was one of the original members of the famous Bristol club), and amid cheers of cordial agreement, to his unflinching kindness and helpfulness to all who came to him for aid.

Mr. Prout, in reply, thanked the large company of his colleagues for tearing themselves away from the registered paper cases to which they were so closely attached in order to bid him so kind a farewell. And now, after having been the recipient of several white elephants in days of yore, such as huge tea urns with cubical capacities of colossal proportions exceeding his own powers of consumption of this beverage, Mr. Dalzell had just handed him a "draft." But Mrs. Prout who was present at his side had often warned him to avoid "draughts" to say nothing of "overdrafts." This particular draft, however, would make it possible for his wife to secure the magic carpet of her dreams and by closing her eyes and wishing further to see an easy chair descend upon it out of the ether.

Mr. Prout said he could say in Tennyson's alleged most atrocious verse :-

"I have a little room
None so bright,
Wherein to read
Wherein to write."

This room would assume new glories by this great kindness on the part of over a hundred of his friends at the G.P.O. on this day Dec. 13. His provincial friends had actually forestalled those at Headquarters by dissembling their love last Friday! The sinister associations of Friday and 13 were dissipated by his calculation that based on those days his income had been increased at the rate of £5,000 a year! The proper emphasis should be on "at the rate of" rather than on the £5,000. While he would prefer not to linger on the problem of How to live on 24 hours a day and half-pay and that doled out quarterly, he still had a strong fellow feeling with the great company of turkeys which, at this season, were being regally fed and pampered, but where will the turkeys and himself be in January 1927. Echo answered "Where?" Seriously, however, "friends are the flowers in life's garden," and he intended to cultivate those who had taken root in his life for so long as life was spared to do so.

If there was anything to complain of in the life here it was an absence of thrills. Apart from the Saturday morning when the Germans bombed us so that with our backs to the lower corridor walls we thought with each reverberation our upper floors had gone west, one's experiences in such a sea of courtesy and kindness were on the placid side. This was far from being the case of the telephone pioneers in the early eighties. Those were hard-up exciting days. No A.G.D. to pay your salary into the bank with Income tax painlessly subtracted. On Wednesday it was often difficult to see the cash for Saturday's pay roll in the offing. One week-end the skies were blacker than usual with the Company operating in the West and South-West of England and South Wales. Unless more capital could be secured and that mighty quick the fascinating business would be punctuated with a full stop. On arriving at the Bristol Office on the Monday morning the indefatigable General Manager's first anxious question was "Any applications in to-day Prout?" The reply was "None, Sir, but there is a man who has lots of money if only he would let us mind some of it for him." "Who is he and where is he to be seen?" His name is Mr. B— and he lives at P— where the railway ends." "Get me a Bradshaw and pick me out a night train." Away the brave man went with so slender a clue, and puffing the biggest cigar procurable in those days. The financier was found, the romantic new instrument explained and eulogised, he was invited to test it as the "Emperor of Brazil" had done in America a few years earlier when he exclaimed "my God it talks." In the "Delectable Duchy" in the eighties, what was not done to-day could be done to-morrow and if not done this week it could be done in the next, but the farseeing financier saw truly the potentialities of the invention and agreed to invest many thousands of pounds in the concern, and we all lived happily ever afterwards. The ship was salvaged once more. The Captain was given £100 by the Directors and the boy an increase of salary.

The never ceasing hunt for bold infringers of Bell's and Edison's precious patents afforded thrills and dangers galore for years on end. The thrill of talking from Teignmouth to London on a Sunday in the eighties over a single iron telegraph wire lent for the purpose by the Great Western Railway, was of the same order as that felt on a Sunday in 1926 in speaking for the first time from London to New York largely without wires.

Putting on one side the past, the most frequent question now was "Well, Father Prout, how are you going to spend your time without your blessed telephones?"

Ignoring for the moment the possible problem there may be in "How to live hilariously on 24 hours a day on half-pay and that in quarterly doles," the prospect was alluring. Fond as he was of agriculture he was not conscious of having yet sown his wild oats. Devoted to cricket and football he had yet to pay his first visits to Lords, The Oval, Twickenham and Richmond. Then there was golf which, regarded either as a disease or a career, certainly could involve a full time occupation. Smoking seemed a possibility. It was 50 years ago since he had smoked his first cigar. On the strength of to-day's draft he had just purchased a small box containing no less than 48 matches which, if draughts are avoided might suffice to ignite the 10 cigarettes just purchased from a Nottingham firm named Player. What too, of drawing, painting and photography. And as for reading, after 50 years practice, there were the works of Stevenson, Dickens, and Scott crying aloud from the bookshelves to be read and enjoyed. There were those Treasure Islands to be visited, great expeditions and romances of the first water looming ahead. Every Wednesday there will be the P.O. Circular and *Punch*. "Who could be dull?" To fill up interstices of time he had first joined a new Bowling Club. And if multitudinous occupations failed what was wrong with leisure, was not that worth struggling to achieve.

W. H. Davies, the poet, was probably right.

"What is this life if full of care,
We have no time to stand and stare,
No time to see in broad daylight
Streams full of stars like skies at night,
A poor life this if full of care
We have no time to stand and stare."

Mr. Prout concluded by saying that he had experienced at the G.P.O. the truth embedded in some doggerel lines in a recent number of *Telephony*,

"An office can become in time
To man, and girl, and boy,
A certain kind of fellowship,
And work a certain joy."

OVERSEAS COMMUNICATION—ITS ORIGIN AND DEVELOPMENT.*

BY H. G. SELLARS.

ACCUSTOMED to the general and common use of the telegraph and telephone, the present generation is prone to forget the origin of these two means of communication and the difficulties which had to be overcome before their present standard of efficiency was attained. The ordinary citizen, to whom the transmission of messages by the medium of electricity is still somewhat mysterious; the engineer, who is continually striving to improve on the methods of his predecessors; and the operator, who carries out his, or her, daily task of manipulating the apparatus and makes excursions into the realms of theory with a view to obtaining technical certificates, are equally unmindful. Only on rare occasions do we throw our minds back over the past centuries, and endeavour to realise what the world was like before the ingenious apparatus, with which we are all familiar, became commonplace. The antiquarian, the curious, the amateur, and the expert will, therefore, not consider the time wasted if an attempt is made to examine, briefly, some of the data which will indicate the hopes, expectations and realisations of those who have contributed to the establishment of the world-wide system of communication which we enjoy to-day. It may be postulated without fear of contradiction, that the need for communication has existed as long as man has inhabited this globe. The desire to keep in touch with those setting out on a journey must have always been present, even if the imagination were not sufficiently developed to render the wish articulate.

The women of the Palaeolithic, Neolithic, Bronze and Iron Ages, watching their men leaving to face unknown perils; the dependents of those whose valiant deeds are told in Homeric epics; wives bidding farewell to the Greeks and Romans who left their countries on foot or by galley to conquer new worlds; spouses of Crusaders leaving for the Holy Land; the loved ones of all who have had to leave their homes, prior to the 18th century, would have been spared much of the anguish of parting, and the constant anxiety which prevailed until the travellers returned, if the facilities of which we now speak so glibly had been available. The necessity for communication has its roots deep down in the sentiments and psychology of mankind, and there is no doubt that attempts have been made from the earliest times to find means to satisfy the innate craving for news of distant friends, for the mental support which the reception of tidings brings, or for the furtherance of plans which may be necessary for mutual well-being.

EARLIEST METHODS OF COMMUNICATION.

To meet the multitudinous desires of human intercourse many ideas have presented themselves and innumerable methods have been tried. Fires and lights were, no doubt, used quite early in Man's career to convey information of various kinds. Beacons were lit on hilltops, or torches were waved to carry messages of goodwill or warning. In the shadowy records of Babylonia we read the charming story of the god Bel causing a rainbow to appear in the sky as a pledge to Khasisadra (or Xisuthros) that the deluge, which his ark had just survived, would not occur again. At a later period we are told, in early Jewish history, of the pillar of fire and the pillar of cloud, which served to direct the movements of the Israelites proceeding from Egypt to Canaan, and to indicate Divine presence. In connexion with our own country the story of the transmission of the news by beacon fire of the arrival of the Spanish Armada in 1588 springs readily to the minds of all of us. These cases, widely separated in time, and differing in circumstance, are excellent illustrations of the visual means of conveying information to a great distance, and over a wide area.

There is no doubt that on innumerable occasions, in the dim past, fire and light, used in various ways, have proved to be efficient news carriers and, as we know, lamps, rockets, and searchlights, are still extremely serviceable.

Another visual means of communication was that of flags, which, after being utilised in the British Navy since the thirteenth century, was systematised about 1665, when Sir William Penn (1621-70) drew up a code of signals. This was used until the end of the war with America, when M^r Arthur improved upon it by including several flags in the same hoist. About the same time Lord Richard Howe (1726-99) devised a similar arrangement and the advantages of each were combined, twelve flags being brought into operation. In 1805 Admiral Sir Home Riggs Popham (1762-1820) introduced the system which formed the foundation of the present international code, consisting of 26 flags and pennants, of various colours and patterns.

Sound also has been pressed into the service of mankind. Turning again to Jewish history we find that Moses received Divine instructions to make two trumpets to be used for calling the people together for peaceful, religious, or martial purposes. Trumpets, or bugles, fashioned from the horns of animals, drums of crude or elaborate manufacture, and metallic instruments have all been used as occasion demanded and ingenuity prompted.

Bells, of course, have been used from the earliest times to disseminate information, e.g., Lucian, born about A.D. 125, mentions the marking of time by means of a bell. In A.D. 400 Paulinus, Bishop of Nola, introduced

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

them into Christian churches, and in A.D. 1068 the ringing of the curfew bell at 8 p.m. informed all Englishmen that fires and lights must be extinguished. In A.D. 1282 the vesper bell was the signal for the butchery of eight thousand Frenchmen, and, in 1572, the massacre of St. Bartholomew was started by the ringing of the bells of St. Germain l'Auxerrois. As a set-off against the murderous use of bells demonstrated by these two events, one might refer to the humane practice of placing bells on rocks and buoys, and the consequent saving of thousands of lives by the conveyance of their warning notes.

The invention of gunpowder by Schwarz in 1320, and the introduction of small-arms in 1471, rendered it possible to convey signals to greater distances than had been practicable previously, and, about the year 1780, the British Rear-Admiral Kempenfeldt (1718-82) introduced a system of communication by guns which was improved and adopted in 1785 by Lord Richard Howe, First Lord of the Admiralty.

Whistling with the mouth has for centuries been the means of communication between the natives hunting in the Andes, and, as we are all aware, sirens are used on modern vessels and locomotives to give certain information.

Leaving the question of utilising sound for the purpose of communication, we must revert to visual signals, because, prior to the introduction of the electric telegraph, sight reading was the method of which the Government and the public made the greatest use. The British naval authorities, always interested in signalling, placed on the roof of the Admiralty towards the end of the eighteenth century the shuttle telegraph, which had been invented by Richard Lovell Edgeworth (1744-1817) and, by relaying the signals, kept in touch with the Dockyard at Portsmouth. In 1794 a Frenchman named Chappé introduced the semaphore, and in 1795 it was adopted by the British Government. Three pairs of movable arms were used originally, but this number was reduced to two and finally (in 1847) to one. James Henry Leigh Hunt (1784-1859) writing in 1835, and 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."

The success of the Admiralty optical signalling station led certain enterprising individuals to provide public facilities, notably a London merchant named Watson, who erected a station at the top of a shot tower near London Bridge for the purpose of communicating with Deal. This station had a very short life, being burned down in 1843. Semaphores, of course, could only be used advantageously when visibility was good, and their supersession was a very welcome event.

ELECTRICAL DISCOVERIES.

While ingenious minds had been employed in devising mechanical methods of communication, others had been fired with the idea of utilising the powers of electricity to attain a similar result, and when the Admiralty semaphore was dismantled in 1851 it was possible to connect that office with Portsmouth by means of nine lines of electric telegraph. Let us follow the laborious steps of the inventors whose experiments made such a result possible.

In one respect, at least, electricity occupies an unique position—it was not used by the Chinese two or three thousand years ago. It is claimed, however, that their Emperor Hoangti constructed a mariners' compass about the year 2634 B.C., a declaration which implies that he had unwittingly detected the earth's magnetic force and thereby anticipated the discovery of the lodestone by Roger Bacon in 1267, and the compass introduced by Flavio Gioja in 1302. Thales, father of Greek philosophy, is said to have known the electrical properties of rubbed amber in 600 B.C., but no progress appears to have been made in this branch of science until Roger Bacon (1214-1294) published his discoveries, which led to an accusation of dealing in magic, and to his banishment from England. In 1600 Dr. William Gilbert (1540-1603) gave the world his theories on magnetism and electricity, and is said to have invented the terms "electric force" and "electricity." His name has since been adopted to indicate the unit of magneto-motive force. About 1650 Otto von Guericke (1602-86), of Magdeburg, invented an electric machine and conducted experiments in electro-statics. The electrical condenser known as the Leyden jar was discovered by Musschenbroeck in 1745, and this led Benjamin Franklin (1706-90) to investigate electricity and its place in nature. Aug. 5, 1747, is an important date in the history of telegraphy, for on that day Dr. Watson proved that electric current could be transmitted through a wire using the earth for the completion of the circuit. It soon became evident that research should be carried out on co-ordinated lines, and in 1767 Dr. Priestley suggested the formation of an Electrical Society, but it was not until 1837 that the London Electrical Society came into being, with William Sturgeon (1783-1850) and Gassiot as the President and Treasurer, respectively. In his inaugural address, Sturgeon said that the preceding forty years had been more productive of electrical discovery than all the antecedent centuries. This conclusion was undoubtedly correct, as will be seen by a brief recital of the names of those who laid the foundations of the science which was to become so beneficial to man. Henry Cavendish (1731-1810) carried on research work about the year 1775, while Charles Augustin de Coulomb (1736-1806) invented the torsion balance for measuring electrical attraction in 1779. In 1789 Luigi Galvani (1737-98) made various electrical experiments and in 1800 his fellow-countryman, Count Alessandro Volta (1745-1827), introduced the electric battery. André Marie Ampère (1775-1836) demonstrated the relation between magnetism and electricity in 1820 but it was not until 1825 that William Sturgeon produced an electro-magnet. In 1831 Michael Faraday (1791-1867) published his discovery of magneto electric induction. Useful work was done by Karl Friedrich Gauss

(1777-1855) who, in conjunction with Wilhelm Eduard Weber (1804-91) erected a magnetic observatory at Göttingen and formed a Magnetic Association, while Eduard Friedrich Weber (1806-71), brother of the latter, devoted himself to magnetism and electro-dynamics. Women have been conspicuous by their absence from electrical research work, but it must be mentioned that about this time, viz., in 1834, Mrs. Mary Somerville (1780-1872) published her work on "The Connection of Physical Sciences." In 1834 Sir Charles Wheatstone (1802-75) determined experimentally the velocity of electricity, and in 1843 introduced instruments for measuring the constants of a voltaic series. He did not actually invent the apparatus known as the Wheatstone Bridge, but was instrumental in bringing it to public notice. In 1845 Sir William Thomson (afterwards Lord Kelvin) published his work on the laws of electro-statics and gave his attention to electro-dynamics. Sir Charles Tilston Bright (1832-98) in 1852 patented a new system of winding coils for obtaining a greater determination of polarity, while James Prescott Joule (1818-89) dealt with the magnetisability of iron, and the quantity of heat due to the passage of a current. Georg Simon Ohm (1787-1854) established the fact that the strength of the current in a circuit varies directly as the electro-motive force and inversely as the resistance, and his fellow-countryman, Gustav Robert Kirchhoff proved that current divides between circuits in parallel, in direct proportion to their respective conductances. Time will not permit a fuller reference to the work of the foregoing scientists, or the mention of many others who followed in their footsteps. In 1861, as the sequel to a letter written to Professor J. Clark Maxwell some months previously, Sir Charles Tilston Bright and his partner, Latimer Clark, pointed out to the British Association the desirability of establishing a set of standards of electrical measurements and, following the discussion, a committee was formed to determine a rational system of electrical units, and to construct an equivalent standard measurement. The members were Professor Williamson, Sir Charles Wheatstone, Sir William Thomson, Miller, Clark Maxwell, Dr. Matthiesen, Fleming Jenkin, Sir Charles Bright, Dr. J. P. Joule, Dr. Esselbank, Balfour Stewart, C. W. Siemens, G. C. Foster, D. Forbes, C. F. Varley, Latimer Clark and Charles Hockin. The work of the committee was finished at the end of 1869 and, as a result of its labours, we have a system of electro-magnetic units—an arrangement which was confirmed by the International Congresses held in 1881 and 1908. The names of great pioneers have been identified with the nomenclature of these electrical units and standards. We have Gilbert, the unit of magneto-motive force; Oersted, the unit of reluctance or magneto resistance; Coulomb, the unit of quantity; Volt, the unit of electro-motive force; Ampère, the unit of electric current; Farad, the unit of electrical capacity; Gauss, the unit of magnetic intensity; Joule, the unit of electrical work; Ohm, the unit of electrical resistance; Mho, the unit of conductivity; Maxwell, the unit of magnetic flux; Henry, the unit of inductance; and Watt, the unit of rate of work. To these must be added Galvani, who gave his name to Galvanism, and Lenz and Kirchhoff, whose "laws" are continually being quoted. Members of the Telephone and Telegraph Society of London will agree that no better method could be devised for honouring and perpetuating the memory of some of our greatest electrical authorities than that of embodying their names in the terms which are in everyday use by electricians throughout the world.

PRODUCTION OF ELECTRICAL POWER.

The theories of electricity having been established, it was necessary to produce the power, and scientists of all nations worked hard in that direction. Otto von Guericke in 1650, Volta in 1775, and Pacinotti in 1860 produced electrical machines, their efforts being emulated by Holtz, Bertsch, Carré, Voss, Winshurst, &c. Galvani, Volta, Clamond, Planté, Leclanché and others studied the means of producing electricity by batteries and other methods. John Frederic Daniell (1790-1845) invented the battery known by his name and Latimer Clark introduced a standard cell composed of platinum, zinc and mercury. The storage of electricity occupied attention and in 1860 Gaston Planté invented the first lead cell, which was the forerunner of our secondary cells. Metzger in 1878, Faure in 1880, Gladstone, Hart, Tribe and Bright contributed the results of their ingenuity. Much literature has appeared on this subject and some of the most useful has been produced by practical men well known to this Society, e.g., T. F. Purves, W. Perren Maycock, J. G. Lucas, W. R. Cooper, A. Fraser, H. H. Harrison, &c.

The Leyden Jar demonstrated the value of condensers, and Franklin, Fizeau, and many others, laboured to produce apparatus of suitable form. In 1900 G. F. Mansbridge patented an ideal condenser, in which tinfoil paper took the place of metallic foil and paper.

TESTING APPARATUS.

Testing of batteries, lines and apparatus was, of course, found to be necessary. In 1849 Sir Charles Bright devised a system for locating line faults from a distant point, while Varley, Pomeroy and Eden suggested other means. Lord Kelvin, who solved the mathematical problem of the propagation of currents in telegraph cables, invented a method of measuring the resistance of a battery. Rayleigh and Crompton found means of measuring electro-motive force. Preece calculated the current necessary to fuse wire, and Glover worked out the resistance of various metals. Dr. Muirhead, Fleming, Kempe, Pogendorf, Mance and Maycock have dealt with various phases of the subject. Mention must be made of a very useful piece of apparatus used when testing, viz., the galvanometer, an instrument in which an indicator needle is deflected in response to the current passing through the adjacent coil or coils. Reference will be made later to the discovery of this phenomenon. Galvanometers were produced by Schweigger, Spagnoletti, Melloni, Wiedemann, Helmholtz, and others, but the most ingenious was the reflecting galvanometer invented by Lord Kelvin and based on an instrument utilised

by Gauss and Weber at Göttingen in 1833. It consists of a coil of wire in the centre of which is a copper tube from which is suspended a small mirror, upon the back of which are fastened two or three pieces of magnetised steel. A beam of light is directed by a lens on to the mirror, the reflection from which moves along a scale in accordance with the movements of the mirror caused by the current in the coil. The copper tube was intended to retard the oscillations of the mirror. D'Arsonval, Ayrton Mather and Crompton galvanometers are variations of Lord Kelvin's instrument.

PROVISION AND MAINTENANCE OF LINES.

Before dealing with the many types of signalling apparatus which have been utilised we might usefully direct our attention to the question of wires. The provision of overhead lines presented little difficulty, insulators of various kinds, particularly the double-shed insulators of Bright and Cordeaux, rendering insulation fairly easy. Underground wires, however, opened up a difficult problem which was tackled as early as 1795 by Don Francisco Salva, who suggested to the Barcelona Academy of Sciences that wires could be covered with pitch-coated paper and laid underground, or under water. In 1843 Dr. Montgomerie, of the Indian Medical Service, had submitted samples of gutta-percha to the Society of Arts and, in 1847, Faraday suggested its use as an insulating medium. The idea was adopted by Dr. Ernst Werner von Siemens (1816-92) who constructed the first telegraph line in Germany. In 1851 and 1852 underground cables were laid from Dover to London and thence to Birmingham. In spite of the protection afforded by troughs and tarred yarn, however, the gutta-percha became desiccated and the lines were placed on posts. Since that date insulating media of various kinds have been brought into use, and perfection may be said to have been reached. It may be interesting to mention here that the longest span of overhead wire used for telegraphic purposes is nearly $1\frac{1}{4}$ miles in length and spans the River Kistnah (India) at a height of 1,200 ft., while the longest submarine cable is that running from Vancouver to Fanning Island which is 3,458 nautical miles in length.

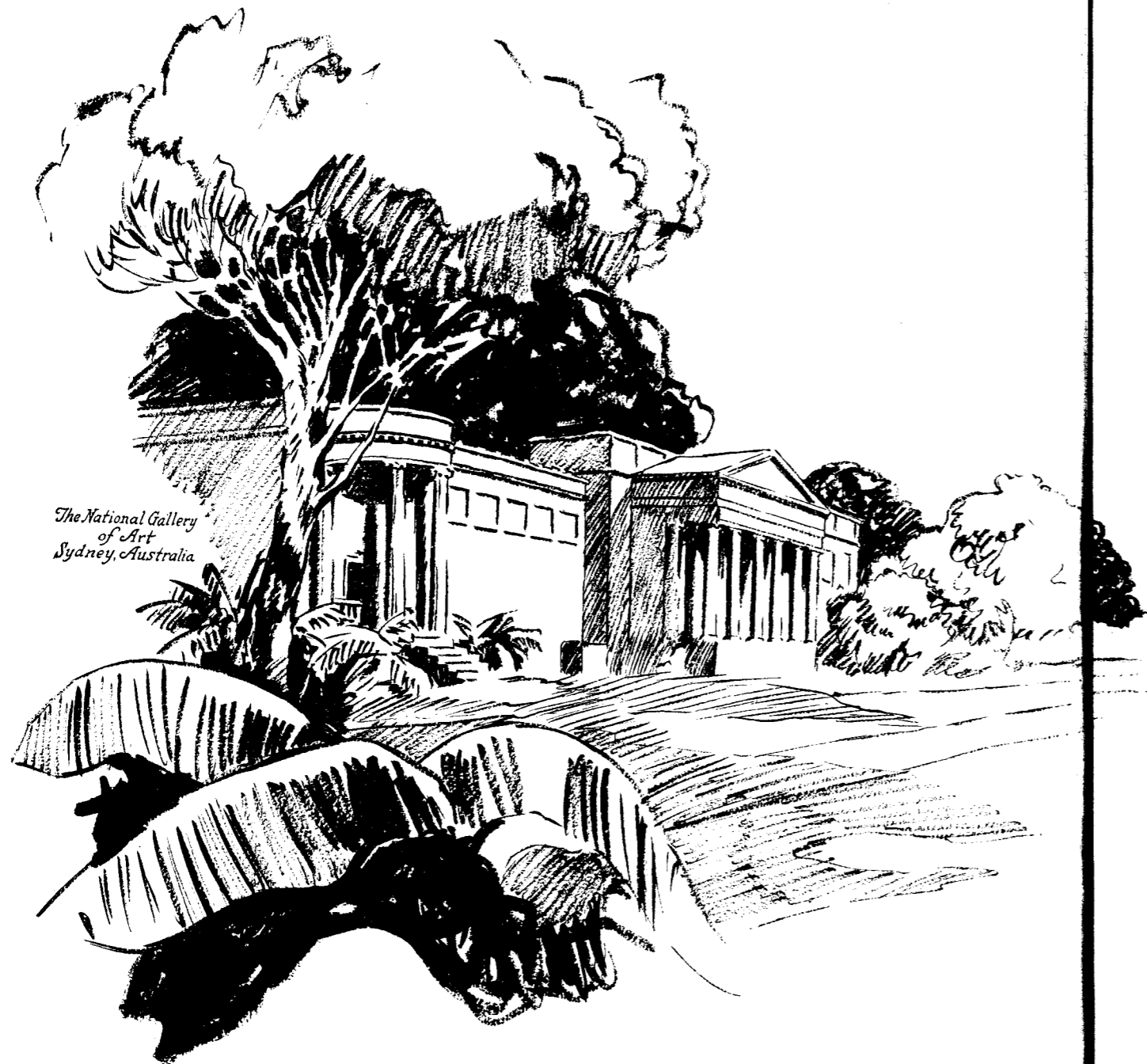
At an early stage in electrical telegraphy it was found that induction took place in wires running along the same route, and, in 1879, Professor David Hughes (1831-1900) suggested to the Society of Telegraph Engineers and Electricians that this could be obviated by twisting the wires. M. Brasseur, of Belgium, supported this idea in 1881 and the system has been extensively adopted.

ELECTRICAL SIGNALING APPARATUS.

The great electrical discoveries of the early eighteenth century led to numerous devices for telegraphing electrically being proposed by experimentalists domiciled in all parts of the world. Inventions followed each other with astonishing rapidity.

In 1753, Charles Morrison, writing in the *Scots Magazine*, suggested an insulated wire for each letter of the alphabet the words to be spelled by passing a current, or charge, along the appropriate wire. This system was tried and worked to a small extent by Lesarges at Geneva in 1774, but its slowness, and the number of wires involved, rendered it impracticable. In 1787, 1790, 1809, 1810 and 1816 ingenious but cumbersome methods of communication were tried by Betancourt, Chappé, Soemmering, Schilling and Sir Francis Ronald, respectively. In 1819, however, existing ideas were revolutionised by the Danish professor, Hans Christian Oersted (1777-1851) who ascertained that a needle could be deflected by the current passing through an adjacent coil or conductor. Following this idea, Ampère, in 1821, prompted by Laplace, suggested that a telegraph apparatus might be constructed composed of needles which, deflected in certain directions, would indicate different letters of the alphabet. At Heidelberg, in March, 1836, Sir William Fothergill Cooke (1806-79) saw a pair of needles fitted up in a manner similar to that proposed by Laplace and Ampère, and, at a later date, showed Michael Faraday an apparatus which he had constructed for the directors of the Liverpool and Manchester Railway. He met Sir Charles Wheatstone (1802-75) subsequently and, in June, 1837, joined him in patenting an instrument with five vertical needles on horizontal axes which necessitated the use of five wires. To carry out experiments lines were laid between Euston and Camden Town and, on the evening of July 25, 1837, Wheatstone and Cooke, accompanied by Brunel and Stephenson, demonstrated the practicability of the electric telegraph. Afterwards a two-needle apparatus was used and finally in 1845 it was found possible to use only one needle. This was controlled in a manner already suggested by Schilling, viz., by reversing the direction of the current in the adjacent coils, of which there were several patterns, e.g., those of Neale, Spagnoletti, and Varley. In 1832 Samuel Finley Breese Morse (1791-1872), while returning to America, had conceived the idea of recording telegraph signals, and before he left the ship the telegraphic system of dots and dashes known by his name was practically complete. This code was used on the single-needle instrument, beats to the left and right representing dots and dashes respectively. Used on the railway at first, the utility of the telegraph soon rendered it necessary to give facilities to the public, and, in 1845, the first line of Cooke and Wheatstone's telegraph was opened between London and Southampton. In the same year a game of chess was played by telegraph between London and Gosport, and the first newspaper report sent by telegraph appeared in the London *Morning Chronicle*. In 1854 the single-needle system was displaced to some extent by the bell sounder introduced by Sir Charles Tilston Bright (1832-98) which produced two sharp different sounds representing dots and dashes to the receiving operator. Professor Morse, in his report on the French International Exhibition of 1867, referred to Bright's Bell Sounder as the "fastest manual telegraph." This can be readily understood when it is remembered that the operator reads by two distinct sounds and the dashes are of the same length as the dots.

(To be continued.)



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

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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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ANOTHER YEAR'S PROGRESS.

THE year 1926 has seen a remarkable increase in the number of telephones in Great Britain. The million and a half mark has just been passed, whilst in the London area alone the half-million was reached in July last. The full returns for December are not to hand at the time of writing but the total number of telephones in the country at the end of last year may safely be put at 1,507,000, an increase of 148,000—the largest yet recorded—on the figure for 1925. This represents a percentage increase of 10.8, and brings the proportion of population to telephones down to 29. The number of new exchanges opened during the year was upwards of 170.

The telephone year has been signalled by the laying of a third Anglo-Dutch cable containing 12 additional circuits, and of a new Anglo-Belgian cable containing 21. During the year, too, public telephone communication was established with Germany, at first with Berlin and Hamburg only, then gradually extended to all parts of the Reich. Most interesting of all, perhaps, of the year's news is the fact that successful speech-trials were made by wireless between London and New York, resulting in the recent announcement that a public service will be offered early in the New Year.

The story of the telegraph service during the past year is like the curate's egg. In one respect it has been a notable year for

it saw the debut of Beam Wireless, the latest manifestation of Senatore Marconi's genius. The very efficient service which has been established by this means between this country and Canada is to be followed soon by similar means of communication with the other Dominions, and we may hope that this Empiradio service will add not only to the credit of the British Post Office—which, though important enough to us, is a comparatively small thing in the greater issues—but to the cohesion and welfare of the Empire. It is worth mentioning in this place that the number of Imperial Christmas Greetings transmitted by the Imperial Cables and the Beam Wireless have practically doubled in comparison with last year.

The past year has not witnessed the removal of the blight which has for so long lain on the traffic of the inland telegraph service, but such a year, with its industrial troubles of unprecedented magnitude, gave the inland service no opportunity to raise its head. The new year opens with the prospect of greater industrial stability and activity and we hope that, at its finish, it will have proved to be a prosperous one in all respects.

"PIRATES."

THIS article does not profess to deal with the delights of "Treasure Island" or the hidden gold and jewels of the Caribbean Seas. Still less with the transmogrified cellars of the great west-end stores, the bazaars established during the Christmas season for the great and noble purpose of extracting the shy and crumpled Treasury note from the reluctant hands of young and old alike. Some of those past the rosy glow of youth may think and even say that the Christmas season is one sustained unlicensed orgy of piracy; but we won't waste our time and sympathy on such debased souls.

What really gave occasion to this note is the Press statement that a great wave of crime has now spread like a plague over our law-abiding fellow citizens. The law says you may not use wireless receiving apparatus without a licence, and we know from the frequent records of prosecutions that there are some folk who regard the law generally as a "hass" and this law in particular as not applying to them. They call such folk "pirates" because, forsooth, they take without paying and often as "oscillators" spoil what they do not consume. But the percentage of "pirates" to "honest citizens" cannot surely be so high as the Press claims. We have seen the number given as anything between half a million and seven millions. Just think what that means! There are something over two million licensees and we are told that at least 20% as a minimum and 80% as a maximum of the total number of listeners are "pirates." Frankly, we do not believe it; even in these days of cat burglars and motor getaways, it is too much to swallow, and we are reminded of Grimm's fairy tales and the black expectoration which ultimately became a flock of crows. Rumour is always a lying jade.



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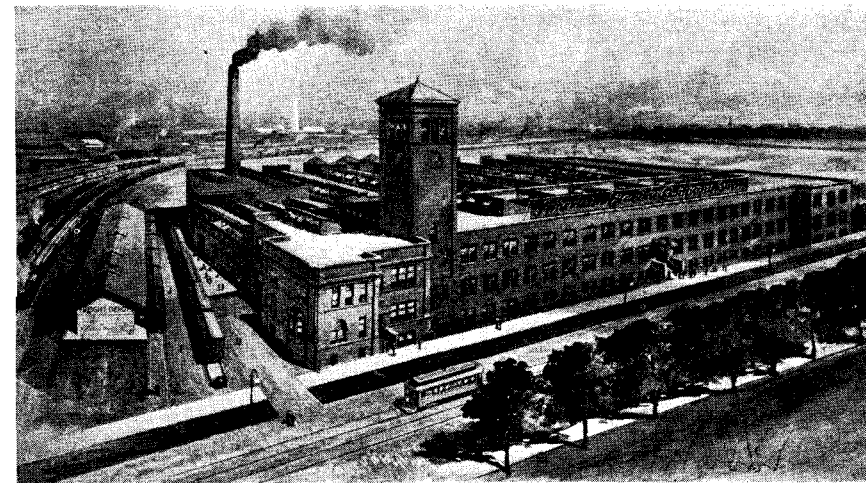
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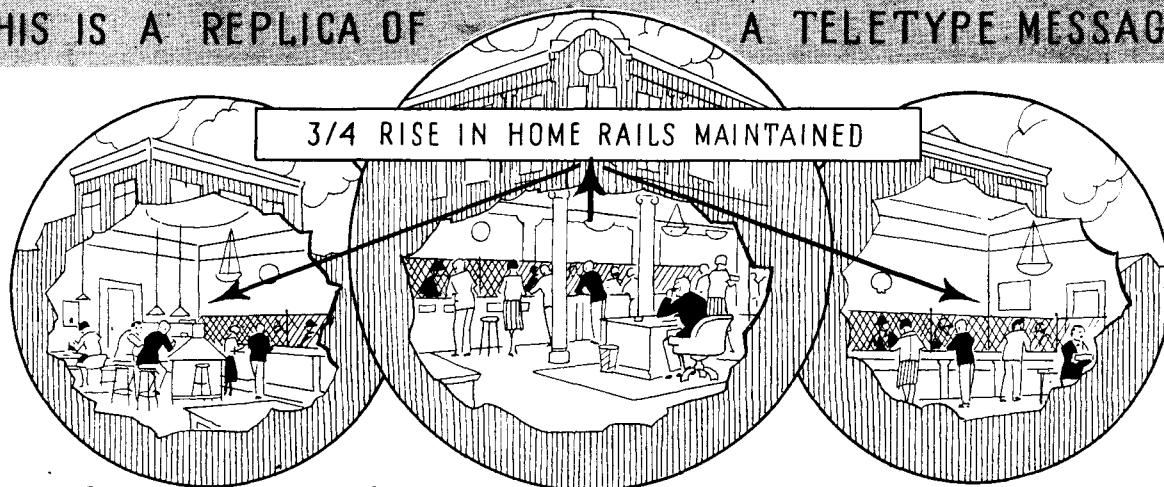
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SOLE AGENTS:

Standard Telephones and Cables Limited

Connaught House, Aldwych, London, W.C.2.

Central 7345 (10 lines).

TRANSATLANTIC TELEPHONY.

THE Postmaster-General announced on Dec. 28 last, that in view of the satisfactory progress being made in the experimental development of Transatlantic telephony, it was hoped to open a preliminary public service with the New York telephone area early in the present month.

Calls will be accepted for a *particular person*, if so desired, in which case the name of the person required *as well as* his usual telephone number and the name associated with this number in the Telephone Directory should be given. If the person asked for is not obtainable, either at his own telephone station or at some other telephone station in the New York area, the calling subscriber will be asked whether he wishes to speak to another person at the telephone station designated. Details as to method of booking calls will be announced later.

The charge will be £15 for a conversation of three minutes and each additional minute above the first three will be charged at £5. In the present stage of technical knowledge, there will be occasions, more particularly in the late afternoon, when atmospheric

conditions will prevent effective conversation; and allowance will be made in charging for individual calls when the conditions have been difficult.

In the case of a "particular person" call, the normal charge will not be levied unless effective conversation is actually offered between the calling subscriber and either the particular person asked for or a substitute accepted by the caller. When communication with the number required is established, but neither the particular person required nor an accepted substitute is obtainable, a Report Charge of £2 will be made in place of the normal charge. When communication with the number is not established no charge will be made.

The period allowed on any individual call will be limited to 12 minutes when there are other callers waiting to use the service. Time in excess of 3 minutes will be charged at the rate of £5 per minute.

It is hoped to issue a further notice in the first week of January.

PHANTASY AND FACT.

THE sweeping criticisms of telephone affairs which are made by those who have only the vaguest and most precarious grasp of any relevant facts or figures are often truly astounding. A writer in a well-known London evening paper recently said: "I see that the Postmaster-General announces with something of a flourish that there are now over 515,000 telephones in the London area. But, as there must be a dozen of second-rate cities in America with more than that, the figure only serves to show the leeway we have still to make up."

In the light of cold fact, the dozen second-rate cities in America dwindle down to two, viz., New York and Chicago. We hope that those flourishing villages will like the adjective with which our light-hearted critic has honoured them. These two cities, it may be added, are the only ones, not only in America but in the world, which have more telephones than London.

HIC ET UBIQUE.

By a printer's error in Mr. Archibald's "Notes on Telegraph Practice" in the December issue the third paragraph from the bottom (page 42, second column) reads "delivery by telephone was uneconomical." It should read "was economical only if a telegraph or telephone retransmission is saved," &c.

We quoted in our last issue a report of the Department of Overseas Trade in which it was stated that the number of telephones in Germany had increased at the end of January, 1926 by 11.2% compared with the year before. It is difficult to reconcile this figure with the official statistics at our disposal. We have not indeed, the figures as at Jan. 31, but the increase in telephone development in Germany during the year ending Dec. 31, 1925, was at the rate of rather more than 8%, and during the year 1924 at the rate of 6.5%.

A paragraph in *Telephony*, of Chicago, states that a report of the Japanese Government shows that there are approximately 400,000 telephones in that country. Official figures supplied to the British Post Office show that there were 573,144 in 1924. The official *Statistique Générale*, published at Berne, shows 544,540 for the same year, and the American Telephone & Telegraph Co.'s statistics for 1924 (based on official information) give 544,433 (excluding 23,800 temporarily out of service as the result of the earthquake). Truly, the way of the statistician is hard!

A development of significance for British manufacturing interests, according to *The Times*, is involved by the purchase of the control of the British Columbia Telephone Company, one of the most flourishing telephone concerns in Canada. In fact, British Columbia is telephonically the most highly developed Province in the Dominion. The buyers are a holding company (the Associated Telephone and Telegraph Company) which includes Theodore Gary & Co., the International Automatic Telephone Company, British Insulated Cables, Cables, Telephones & General Trust, and Siemens Brothers & Co. It is understood the British Columbia Telephone system is now going to be converted to an automatic system, and this must obviously lead to the International Automatic Telephone group having the important business of carrying through the conversion. For some time past determined attempts have been made to acquire control of telephone companies abroad for the purpose of transferring valuable manufacturing

business pertaining thereto to factories on the continent of Europe and elsewhere, which owing to exchange conditions and cheap labour are able to quote competitive prices for supplies. The British Columbia Telephone acquisition is a direct answer to these attempts to cut into British export trade. By reason of the operation of Imperial preference it may be anticipated that all new apparatus and supplies will be furnished by Canadian and British manufacturers.

A Manchester paper says that Father Ronald Knox can recall telephoning from Manchester to London in order to find out whether the telephone, *then a new toy*, really worked. As a matter of fact, however, the telephone was long past the "new toy" stage before communication between London and Manchester was obtainable, which was not until 1890.

A correspondent of the *Times* says:—

"Including the rent for the telephone, the charge for 76 local calls by me during one quarter comes to £2 6s. 4d., that is to say, over 7d. per call, whereas I could have made calls at a public call office for 2d. each!"

The writer does not seem to realise that the difference between the two facilities is much the same as that between having a car of his own and employing an occasional taxi.

The Annual Prize Distribution and Students' Conversazione of the Northampton Polytechnic Institute was held on Dec. 3. Mr. W. H. Webbe, C.B.E., Chairman of the Education Committee of the London County Council, distributed the awards and gave an address.

The Conversazione was continued on the following Saturday, when the building was thrown open to the whole of the members and students and their friends.

We wish all our readers at home and abroad a Happy and Prosperous New Year.

J. J. TYRRELL—AN APPRECIATION.

It is not for the present writer to attempt a biographical record of a member of the Editing Committee of this *Journal* who left us at the end of last year, nor yet to appraise his great services both to the Central Telegraph Office and to the *Journal*. But perhaps I might set down, for what they are worth, the impressions of one who had the honour and the good fortune to be brought into fairly close contact with him during the last twelve months of his official career.

The dominant impression is one of keenness and hopefulness. A novice entering the Post Office after the war might well suppose, from conversation with men of Tyrrell's age, that the Post Office passed through its Golden Age somewhere in the nineties, an age when men were absorbed in their work and indifferent to their pay; that a Silver Age lingered on until 1914 or thereabouts; but that in these decadent days the only thing left was to mourn the glories of the past and to try to prevent the spark that might still remain from dying out altogether. He would suppose that of all the sides of Post Office activity, telegraphy was in the worst case, condemned as it was by the most eminent physicians, if not to extinction, to a lingering but inevitable decline.

But Tyrrell was never among the pessimists. He had been a telegraphist, man and boy, for forty-four years, and fervently believed in telegraphy. His confidence in its future was no less than his reverence for its past. He believed that if you turned it out at the door, it came in again at the window; you closed down the inter-communication switch to Balham, only to establish a wireless circuit to Montreal.

His pride and belief in his job is probably the reason why, despite his natural conservatism, he adapted himself so well to the startling developments of international telegraphy after the war. In the last ten years of his official career he must have had little leisure. He helped to found the fine tradition of the Imperial Cable Service, combining the old spirit of conscientious and accurate operating with a new spirit of commercial enterprise and competitive keenness. He fostered the wireless organisation of the C.T.O. from its almost helpless infancy to its present sturdy manhood; and it was good to see, in the press-photograph at the inception of the Canadian Beam service, that Tyrrell was in the centre of the group.

So boundless was his experience and so retentive his memory that we in the Secretary's Office, whether on the cable or wireless side, found him almost indispensable. We shall have to try to get along without him, and we should be false to his memory if we unduly mourned his loss. For after all his enthusiasm was infectious, and many were infected. The tradition which he absorbed and diffused will continue, and telegraphy will find other servants, though none more loyal and faithful. We wish him a good time in his retirement, where he will have some leisure to expand those other interests which are no secret to the readers of this *Journal* and *St. Martin's*; we hope that his recollection of his colleagues may be as pleasant as theirs are of him, and that, despite his modesty, he may sometimes be cheered by a merited pride in the good work he has done, and the fine example he has left behind.

W. D. S.

NOTES ON TELEGRAPH PRACTICE.

BY G. T. ARCHIBALD.

(Continued from page 43.)

XXIII.—Concerning Phonogram and Telephone-Telegram Equipment.

THE history of phonogram and telephone-telegram equipment lacks the glamour and romance of telegraph equipment and is soon told. It is nevertheless of considerable interest particularly in regard to the more recent development.

As has been shown, a 15 minutes quality of service is aimed at in the case of telegraph circuits; it is possible, therefore, to line up the traffic and to work any number of circuits justified on a transit time basis. The telegraphist is not brought into direct contact with the public except as regards the counter transaction, usually carried through without delay. The sender of a telegram so tendered knows that the message will reach its destination within a reasonable time, and he is not particularly interested in the process of transmission, &c.

The position is not quite similar where the acceptance of a phonogram is involved. Telephone subscribers are, naturally, impatient of delay in the acceptance of their demands and as telephonists cannot hold over even for brief periods calls which it is not possible to complete on demand it is necessary to provide phonogram circuits on a basis which will meet all reasonable requirements. Moreover, the Post Office urges telephone subscribers to rent sufficient lines to enable them to answer calls promptly, and it is, therefore, compelled to set an example in providing adequate circuit facilities for its own traffic. Accordingly it has been decided as a matter of policy that subscribers must not, except in very unusual circumstances, be told "Number Engaged" when they ask for "Telegrams."

The answer of a phonogram telephonist to a demand for "Telegrams" is equivalent to the answer of a called subscriber.

The standard speed of answer has therefore been fixed at 10 seconds. Without this period of what may be called permissible delay the phonogram service would be so costly as to be impracticable.

The phonogram equipment enables incoming calls to be held over, if necessary, for short periods so that the load may be distributed evenly over the working positions. The possibility that a phonogram operator will be at liberty to take a call during the permissible waiting period increases with the number of working positions in use; put in another way the economy resulting from the use of switching apparatus increases with the size of the installation.

Under the old Post Office system subscribers' telegrams were dealt with at the switch section and this method is still used in a few unimportant instances. The earliest definite phonogram equipment was a small concentrator switchboard with jacks and indicators (magneto or lamp) to which was led the necessary exchange lines and phonogram positions. All calls received were for "Telegrams" and there was no necessity for the switch operator to speak. Then, as now, direct telephone-telegram lines were also led to the switchboard and all calls were dealt with as far as possible in the order of calling, preference being given to telephone subscribers.

The concentrator type of equipment was in general use until quite recently. It was fairly satisfactory, but the switching load even during the busy hour was not generally sufficient to provide a full load for the operator who was, as a rule, expected to deal with a few phonograms or simple non-operating work. This arrangement is open to the objection that the operator's attention is divided between two kinds of work and it has been found in practice that it results in a definite loss of time in connecting and disconnecting circuits. Moreover the operator is more liable to make mistakes in the reception and dictation if she attempts to carry out her switching duties whilst engaged in the disposal of a telegram.

In order to overcome the difficulties created by the use of a switchboard and switching operator the whole question was carefully considered, and in 1920 a new type of board was tried at certain small offices. This consisted of a small lamp signalling switchboard with three positions, each telephonist being required to operate her own calls. Each operator has 2 ft. 6 ins. of table space in which to work and the panel is placed in the centre position.

Limitations of reach prevent more than three telephonists from working at a single switchboard and the logical development, the trial having proved satisfactory, was a form of ancillary equipment whereby the concentrator is duplicated for every three positions. Each calling signal is thrown up simultaneously on each ancillary panel and every operator is in a position to answer every call. It is possible that two or more operators may endeavour to take up the same call, but such cases are infrequent and, as the equipment is so arranged that only one operator can secure connexion with the calling circuit, no difficulty is experienced.

Outgoing circuits are included in every panel and in order that telephone-telegram circuits may be called, each operating position is equipped with a ringing key.

Operating positions are provided with head set, key and plug cord; the insertion of the plug automatically extinguishes the calling signal on every multiplied panel. In addition a holding circuit is fitted which enables the operator to ask any calling subscriber to wait for a moment. This type of apparatus has the positive advantage that it may be opened or closed position by position as the work demands and it is now the standard equipment for small and medium sized offices, i.e. offices requiring not more than 12 positions. The dimensions of the panel are $18\frac{1}{2} \times 6 \times 12\frac{1}{2}$ ins. There is, however, a tendency on the part of operators to sit close together with the result that there is greater liability to overhearing. This tendency can only be checked by careful supervision.

The most recent development of ancillary phonogram equipment is the continuous panel system designed for use at offices where

more than 12 positions are staffed during the peak period. The circuits are arranged over a continuous line of panels, each $8\frac{3}{4}$ inches in height by $9\frac{3}{4}$ inches in depth, along the operating tables. In effect, the arrangement is a five-panel multiple; each panel is one foot wide and the length of the multiple is equivalent to two operating positions.

The face equipment is divided into two portions. The upper portion carries outgoing circuits and the incoming and both-way circuits used during the day period; the lower portion is reserved for concentration during the slack hours. Operating positions are divided into suites of twelve. If, therefore, an installation comprises 36 positions, any calling circuit on the second and third suites can be reproduced on the lower portion of the first suite for concentration purposes. Outgoing circuits are located in the two upper strips of the top half of the panels; the incoming and both-way circuits are immediately below.

Each operating position is provided with:—

- (a) Two double-ended cords in order that calls for the Supervisor or for enquiries may be extended to the appropriate position. Thus an operator may continue to answer other waiting calls without delay.
- (b) A clearing signal and a speaking and ringing key for each pair of cords.
- (c) A transmitter cut out key and dialling facilities.

Facilities are available for dealing with outward traffic at every position.

The capacity of the multiple is 100 outgoing and 50 incoming circuits. Outgoing circuits are multiplied every two positions throughout the equipment and incoming circuits are distributed over the suites. It is in this direction that the continuous panel system differs from the three position panels upon which all circuits are multiplied throughout the equipment. Normally only 25 incoming circuits will be served from a suite of twelve positions; the circuits spread over the multiple, leaving alternate jacks and lamps out of use; thus five circuits will be accommodated on each panel. This arrangement restricts the number of calling circuits within the field of any one operator; the reason is perhaps obvious, but the fact should perhaps be recorded that it was found to be unnecessary and even undesirable to provide facilities to enable a particular call to be answered by one of 36 operators. Another advantage of this system is that each operator has ready access to a larger number of circuits than is possible with ordinary ancillary equipment. In the latter case two of the three telephonists operating at one panel are required to reach to an adjacent position for 100% of their calls whereas with the continuous panel system the majority of the calls are taken from jacks immediately in front of the operators.

Only three continuous panel equipments have so far been installed, one at Cardiff, one at Sheffield, the other at Manchester. The results so far obtained are entirely satisfactory: the speed of answer has been reduced by 25% at Sheffield and by at least 50% at Manchester. In due course, similar equipment will be provided at Birmingham, Bristol, Leeds, Liverpool and other large towns.

The use of automatic working has not been lost sight of but the available apparatus is not intended for "hunting" for a period for a disengaged circuit; moreover, there is no simple automatic device capable of making a selection over more than ten circuits. These difficulties could no doubt easily be surmounted; ancillary equipment is, however, comparatively cheap, simple in construction and inexpensive in maintenance and there is no real need at present to embark on experiments with automatic equipment.

Special inquiry and supervising positions are not provided for small phonogram equipments. At the larger offices a combined supervisor and enquiry desk is available and separate positions are or will be fitted at the largest offices. Circuits are arranged from these desks to the outgoing multiple of the phonogram equipment together with such other special circuits as may be required.

Steps are now being taken to instal observation boards in order that the working of the larger phonogram rooms may be thoroughly tested.

It should perhaps be mentioned that at the Central Telegraph Office, London, and a few of the largest provincial offices, band conveyors are provided to carry the traffic from the incoming positions to the circulation point. At the Central Telegraph Office a band conveyor is employed to distribute outgoing traffic. Disengaged operators are required to pick telegrams off the carrier and telegrams which have been circulated more than twice in this way without finding a disengaged operator are then specially distributed by hand.

(To be continued.)

REVIEWS.

"Questions and Solutions in Telegraphy and Telephony." *Grade I Examinations.* By H. P. Few. (Published by S. Rentell & Co. Sixth Edition. 350 pp. Price 6s. 6d. net.)

The first edition of this book was published early in 1909. Since then five additional editions have appeared, a testimony to the utility of the book to students, especially to those studying without the aid of a teacher.

It is an unfortunate fact, with which those who have had any experience with students are only too well acquainted, that frequently a man may really have a good knowledge of his subject, well above the standard required for the examination for which he is preparing and yet fail to pass from the want of that accurate and brief style which enables the candidate to answer correctly the necessary number of questions in the time allowed. The want of this style causes far more failures than actual lack of knowledge.

This book enables the necessary examination style to be easily obtained. The student can himself attempt the questions, and then compare his answer with that given. By systematic practice in this way, anyone with the necessary knowledge need no longer be afraid of the bog of the lack of ability to express himself in the examination room.

Full solutions are given to every question set between 1904 and 1919, and to those set in 1925. In order to keep the book within due bounds the solutions to the questions set in the years 1920 to 1924 have been omitted. This has enabled the present edition to be issued without a material increase in cost.

At the end of the book is given a selection of questions from the written examination for overseers and also a selection from the oral questions and practical tests set at the Departmental Examination for overseers and assistant superintendents.

The printing and paper are good, the diagrams are well drawn and clearly reproduced, and we can strongly recommend the book to all who are studying for the examinations with which it deals.

"Wireless Pictures and Television." By T. Thorne Baker. (Published by Constable & Co., Ltd. x + 188 pp. Price 6s. 6d. net.)

The subject of the electrical transmission of pictures, with its ultimate goal of television, is one which is of particular interest at present in view of the development during the last few years of the wireless broadcasting service.

We can now hear a theatrical performance which is taking place perhaps hundreds of miles away, but the full enjoyment of the play is prevented because the actors are not visible to us. If

we could see the stage as well as hear the words and music we should be able to enter fully into the performance.

There has been very little published in English on this subject, and consequently the book under review fills a noticeable gap in technical literature.

In the first chapter the elements of telegraphy and early attempts at picture transmission are dealt with. In the second chapter various light-sensitive cells are described. The next chapter deals with the different forms of galvanometer and oscillograph which are suitable for use as receivers for picture reproduction. In the following chapter the elements of the theory of photography are given, as far as they apply to picture transmission, and the next is devoted to certain miscellaneous devices.

The following five chapters contain descriptions of the various modern systems of picture transmission.

The ninth chapter deals with the wireless transmission of pictures, and the final chapter with the various methods by which the problem of television is being attacked, the measure of success which has been reached, and the lines along which future developments are likely to take place.

It will be seen that the book covers the whole ground, and it should be a useful guide to anyone wishing to take up the study of this fascinating subject.

We notice, however, several minor points which could with advantage be modified in a future edition.

The action of the system shown in Fig. 10 is not clear. A more explicit diagram is desirable.

On page 22 there is an error in dates. From the context either "1880" should be "1890," or else "1902" should be "1892."

On page 24 equations are given containing symbols to which, certainly, names are applied, but these names mean nothing without definition.

On page 25 the reader is assumed to know the unit in which wavelengths of light are measured, as this is quoted without explanation, but on page 31 the necessary definition is given. The definition should precede the use of the symbol.

In diagram A of Fig. 15 a battery is shown having two positive poles.

In Fig. 17 the disposition of the guard-ring G is by no means clear.

At the end of page 39 a formula involving current is given, but the unit in which the current is expressed is not mentioned, and, in addition, a numerical constant appears to be wrongly printed.

On page 158 "Fig. 84" is mentioned in the text, but there is no Fig. 84 in the book. Fig. 83 is followed by Fig. 85.

The foregoing points are, however, only minor ones, and do not detract from the usefulness of the book as a guide to the subject.

DEATH OF MR. L. M. ERICSSON.

MR. L. M. ERICSSON, the Swedish Telephone Engineer and Manufacturer, died on Friday, Dec. 17.

Mr. Ericsson was the founder in 1876 of the organisation bearing his name and therefore was the world's pioneer manufacturer of the Commercial Telephone. He commenced business in a very modest way, but being a man of keen intelligence and foresight, his business rapidly grew until to-day it is the largest telephone manufacturing concern in Europe. In this and other countries the Ericsson concern employs many thousands of workpeople.

PROGRESS OF THE TELEPHONE SYSTEM.

THE number of telephone stations working at Oct. 31, 1926, was 1,453,180. During October new stations numbered 20,751 and cessations 11,873, resulting in a net increase of 8,878 on the total at the end of September.

The growth for the month is summarised as follows:—

Telephone Stations—		London.	Provinces.
Total at Oct. 31		510,806	942,374
Net increase for month		3,679	5,199
Residence Rate Installations—			
Total		106,479	176,755
Net increase		1,518	2,013
Exchanges—			
Total		112	4,004
Net increase		1	7
Call Office Stations—			
Total		4,626	16,533
Net increase		34	105
Kiosks—			
Total		373	2,123
Net increase		28	76
New exchanges opened under Rural Development Scheme—			
Total		—	969
Net increase		—	7
Rural Party Lines Stations—			
Total		—	9,897
Net increase		—	—
Rural Railway Stations connected with Exchange System—			
Total		—	791
Net increase		—	4

The number of inland trunk calls made during September—the latest statistics available—was 7,871,104, an average of 302,735 calls per day. During the six months ended Sept. 30, the number of calls dealt with was 47,780,370, representing increases of approximately $4\frac{1}{2}$ millions (10.6%) over the preceding half-year and 5 millions (11.6%) over the corresponding period last year.

Calls made to the Continent during September numbered 22,241 and from the Continent 25,217. For the six months ended September, the totals were—outgoing calls 131,513 and incoming calls 148,595.

The table below illustrates the growth in the Anglo-German trunk traffic since its inauguration in March last.

Month.	No. of Calls.	
	Outgoing.	Incoming.
March 19-31	505	331
April	898	836
May	1,234	979
June	1,244	1,066
July	1,937	1,905
August	1,941	1,781
September	2,520	2,327

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

LONDON—Bexley Heath.

PROVINCES—Gravesend, Coventry (Automatic), Dumfries.

And among the more important exchanges extended were:—

LONDON—Clissold, Clerkenwell, Grosvenor, Malden, Mill Hill, North, Reigate, Streatham, Tottenham, Waltham-stow.

PROVINCES—Barnstaple, Bourne End, Failsworth, Preston, while 65 new overhead trunk circuits were completed, and 60 additional circuits were provided by means of spare wires in underground cables.

BROADCASTING AND THE TELEPHONE SERVICE.

SOME time ago, an interesting discussion on the linking up of Broadcasting Stations by means of land lines was opened by the Chief Engineer of the British Broadcasting Company at the Institute of Electrical Engineers, and it appeared to the writers that a few notes on the help given by the Post Office Trunk Telephone Service to the simultaneous and "special event" broadcasting service will prove of general interest.

The completion of the Gloucester Relay Station by the B.B.C. (which, and its successor, the British Broadcasting Corporation, we shall refer to hereafter as the "B.B.C.") provides an opportune moment for presenting the following notes:—

Arrangements were made to hand over every evening to the B.B.C. a network of long distance telephone circuits in order that the broadcasting stations may be linked together in such combinations as the programme requirements need.

It is common knowledge, however, that the long distance telephone system in this country was constructed primarily for the satisfactory transmission of speech, and not for the more delicate transmission of music. The two chief line characteristics required for satisfactory music transmission are:—

- (1) stability
- (2) high-frequency cut-off.

Of course, stability is absolutely necessary for the transmission of speech and music, but the higher frequency cut-off characteristic is not essential for speech transmission.

The frequencies produced in ordinary speech vary between 300 and 2,000 cycles per second, and so, if the telephone circuits have a frequency cut-off of not less than 2,000 cycles per second, they are satisfactory for the purpose for which they were constructed.

The transmission frequency characteristics of commercial types of telephone circuits are shown by the curves on diagram (Fig. 1).

For successful transmission of music, however, it is necessary to cater for frequencies between 100 and 5,000 cycles at least.

It may not be out of place to mention that tests have shown that many overhead circuits possess very high frequency cut-off characteristics.

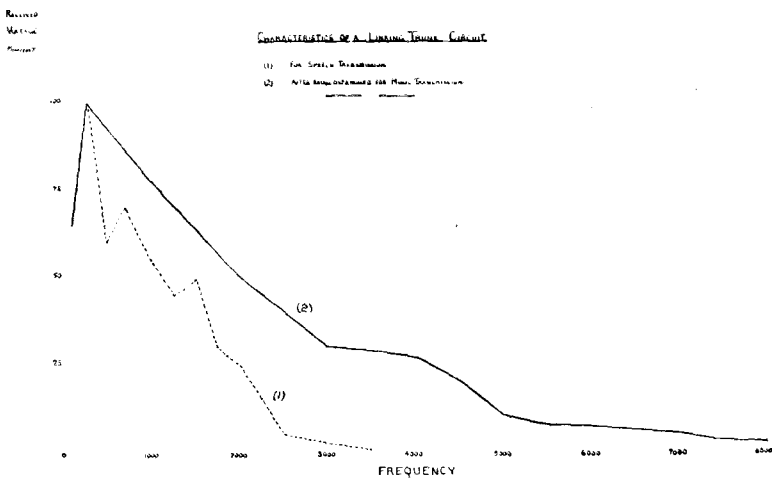


FIG. 1.

The "linking-up" system has resulted in the erection by the B.B.C. of four relay stations—London, Leeds, Glasgow and Gloucester. The stations permit of amplification being effected along the route, and maintain the ratio of the signal strength to noise to such a degree as to ensure that the received signal strength is not normally marred by extraneous noise.

In the early days of broadcasting, difficulties were experienced owing to the input energy from the B.B.C. transmitters being so small that the ratio to the normal noises of a telephone circuit was relatively low. When

amplification took place at the broadcasting station the noise was amplified with the signal so that the resulting transmission was frequently very poor as a reproduction of music.

The long-distance telephone circuits used to link up the British Broadcasting Stations in this country are shown in diagram (Fig. 2).

At London, Leeds, Glasgow, and Gloucester, special attention is provided by the Post Office during the hours of simultaneous broadcasting, and the officers in charge at these places are responsible for placing suitable circuits promptly at the disposal of the B.B.C.—all extensions being made in the test rooms.

BRITISH ISLES

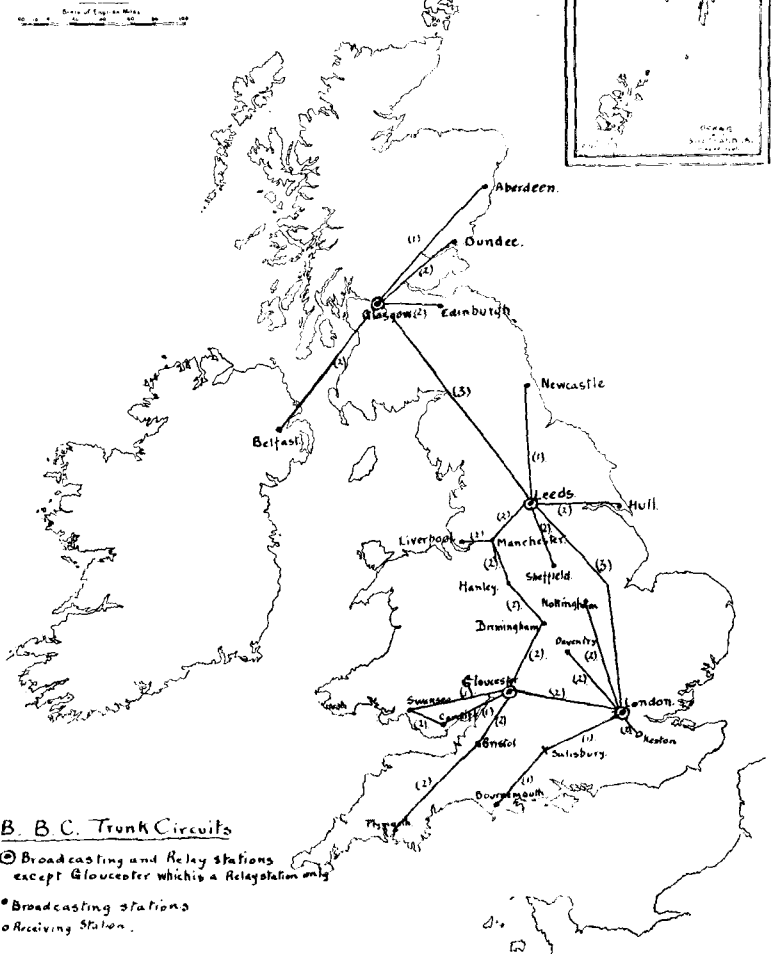


FIG. 2.

A further essential in the broadcasting service is that any circuit which becomes faulty during a transmission should promptly be substituted by a good circuit. The duration of faults, so far as the B.B.C. is concerned, is the time taken to report the faults and to replace the faulty circuits. Special arrangements have been made, so that this interval should not exceed two minutes. It will be seen from diagram (Fig. 3) that the average time taken to replace faulty circuits shows steady improvement, although it still falls short of the desired standard, and of what should be possible when the whole of the arrangements have been adopted.

In order to speed up the replacement of faulty circuits appropriated for broadcasting, provision being made at the minor centres—Birmingham, Cardiff, &c.—for the circuits used for simultaneous broadcasting to be terminated, together with the reserve circuits, on special positions, so that the exchange staff may make extensions and changes whenever they are required by the controlling centres.

It is not claimed that the lines have always been perfect, perfection being such an elusive if not impractical proposition; but it can be claimed that the facilities given to the B.B.C. have steadily improved, and it is a tribute to the efficiency of the Post Office lines that only on one occasion out of four hundred was it necessary to advise the B.B.C. that suitable lines were not available.

A few instances in which a satisfactory link has been provided by the Post Office under conditions more than usually difficult may be of interest:—

At Croyland Abbey, good transmission was effected by cutting a long trunk line near the Abbey and completing the connexion via a local subscriber's circuit.

In a garden in Surrey, the quest of the elusive nightingale taxed the ingenuity of the individual who carried the microphone attached to a trailing lead with due regard to the amenities of the herbaceous border. The success of the broadcast was ample compensation for the heartfelt expression of unpoetic thought "All through the night!"

From Aberystwyth, Insch, Marazion, and other "outside" places, successful transmission was effected, after the local obstacles had been surmounted.

From Pewsey, New Romney, and Loughborough; from the good ships "President Roosevelt" and "Mauretania"; from H.M.S. "Victory" in Portsmouth Dockyard; from cathedrals, coal mines, and bell tents, no

AVERAGE DURATION OF TRUNK CIRCUIT FAULTS
AT
LONDON, GLASGOW, AND LEEDS B.B.C. STATIONS

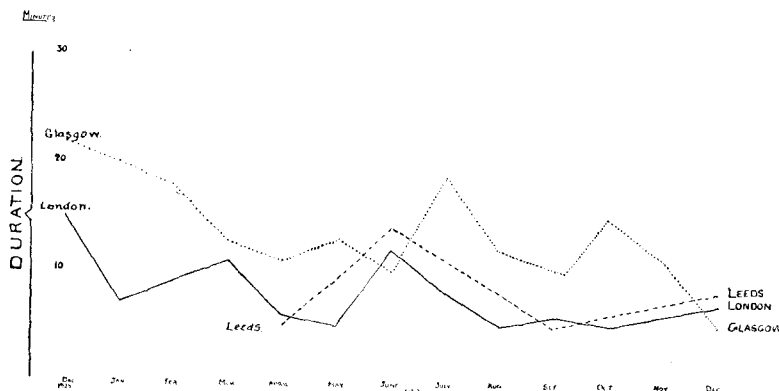


FIG. 3.

complaint could be made as regards quality of the transmission, even although the local circuits were linked up under conditions that were not too favourable to the engineers.

A justification for the time and effort spent in improving the arrangements for the broadcasting service may be found in the revenue obtained from the B.B.C. for leased trunk circuits and for special broadcasts. The appropriation of circuits for broadcasting employs the long distance plant at times when it would not normally be in use.

The extent to which the use of telephone circuits for broadcasting may develop is, of course, problematical, but it is conceivable that the development might increase to such a degree that would justify it being taken into account in planning additional circuits, including underground circuits with the necessary special electrical characteristics and stability, which might entail additional expense not justifiable for speech transmission.

In conclusion, it should be mentioned that the underground circuits provided between London and the Rugby Wireless Station have a cut-off frequency of 6,000 cycles, thus proving that the provision in underground cables of circuits suitable for transmission of music is quite practicable and the development of longer trunk circuits having similar characteristics may also be worth while.

T. T. U.

CHRISTMAS GREETINGS TELEPHONED TO AMERICA.

On Dec. 24 the Transatlantic wireless telephone system, shortly to be opened to the public, was used to exchange Christmas greetings between officials of the Post Office and the officials of the American Telephone & Telegraphy Company and New York Telephone Company in New York. The greetings were subsequently confirmed by teletype.

COVENTRY AUTOMATIC SYSTEM.

FIGURE 1 gives a view of the manual switchroom at Coventry. Figure 2 shows the lay-out of the equipment on the two key sending "B" positions which accommodate the incoming circuits from the Birmingham Trunk, Central and Midland exchanges.

As the key-sending "B" positions embrace many of the latest developments in connexion with order wire cordless "B" positions (C.B. 10 sections), it is thought that the following summary regarding the equipment of this type of position may be of interest:—

KEYBOARD.—(a) *Single strip of ten digit keys with key-tops engraved with numbers 1 to 0.*—Immediately the fourth digit of a number has been keyed, the position "peg count" register (fitted on the cable turning section) is automatically operated, the digit keys are dissociated from the sender equipment and the keys are available for the next call.

The Coventry area numbering scheme for subscribers provides for a uniform number of digits and therefore a "start" key is not required.

In the event of a fault developing in connexion with any of the digit keys, the whole strip can be easily replaced by the operating staff with a spare strip which is available in the switchroom.

(b) *Cancel key.*—This key is fitted to the right and in line with the digit keys. It can be operated in the event of an error being discovered prior to the last digit being keyed. After the cancel key has been depressed, the whole of the number is then keyed correctly.

(c) *Notice panel.*—A glass panel is fitted on the left front of the keyboard and accommodates a list of four figure numbers to be keyed for calls to service points (including rural party line position).

(d) *Forty assignment keys in two strips of twenty with designation strips.*—The depression of the assignment key of the junction allotted associates the sender equipment with the junction and keying can commence practically at once.

(e) *Supervisory lamps (green).*—One supervisory lamp is associated with each junction although there is provision for two if required.

The supervisory lamp indicates whether the junction has been taken up at the Birmingham exchange and glows steadily during the whole time the connexion is held.



FIG. 1. GENERAL VIEW OF MANUAL SWITCHROOM.

Disconnection takes place, and the supervisory lamp darkens when the Birmingham telephonist withdraws her plug, thus indicating to the key sending telephonist that the junction is available for re-allocation.

(f) *Four sender finder lamps (white) with circular number labels.*—The sender finders have multiplied on their banks connexions to six senders which are provided to serve the two positions.

When an assignment key is depressed a sender finder is seized, the corresponding sender finder lamp glows and the sender finder starts to hunt for a disengaged sender. Also, in the unlikely event of each of the six senders being in use or unavailable, all the sender finder lamps on each position will glow immediately the last available sender has been taken into use.

A master "sender finders engaged" lamp which will light when all the individual sender finder lamps on the position glow, is also being provided (in the pilot rail on each position) as an additional safeguard against the allotment of junctions being proceeded with prior to a sender being available.

PILOT RAIL.—(g) *Order wire calling signal (white)* are in its right hand panel. (h) *Outlet finder fuse alarm (red)* are in its left hand panel.

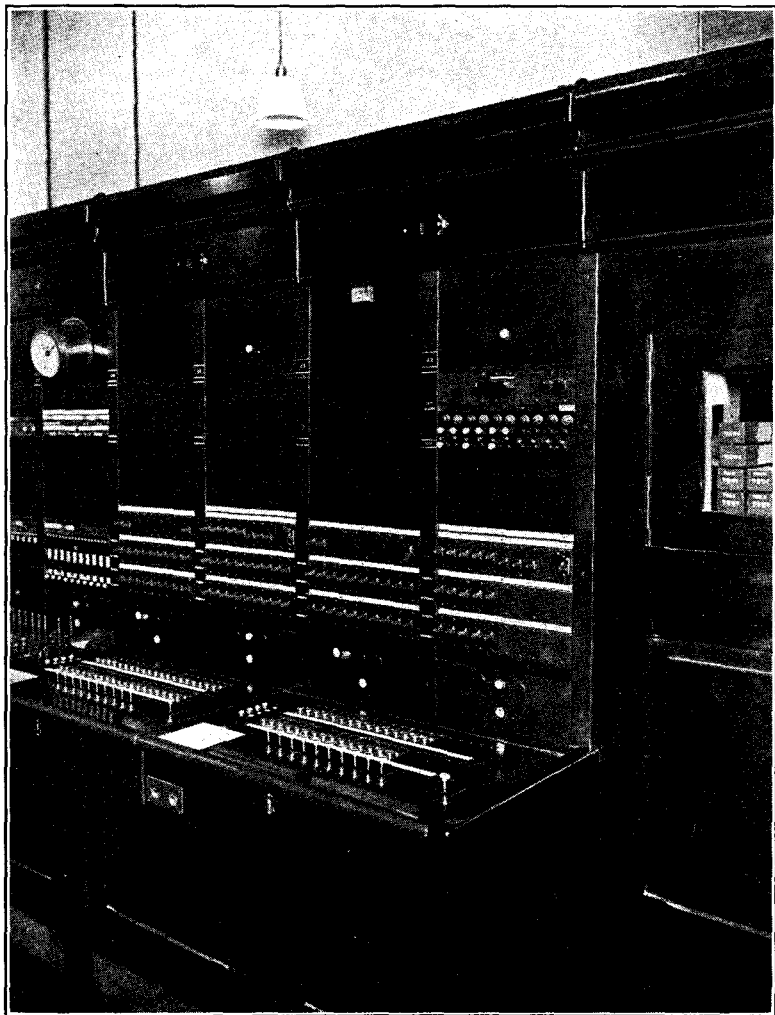


FIG. 2. LAY-OUT OF KEY-SENDING "B" POSITIONS.

PANELS.—(i) *Forty transfer and disconnect keys (two strips of ten per panel with designation strips)*.—In the case of a through call for a manual exchange, the "transfer and disconnect" key associated with the incoming junction allotted is momentarily operated to the "transfer" position and this lights a calling lamp on a jack ended "B" position where the call is completed; "trunk offering" calls are similarly transferred.

On the jack-ended "B" position a jack and calling lamp associated with each of the incoming junctions is provided, and these jacks are also utilised to replace temporarily (by means of a special straight through double ended cord) a faulty incoming order wire by one of the junctions.

The supervisory lamp on the key sending "B" position continues to glow steadily until the telephonist at the jack-ended "B" position withdraws her plug.

The operation of the "transfer and disconnect" key in the disconnect position (downwards) throws the relative junction out of use and causes the supervisory lamp on the keyboard to glow steadily.

Upon a request from a Birmingham telephonist for a number to be rung on a junction already allotted, the "transfer and disconnect" key is operated downwards momentarily, the assignment key is again depressed and the number keyed.

RIGHT HAND PANEL.—(j) *Outlet finder change over key*.—This key is fitted on the extreme right of the panel. On the pressing of an assignment key, the first switch brought into operation is the outlet finder, via which the assigned junction is picked up and a disengaged sender found.

In order that the outlet finder may be available for periodical overhaul a duplicate is provided. The use of the two switches is controlled by the key, which is designated $\frac{\text{ODD}}{\text{EVEN}}$ and operated at the commencement of the day according to the date in the month.

(k) *Four sender finder keys*.—Three of these keys are fitted next to item (j), the fourth sender finder per position having not yet been provided. The operation of the sender finder key (the designation number of which agrees with that of the lamp on the keyboard) throws the relative sender finder out of use and causes the appropriate sender finder lamp to glow.

(l) *Five order wire disconnect keys*.—These keys, fitted on the left of the panel, are provided to enable the disconnection of a faulty order wire to be effected at the position.

As mentioned in connexion with item (i), the temporary replacement of a faulty order wire is carried out at the jack-ended "B" position where break jacks on the incoming order wire circuits are provided.

LEFT HAND PANEL.—(m) *Coupling key*.—This key is fitted at the right of the panel. At present only the head set circuits are coupled, but arrangements are being made to admit of the key set on one cordless "B" position being used to set up a call on the adjoining coupled "B" position.

(n) *Order wire re-setting key*.—This is fitted on the extreme left of the panel.

(o) *"Call Supervisor" key*.—This key is fitted next to item (n) and operates in an upward direction. The operation of the key causes the lamp at the top of the right hand panel to glow and actuates a buzzer. The key is restored to normal by the section supervisor.

CABLE TURNING SECTION.—(p) *Group registers*.—Each incoming junction is terminated on a separate first selector, and, in addition to the "pog count" register referred to under "remarks" against item (a), a totalling register is associated with each group of ten (or less) incoming circuits on each individual route.

This group totalling register is operated upon release of the first selector switch which is effected when the Birmingham telephonist withdraws her plug.

These group registers therefore indicate, for any period for which readings are taken, the number of keyed effective and ineffective calls received over any route served by the key sending positions.

N.B.—Position No. 1 is at present only partially equipped, i.e., for 30 incoming circuits.

REVIEW.

"Television." By Alfred Dinsdale, A.M.I.R.E. (Published by Sir Isaac Pitman & Sons, Ltd. 62 pp. Price 2s. net.)

Seeing distant objects by means of electricity, either through the medium of a connecting wire or "wirelessly" through the free ether has been a long desired sequel to the hearing at a distance made possible by Graham Bell's invention of the telephone. The problem is, however, far more difficult of solution, and despite the large amount of work done on it, it is only just now approaching a really satisfactory solution. This small book gives a brief account of the various attempts which have been made to attain the goal of television, concluding with the Baird "Televisor" with which sufficient success has been attained to bring the broadcasting of actual scenes within the region of practical possibility. It is a good general account of a fascinating subject.

TELEPHONE NOTES.

A NEW telephone cable in the Baltic Sea, between Denmark and Germany, is to be laid shortly to provide for faster and more distinct telephone calls. This new cable will connect with the large underground telephone cable which Germany has recently completed, and will run via Nykoping, Falster, Gjedser, Warnemünde, and Rostock. Communication between Copenhagen and Germany has been carried out in the past through a cable containing only four wires, but this old cable could not be connected with the new telephone system. The new cable, however, will be more than ample to take care of present requirements, carrying a sufficient number of wires so that twelve telephone calls can be provided for at one time. The cost of the new cable is to be divided equally between Denmark and Germany, but the actual work of laying it in the Baltic Sea is to be done by Germany.—*Telegraph and Telephone Age.*

* * * *

According to the *Sydney Morning Herald*, the Postmaster-General's Department of New South Wales has been for some considerable time considering the one system of charging for telegrams, though so far, no definite decision has been arrived at.

* * * *

In a contribution to *Telephony* the Divisional Commercial Superintendent of the Illinois Bell Telephone Company describes a new operating procedure adopted by that Company, whereby the normal method of repeating to calling subscribers the numbers of the called subscribers' lines has been abandoned in favour of the expression "Thank you." The new method is termed "Restricted Repetition" and is reported to be very successful.

It is stated that the change has been most favourably received by the Press, and it has been proved conclusively that the new method materially speeds up the service, and does so without sacrificing accuracy.

The main reason for the change in procedure appears to be the frequent failure of subscribers to take interest in, or correct, when necessary, the "A" operators' repetition of numbers.

It is claimed that in addition to reducing the holding time on calls, the new procedure promotes a better understanding between the public and the exchange operating staffs.

* * * *

After commenting favourably on the new method whereby calls between London and Paris are charged minute by minute after the first three minutes, the European special correspondent of *Telephony* says:—

"It is not anticipated that the change will have a material effect on the revenue from the trunk service. . . . Whether the facility will be extended in the future to inland trunk calls probably depends on the success of the London—Paris experiment. The authorities have the extension under consideration, but we must confine ourselves to 'confident anticipations.'"

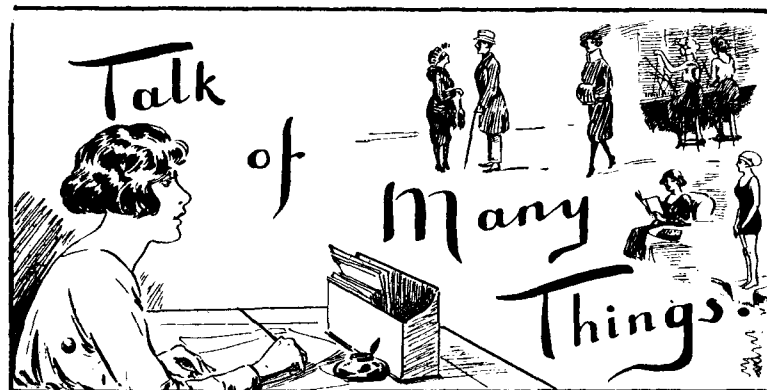
The problem of timing inland trunk calls is, however, a very complex one, and has long been the subject of investigation by the Department. The general conditions applicable to the long continental routes are scarcely comparable with those existing in the case of the inland trunk service, and it is difficult to forecast the nature of any change which may be made in the present timing procedure.

* * * *

The correspondence which has arisen as a result of the reference in these columns to "Automatics in Oriental Countries" must be of particular interest to all concerned with the development of automatic telephony in the Empire. It is desired to give publicity to both sides of the question, and the views of those best acquainted with the local telephonic conditions in countries with cosmopolitan populations will be welcomed.

H. J. E. S.

WE TELEPHONISTS



The Walrus and the Carpenter.

I HAVE a great respect for the Walrus and his friend the Carpenter. The Walrus must have been a brilliant conversationalist, and I think that the Carpenter must have been an excellent listener although he was getting on with the oysters all the time. You will remember the verse:—

"The time has come, the Walrus said, to talk of many things,
Of shoes and ships and sealing-wax, of cabbages and kings,
And why the sea is boiling hot, and whether pigs have wings."

It is seldom that we meet with people whose range of casual conversation is so wide and so varied. It would be difficult for anyone lacking the extensive and peculiar knowledge of Sherlock Holmes to join intelligently in such a conversation. We "dear Watsons" would have only a minimum of muddled information on such topics scattered loosely through a disorderly mind. Those of us who shone in shoes would be wrecked in ships. Sealing-wax would cause most of us to go to pieces although gardeners might take heart from cabbages. All that we—I at any rate—know of kings could be expressed in the phrase "William the Conqueror, 1066"—but kings seem at a discount in these days. Perhaps the scientists would have the best of it for they would delight in proving that the sea was in fact boiling hot and that, contrary to popular conception, pigs really have wings.

Have you ever noticed how these great and learned men love to confound our simple beliefs? They allow us to cherish some particular notion on some commonplace thing for years and then they suddenly confront us with some absolutely contradictory theory which destroys our faith in mountains and mustard seed. They will, for example, commence artlessly by saying that Ludgate is supposed to be so named after its builder—King Lud—to which we say "Yes, of course." We have often pictured King Lud to ourselves—rather a jolly old fellow we should think, bluff, hearty, large of person and manner, with a flowing beard and a golden crown,—in short just such another as the dear friend of our youth, old King Cole. But, says the antiquary, that supposition is entirely wrong; actually the name is derived from the Saxon for postern. Alas, and so our vision of King Lud vanishes into thin air. Although (so far) we are left with Ludgate, we scarcely dare hope that King Lud ever existed, and it is safe to assume that if one proves his existence another will disprove it. Thus do they argue to and fro and "Tis, 'Tisn't" like so many children while we, their victims, look on in bewilderment. In the circumstances our best course is, I think, to let the Walrus carry on the conversation, while we get on with the oysters.

PERCY FLAGG.

Snakes and Ladders.

Whilst watching my young nephews playing at "Snakes and Ladders" the other day, I was suddenly struck with the similarity of this game to the "Game of Life." For a little space we go calmly on and then suddenly without any warning we come to a ladder, and in the exhilaration of the moment forget all about the snakes, the pitfalls and the snares, and we taste to the full the joy that comes to us (in various guises) however short-lived it may be. And so, as I watched them playing, I saw the dice box rattled again and the dice thrown—this time the number disclosed brought the thrower a number which landed him right on to the head of one of those nasty creeping reptiles, and down, and down, down he had to go until he was almost as far away from his goal as when he started the game.

My friends, life holds a deeper and more wonderful New Year message for us than this—but, sometimes, it does seem that the snakes and the ladders are very real things.

How often have we set our hearts on some particular thing, and sometimes seemed to be so very near the goal; perhaps we have got within a few throws of "home," and then we have to go back again, with bitterness in our hearts and a sense of frustration and defeat. But there is always this thought to cheer us on—Let us go back to the two little boys playing their game; they know they will get to the goal some time or other, how ever many times they go up the ladders and down the snakes. Suddenly they throw the dice, and oh joy, just the right number—goal!

There's only one rule, and that is to keep on "Playing the Game."

L. R.

To Our Contributors.

Well Done, Sydenham.

It is a year ago since we made an appeal to all Exchanges to resolve to send in contributions regularly.

"And did responses come?

Oh, no; hey nonny no,
For nearly all were smitten dumb
It seems, a year ago."

There is one notable exception so far as the Exchanges are concerned, and that is Sydenham, where Miss G. M. Turner not only writes for this column frequently herself, but persuades others to do so. We thank Miss Turner very sincerely for her loyalty and help.

We would thank, too, very heartily, Percy Flage, that most regular of our contributors—whose pseudonym scarcely does justice to his never-failing fount of dry but always kindly humour. What play he would make with the rich store of humorous happenings that must be open to our telephonist colleagues, in their daily contact with a public whose knowledge of the working of the mechanism they set in motion must be as extensive and peculiar as Sam Weller's knowledge of London. Here, surely, is a theme which could make this page a serious rival of *Punch*; and we commend it to our colleagues in "the field."

But we do not forget our occasional contributors—always welcome,—for it is only in so far as our page expresses the diversity of thought of our great Service that it can make the appeal it might.

To all our contributors then, regular and irregular, present and potential, we wish a happy Christmas and New Year, with plenary inspiration for their pens.

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.

MANCHESTER DISTRICT.

ANNUAL REPORT ON TELEGRAPHS AND TELEPHONES.

THE past year has been a period of much difficulty, consequent on the depression arising from the coal strike, but it is pleasing to record satisfactory progress in nearly every direction.

Automatic Telephones.—Good progress has been made with the arrangements for introducing automatic working in the Manchester District. The laying of underground ducts for the accommodation of cables to the new building in Chapel Street has proceeded steadily, and multiple-way ducts equivalent to over 70 miles of single duct have already been provided. A further section involving an equivalent of over 40 miles of single duct in the heart of the city will shortly be commenced. Unfortunately the construction of the main building in Chapel Street, which was well in hand early in the year, has been retarded owing to the supply of steel and bricks being delayed as a result of the coal dispute. The buildings for the new subsidiary automatic exchanges at Ardwick, Collyhurst and Moss Side have also been adversely affected by the coal dispute.

New or Improved Exchanges.—Complete new exchange equipments have been provided and brought into use at Knutsford, Openshaw and Whaley Bridge, and substantial additions have been made to the exchange equipment at sixteen exchanges, including Cheetham Hill, Chorlton, Failsworth, Gatley

and Trafford Park. An additional exchange will be opened at Stalybridge early in December which will relieve the existing Ashton-under-Lyne exchange pending the provision of a new automatic exchange at Ashton. Arrangements are in hand for providing new equipment or new exchanges at Bramhall, Heaton Moor, Pendleton, Rusholme and Wilmslow, and for the opening of an automatic exchange at Shaw.

Telephone Progress and Increasing Number of Telephones.—During the year ended Sept. 30, 1926, 10,679 new telephones were fitted; after allowing for cessations this shows a net increase of 5,475, or 7½%. The number of telephones increased from 32,946 in September, 1912 to 76,433 in September, 1926, a growth of 132% in 14 years. The provision of additional underground cables required to meet the demand for new circuits is proceeding steadily; and, in general, new services can now be given in the majority of cases within one or two weeks from the date of the order. Many letters have been received expressing appreciation of the speedy provision of new telephones in the district.

Isolated cases of unavoidable delay occasionally arise owing to the spare underground plant being used up through rapid growth in different localities. In such cases prompt steps are taken to lay new cables.

Underground Cable Extensions.—During the past year the underground wire mileage has increased by 53,412 miles. In 14 years the total has risen from 75,476 miles to 299,538 miles, an increase of 224,062 miles or 297%. These figures include the considerable additions made to the underground plant at Oldham. To supplement existing services new main cables have been provided from Manchester to Bolton, Blackburn, Bury and Burnley; additional cables will shortly be laid from Manchester to Rochdale, Liverpool, Huddersfield, Ashton, Middleton, Heaton Moor, and Stockport.

Telephone Repeaters.—Several additional long-distance circuits from Manchester and the surrounding industrial areas to London, and other important centres, have been brought into use by means of the various repeater stations associated with the main underground cable routes. The temporary repeater station at Manchester is equipped with 65 repeaters, of which 53 are already in use. Permanent equipment of the latest type will shortly be provided in the Head Post Office for 90 repeaters, and accommodation has been arranged for an ultimate provision of 300 repeaters.

Telephone Traffic.—The number of effective trunk calls and telegrams during the year ended Sept. 30 last was 5,794,288, and increase of nearly half a million. Local effective calls during the year ended June 30, 1926, numbered 56,946,645, an increase of over 10½ millions on the previous year's figure.

Complaints relative to service and plant defects continue to decrease. The average number of written complaints received monthly during 1926 is 197 as against 288 during the previous year. The average time taken by a telephonist to answer subscribers' calling signals during 1926 was 5.7 seconds as against 6.0 seconds during the previous year, and there is a tendency towards further improvement.

Street Kiosks.—These have increased from 119 to 193 during the year. The extensive use made by the general public of the facilities is evidence of the growth of the telephone habit and shews how much the kiosks are appreciated.

Phonogram working.—A new Phonogram Room has been opened at the Manchester Office and the latest type ancillary panel board has been introduced. During the short time the board has been in operation it is clear that the improved facilities for handling the work will be beneficial to those subscribers who telephone their telegrams for onward transmission. The speed of answer is extremely rapid and we hope to avoid those irritating delays which occurred when a subscriber was held up until a telephonist was disengaged.

Private Automatic Branch Exchanges.—Considerable progress has been made throughout the district in the transfer from manual to automatic working of internal Private Branch Exchanges. In all cases where the transfer has been made, the subscribers have expressed their appreciation of the utility and the value of the service.

Telegraphs.—The possibilities of voice frequency telegraph circuits between Manchester and London are being investigated by the Post Office Research Department, and it is expected that an experimental circuit will be installed shortly to try out the system.

Manchester Civic Week.—The Civic Week demonstration at the York Street premises was a success. 1,160 subscribers and telephone users visited the display and the majority were also shown over the manual exchanges. From an educational point of view the trouble taken was considered to have been well worth while, as many features of a telephone exchange were a complete surprise to most telephone users. No small part of the public interest in the exhibition was due to the example set by the Chamber of Commerce in making a corporate inspection of the exhibits.

JAMES G. MADDAN.

Postmaster-Surveyor.

W. J. MEDLYN.

Superintending Engineer.

Nov. 26, 1926.

LONDON TELEPHONE SERVICE NOTES.

Telephonists' Society.

ON Dec. 3, 1926, the Society held its third meeting of the session, when Mr. H. G. Corner delivered a delightful lecture entitled "Some thoughts on the Telephone Jubilee." The hall was very full and those who were fortunate enough to be present heard a most interesting address. It opened with a realistic description of London, town and folk, at the time when the first telephone patents were applied for in 1876, and the history of the development of the telephone industry in this country was traced from that time up to the present.

Mr. Corner remarked upon some of the events which marked the passing of the Jubilee Year. The closing of Bank Exchange early in the year marked the passing of an early type of exchange equipment, and the working of trial tandem equipment in City Exchange brought automatics into the practical scheme of things in London. He referred also to the experimental transmissions between London and New York, and commented upon the advance made in intercommunication with European countries. Truly a very remarkable year in the history of telephony.

The historical aspect of Mr. Corner's address was most instructive, but his review of the more personal side was most entertaining and provided him with opportunities for illuminating his remarks with many shrewd and witty comments. True humour has always an element of reality, and his closing sally, that in the old days when technical qualifications could not be looked for in new entrants the superior posts were filled by candidates who could wear clean collars without appearing conspicuous was hailed with delight.

An interesting discussion followed, during the course of which many reminiscences were related.

The next event of the session is the annual dance on New Year's Day, and serious business will be resumed on Friday, Feb. 4, when Mr. W. Glenny will read a paper on "Contract work as affecting the Traffic Branch," followed by a paper by Miss A. M. Kingshott on "The Telephone Operating School."

* * * *

In the Dark.

It was a dull morning, very cold with a fog overhanging the City, and one was glad to reach the warmth and light of the exchange building. Business, and that means telephone traffic, was getting into its stride when the electric light failed. For half a minute or so the darkness was relieved only by what, in these circumstances, appeared to be the fairy lamps of calling and supervisory signals. Then the emergency lights were switched on and the switchroom was bathed in a sort of twilight. The work of putting the traffic through was now commenced, but the speed of operation was slowed down by the semi-darkness. In the meantime all the electric light switches, save one, were turned off so that there should be no complications in case the failure was due to a blown fuse. So the exchange carried on for five minutes. In the switchroom it seemed much longer, and to the Engineers whose business it was to attend to the failure it must have seemed that hours had passed. Then a welcome exclamation of a suppressed "O—h" as the solitary light which had been left switched on announced the restoration of the electricity supply. Quickly the other switches were turned on and the emergency lights dimmed and so passed an incident, one of the very few, which from time to time may put us out of our stride.

* * * *

Charity.

The women staff of the London Telephone Service figured prominently at the Bazaar held on Nov. 30 and Dec. 1 and 2, at Spring Gardens Galleries in aid of the Elizabeth Garrett Anderson Hospital Extension Appeal Fund, two stalls being stocked and staffed by them. The Exchange Staff, under Miss Cox, had a stall of table delicacies, and the staff in the Controller's Office, under Miss Liddiard, provided the china stall. Friends of both turned up in large numbers and assisted in depleting the stocks. This Bazaar, like the Hospital it was in aid of, was organised and run entirely by women, though men friends were welcomed as purchasers, and the stalls were stocked with useful rather than ornamental commodities. Reminiscences of Wembley appeared at the Empire stall, while famous sportswomen ran the sports stall, lady novelists the book stall, and so on.

The women staff in the Controller's Office subscribed £125 to purchase stock for the stall, and when all expenses were covered a cheque for £146 was handed over to the hospital.

The Exchange Staff did well with their table delicacies, the net profit of the stall being £118.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Resignations on account of marriage:—

Miss E. R. LANDLES, Telephonist, of Harrow Exchange.
Miss E. V. SHRIMPTON, Telephonist, of Harrow Exchange.
Miss M. MORRIS, Telephonist, of Harrow Exchange.
Miss E. M. COOPER, Telephonist, of Central Exchange.
Miss E. C. EDMONDS, Telephonist, of Central Exchange.
Miss C. S. MATTSON, Telephonist, of Trunk Exchange.

GLOUCESTER.

ON Nov. 6, 1926, Mr. H. B. CARROLL, a member of the Liverpool Traffic Staff, completed a period of some 19 months' detached duty at Gloucester, and, at a representative meeting, prior to Mr. Carroll's return to his headquarters, Mr. R. S. Grosvenor, Traffic Superintendent, on behalf of the local Traffic Staff, presented to him an expanding suitcase and an Eversharp pencil.

Before making the presentation, Mr. Grosvenor expressed the gratitude of all members of the staff for the valuable assistance rendered by Mr. Carroll during the period of his stay in Gloucester. Mr. Carroll, he said, took with him the good wishes of his Gloucester colleagues, all of whom hoped that his enthusiasm and ability would soon receive well-deserved recognition.

Appreciations of Mr. Carroll's contribution to the arduous work of the section and regrets at his departure were also voiced by Messrs. Pirie, Raymond, Dance, and Miss King.

After returning thanks for the presents and expressions of goodwill, Mr. Carroll said that whatever the measure of assistance he might have rendered, the task had been made considerably easier by the team spirit which had pervaded the section. He had found the experience of the work in a comparatively small district most beneficial and although his future official interests must of necessity be centred in Liverpool, he should always retain a personal interest in the welfare of, and pleasant memories of his associations with, the Gloucester Traffic Section. He was convinced that the only solution to the existing difficulties in Traffic offices generally was to be found in the effacement of individual self-interest and the fostering of such a spirit of close co-operation between the members of the staff as he had found at Gloucester.

OBITUARY.

WE regret to record the death of Miss H. A. Ellis, Travelling Supervisor, Chester District, on Dec. 11. Miss Ellis, who travelled in the Staffordshire and East Cheshire Section, had had thirty-two years' experience of telephone work, having enlisted with the old National Telephone Company in 1894. Prior to her last appointment she was in charge of the Newcastle (Staffs.) Exchange, where she was held in high esteem and respect. As Travelling Supervisor, she was most efficient and conscientious in the discharge of her duties, and her unfailing courtesy and kindness won for her a host of friends, by whom she will be greatly missed. Miss Ellis had borne severe pain and suffering with great fortitude for many months.

THE Telegraph and Telephone Journal.

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FEBRUARY, 1927.

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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XXXVII.—

MISS H. E. WALLIS.

We present this month the portrait of Miss H. E. Wallis, who, as Chief Supervisor of the Central Telegraph Office, occupies the most important post open to women in the British Telegraph Service.

The staff of the Central Telegraph Office includes over 1,200 women, and to rise to the headship of this large body is no mean achievement. Miss Wallis—to employ a phrase sometimes used by men, rather arrogantly perhaps, in expressing admiration of a woman's business capacity—has a "man's head," but her gifts of judgment, impartiality, and energy have not effaced or even weakened her possession of those qualities of the heart which are regarded



as the special attributes of women.

Her responsibilities are heavy, but she would be the last to make any such admission. She faces her duties with a sanity and a sense of humour which lighten the heaviest load and which refuse to make molehills appear other than as molehills.

These days are fateful for women. They are entering fields of employment hitherto reserved for men and taking a greater hold on fields to which they have already had an entry. The telegraph service cannot be exempt from this tendency of the times and Miss Wallis, more than any other telegraph woman, has the opportunity to prove the capacity of her sex for a larger share in the responsibilities of the Service. Those who know her know also that the women's cause could not be in better hands.

NOTES ON TELEGRAPH PRACTICE.

By G. T. ARCHIBALD.

(Continued from page 71.)

XXIV.—*Concerning Phonogram and Telephone-Telegram Organisation.*

At first sight it may seem reasonable to assume that the ordinary telegraph procedure should suffice for the efficient working of the phonogram and telephone-telegram system. A moment's consideration will, however, dispose of any such postulation. In telegraph working there is no intermediate switching operation at a point remote from the operating sets, whereas the reverse is almost universally the case in phonogram and telephone-telegram working. It is important to remember in this connexion that the telephone switchboard operator, unlike the telegraph concentrator switchboard operator—who controls the traffic—is not in a position to visualise the traffic position at the phonogram sets and her aloofness or remoteness is a factor of considerable importance in the organisation.

It will be clear, therefore, that the development of phonogram and telephone-telegram working has called for the creation of a new technique and for that reason, if for no other, the service is of particular interest to those occupied in traffic organisation.

It has to be borne in mind that telephonic transmission is slower than telegraphic transmission and that it is necessary to repeat every telegram sent over a telephone circuit because of the greater liability to error, i.e., sound and spelling errors. These two factors would probably be sufficient to render the telephonic disposal of telegrams uneconomical; other considerations tend, however, to throw the balance in the opposite direction. As was pointed out in the preceding chapter upwards of 50% of the phonogram traffic would be tendered at sub-post offices for telegraph transmission if the phonogram service were not available, and the saving in this respect alone is sufficient to make the service economical.

There are equally important considerations in relation to the telephone-telegram system. Originally telephone-telegrams were dealt with only over direct circuits, i.e., in cases where the volume of traffic was sufficient to justify independent circuits. In 1913 it was decided to develop the use of what are called "jointly used" circuits which are provided at small offices where neither the telegraph nor the telephone load is sufficient separately to justify the facility. The great advantage of this arrangement is that combined facilities can be given at a large number of remote places which would not otherwise be so served and that the cost of maintenance, &c., is shared equally by the telegraph and telephone services. Telephone calls receive precedence on jointly used circuits unless a telegram has been waiting disposal for ten minutes.

This arrangement proved so successful that it was decided to extend the use of the telephone system as a means of linking up small offices with a larger telegraph transmitting centre in order to save telegraphic transmissions provided that—

- (1) ordinary telephone traffic was not prejudiced;
- (2) not more than two short trunk circuits or two junction circuits or one short trunk circuit and one junction circuit was employed;
- (3) the number of telephone switchings involved was not excessive in comparison with the number of telegraphic transmissions saved;
- (4) the whole of the traffic between two places, in each direction, was disposed of as far as possible by the same route.

It was also laid down that routes worked by telegraph upon which the traffic did not exceed 50 telegrams a day with a busy hour load of 10 should be converted to telephone working.

The arrangement was a great boon to Sub-Postmasters who were no longer compelled either to become expert Morse telegraphists or to engage as assistants persons who were trained telegraphists. The difficulty in finding suitable assistants which had by that time become rather serious in many districts was lessened and the cost of special training was saved.

In 1914 a further extension of the telephonic disposal of telegrams was decided upon and in 1920 it was laid down that this form of working should be established in order to save one or more telegraph transmissions within the following radii:—

- (i) where two switchings at two terminal offices only are necessary—20 miles;
- (ii) where switchings are necessary at an intermediate telephone exchange in addition to the two terminal exchanges—15 miles.

Switchings at terminal exchanges where the telegrams are dictated from or received at the switchboard are ignored. If switchings at four or more exchanges would be necessary telephone circuits are not used in normal circumstances.

The distances are measured radially between the exchanges to which the sub-offices are connected.

The result of this development has been not only to save telegraphic transmissions but also to expedite the disposal of local telegrams which can be dealt with in this way.

Previous to 1913 the executive control and supervision of phonogram and telephone-telegram work was indefinite. In that year, however, it was decided that the immediate supervision of phonogram and telephone-telegram work done by telephonists, and where a separate supervising officer was justified, should always be performed by an assistant supervisor on the telephone establishment.

At the same time it was laid down that general control of the work would depend upon local circumstances: when performed in the telegraph instrument room or in a separate phonogram room adjacent to the telegraph instrument room and practically part of it, the general control should be exercised by telegraph officers. As, however, the question of junction loads arises from time to time, telegraph officers are expected to keep in close touch with the telephone District Managers. Where the work is performed in a telephone exchange or in a phonogram room more closely associated with a telephone switchroom, general control should be exercised by the District Manager who is expected to keep in close touch with telegraph officers on telegraph questions. This arrangement is still in operation.

At the outset phonogram work was performed by telegraphists, but except in a few isolated instances it is now done by telephonists. Telephonists so employed perform phonogram duties for periods varying from three to six months and then revert to telephone duties in order that they may maintain their all-round qualifications. It is open to question whether a rotary system is satisfactory and fully efficient either from a telephone or a telegraph point of view, now that the traffic has reached such large proportions. It has recently been decided to form a separate establishment of telephonists for phonogram work at the Central Telegraph Office, London, but whether similar steps will require to be taken at the large provincial towns is a matter for consideration. The chances of promotion of operators employed solely on phonogram work may be less favourable than those of their colleagues engaged in the ever-increasing telephone service, but a greater measure of specialisation would seem to be necessary if further expansion takes place.

It will be obvious from the information furnished in the preceding chapter that the unit of standards of load cannot

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be based entirely on the number of messages handled per operator in an hour. The time occupied depends upon (i) the length of the message; (ii) the number of outgoing telegrams (the time taken to secure connexion must be added to the working time) and (iii) the number of occasions where more than one telegram is passed during one connexion, and in order to meet these conditions the staff is based on standards of directly occupied time per operator hour.

This question was very ably dealt with by Mr. W. C. Griffiths in a paper read before the Edinburgh Telegraph and Telephone Society in 1922. Mr. Griffiths pointed out that in order to preserve a uniform standard of service in towns of all sizes variation in the standard of directly occupied time were necessary. In a large installation the chances that an operator is free at the moment a call is received are greater than in a small installation; it follows, therefore, that if every operator is engaged when a call is received, the chances are that one will be available sooner at the larger installation. If the average duration per call is three minutes a second call received at an installation of only one position would be kept waiting for about 90 seconds, whereas the eleventh call at an installation of ten positions would have to wait only 9 seconds.

In order to maintain a uniform standard of service it is necessary, therefore, to reduce the waiting time at the smaller installations, and this is accomplished by reducing the load so that there shall be a quick speed of answer on calls received when a telephonist is free, compensating the inevitably slower speed of answer when all the operators are engaged.

The standards at present in use are:—

1 position staffed	27	minutes	occupied	time	per	operator	hour.
2 positions	33	"	"	"	"	"	"
3 "	38	"	"	"	"	"	"
4 "	42	"	"	"	"	"	"
5 or more "	45	"	"	"	"	"	"

It will thus be seen that the variations mentioned above are provided for not only at offices of different sizes but that the varying conditions throughout the day within any one installation are provided for. The fact that a large installation can be staffed more economically and more efficiently than a small one with a similar quality of service is of great importance. If the efficiency attainable when one position and five positions or more is represented by 60% and 100% respectively for the same quality of service, it is not unreasonable to argue that there is a sound case for concentrating phonogram work on the larger offices.

A load of 100 messages of an average duration of 2.2 minutes can be handled within the standard of permissible delay by five telephonists at one installation. Six telephonists would be required if the work were divided between two offices and ten if it were divided between five offices.

There can be little doubt that telephone development will be reflected in phonogram traffic, and it is necessary therefore that traffic officers shall keep closely in touch with the work of phonogram rooms. In London a new equipment of 230 positions estimated to suffice for years was installed in September, 1923, the question of further accommodation is already under consideration.

(The End.)

TO THE EDITOR, "TELEGRAPH AND TELEPHONE JOURNAL."

SIR,—I cannot allow the last of the series of articles on Telegraph Practice to appear without acknowledging my indebtedness to Mr. John Lee, Mr. J. Stuart Jones, Mr. J. W. Plackett and my colleagues in the Telegraph Division of the Headquarters Telegraph and Telephone Traffic Section for their kindly help, advice and criticism.—Yours,
G. T. ARCHIBALD.

TELEPHONE DEVELOPMENT OF THE WORLD IN 1925.

By W. H. GUNSTON.

(Continued from page 61.)

NORTH AMERICA.

	No. of Telephones.	Population (thousands).	Inhabitants per telephone.
United States (16,159,550) ...	16,935,924	113,200	6.6
Canada (1,072,454) ...	1,144,095	9,160	8
Mexico (50,980) ...	53,000	16,000	302
Cuba (54,918) ...	60,000	3,000	50
Other West Indies (2,500) ...	3,000	2,000	—
Central America (17,930) ...	19,500	6,000	—
Total ...	18,216,000	149,000	8

The total for the *United States* is made up as follows:—

	Telephones.
American Telephone & Telegraph ("Bell") Co. and Associated Companies ...	12,035,224
Independent Companies having connexion with above system ...	4,685,000
Entirely independent (estimated) ...	215,700
Total ...	16,935,924

The increase on last year is at the rate of 4.8%.

CANADA.

The following statement shows the distribution of the telephone in the Dominion:—

	Telephones.
Ontario ...	508,513
Quebec ...	223,227
Saskatchewan ...	100,096
British Columbia ...	99,346
Alberta ...	70,073
Manitoba ...	69,000
Nova Scotia ...	39,242
New Brunswick ...	28,945

Telephone development in Canada increased at the rate of 6%.

The figures for Cuba, Mexico and Central America are from an American source.

SOUTH AMERICA.

	Telephones.	Population (thousands).	Inhabitants per Telephone.
Argentine (173,605) ...	186,000	9,839	54
Bolivia (1,824) ...	2,000	—	—
Brazil (98,564) ...	103,000	30,900	300
Chile (30,895) ...	31,000	4,500	145
Colombia (14,923) ...	17,000	—	—
Ecuador (4,518) ...	4,500	—	—
Guiana ...	2,500	—	—
Paraguay ...	500	—	—
Peru (9,552) ...	10,000	—	—
Uruguay (24,184) ...	26,000	1,640	63
Venezuela (11,047) ...	11,500	—	—
Total ...	394,000	69,000	176

AUSTRALASIA.

	Telephones.	Population (thousands).	Inhabitants per Telephone.
Australia (343,151) ...	384,563	5,633	14.6
New Zealand (115,549) ...	125,372	1,320	10
Hawaii (17,707) ...	18,500	256	14
Other places ...	1,500	700	—
Total ...	530,000	8,000	15

The 384,563 telephones in the Australian Commonwealth are thus distributed :—

	Telephones.
New South Wales	146,866
Victoria	120,749
Queensland	46,007
South Australia	39,901
Western Australia	19,783
Tasmania	11,257

Development in Australia in 1925 was at the rate of 12% and in New Zealand at 9%.

CITIES WITH 75,000 TELEPHONES AND UPWARDS.

	Telephones.
New York	1,415,108
Chicago	790,711
*London	476,813
*Berlin	415,871
Boston	392,381
Philadelphia	359,000
Los Angeles	280,954
*Paris	255,561
Detroit	240,696
San Francisco	215,464
Cleveland	184,694
Pittsburgh	181,385
St. Louis	176,847
Toronto	154,740
Cincinnati	140,547
*Hamburg	139,107
Montreal	138,225
Washington	129,405
*Copenhagen and suburbs	127,742
Kansas City	124,427
Milwaukee	120,924
*Tokyo (1924)	119,885
Minneapolis	115,833
Baltimore	115,427
*Stockholm	107,173
Buffalo	103,628
Oakland	100,883
*Vienna	98,226
*Buenos Aires (1924)	97,838
Seattle	96,981
*Sydney	87,504
Portland (Oregon)	84,432
Newark, N.J.	81,754
Denver	76,440
*Osaka (1924)	76,426
Indianapolis	76,254

All these cities except those marked * are in North America.

CITIES WITH 10,000 TELEPHONES AND UPWARDS.

Of these 261 Cities 159 are in North America, 76 in Europe, 10 in Asia, 8 in Australasia and 4 each in Africa and South America.

<i>United States</i> :—(The principal cities are mentioned in the foregoing table.)	145
<i>Germany</i> :—(Berlin 415,871, Hamburg-Altona 139,107, Munich 61,537, Leipzig 57,586, Cologne 57,563, Frankfurt-Main 50,980, Dresden 50,139, Breslau 36,486, Düsseldorf 33,919, Stuttgart 34,538, Hanover 30,897, Nuremberg 30,633, Bremen 27,161, Mannheim 22,212, Chemnitz 20,785, Essen 21,273, Magdeburg 18,892, Königsberg 18,730, Duisburg 18,510, Stettin 16,915, Dortmund 16,391, Elberfeld, Barmen, Halle and Crefeld each over 10,000)	25
<i>Great Britain</i> :—(London 476,813, Manchester 63,630, Glasgow 50,160, Liverpool 48,593, Birmingham 40,515, Edinburgh 20,882, Leeds 17,700, Newcastle-on-Tyne 17,007, Bradford 16,539, Sheffield 15,013, Hull, Bristol, Cardiff, Belfast, Nottingham and Leicester all over 10,000)	16
<i>Canada</i> :—(Toronto 154,740, Montreal 138,225, Ottawa 33,547, Vancouver, Winnipeg, Quebec, Hamilton, London, Victoria (B.C.), Halifax, Edmonton and Windsor all between 10,000 and 30,000)	12
<i>Japan</i> :—(Tokyo 119,885, Osaka 76,426, Kobe 22,156, Kyoto 20,890, Nagoya 18,617, Yokohama 13,421—all in 1924)	6
<i>France</i> :—(Paris 255,561, Marseilles 18,528, Lyons 18,501, Bordeaux 12,579, Strasbourg 10,187)	5
<i>Australia</i> :—(Sydney 87,504, Melbourne 73,694, Adelaide 24,838, Brisbane 18,477, Perth 11,628)	5
<i>Switzerland</i> :—(Zürich 26,775, Geneva 15,778, Basle 15,042, Berne 13,537)	4
<i>Netherlands</i> :—(Amsterdam 39,644, Rotterdam 32,523, The Hague 29,070)	3
<i>Belgium</i> :—(Brussels 53,893, Antwerp 23,046, Liège 11,209)	3
<i>Sweden</i> :—(Stockholm 107,173, Goteborg 28,993, Malmo 14,893)	3

<i>New Zealand</i> :—(Wellington 14,686, Auckland 14,655, Christchurch 10,055)	3
<i>Russia</i> :—(Moscow 49,897, Leningrad 38,860)	2
<i>Spain</i> :—(Madrid 16,000, Barcelona 17,000)	2
<i>Italy</i> :—(Rome 14,000, Milan 18,000)	2
<i>India</i> :—(Calcutta 12,171, Bombay 10,061)	2
<i>China</i> (Peking about 40,000, Shanghai 23,000)	2
<i>Egypt</i> :—(Cairo 13,822, Alexandria 10,112)	2
<i>South Africa</i> :—(Johannesburg 21,343, Cape Town 12,917)	2
<i>Argentine Republic</i> :—(Buenos Aires 98,000)	1
<i>Austria</i> (Vienna 98,226)	1
<i>Brazil</i> :—(Rio de Janeiro 34,000)	1
<i>Chile</i> :—(Santiago 10,000)	1
<i>Cuba</i> :—(Havana 38,000)	1
<i>Czecho-Slovakia</i> :—(Prague 27,000)	1
<i>Danzig</i> :—(Danzig 10,986)	1
<i>Denmark</i> (Copenhagen 127,742)	1
<i>Hungary</i> (Budapest 32,005)	1
<i>Ireland</i> :—(Dublin 13,867)	1
<i>Mexico</i> :—(Mexico City 27,000)	1
<i>Norway</i> :—(Oslo 39,682)	1
<i>Poland</i> :—(Warsaw 33,000)	1
<i>Portugal</i> :—(Lisbon 13,893)	1
<i>Roumania</i> :—(Bucarest 11,584)	1
<i>Turkey</i> :—(Constantinople 10,325)	1
<i>Uruguay</i> :—(Monte Video 15,000)	1

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THE MAN WHO LETS THE NEW YEAR IN.

[Reprinted from the *Westminster Gazette*.]

It may be that he does not fully realise the responsibility, for he has other responsibilities. It is his function to let the New Year in, not to one particular house or to one particular town or village, but to the whole Planet on which we live. At midnight he stands, as no one else stands in the whole world, on the threshold of the New Year, for he lives and moves on that particular line where the New Year begins. Twelve hours before you and I have finished our midnight resolutions he has lived half a day in patting them into practice. For he is to be found (if you go and search for him) at Suva, in the Island of Fiji, where the New Year begins. He is as English as you and I are English, and he fulfils the solemn responsibility of conducting the business of a long submarine cable which connects Canada with Australia. So he is awake at midnight, for his are affairs which go on night and day. He is passing all sorts of messages for the Press, all sorts of tender greetings of good wishes for the New Year, which comes to him first of all the human race. So Fiji, as at this time, is a place of thrilling importance.

* * * *

Let us get hold of the romance of it before we interview him. Suva is a romantic spot. It has nowadays a vast trade with Australia and New Zealand, and about a year ago was the scene of celebrations of rejoicing when the native drum was brought forth to sound the jubilee of the establishment of the Crown Colony. The native drum will not sound for the coming of the New Year. But our friend, having assured himself of the kindly arrival, will announce to his friends at New Zealand and Australia that they may expect 1927 in an hour's time, for it is on the way. So time marches on and the Empire sets itself for a 24-hours' welcome of the little stranger. We ourselves are half way in this prolonged greeting, as we ought to be, but we must give our friend the credit of being first.

Someone will say that all this is arbitrary, and that one, Einstein, with the bludgeon of relativity, has knocked it endways. So I ask our friend at Suva what he thinks of it. "Yes," he says, "this group of islands, with all their tropical verdure, with their history of weird ceremonies of whale's teeth, and the like, have the honour of presenting the first front to 1927. Were it not for the means of communication, cables and wireless and the like, it would not be possible. You, in your conventional way, choose a dark-haired man (for luck) to let in the New Year, but it is I, on night duty in Suva, who really let it in. I do it well and in a seemly way. I tell the New Year what the world wants at its hands. I speak for all of you—black, and white, and yellow. It is a solemn moment, for all real hospitality is based on the kindness of the first words. I am the Man who lets the New Year in."

* * * *

This lonely watch of our friend, with his little company of colleagues, is a real Watch-Night Service, as one may say. He is the first to put "1927" at the head of his paper. Presently the force of habit may drive him to "1926" again, but we may be sure that at the beginnings he is invariably accurate. When New Zealand and Australia have awakened to the New Year and the crowds in Melbourne and Sydney have finished their cheering in the hot night (so different from home), already the New Year is to him a familiar friend. He was the very first to let in the New Year, and the Vancouver to which he is closely connected must wait yet twenty hours before its turn comes. We may hope that he will fulfil his mission with unusual tact and kindness, for the civilisation which he represents on this august occasion has much to expect from the New Year which he will let in. J. L.

Reuter's Trade Service, Melbourne, reports that according to a return issued by the Director of Postal Services, the total number of wireless listening licences held in Australia is 175,298. New licences to the number of 10,796 were issued last month; Victoria stands out from the other States with over 89,000. The ratio of licences for every 100 of population of the Commonwealth is now 2.9, of Victoria 5.28, and of New South Wales 2.04.

AUSTRIA.—Interesting particulars are given in the recently issued report for 1925 of the Austrian Posts, Telegraphs and Telephones Department regarding the extensions undertaken during the year. For the first time porcelain insulators of Austrian manufacture were used, to the extent of approximately 290,000 pieces. The work of changing over the Vienna telephone system to automatic operation, commenced before the war, was completed, and 6,000 new subscribers connected in 1925. There are now about 70,000 telephone subscribers in Vienna, who are served by thirteen exchanges, the largest having 10,000 connexions and the smallest 1,000. A new automatic telephone exchange has been completed in Linz; one is approaching completion in Salzburg, while work on one in Neustadt, Vienna, has been started. New international telephone connexions have also been established between Vienna and Warsaw, Vienna and Pressburg, Vienna and Agram, and between Kufstein and Oberaudorf.

Reuter's Vienna agency makes a statement which envisages telephone communication with India and China in the not too distant future. It says that the opening of the Vienna-Nuremberg telephone line on Jan. 4 connected Austria with the main telephone systems of Western Europe. The new line will form an important link in the extension of the telephone from Great Britain across the Continent to the Black Sea, Persia, and India. It is hoped to open a direct service between Vienna and London in April; next year the Austrian system will be connected with those of Hungary, Yugo-Slavia, Italy, Switzerland, and Czecho-Slovakia.

It is not thought that this particular development of long distance telephony to the Far East is likely to effect, detrimentally, the cable companies serving these huge areas.

The Radio-Austria Gesellschaft, which maintains the foreign wireless-telegraph service in Austria, continues to make good progress. During the past year a third transmitter (25-kw. Marconi) was installed at the Deutsch-Altenburg transmitting station. The receiving station at Laaer Berg was reconstructed and connected to the local municipal electricity supply mains. A short-wave transmitter has also been installed for experimental purposes. The average number of messages dealt with increased from 939 per day in 1924 to 1,708 in 1925.

BELGIUM.—According to the London *Times* the Ministry of Posts and Telegraphs is preparing the draft of a Bill, which will probably be placed before Parliament about the end of this month, for the creation of a separate and autonomous administration of telegraph and telephone services. The measure would provide the services with an accounts department on an industrial basis, and would empower the administration to borrow for extension purposes. Five companies have offered to provide the State with the necessary credit for the development of its plant, two of which would supply apparatus and the other three cables required for extending the system. Payments would be spread over a period of five years, the first instalment becoming due six months after the completion of the works, and subsequent instalments every six months thereafter. This arrangement would enable the State to defray the cost of the new installations with the additional receipts which they would yield.

BRAZIL.—From Rio de Janeiro per Reuter we obtain an apparent confirmation of the short wave service in the statement that a *new* direct means of wireless communication has been established between Brazil and Germany. The German sending station is at Nauen, near Berlin, and the Brazilian receiving station at Rio de Janeiro.

CENTRAL AMERICA.—From Guatemala City via the same agency we also learn that the radio stations presented by the Government of Mexico to Guatemala and El Salvador have been completed and put into public service. They deal with ordinary messages, night and special Press service, and day and night letters. The neighbouring States of Honduras and Costa Rica have been brought into radio communication range.

DENMARK.—From *Commerce Reports*, *World Radio*, and other sources, the information reaches London that over 92,000 licensed receiving sets, about 44,660 of which are valve sets, are now operating in Denmark, according to a recent announcement made by the Government Control Board. Practically 90% of all the sets are in Copenhagen and its suburbs, most of them being of the crystal type. It is expected that with a more strict enforcement of the licence law the figures for receiving sets in Jutland will show a great increase.

The present station in Copenhagen, which broadcasts on a wavelength of 337 m., will in the near future use a new transmitter built by Danish firms. The energy will be 1 kw., and it will act as relay for Copenhagen and its suburbs in co-operation with the new high-power station now under construction near Kalundborg, which will be working next autumn with 7.5 kw. aerial power. The provision of other relay stations will not be discussed until the Radio Council has experience to what extent the new high-power station will give satisfactory reception in the different parts of Denmark.

FRANCE.—Wireless-telephony in France is to be placed on a legal basis, according to a proposal made by the Minister of Commerce which has been unanimously approved by the Cabinet. Broadcasting becomes the prerogative

of the State, which will assume possession of all transmitting stations in five years' time. Meanwhile broadcasting will be State-controlled by a mixed committee of Government officials, authors, musicians, and lecturers, who will supervise operation, which will be carried out by authorised private enterprise. During the transition period the State will receive a percentage of the advertisement receipts, says Reuter's Paris agency.

It is also reported, by the *Financial Times*, that the French Commerce Minister, M. Bokanowski, is seriously considering the advisability of issuing a decree shortly which will place all broadcasting in the hands of the State. The postal and telegraph workers have met M. Bokanowski and urged him to do this so that the broadcasting business may become a department of the French Post Office, employing only postal servants. The Commerce Minister apparently favours this idea.

On the other hand, and according to the London *Times*, M. Bokanowski, Minister of Commerce, who recently described as "anarchic" the conditions under which French broadcasting is carried on, prepared a scheme of control with a view to placing broadcasting in the hands of properly constituted and authorised organisations. The Superior Council of the Post Office Department, an advisory body to which M. Bokanowski submitted the scheme, has, however, refused to regard the matter as urgent and decided not to discuss its details for the present. In an official note the Ministry of Commerce, which seems to have yielded to this ruling, observes that broadcasting will therefore continue "to await in anarchy its permanent regulation."

The *Daily Mail* says that Strasburg is to have a powerful broadcasting station as the result of the action of a group of Alsatian patriots interested in replying to the Germans who recently strengthened their propaganda station at Freiburg-im-Breisgau, while the *Electrical Review* says that it is also reported that a 5-kw. radio broadcasting station is to be constructed at Nice, and it is expected that the station will be in operation early in 1927.

In Paris the new year commenced with the issue of a police order for the suppression of loudspeakers used for advertising and other purposes in the streets. They have long been threatened by the authorities.

GERMANY.—Several German newspapers announce that the new station at Langenburg, near Elberfeld, in the Rhineland, recently commenced testing on a wave of about 470 m. It is expected that it will commence regular transmission early in the new year on a wavelength of 468.8 m. It is said to be the most powerful station in Europe; its power is said to be 22 kw. and rumour has it that this figure will be increased to 60 kw. in the near future. The studios are situated at Cologne and Dusseldorf.

GREAT BRITAIN.—At midnight on Dec. 31, 1926, the British Broadcasting Co., Ltd., ceased to be, and the British Broadcasting Corporation (Inc.), came into being. Probably coinciding with the change-over, a campaign against "pirate" owners of receiving apparatus is to be commenced. The Post Office authorities have secured about 500 convictions of unlicensed listeners since the passing of the Act of 1925. There are now over 2,178,000 holders of receiving licences in this country.

The Assistant Postmaster-General, Lord Wolmer, recently said that people who have more than one receiving set are expected to take out a licence for each. Lord Wolmer said that the idea of taxing receiving sets according to the valve power, instead of the present flat rate, was a very attractive one, but there were many difficulties in the way.

"The owner next to you owns everything above his property right up to Heaven, and I am afraid you will have to take your aerial down," said Mr. Clarke Hall, the magistrate at Old Street police-court, London, recently, to a man who stated that a neighbour, over whose premises he had stretched an aerial, had asked him to remove it.

The *Daily Mail* says that it is reported that the scheme for the erection of new regional higher-power broadcast stations for Great Britain and for the provision of alternative programmes has been agreed to by the Postmaster-General in its broad outline. The main idea is for a certain number of high-power stations to be erected, some in parts of the country at present without a station. They will number five or six, and will have a power of 10-15 kilowatts, and there will also be other stations with the same power as that of London. It is expected that part of the scheme will be ready for inauguration at the end of this year.

The Eastbourne Corporation, like Paris, has been much plagued by the number of loud speakers and has been informed by the Home Office that if application be made for authority to issue a by-law, the same will be sanctioned if submitted in the following terms:—

"No person shall in any street or public place, or in any place which adjoins any street or public place, and to which the public are admitted, operate, or cause or suffer to be operated, any wireless loudspeaker or gramophone in such a manner as to cause annoyance to, or disturbance of, residents or passengers. Any person offending against the foregoing by-law shall be liable to a penalty not exceeding £5."

Reading has already a by-law of this kind, and other towns are likely to follow suit if users do not exercise a little more discretion. In the main these by-laws affect the proprietors of wireless shops who make a practice of fixing a loudspeaker outside their premises with the object of attracting purchasers.

HOLLAND.—*World Radio* and other journals are responsible for the two following items:—

The Commission appointed by the Algemeen Nederlandsch Verbond to find a solution of the state of affairs arising out of the report of the Royal Commission on National Broadcasting started its work on Dec. 10. Besides the chairman and vice-chairman of the Verbond, the Commission consists of six members from Amsterdam, The Hague, and other parts of Holland.

Dutch wireless dealers are organising an effort for the standardisation of parts and fittings, and also of the technical terms used with regard to wireless.

HONDURAS.—*Commerce Reports* states that work has been commenced on the erection of the high-powered wireless station at Puerto Castilla, which will eventually replace the obsolete one now in use. With the opening of the new station, messages may be received and sent direct, if necessary, to New Orleans, Tegucigalpa, Habana, Puerto Cortes, and other distant destinations. However, as heretofore, messages will normally be relayed through the station at Tela, a supervisory centre in Honduras.

HUNGARY.—*World Radio* maintains that great improvements are being made in the Budapest station, which celebrated its first birthday on Dec. 1. The aerials are being raised, literally, and their capacity increased to 3-kw. By October the new transmitter, with a capacity of 20-kw., will be ready. The Post Office and Telephone Administration controls all broadcasting in Hungary. The Minister of Education has ordered receivers to be supplied to all schools if funds permit, and the Minister of the Interior that all hospitals shall be supplied with equipment, including loudspeakers, at the State's expense. All Budapest municipal blocks of dwellings are also to be furnished with radio sets.

INDIA.—The Indian Radio Telegraph Co., Ltd., has accepted the terms offered by the Improvement Trust for the lease of land in the Cossipore-Chitpore open space for the location of a broadcasting station.

The Indian correspondent of the *Electrical Review* states that another step is to be taken to popularise broadcasting in Ceylon. Government has recognised that it is impossible to provide good programmes constantly without some financial expenditure. The Postmaster-General has reported that the general impression in the trade and wireless circles is that progress in broadcasting is retarded because the programmes are not sufficiently varied. The chief engineer, Telegraph Service, recommends that the sum of Rs. 300 per annum allowed for entertaining artistes should be increased to Rs. 3,000 per annum for the organisation of programmes. There are at present 335 licence-holders, and the revenue collected from licence fees during the year amounted to Rs. 3,350. With better programmes it is anticipated that the number of licences will be greatly increased. Government proposes to authorise the Postmaster-General to incur an expenditure not exceeding Rs. 3,000 this financial year, on the understanding that the whole position will be reviewed again 12 months hence.

IRISH FREE STATE.—Mr. J. J. Walsh, Irish Free State Minister of Posts and Telegraphs, announces that the new broadcasting station at Cork will be completed by about March, and that it is intended to erect a station at Athlone, with a radius of 80 to 100 miles for crystal reception, and that it is also proposed to erect stations for the Irish-speaking districts. The Athlone station will be ready in about 18 months. He mentioned that of 40,000 listeners, only one in ten purchased licences, but legislation is now passing through Parliament making payment of licence fees compulsory under penalty. It is hoped, he added, to use electric power available from the River Shannon for the Athlone station.

The number of wireless receiving licences issued in the Free State up to the end of November was 4,544, of which number 430 were issued during November.

JAPAN.—The *Electrical Review* mentions that an order is said to have been placed for a 600-kw. station, which will be ready in 1928. It is to be entirely the property of the Japanese Wireless Telegraph Co., an official concern enjoying the support of Parliament. Also that the Osaka station is now regularly receiving direct wireless messages from the Sainte Assise wireless station near Paris. This service was commenced in September, 1926. Formerly messages were sent from the Bordeaux station indirectly to the Iwaki station in northern Japan, and were confined to news dispatches.

MEXICO.—From Mexico City by the medium of Reuter's comes the statement that the Telegraph and Postal Department of the Mexican Government will shortly call for tenders for the modernising of the entire telegraph and radio-telegraph systems of Mexico. Fourteen additional radio-telegraph stations will be installed, or acquired, and a considerable amount of equipment, including repair tubes, transmitters, and receivers, will be ordered.

POLAND.—H.M. Commercial Secretary, Mr. R. E. Kimens, at Warsaw, informs the Department of Overseas Trade that the exploitation of broadcasting in Poland is in the hands of a private company with Government participation in 40% of the share capital. The concession is for 10 years and the Post Office is collecting licences; the fee is Z30 per year, or Z3 monthly; 25% of the licence fees is retained by the Post Office and 75% is handed over to the company. On the formation of the company arrangements were made to erect one broadcasting station for Warsaw of half the power of Daventry, and one smaller station (6-kw.) for Cracow. The opening of the Warsaw

station took place in the spring of 1926. In spite of the summer season the rush of applications for licences shows keen development. At present the number of issued licences amounts to 30,000. The collected fees are quite sufficient to run the Warsaw station without losses, with a quite good programme. Taking into consideration this quick development, it has been decided by the company to erect two additional transmitters, one in Poznan the second in Katowice, and a considerable number of new transmitting stations, some as relays, are proposed for the beginning of the next year.

Mr. Kimens has also forwarded to the Department of Overseas Trade a brief survey regarding development in Poland. For communication with foreign countries the Post Office is in possession of four stations:—The transatlantic station has been built with the assistance of the Polish emigrants in America by the Radio Corporation of America. The transmitter consists of two 300-kw. alternators, which can work both in parallel on a very good elaborated aerial. This station was designed for high speed, but as the actual number of words available for transmission is only between 700-1,000 daily, the running expenses are so high that special credits must be voted by the Diet to cover the losses. The greater part of the cost of the station is paid off, with the exception of an outstanding sum of approximately Z100,000, which has to be paid off within six years. Second and third stations are the arc transmitters at Cracow and in Poznan. These only permit of hand-speed working, and are used for communication with European countries. A French alternator station of approximately 6-kw. at Grudziadz is also used for communication with European countries, especially with France; the last-mentioned three stations are "extremely inefficient" and are not equipped with modern receivers. Only a small part of correspondence which could be transmitted from and received in Poland is going by wireless.

PORTUGAL.—A direct high-speed wireless telegraph service between England and Portugal was opened on Dec. 15. It is the first of a number of wireless telegraph services which are being established by the Portuguese Marconi Co. under a 40-years' concession granted by the Portuguese Government to Marconi's Wireless Telegraph Co., Ltd., to undertake the organisation of a complete wireless telegraph and telephone system to place Portugal in communication with her Colonies, the principal capitals of Europe, South America, and other countries. Stations are being built near Lisbon, in Cape Verde Islands, Maderia, the Azores, Mozambique, and Angola. One of the group of transmitting stations to be erected at Alfragide, near Lisbon, and one of the corresponding receiving stations at Vendas Novas will work at high speed with the Marconi stations at Ongar and Brentwood, near London, and with the principal capitals of Europe; another will communicate with the Portuguese Islands and with ships at sea, and short-wave "beam" stations are also being built for communication with Brazil and other parts of South America, and the Portuguese Colonies at Mozambique and Angola, where similar beam stations are being constructed. The services recently inaugurated are those between Lisbon and London, Maderia, and the Azores.

RUSSIA.—The Soviet Government contemplates big developments in broadcasting, some of which were recently explained to the *Daily Telegraph* by M.I.N. Smirnof, People's Commissar for Posts and Telegraphs of the U.S.S.R., who has been in Great Britain studying our methods, not only of broadcasting, but also of conducting the telegraph and telephone services. M. Smirnof stated that there were in Russia about sixty local stations, in addition to the Moscow station. In two months' time a much more powerful station, with a radius of 2,000 miles, would be opened at Moscow. Broadcasting was being used for three purposes: For supplying the population with newspaper information, for announcing Government decrees and instructions, and for transmitting lectures, music, and the drama. At many of the street corners of Moscow there were loudspeakers, beneath which crowds gathered, even in winter. M. Smirnof returned to Russia on Dec. 21.

Reuter's agency has received the following statement by M. Smirnof: "The Commission which accompanied me on my visit to Great Britain consisted of Professors Bronch-Bruevich and Rozhansky, engineers Shorin and Vassiliev, and the president of the Low-Tension Electrical Trust, M. Zhukov. It came here at the recommendation of the late M. Krassin and the invitation of the Marconi Company, and its main object was to acquaint itself with the latest achievements in the domain of radio construction and broadcasting.

"As regards the telegraph system, it is still insufficient for our needs. We are extending the system so far as is possible with the means at our disposal; during 1926 a new telegraph station was erected in Moscow, which will be the second largest building in Moscow, and it will also house the international telegraph station.

"With reference to Radio communication, I should like to express our thanks to the management of the Marconi Company for the assistance it gave us in our investigation of the radio system of Great Britain. We are full of admiration for the remarkably fine work done by the Marconi Company; it struck us as some of the best we have seen anywhere. We should also like to express our thanks to the Postmaster-General, Sir William Mitchell-Thomson, by whose courtesy we were enabled to view the telegraph and other institutions of the Post Office. Our short stay in Great Britain has furnished us with exceedingly valuable material which we hope to make good use of on our return to the U.S.S.R."

Quite a number of the C.R.O. staff, C.T.O., London, will recall the visit of these interesting and interested officials.

SWEDEN.—Reuter's Trade Service, Stockholm, says that an invention to prevent interference between broadcasting stations issuing the same

programme on the same wave-length has been made by the broadcasting expert of the Swedish Telegraph Office.

UNITED STATES.—*World Radio* says that with the advent of the new National Broadcasting Company, WEAJ (New York) now becomes the centre of a system which comprises some twenty different transmitters in America. Several are of high power, and transmission from them is now being regularly and clearly received on this side of the Atlantic. The new company is in a position to link up with different cities in the United States and to relay programmes from any point in the system. For this reason listeners in the British Isles may pick up strange calls on wave-lengths which they have hitherto associated with certain well-known stations.

In a recent address, says the same authority, Major-General J. G. Harbord, president of the Radio Corporation of America, said that under the present developments there were only 89 wavelengths available within the United States, or approximately one-tenth the number of stations now in operation or projected in the immediate future. The National Radio Co-ordinating Committee had urged Congress to deal with the radio problem, saying that further delay would jeopardise a national industry involving \$600,000,000 a year and disappoint 20,000,000 persons. The Co-ordinating Committee urged emergency legislation, necessary because broadcasting stations were increasing at the rate of one a day. The Committee urged prompt passage of a permanent control law, and endorsed the principle of the White Bill for control by a Federal Radio Commission and the United States Department of Commerce.

ATMOSPHERICS.—In addressing a gathering of 1,500 scientists from all parts of the world at Philadelphia, Dr. Michael Pupin made the startling announcement that "atmospherics" and the fading nuisances so well known to wireless enthusiasts were "messages" from the sun and the planets. The *Daily Telegraph* says that Dr. Pupin made it quite clear that he used the word "message" in a symbolic sense, and meant merely the electrical attraction between the earth and the planets as demonstrated by the periodical swing of great earth currents, the tidal flux of electricity through submarine cables, and objectionable noises in wireless instruments. These phenomena would in time be interpreted. It is, however, not unlikely that the bulk of a lay audience or readers would still misunderstand! and one can only reflect upon the loose expressions which sometimes escape even from the lips of scientists.

Electrical Merchandising, an American periodical, recently gave an account of the extent to which the wiring of houses for radio reception is taking hold of the U.S.A. One installation was recently fitted in an apartment house in San Francisco which cost \$10,000. The building is a ten-floor construction with a hundred apartments. The receiving set is situated in the entrance lobby and loudspeakers are arranged in ten groups of ten (a group for each floor). In 100 rooms a loudspeaker is set in a compartment specially provided in the wall, and it is covered with a neat metal grill so that it is entirely out of the way. Each instrument is, of course, controlled by the occupant of the room. A compensating arrangement is provided to control the volume.

VENEZUELA.—Reuter's Caracas correspondent states that the Government has concluded a contract with Marconi's Wireless Telegraph Co. for the erection of a high-power station at Maracay. It was originally proposed to erect the station at Caracas, but it has been found inadvisable to do so.

The Duty of Happiness.—There is no duty we so much underrate as the duty of being happy. By being happy we sow anonymous benefits upon the world, which remain unknown even to ourselves, or when they are disclosed, surprise nobody so much as the benefactor.—*R. L. Stevenson.*

J. J. T.

REVIEWS.

"*Fifty Years of Electricity.*" By J. A. Fleming, M.A., D.Sc., F.R.S. (Published by Iliffe & Sons, Ltd., Dorset House, Tudor Street, E.C.4. Cheap Edition. xi + 371 pp. Price 15s.)

Every reader of the *Telegraph and Telephone Journal* knows Dr. Fleming by reputation, and a considerable number have had the privilege of making his personal acquaintance as students at one or other of the many courses of lectures which he has delivered. There is probably no one in recent years who has individually done so much to assist the developments of the scientific side of our work, while at the same time he has made the knowledge of these developments widely available by means of his remarkable gift of lucid expression in books and lectures.

It is therefore with great pleasure that we welcome the issue of a new edition of Dr. Fleming's book "*Fifty Years of Electricity*," published at a price within the means of all.

Dr. Fleming takes the period from 1870 to 1920, and reviews in a clear and non-technical manner, suitable for the intelligent general reader as well as the expert, the developments which have taken place during that period in electrical theory and the applications of theory to practice.

In the introductory chapter he surveys briefly the course of electrical engineering before 1870, describing the invention and early development of the electro-magnet, the voltaic battery, the telegraph, the submarine cable and the dynamo. Then follow five chapters dealing respectively with the development during the five decades in question in Telegraphy and Telephony; Generators and Motors; Electric Lighting; Electric Heating; and Supply Stations, Railways and Power Transmission. The sixth chapter deals with the advances made in Electric Theory and Electrical Measurements, and the seventh chapter is devoted to Wireless Telegraphy and Telephony, a subject in the development of which Dr. Fleming has played a leading part, from the earliest days of the application of electro-magnetic waves to signalling across space up to the present.

In a concluding chapter Dr. Fleming indulges in some very pertinent reflections on the manner in which the valuable gifts to humanity which he has described in the previous portion of his book have been secured, and on the methods by which these gains may be extended and enlarged in the future.

We can strongly recommend this book, first to those of our readers to whom many of Dr. Fleming's reminiscences will recall memories of their own early days, and secondly to those who are still in the student stage of their careers. There is so much to be learnt concerning the present-day stage of the various branches of electrical engineering that many students find little time to study the early work on which the present is based. To these a concise review such as Dr. Fleming's book should be an inspiration. A knowledge of the small beginnings from which the present mighty structure of electrical engineering has grown gives an indication of a still mightier development in the future.

"*Exploring Life.*" *The Autobiography of Thomas A. Watson.* (D. Appleton & Co., New York and London, 315 pp. \$3.50.)—

This autobiography of Thomas A. Watson is happily named. From working electrician, collaborator with Alexander Bell, to Bensonian actor is a wide step, in the making of which Mr. Watson explored many varieties of life with a single mind and a rare gusto. The whole story is told with a frank and clear straightforwardness, not without a certain naïveté, which gives the book an undeniable charm of its own. The episode of Watson's connexion with Bell is well told, and his wholehearted devotion to his task of working for the inventor during an exciting and protracted period of experiment forms good reading. The chapters describing vividly their ultimate success will have a special claim on our readers, but the remaining chapters are no less full of interest. Mr. Watson's description of Bell's lectures on the telephone, when his own share in the performance was to sing from a transmitter some 25 miles away a couple of Moody and Sankey ditties, or "Do not trust him, gentle maiden"—to the rapturous encores of the audience—are distinctly humorous. Mr. Watson confesses that his vocal gifts like his repertory were limited, but he mastered the art of making the most of both in close quarters with the primitive transmitter—always with a gratifying success. Tiring of electrical work and longing to attain a more general culture, Mr. Watson tried travelling, the study of languages, and shipbuilding, and then in response to a love of elocution which had been latent in him from boyhood, he asked to be accepted as a student in F. R. Benson's theatrical company in England. After touring with him, he directed his abounding energies to adapting Dickens for the stage, with enjoyment if without conspicuous financial success. The book throws an interesting light on American life in the seventies and eighties of the last century, and Mr. Watson describes the course of his eventful and varied part in it with a modest account of his achievements and valuable work, and always in most readable and vigorous style.

THE CONTRACT OFFICER.

THERE would appear to be an impression among many members of the service that a contract officer's life consists of one long glorious excursion into a sort of official Tom Tiddler's ground where two-shilling pieces are to be had for the picking up and where barren spots are covered in a single night by splendidly erected kiosks sprung like Aladdin's Palace solely from a desire. Alas! how different is the reality. The true picture of a contract officer is more like Christian passing across the Slough of Despond where all applications must be refused, or through Vanity Fair, gradually getting rid of his heavy burden of profusely illustrated literature, hoping some day to reach those Delectable Mountains where external and internal plants flourish, and a mass of enlightened people armed with fountain pens stretch forth eager hands for agreements.

What really happens is that, the staff being inadequate to attempt house-to-house canvassing, only those people who there is some reason to believe are likely to require a telephone are visited. This information is obtained in various ways; a builder or estate agent tells the contract officer that a house has been sold, or the contract officer sees a house newly occupied, or he may get an introduction from an existing subscriber. He calls and tries to obtain an order; often in the suburbs the husband is in town and will not be home until the evening and it may be 8 o'clock at night before an interview can be obtained. In many of the outlying districts transport is poor and, even if the contract is signed, it is late before the officer can reach home, and the commission is by no means easily earned. It frequently happens that at the first interview the prospective subscriber is undecided, and the contract officer has then to use his judgment as to when the seed he has sown is likely to mature, and he makes out a card with the name and address on it and the figure 1, 3 or 6 at the top according to the number of months which he considers will elapse before a further call is likely to be successful. These cards are filed and followed up in due course until an order is obtained or the case abandoned as hopeless, the latter being a very rare occurrence.

It will be realised that in order to carry out his work effectively a contract officer must keep a constant watch over all his territory, usually many square miles in extent. Old property must be watched to see if there is any change in the tenancies—this particularly applies to shop property where it is usually found that the new occupier is more up-to-date than the old one—and an eye must be kept on all building land because in the present state of affairs houses are completed and occupied in an incredibly short time after the foundations have been dug.

Perhaps one of the greatest difficulties a contract officer has to contend with is that, in spite of the fact that we as a nation label ourselves liberal, progressive, socialist or communist, there is a racial conservatism in all of us that looks with suspicion on anything we have not had before. Strange as it may seem, great difficulty is still experienced in convincing some people that a telephone extension is more convenient than a speaking tube, or than a bell which calls a servant from the bottom of a house to the top to receive a message. Even by business men the argument has been advanced that they were already doing as much business as they wanted to and did not require any more. With the latter the reply that if they did not employ up-to-date methods they might lose what business they already had has been found effective.

It is in endeavouring to persuade subscribers to withdraw notice to cease after they have given it that an infinite amount of tact is requisite. The contract officer must be prepared to prove that alleged trouble with the service is frequently due to the fact that the subscriber himself has done something he ought not to have done or left undone something he ought to have done. He must be prepared to show that privately kept records of calls made by the subscriber cannot be as efficient as those made automatically by a skilled operator, and he must be prepared to listen

to and treat sympathetically general complaints about the whole conduct of the Government. As an instance, one complaint made was that compensation had been refused for the loss of registered letters where it could not be proved that the valuables lost were actually placed in the envelopes. In connection with notice to cease work perhaps the contract officer's greatest bugbear is the subscriber who apparently out of sheer cussedness gives notice regularly every quarter and as regularly withdraws it at the eleventh hour, but fortunately these are few.

After adopting in its entirety the advice of Polonius to his son, the contract officer will also find useful a general knowledge of the telephone systems of other countries, more especially of the United States and Sweden, as these are the ones most frequently quoted by the amateur technical subscriber as examples of what ought to be done in this country.

In spite of its many trials and difficulties the life of the contract officer being principally out of doors is a healthy and therefore a happy one, and he meets with many who treat him with the milk of human kindness and at rare intervals with the dew usually associated with mountains; so for the time being we leave him, wishing him patience under his sufferings and a happy issue out of all his afflictions.

J. R.

LONDON TELEPHONE & TELEGRAPH SOCIETY.

ON the 17th ult, Mr. H. G. Warren gave an intensely interesting paper at the Institute of Electrical Engineers and before the above society, illustrated with some excellent slides, on "Post Office Buildings," and might have added, though he did not, "And the troubles and trials of an Architect," as a very suitable sub-title.

We are all inclined to think at least at times that *we* have the worst and most difficult job in the Service, but an evening under Mr. Warren's tutelage proved to most of us that we might have more not less worry, and trials, and tribulations by changing over!

One's eyes opened, too, when we learnt that the Post Office of to-day has, on occasions, seriously to consider how to make a modern building such as should be a centre for posts, telegraphs, and telephones, assimilate the spirit of the architecture of, say, Oxford or York or Canterbury, &c., &c.

Who would have thought that Gothic, or Norman, or Corinthian styles troubled so prosaic a department as that charged with the design and erection of H.M.'s Post Offices?

One striking difference between engineers and architects was emphasised by the lecturer which is well worth quoting: "Engineers work *up* from detail to the mass, but architects work from the mass down to the detail."

Here and there we were given what may be termed "tips for house purchasers," for example, as to the best place for the bathroom, the correct fall for drain-pipes of 4 in. and 6 in. respectively, tricks of dishonest builders and contractors with wood-work, concrete-mixing, and the like. One gentleman came away asking himself why he had already chosen his house and paid for it, and was last understood to say, "How did I know that there should always be a damp-proof course round the base of a chimney pot? and how can I get up there to see? Another gentleman was concerned with the mystic measurement of "treads" and "rises" and how to juggle with the twice-times table in order to arrive at the correct number of 23 inches.

Mr. Warren well deserved the hearty vote of thanks accorded at the close of his paper and is to be congratulated upon so pluckily fulfilling his engagement despite an annoying attack of laryngitis.

J. J. T.

WEST YORKSHIRE DISTRICT.

ANNUAL REPORT (1926) UPON THE TELEPHONE SERVICE.
(Abridged.)

DURING the past year, in spite of the serious handicap caused by industrial unrest, a marked advance has been made in all directions.

New Stations.—

New lines, connected	...	...	...	...	4,722
Lines ceased	...	...	...	...	2,424

Net gain = 2,298 = 6%

Total number of lines on Sept. 30, 1926 = 38,119.

New Exchanges.—In the Leeds area the satellite exchanges of Chapelton, Headingley, Roundhay and Stanningley have been converted from magneto to automatic working.

At Halifax the construction of an automatic exchange is proceeding rapidly, and it is hoped the work will be completed early in the year.

At Wakefield the installation of automatic equipment is in hand.

Shipley exchange is shortly to be transferred to new and more commodious premises over the new Post Office.

Brighouse exchange is to be converted from magneto to central battery working and very shortly will be transferred to new premises.

At Dudley Hill and Low Moor new central battery exchanges are in course of construction.

At Keighley, Armley and Sandal, building has commenced in which to house new automatic exchanges.

At a number of existing exchanges additional switchboard equipment has been installed.

At Idle premises have been purchased for a new exchange

At Lofthouse, a site for a new automatic exchange is being sought.

An extension of the Batley Head Post Office to accommodate a new exchange is about to be commenced, and at Hebden Bridge plans for a new Post Office and exchange are under consideration.

Rural Exchange.—An exchange has been opened at Cracoe where continuous service is now available to certain subscribers by means of through switching at night and on Sunday to Skipton Exchange.

Telephone Kiosks.—Very considerable progress has been made in the provision of public kiosks throughout the district, from which telephone service is available day and night, and there are over 200 actually available for public use or on the point of completion.

Telephone Calls effected during the Year.—

Trunk calls	...	...	...	...	5,231,959
Local and junction calls	...	...	...	...	38,208,568
Telegrams passed by subscribers by means of the telephone	...	...	...	...	388,825

Private Automatic Branch Exchanges.—The value of private automatic exchange switchboards at subscribers' premises is being increasingly recognised, and since the last report a number of private business firms in the district have been provided with these installations. As previously pointed out, the provision of this type of switchboard enables rapid intercommunication between offices without the intervention of a switchboard operator.

Underground Cable Extensions.—During the year in question satisfactory progress has been made with the laying of trunk and local underground cables. The gross mileage of wire existing at the end of September was 202,895 miles, being an increase of 22,184 miles during the year.

During the year additional main underground cables have been brought into use as follows:—

- Leeds to Hull (2nd cable), with spurs serving the Doncaster and and Goole areas.
- Hull to Driffield and Bridlington.
- Lincoln to Newark and Nottingham.

The main cables referred to are of the balanced and loaded type.

A new underground cable between Dewsbury and Wakefield has been authorised. The work is well in hand, and it is anticipated that it will be brought into use early next year. The provision of an additional underground cable between Huddersfield and Manchester is also scheduled for next year.

In connection with the provision of an additional cable from Bradford to Keighley and Skipton, all the necessary duct work has been completed, and the laying of the cable will follow as soon as the latter is available.

In addition to the foregoing proposals, arrangements are in hand for loading additional circuits in the existing Bradford-Dewsbury cable to improve speech efficiency on circuits routed through that cable.

The provision of local underground cables to serve subscribers in the various exchange areas is resulting in a gradual reduction in the number of

overhead lines carried on poles and brackets, and in a very large number of cases the only overhead plant now existing is one or two spans from a distributing pole—up to which point the underground is laid—to the subscribers' premises. This not only gives greater immunity from line faults due to storms or other causes, but is far more satisfactory and economical from a maintenance point of view, and undoubtedly provides the subscriber with a more efficient and regular service. Further, in large cities such as Leeds and Bradford, underground cables are frequently led to a point within a building containing suites of offices, &c., which point is technically known as a "block wiring" point. Connections are then made to the subscribers' instruments by internal covered conductors. It will thus be seen that in these cases overhead lines are dispensed with altogether.

Trunk Communications.—As a further indication of the progress made during the year, 165 additional trunk and junction circuits in the West Yorkshire Telephone District were brought into use, whilst 46 additional circuits were provided from towns in this district to towns in other telephone districts.

Telephone Repeater Working.—The raising of the roof of the right wing of the Leeds Head Post Office has been completed. This alteration has been carried out to provide room for a new repeater station which is to work in connection with the underground cable from London to Glasgow. At present, only a temporary repeater station exists, fitted with a capacity of 43 repeaters, 35 of which are working. The new repeater station will have an initial capacity of 190, and an ultimate capacity of approximately 1,000 repeaters, and will enable full use to be made of the wires available in the new underground route from London to Glasgow via Leeds and Edinburgh. Leeds being a good geographical centre, the establishment of the repeater station will also enable underground wires east and west of Leeds to be placed in repeater, and thus provide more efficient transmission on these circuits.

The installation of the apparatus is now completed, and is being tested out. It is hoped to bring the new repeaters into use early in the new year.

In connection with the above station a new secondary battery installation has been completed, which has a capacity of approximately 5,000 ampere-hours.

(Signed.) W. H. HANCOCK,
Surveyor,
West Yorkshire District,
Leeds.

(Signed.) T. B. JOHNSON,
Superintending Engineer,
North Eastern District,
Leeds.

TELEPHONE PROGRESS IN SPAIN.

KING ALFONSO, General Primo de Rivera, together with over two hundred Government Officials, Diplomats and leading citizens of Spain, participated last month in the establishment of a new European long-distance telephone record, when a conversation was carried on over a circuit 3,800 kilometers long, as a feature of inauguration of Standard Rotary Automatic Telephone Service throughout Madrid.

The record was established in a demonstration of the lines of the nationwide system that has been built in the last eighteen months by the Compania Telefonica Nacional de Espana and, although the distance covered was equal to that from Madrid to Moscow, the circuit did not extend beyond Spanish territory. It did, however, cross the Straits of Gibraltar by submarine cable uniting the Continents of Europe and Africa. Starting at Madrid, the circuit travelled north of San Sebastian on the Bay of Biscay, passing thence south-easterly to Barcelona on the Mediterranean, then turning westward to Madrid, deflected to the South and diving beneath the surface of the sea at Algeciras, brought up at Ceuta in the Spanish Protectorate of Morocco. Returning northward to Madrid by another line the circuit then shot off toward Galicia, terminating at Coruna on the north-west corner of the Iberian Peninsula. Sixteen stations responded to the roll-call over this circuit and greetings were exchanged with the four corners of Spain. The demonstration was opened with a talk by the Marques de Urquijo, President of the Company, in which he described the work accomplished in the past year. General Primo de Rivera replied in the name of the Government, expressing his appreciation and congratulating the Company on what it had accomplished for the benefit of the National communication in such a short time.

After the roll-call was completed, His Majesty addressed the sixteen stations over the circuit, congratulating the Compania Telefonica Nacional de Espana and the Spanish Nation, expressing his satisfaction upon the important advance which had been made in the Telephone service of the country.

This event was preliminary to the formal opening by King Alfonso of the new Madrid Local Telephone system completely installed in a space of fourteen months by the Compania Telefonica Nacional de Espana, the old manual switchboards and overhead lines being replaced by Standard Rotary Automatic equipment and underground cables.

The change in service was accomplished simultaneously throughout the Capital and was loudly acclaimed by the public, who had endured many years of inadequate facilities. Madrid is second in the series of nineteen cities in which the Compania Telefonica Nacional de Espana will convert the telephone service to Rotary Automatic within the coming three years.

TELEPHONE NOTES.

ACCORDING to Reuter's Trade Service (Stockholm) the Director-General of the Swedish Telegraph Board stated in a recent interview that a third telephone cable between Sweden and Germany would be laid this year, 1927, not only to meet the steadily increasing communication between Sweden and Germany, but also for an extension of telephone traffic to England, in which very great interest is shown, and perhaps later on to France and Italy. The planned telephone cable to Finland will not be laid yet, no allowance having been made in the Finnish Budget for this purpose. Among other features will be the continued erection of automatic telephone stations at Stockholm, the extension of the telephone cable northwards to Upsala and Gaefle, and an increased use of the Stockholm-Gothenburg cable.

* * * *

Reuter's agency has received a statement from M. Smirnov, People's Commissar for Posts and Telegraphs of the U.S.S.R., who has lately been in England. He states, *inter alia* :—

"Telephony has developed considerably during the last few years, although there is still a very great shortage of connections in the U.S.S.R. During the present year the Moscow system has been extended; four automatic stations with an initial capacity of 40,000 'members' are now being constructed. The work is being carried out by the Low-Tension Trust, and a programme has been drawn up for a period of five years, which will supply the most necessary needs of the population at a cost of 150,000,000 roubles, but an endeavour will be made to raise the necessary capital in order to put the work on a more extensive footing. The Telephone Department is very profitable, and a considerable proportion of the required capital is furnished by the profit made in this Department. The rest is obtained from the profit on the postal system and by means of loans. During the last three years the extent of our telephone lines has increased by 40%; last summer the Moscow-Rostov and Moscow-Kiev lines were completed, whilst in 1927 a Rostov-Tiflis line will be constructed. We shall thus have connexion between Leningrad-Moscow-Rostov-Tiflis, a total of 2,000 kilometres. Our international telephone communications are also developing very successfully."

* * * *

In connexion with a discussion on a paper read before the Institute of Electrical Engineers by Mr. J. A. Cooper, Chief Engineer of the Birmingham Broadcasting Station, the *Electrical Review* states that Mr. Cooper paid a tribute to the Post Office Engineers in connexion with the telephone lines allotted to the B.B.C. for use in simultaneous broadcasting, and mentioned an important improvement in S.B. work by which the engineers hoped to minimise line distortion and line noises. In the earlier days, he said, it was found necessary to introduce filter circuits at the end of the line, but they were now dispensed with, and the new method, details of which he was not at liberty to disclose, consisted of the insertion at stated and convenient intervals along the line of what were called "mirror images." They revealed the characteristics of the line, and it was possible by their use to check distortion in sections of the line; the ultimate result was that at the station end of the line a fairly good frequency characteristic was obtained.

* * * *

A service complaint, rather out of the ordinary run, according to the *Telephone Engineer* of Chicago, came to a telephone manager in a certain city in the United States, recently. A subscriber called the manager and asked if some way might not be found to prevent his residence telephone being called by people conducting sales campaigns by telephone. The complainant said that scarcely a day passed when his wife was not called to the telephone by agents selling household appliances, articles of clothing, toilet preparations, dress patterns and all manner of merchandise, and these repeated calls had become very annoying. After giving the matter some consideration, the manager was able to suggest only one remedy that might be applied, namely, the withdrawal of the telephone directory listing, which might or might not be a solution.

* * * *

The opening of the Vienna-Nuremberg telephone line on Jan. 4 connected Austria with the main telephone systems of Western Europe. The new line will form an important link in the projected extension of the telephone from Great Britain to Austria and the countries beyond in Near East.

H. J. E. S.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of stations working at Nov. 30, 1926, was 1,464,735, a net increase of 11,555 on the total at the end of the previous month. During November 21,780 new stations were added to the system counterbalanced by 10,225 cessations.

The growth for the month of November is summarised as follows :—

	London.	Provinces.
Telephone Stations—		
Total at Nov. 30	513,300	949,435
Net increase for month	4,494	7,061
Residence Rate Installations—		
Total	108,310	179,141
Net increase	1,831	2,386
Exchanges—		
Total	112	4,012
Net increase	—	8
Call Office Stations—		
Total	4,660	16,645
Net increase	34	112
New exchanges opened under Rural Development Scheme—		
Total	—	981
Net increase	—	12
Rural Party Lines		
Total	—	9,932
Net increase	—	35
Rural Railway Stations connected with Exchange System—		
Total	—	798
Net increase	—	7

The number of inland trunk calls dealt with during October—the latest statistics available—was 7,873,526, an increase of 343,810 or 4.6% over the figure for the corresponding month of 1925.

Calls made to the Continent during October numbered 24,876, and from the Continent 27,363.

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

- LONDON—Burgh Heath, Seven Kings.
- PROVINCES—Crowborough—Automatic.
- Leigh-on-Sea ..
- Stalybridge ..
- Cosham ..
- Oxford ..

And among the more important exchanges extended were :—

- LONDON—Buckhurst, Esher, Purley, Royal, Sidecup, Sydenham, Thornton Heath, Willesden.
- PROVINCES—Cheetham Hill, Garston, Portsmouth, Urmston, Uxbridge, Wigan, Wilmslow, Wolverhampton.

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

- Exeter—Torquay,
- Polmarkyn—Liskeard,
- London—Welwyn,

while 99 new overhead trunk circuits were completed, and 82 additional circuits were provided by means of spare wires in underground cables.

In the Capital of the Mid-Pacific



THE operation of a telephone exchange in such a remote and different place as Hawaii presents many handicaps. The climate, perfectly suited to one of the world's great playgrounds, is far from favourable to telephone operation. In addition, the many nationalities served and the many different languages spoken might well be expected to offer almost insurmountable difficulties.

In spite of these things, the Mutual Telephone Company of Honolulu, by its great resourcefulness and through the aid of Strowger Automatic Telephone Equipment, which it long ago adopted as a "tropical standard," has achieved enviable success and prosperity in its work of rendering telephone service on this far-away island.



Automatic Electric Inc.

FACTORY AND GENERAL OFFICES : 1033 W. VAN BUREN ST.
CHICAGO, U.S.A.

The Telegraph and Telephone Journal.

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

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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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No. 143.

A MESSAGE FROM SIR EVELYN MURRAY.

THE opening of the transatlantic telephone service is an historical event in the sphere of communications, and I should like to take this opportunity to congratulate the Wireless Engineers of the Post Office who, in collaboration with our friends of the American Telephone & Telegraph Company, have achieved this notable success.

Credit is also due to the London Telephone Service and to the Traffic Staff for the smooth and efficient organisation at the Trunk Exchange, and last, but not least, to the admirable team of operators, who worked the service under the difficult and somewhat discouraging conditions of the opening day with enthusiasm and efficiency.

G. E. P. MURRAY.

A GREAT EVENT.

A GREAT date, which may be called "epoch-marking" without doing violence to that well-worn epithet, has come and gone. Jan. 7 marked the culmination of years of patient experiment. On that day public commercial speech was exchanged by wireless telephony between London and New York, and the dream of far-seeing telephone engineers became a reality. Although the Press, on the whole, has recorded the event with acclamation and devoted

columns of description to this latest wonder made manifest in our midst, we may doubt whether less marvellous events have not seized more powerfully on the public imagination. The public is suffering from a surfeit of scientific marvels, real and imaginary, in this century, and when a new one is thrust upon its attention, it perhaps ceases to wonder "how it's done." This incuriosity, this attitude of *nil admirari*, can be carried by the easy-going citizen and "heir of the centuries" to a point where the fact that the Rangers have beaten the Rovers by 5 goals to *nil* will seem, for a brief hour, more stupendous than all the triumphs of science. He knows at least how that's done and can marvel that it was done. He has become so accustomed to pick up with a valve-set stray songs and speeches from foreign wireless stations that he hardly realises what it means to devise and perfect apparatus which enables any London subscriber to speak to any New York subscriber over a distance exceeding 3,000 miles without the aid of wires.

Telephony by wireless was, in fact, accomplished a quarter of a century ago, but it was then in such a form as to be impracticable for ordinary commercial usage. It had to await the advent of the thermionic valve, the invention which has revolutionised the arts and practices of communication. Commencing with quite a small size, such as is used in the broadcasting receiver of to-day, the valve has been increased in power year by year until we have the large power valve transmitters of 200 kilowatts capacity which are in service for the telephony between London and New York.

In order to minimise the troublesome factors of "fading" and "atmospherics," systematic observations had to be carried on for over three years, and the conditions which have to be met are known. Side by side with this observation work has proceeded the installation of the 200 kilowatt telephony transmitter at the Post Office Station at Rugby. Continuous experiments have also been directed towards the improvement of the receiving apparatus in the reduction of the effect of atmospheric interference by the use of directive aerials. This work is cumulative in its effect, and as a measure of its magnitude it may be stated that when all the improvements which are at present planned are realised it is expected that the receiving conditions will be 100 times better than they were in 1923. The transmitter at each end which, gauged by its effectiveness, is 500 times the strength of the ordinary broadcasting station, is the most expensive part of the installation. The receiving arrangements, which involve the magnification of a signal, which at a distance of 3,000 miles, in spite of the enormous power of the transmitter, is only about one thousandth of the strength which a broadcast listener receives from his local station. The directive reception involves the erection of very special aerials whose length totals 10 miles. Lastly, there are the underground land-line systems, some hundreds of miles at each end, to connect the transmitters and receivers to the central locations at New York and London respectively. All these links in the chain have had to be carefully engineered with the proper speech levels at all points and with all the necessary amplification and other devices for ensuring good transmission. Another interesting problem which had to be faced was the fact that the aether is very much

overloaded. In the wave band between 5,000 and 6,000 metres, which was decided upon as the best for this particular communication, there were over 40 wireless telegraph services already at work and occupying most of the available space. It was decided, therefore, in order to economise aether space, to work both transmission and reception on the same wavelength. This introduced many difficulties which were solved by the design and adoption of very delicate switching arrangements operated by the voices of the speakers on the circuit. These switching devices are controlled by the voice in such a way that when the subscriber in London speaks, his circuit to New York is switched on and the circuit from New York to London is switched off. As soon as he ceases speaking the switches restore automatically and when the New York subscriber replies his voice works the switches so that he is connected to London and the circuit at New York incoming from London is temporarily cut-off. This to-and-fro process goes on automatically all the time the conversation is proceeding.

A well-known writer in the *Evening News* says that instead of exclaiming at the wonder of transatlantic telephony, many people are content to remark that £15 is a large fee to pay for 3 minutes at the telephone. But when it is remembered that the cost of the Rugby station was about half a million pounds, that a similar station is in use in America and that in both countries separate receiving stations and long and expensive trunk lines are required before a conversation can take place, it will be understood that the charge for such a conversation must be high. The £15, however, includes a privilege not given in the Inland or Continental services, namely the two administrations will endeavour to find a particular person wanted and to put the caller into communication with him. If he cannot be found and a substitute acceptable to the caller is not available, the only charge made will be a report charge of £2 towards the cost incurred in the attempt.

The great event will go down to history fully documented. The future historian will have the ample and ornate columns of the London and provincial press to digest as well as the more matter-of-fact accounts of the scientific journals. Incidentally, he will have some legends to ponder over and, we hope, discard. The stories of the bells of St. Pauls and the film-stars of Los Angeles will amuse but not impose upon him.

THE FIRST PUBLIC TRANSATLANTIC MESSAGE.

THE public Telephone Service across the Atlantic is now a *fait accompli*. It is not merely a service in which some varying and disconnected speech "gets through" in each direction, requiring the speakers to build up intelligibility by some patchwork process of context and guess work. It is a real commercial service with transmission conditions equal to those experienced on our inland routes. The fact that exceptionally bad atmospheric conditions developed on the day of opening and severely handicapped the service is only another case of the exception proving the rule.

Since the opening date the calls have been dealt with efficiently and expeditiously, and no user of this wonderful new channel of communication has been dissatisfied. Many messages of congratulation and appreciation have in fact been received.

It was a thrilling moment when Mr. W. S. Gifford, President of the American Telephone and Telegraph Company, in speaking to Sir Evelyn Murray made the first call passed after the time announced for the opening of the Service to the public. The conversation which ensued and the messages which were passed paid full tribute to the remarkable degree of co-operation that has existed between the American and British staffs throughout the experimental and preparatory stages of this new venture. The work has called for the exercise of ingenuity, patience, and perseverance, coupled with high scientific attainments, and the officers concerned have ungrudgingly devoted extra hours and complete week-ends to the solution of the many problems involved.

In all the circumstances it is fitting that congratulatory messages should have been passed in each direction, and we feel sure that the quality of the service will secure the support of the public and that a rosy future is assured for transatlantic telephony.

HIC ET UBIQUE.

MR. J. F. STIRLING (Assistant Controller, London Telephone Service) and Mr. W. D. SHARP (Overseas Telegraph Branch, Secretary's Office) have joined the Editing Committee in the place of Mr. JOHN LEE and Mr. J. J. TYRRELL who have resigned. Mr. Tyrrell, as our readers already know, will continue to contribute his "Telegraphic Memorabilia" and Mr. Lee's invaluable aid will still be available—for a time at least.

In an Editorial last month we computed the total number of telephones in Great Britain and Northern Ireland at Dec. 31, 1926, at 1,507,000. The official figure is now available. It is actually 1,510,775 made up as follows:—

Post Office system	1,477,003
Hull, Guernsey, and Jersey systems	21,736
Private stations connected with P.O. system	12,036
	<hr/>
	1,510,775

The increase for the year is 119,619—the largest yet recorded. (The figure of 148,000 was a clerical error.) This gives 3.4 telephones to 100 inhabitants.

We see from *The Times* that Mr. Frank Gill has received the King's authority to wear the insignia of Commander of the Order of Isabel the Catholic, an order conferred on him by the King of Spain in connexion with his valuable (telephone) services.

The year 1927 will see some remarkable developments of the trunk telephone system of the world. The line from Melbourne-Townsville (Queensland), 2,017 miles, was opened last month. The Calcutta-Delhi line is about to be opened, and Calcutta connected with Bombay. We record elsewhere the opening of the

Vienna-Passau trunk cable, which will form an important link between Western and Eastern Europe. New Trunk services are being put in force between Prague and Trieste, and Belgium and Italy.

Opportunist or Humourist? A Wimbledon tobacconist who has a telephone call-box in his shop, says the *Daily News*, has taken swift advantage of the latest facility. He has hung out a notice, "You may telephone New York from here—£15."

During the recent tests of the Australian Beam Wireless, one of the first messages sent was from the Editing Committee of this *Journal* to Mr. H. P. Brown, Secretary of the Australian Post Office, asking him if he would contribute for the information of his old colleagues, a short article regarding telephone developments in Australia. The following reply was received:

TO EDITORS "TELEGRAPH AND TELEPHONE JOURNAL, LONDON."

Your message of greeting is highly appreciated and sincerely reciprocated. I have not lost my former deep interest in the achievements of my colleagues in the British Post Office and in all pertaining to their progress and welfare. The *Journal* is one of the means by which I am able to keep in touch with the various activities of the telephone and telegraph branches at home, and to hear of items of interest which concern my old associates. I shall be happy to comply with your request and furnish information reference developments which are taking place here in the Antipodes and which I trust may be of interest to readers of your *Journal*. The statement will be posted to you as early as possible. All good wishes.

BROWN.

TRANSATLANTIC TELEPHONY.

OPENING CEREMONY.

BY LT.-COLONEL A. G. LEE, M.C.

NEARLY twelve months have elapsed since two-way radio-telephony across the Atlantic was first attained experimentally. This was the culminating point of a long series of experiments extending over a number of years. The vast research resources of the American Telephone and Telegraph Company had been attacking this formidable task since 1915, when one-way radio-telephony was obtained between Arlington, U.S.A., and Paris. After the war intensive development of the problem was resumed and in 1923 another effort was made to span the Atlantic telephonically. This time the experiment was performed from Long Island to New Southgate, where a large audience, assembled at the Western Electric Company's works, heard the voices of the speakers in New York clearly and loudly. Following on this demonstration the Postmaster-General decided to co-operate with the American Telephone and Telegraph Co. and the Western Electric Company (now the Standard Telephones & Cables, Ltd.), and a committee under the chairmanship of Admiral of the Fleet Sir H. B. Jackson, G.C.B., was appointed to inquire into the question of the feasibility of commercial radio-telephony between England and America. Further experiments were carried out, involving some thousands of observations, on the factors governing the propagation of the radio waves between the two countries at different times of the year and also on the amount of atmospheric present and the best means of overcoming the disturbance caused by them. Side by side with this work was proceeding the installation of a 200-kw. transmitter at the Post Office station at Rugby

by the Western Electric Company. Experiments were also carried out by the Post Office on directional receiving antennae, first at Chedzoy, Somerset, and later at Wroughton, near Swindon.

The initial two-way conversations were carried out on two separate wave bands, but, owing to the congested state of the ether, it was decided to work both transmission stations on the same wave-band so as to economize ether space, and the interval since last March has been largely occupied on both sides of the Atlantic in developing means for doing this.

Finally, the day for opening the service to the public arrived. It had been heralded the week before by announcements made to the Press on both sides of the Atlantic which created such interest that the excitement in the newspapers did not subside for several days. A further statement to the Press a few days later announced the opening of the service to take place at 1.45 p.m. on Jan. 7. At this hour, which was 8.45 a.m. in New York, Mr. W. Gifford, the President of the American Telephone & Telegraph Company, in the presence of officials of the Company and a group of newspaper representatives, lifted the receiver from his telephone and asked for Sir Evelyn Murray in London. He was immediately connected, and in his greeting to Sir Evelyn Murray Mr. Gifford said:—

To-day, as a result of very many years of research and experimentation, we open a telephonic channel of speech between New York and London. Thus, the people of these two great cities will be brought within speaking distance. Over 3,000 miles of ocean individuals in the two cities may by telephone exchange views and transact business instantly as though they were face to face. I know that it is your aim, as it is ours, to extend this service so that in the near future anyone in either of our countries may talk to anyone in the other. No one can foresee the ultimate significance of this last achievement of science and organization. It will certainly facilitate business; it will be a social convenience and comfort; and, through the closer bond which it establishes, it will promote better understanding and strengthen the ties of friendship. Through the spoken word, aided by the personality of the voice, the people of New York and the people of London will become neighbours in a real sense, although separated by thousands of miles.

We are glad to have co-operated with you in this notable enterprise, and shall actively continue to work with you in extending and improving the service. I congratulate you upon your successful solution of your problems, and wish to extend to you and to your associates the greetings and good wishes of the officers and staff of the American Telephone & Telegraph Company and of their associates in the Bell Telephone System.

In reply Sir Evelyn Murray said:—

The opening of a public telephone service across the Atlantic between London and New York is a conspicuous milestone on the road of telephone progress, and marks the beginning of a new epoch in the development of communication between our two countries. Personal conversation between Great Britain and the United States has emerged from the stage of experiment into a practical reality, and we are confident that the service which we are inaugurating to-day will be a boon to both nations, whether as an aid to commerce or as a medium of social and domestic intercourse, and will tend to strengthen the bonds which unite the two communities.

I am charged by the Postmaster-General to take this occasion to acknowledge the notable contributions which your company has been able to make, through its great engineering and research organisation, towards the solution of the many baffling problems which have been encountered. We recognize, as we believe you recognize, that there are difficulties still to be overcome before the Transatlantic service can attain the standard of regularity and reliability at which we aim; but we are convinced that there is no better means of solving these difficulties than by putting the service to the crucial test of daily use, and we share your hope that before long Transatlantic conversation will be available not only to the citizens of London and New York, but to every telephone subscriber in both countries.

We of the British Post Office look back with pleasure upon the cordial co-operation with the American Telephone & Telegraph Company, which has led to the success so far achieved, and on behalf of the Postmaster-General and the officers of the General Post Office I warmly reciprocate your greetings and good wishes. I now declare the service open to the public.

At the London end a group of Post Office officials who had been associated with the inception of the service, Messrs. R. A. Dalzell, C.B., C.B.E., W. T. Leech, L. Simon, F. W. Phillips of the Secretary's office, Col. T. F. Purves, E. H. Shaughnessy, O.B.E., Lt.-Col. A. G. Lee of the Engineering Department, and Lt.-Col. H. E. Shreeve of the American Telephone & Telegraph Company, were assembled in Sir Evelyn Murray's room to hear the opening speeches,

Thus, in this quiet unostentatious way, was opened a memorable chapter in the history of Telephony. The bringing together of the two English-speaking peoples across the Atlantic by radio-telephony will be, without doubt, the forerunner of many other telephone services to the most distant portions of the globe, linking together the peoples of the earth with knowledge and with friendships.

In closing this brief review I should like to pay a tribute to the genius and far-sighted vision of the American Telephone & Telegraph Company which has made this marvellous product of science and engineering possible, and to express our appreciation of the opportunity of being linked with them in this great venture.

THE ANGLO-AMERICAN TELEPHONE SERVICE.

By W. C. GRIFFITH.

THE wonderful story of engineering achievement which has culminated in the opening of a public transatlantic telephone service has already been told elsewhere, and a brief corresponding account of the preliminary commercial organisation and of the traffic problems may be of interest.

The main discussion commenced in October last, when Mr. Gherardi and Dr. Jewett, vice-presidents of the American Telephone and Telegraph Company, arrived in this country, following on the earlier arrival of representatives of the traffic and engineering branches of their Company.

As soon as the decision to open a public service between the two countries had been taken, it was necessary to settle the questions relating to fees, limitations of area of communication, hours of service, special facilities, equipment and operating procedure. In advising on these questions, the technical officers concerned were guided by a general decision that the service should be opened on a simple and limited basis, and that expansion in area and in facilities should be a matter of subsequent development in the light of experience.

The fixing of the basic fee was mainly an accounting problem, involving considerations of capital cost, depreciation and maintenance, and those who might be inclined to criticise as high the charge which was ultimately decided upon should bear in mind that the users of this service have, during the period required to pass their demands and during the period of conversation, the exclusive use of plant costing over one million pounds, and that each call must necessarily bear its due proportion of the cost of the periods when for various reasons the circuit cannot be employed for paying traffic.

The areas on the two sides between which the service was to be opened were fixed as the London Telephone Area and a corresponding area in New York respectively, early extensions being contemplated as soon as experience had been gained. Before this article appears the service will probably have been extended to the whole of Great Britain and the whole of the Eastern States.

The hours during which the service could be opened initially were limited by technical considerations at the Rugby transmitting station, where, owing to the industrial troubles, certain plant which would permit simultaneous transmission of telegraphy and telephony was not available. When this temporary difficulty has been overcome there will be no technical bar to a practically continuous service, but the number of hours per day during which such an expensive organisation can be kept available must necessarily depend on the demand. This question is affected by the difference

in time in the two countries, amounting to five hours, so that 10 a.m. in New York is 3 p.m. in London, while 5 p.m. in London is noon in New York. The overlapping normal business hours are thus virtually limited to two per day—3 p.m. to 5 p.m. British time—and the waking hours—say 8. a.m. to 10 p.m.—to nine per day.

There exist in the British and American telephone organisations various special service facilities, designed to meet special needs of the respective telephone subscribers, e.g., fixed time calls, differentiation in rates with time, person to person service. The overriding considerations of simplicity during the early period of the public



FIG. 1.—OPERATING POSITIONS.

service led naturally to a desire to offer at first only one type of service. It was felt that in view of the high charge the calling subscriber must be given some guarantee that his fee would not be wasted by the chance absence of the person to whom he wished to speak, and it was decided, therefore, to offer as the initial standard type of service the American "person to person" service. Under this system a call may be booked, not merely to a given telephone number, but to a given individual, and is not regarded as effective until communication has been established between the calling subscriber and the particular person to whom he wishes to speak, or a substitute acceptable to the caller. If, when the connexion is effected, the called person is not available, a report to that effect is given to the calling subscriber, who may then request that the call shall be cancelled (in which case only a comparatively small

"report charge" is made) or may ask that it shall be completed later. Further, the telephone administrations undertake to do all in their power to trace the called person; for example, if a call is booked to an individual at his office, and it is found that when the call matures he has gone home, the call will be diverted to his home, and so on. This facility is undoubtedly of very great value to users of the service.

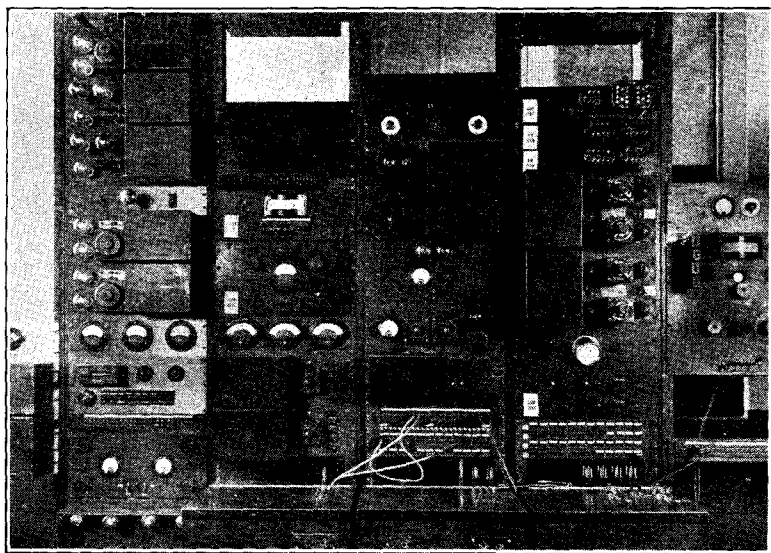


FIG. 2.—TECHNICAL OPERATOR'S POSITION.

The control of outgoing transatlantic calls is vested in the London Trunk Exchange, at which two positions have been specially equipped for this purpose. These positions are shown in Fig. 1. The position on the left is used by the "advance calling telephonist." This telephonist does not speak on the radio channel, but is responsible for tracing and obtaining the British subscriber in connexion with originating and incoming calls. She is further responsible for warning subscribers a short time before their calls will mature, in order that the particular person who originated the call, or who is required to receive it, as the case may be, may be available at the telephone when the call is completed. The position on the right is used by the "line" telephonist. This telephonist is continuously in circuit on the radio channel, and is responsible for passing all demands, and for agreeing with the American telephonist the order in which calls shall be effected, having regard to the order of booking and the subscriber's requirements, and as the "particular persons" required become available, and for the timing of the calls.

In connexion with timing, it may be interesting to note that calls are charged for by the minute with a minimum charge for three minutes, and that a notification is given at the end of each three minutes by the interpolation of the line telephonist with the words "3 minutes," "6 minutes," &c. In order to avoid a waste of line time, extensions are not "offered" in the sense in which they are offered on the inland service.

The technical control of the circuit is vested in the technical operator, who is an engineering officer situated in the Control Room. This officer has under his control the amplifying and correcting apparatus by means of which he can adjust the volume and quality of speech to the particular conditions of each call. The quality of the transmission reaches, when atmospheric conditions are not unfavourable, an extraordinarily high standard. Many transatlantic calls may be said to be quite equal to an inland trunk call. There are however periods, particularly about sunset, when speech is difficult and even impossible owing to extraneous noises introduced by "atmospherics."

The operating of the circuit is on an alternate basis, i.e., one call outgoing from England is normally followed by a call incoming from

the United States and so on. Subscribers have been requested to book their calls as far as possible on the day previous to that on which the connexions are desired, and as soon as the circuit is opened each day all demands on hand on both sides are passed and are assigned serial numbers, the American calls having odd numbers and the British calls even numbers. When once the particulars of a call have been passed in this way the call is known thereafter solely by its serial number. Demands received after the circuit has been opened are passed as opportunity offers. Some extremely interesting experiments have been made in connexion with the passing of numbers over the radio channel by means of Teletype keyboard telegraph instruments. Teletype instruments have been fitted in the London and New York Trunk Exchanges, and it is possible at any time to turn to these and to type out upon them the series of numbers required, thus giving a printed record of what has been passed at both the home and the distant stations. The use of this method for passing numbers has great promise in that it is probably more accurate, and, when repetitions and corrections are taken into account, more speedy than verbal demands. It is absolutely secret, and furthermore, it can be used during periods of atmospheric disturbance when intelligible speech is impossible, and periods when conditions are bad may thus be utilised to the ultimate saving of circuit time. It is probable, therefore, that this method will become the standard method for passing demands. In view of the very high value of the circuit time, great care is taken to ensure that numbers are correctly received: the name of the firm as well as the telephone number is passed in each case, and is checked in the Telephone Directory in order to ensure that no wrong numbers are connected.

As soon as the various matters which have been mentioned had been settled, it was arranged to commence a trial of the service under full commercial conditions. This trial was carried out between officers of the Post Office and officials of the American Telephone and Telegraph Company. Directories of each organisation were circulated in the other, and a certain number of officers were asked to originate calls as if they were members of the public. The requests to pass calls were so regulated as to produce a light load on the circuit at the commencement of the trial, which lasted throughout December, with a gradually increasing load, until during the last week of the month the demand for connexions was intentionally a little in excess of the full limit of the estimated carrying capacity of the circuit under normal conditions. As it happened, during the last week the circuit conditions were considerably below normal, with the result that a certain number of calls booked could not be completed, and those readers of this Journal who were amongst those thus disappointed will perhaps

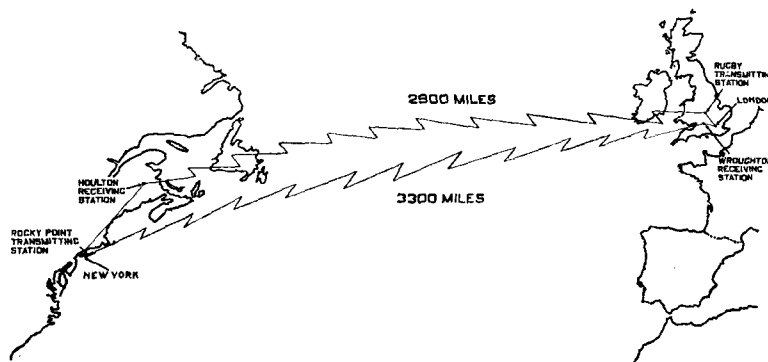


FIG. 3.—SKETCH MAP.

accept this explanation. This trial was exceedingly valuable to all concerned. Certain operating difficulties came to light, and steps were taken to overcome them, while all those engaged on the control of the circuit were able to become familiar with their duties. At the same time valuable data were obtained on such matters as the proportion of the total available circuit time which could be utilised for actual conversation and kindred questions. In order to ensure smooth working of the public service a liaison officer of

each administration proceeded to the headquarters of the other, Mr. W. F. Dobson, of the London Trunk Traffic Office, going to New York, and Mr. E. J. Padmore, of the Long Lines Department, New York, coming to London.

The service was opened to the public on Jan. 7, 1927, and so great was the public interest that on the first day calls greatly in excess of the carrying capacity of the circuit were booked. Through the courtesy of the Foreign Office in foregoing their evening Press transmission from Rugby on that day it was possible, however, to work the circuit until late at night, with the result that a considerable number of the demands were satisfied, though unfortunately the atmospheric conditions on the date of opening were appreciably worse than immediately prior to or since that date.

This, then, is briefly the story of the negotiations which have resulted in the opening of a service the result of which it is difficult to over-estimate in its effect in bringing together in closer business and personal relationships the peoples of the two great English-speaking nations.

OVERSEAS COMMUNICATION—ITS ORIGIN AND DEVELOPMENT.*

BY H. G. SELLARS.

(Continued from page 67.)

An early form of apparatus was Wheatstone's ABC 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 current waves were sent out which actuated the pointer at the distant end and the words were spelled letter by letter. W. S. Steljes adopted this system in his Recorder but replaced the receiving dial by a typewriter which printed in Roman characters upon a tape. In the Rebesi typewriting telegraph, also designed by Steljes, a typewriter keyboard takes the place of the ABC communicator, and the receiver prints on tape, or in column, as required. Continuous efforts were made to produce a step printing telegraph apparatus and, as early as 1845, Jacob Brett, prompted by Royal E. House, of U.S.A., and John Watkins Brett, patented a machine of this kind. Professor David Hughes (1831-1900) introduced in 1855 his direct working typeprinting telegraph, the sending portion of which consists of a piano keyboard with 28 keys, for sending letters, figures and punctuations, and for changing from letters to figures and punctuations, or vice versa. The receiving portion is made up of an electro-magnet, the armature of which, when released by the incoming current, brings into operation the various mechanical devices which cause the synchronised typewheel to print the transmitted letters in Roman characters on tape. This apparatus worked admirably on cables between England and the Continent. Other direct printing machines are the Morkrum Company's "Teletype," and that patented by Messrs. Creed & Company, in both of which a typewriter keyboard is used.

Reference has already been made to the idea of recording pre-arranged telegraphic signals having occurred in 1832 to Samuel Morse. Experiments were carried out, and in 1837 Morse, assisted by Alfred Vail and Gale, perfected his model apparatus. In 1838 he attempted to take out a patent in England, but found he had been forestalled. In July of that year Edward Davy patented a telegraph in which magnetic needles recorded signals upon chemically prepared calico. In 1841, 1843, and 1845 Alexander Bain took out patents for a typewriting, an indicating and an electro-chemical copying telegraph, and in 1846 patented his electro-chemical direct working telegraph, in which perforated and chemically prepared tapes were used at the sending and receiving ends, respectively. This apparatus was tried in Paris before M. Leverrier and Doctor Lardner, and worked successfully at 324 signals a minute. In 1847 it was working between London and Manchester, and on Oct. 9, 1856, when Professor Morse was in London, Sir Charles Bright showed him that from 210 to 270 letters a minute could be sent over a circuit of 2,000 miles, composed of underground wires joined in series.

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

The chemical tape was soon replaced by ordinary slip on which signals were recorded by a wheel running in ink, as suggested by Morse, and for less busy circuits a simple sending key took the place of perforated slip. This Morse printer, as it was known, had been in use for a considerable period when it was found that the movements of the armature carrying the ink wheel could be read by the ear. As a result, the slip and inkwheel were eliminated, and the instrument known as the Sounder was introduced, becoming deservedly popular in all parts of the world. The differentially wound polarised sounder was invented by Mr. C. C. Vyle and has been found extremely useful where weak currents are employed.

The automatic transmitter and receiver, with which Post Office officials of the present day are most familiar, were patented in 1858 by Sir Charles Wheatstone and John Matthias Augustus Stroh. In 1870, when the Government took over control of the Telegraphs, the speed of working was from 70 to 80 words a minute, but, by 1890, thanks to the efforts of Sir William Preece, Mr. Mat Cooper and Mr. A. J. Stubbs, a speed of 600 words a minute could be attained. Improvement has taken place in the three principal components of the system. Several perforated slips can now be prepared simultaneously, and Mr. J. W. Willmot has designed a new form of punch. Mr. J. W. Willmot has also done valuable work in connection with a magnetic bias transmitter, while Messrs. Vyle, Smart, and Mulligan have succeeded in introducing electric motors for driving purposes. In 1896 Mr. F. G. Creed introduced a typewriter keyboard perforator, and, in 1899, the British Post Office purchased a number of the machines. Other keyboard perforators in use now are the Gell and Kleinschmidt. In 1900 Creed produced a receiving perforator and afterwards developed a typeprinter, which printed the telegram in Roman characters when the perforated slip was passed through it.

RELAYS.

The use of long lines and the limitations of battery power introduced another problem and Sir Humphry Davy in 1828 invented an "Electrical Renewer" for strengthening current at intermediate points. In October, 1852, Sir Charles Bright patented an automatic relay for retransmitting signals, an example which was followed by Cromwell Fleetwood Varley (1828-83) in 1854. In February, 1879, Bright increased the delicacy of relays, and at a later date K. Gulstad produced a vibrating relay for use on circuits where high speed is required. Members of the London Telephone and Telegraph Society will remember that Colonel A. C. Booth and Messrs. J. N. McCurdy, A. H. Roberts, J. L. Taylor, and E. Lack have given us the benefit of their studies of relays and repeaters.

We are indebted to Messrs. A. Eden, J. R. Kempe and A. J. Stubbs for the Sounder Silencer, which is fitted to repeaters in such a manner that, although the normal working signals are not heard by the relay clerk, his attention can be drawn when required.

DUPLEX, QUADRUPLER AND MULTIPLEX WORKING.

The need for economy in the provision of wires promoted a desire to make more use of existing channels and, in 1853, Dr. Gintl, an Austrian, succeeded in obtaining duplex transmission. In September, 1855, Bright patented a simple method of duplex working which was used effectively on some of the Magnetic Company's wires. J. B. Stearns, John Muirhead, Alexander Muirhead, Herbert Taylor and M. Ailhaud also devised methods of duplexing landlines and cables, while Edison introduced a system of quadruplex. Multiplex working was the subject of successful experiment in 1852 by M. G. Farmer, an American, and, at a later date, Delaney introduced the synchronous morse sounder multiplex system which was duplexed by Mr. S. Pollock and was used by the Post Office for several years. In 1873 Meyer, an Austrian, exhibited at the Vienna Exposition a four-channel multiplex apparatus which, by means of combinations of eight keys, produced morse characters transversely on slip. Experimenting in the same direction Emile Baudot invented in 1874 his synchronous multiplex system, using on each "arm" a keyboard composed of five keys, which printed Roman characters on slip on the receiving end. The apparatus was adopted by the French Government in 1877, and has been used on circuits of various lengths including submarine cables. In 1897 a quadruple set was installed on a London-Paris circuit and since that date the instrument has come into general use on Government cables and in the United Kingdom. In France, Messrs. Montoriol, Picard and Mercy have laboured to improve and perfect the system, while in this country it has been the subject of deep study by Colonel A. C. Booth, who successfully accomplished the duplex method of transmission, Messrs. Arthur Crotch and H. W. Pendry, who have contributed to the literature on the subject, and Mr. J. J. Tyrrell, who, accompanied by Messrs. E. Barrett and E. H. Dykes, took the Baudot to India. Colonel Booth and J. W. Willmot were associated in the assembling of a typewriter perforator suitable for producing perforated slip for automatic transmission by a transmitter which takes the place of the 5-key keyboard. Systems similar in essential principles to the Baudot have since been brought into use by Mr. Donald Murray and the Western Electric Company, while Mr. H. H. Harrison has invented a 5-unit printing telegraph on which Baudot or Murray tape can be used. Elisha Gray's Harmonic Telegraph and the Mercadier radiophone apparatus fall into the category of multiplex. The Siemens automatic 5-unit printing telegraph can only be worked duplex, but at a speed of 100 words a minute in each direction. The most recent of the 5-unit system is that of Cavaliere Giovanni Miniotti who, in 1923, exhibited a typewriter keyboard printing apparatus in which steel balls, dropping into depressions on a revolving disc, transmit the necessary currents to line. A certain number of signals are stored by this method, and the use of perforated tape is obviated.

THE TELEPHONE.

The telephone is used for overseas communication and it will be interesting therefore to follow briefly its development. In 1870 Cromwell Fleetwood Varley (1828-83) invented the cymaphen, an instrument resembling the modern telephone, and in 1871 Antonio Meucci patented at Washington a similar contrivance. On June 25th, 1876, Professor Alexander Graham Bell submitted to Lord Kelvin a telephone which he had patented in the previous March. The attention of other electricians was attracted, and two years later Professor David Hughes invented the microphone and Thomas Alva Edison introduced his carbon loudspeaking transmitter. Since that date Dr. Cornelius Herz, Dolbear, Machalski, Deckert, Humming, van Rysselberghe and many others have suggested improvements in methods and apparatus, and to-day the number of telephones in use runs into millions.

OVERSEAS COMMUNICATION.

Having summarised very briefly the inventions and discoveries which rendered internal communication possible, we are able to examine the methods employed to extend the facilities to countries overseas. Visualising, to some extent, the future, Andrew Crosse, an electrician, speaking in 1816, 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." The prognostication did not show signs of tangible result until 1838 when Major-General Sir F. C. Pasley carried out experiments with electrical signalling under water in the Medway at Chatham. In 1839 Dr. O'Shaughnessy, in India, passed an electric current under water through a wire covered with pitch and tarred hemp. In the following year Sir Charles Wheatstone evolved a scheme for laying a wire covered with rope between Dover and Calais, but it was not until January, 1849, that the feasibility of the idea became manifest. In that year Mr. C. V. Walker connected two miles of copper wire covered with gutta-percha to the landlines at Folkestone and, taking the free end out to sea on the steamer *Princess Clementine*, exchanged messages with London. This short line served as the forerunner of the network of submarine cables which now encircles the globe. Permission had been obtained from Louis Philippe, King of France, in 1847, and a concession from Louis Napoleon, President of the Republic in 1849, to lay a cable across the Channel, and a single copper gutta-percha covered conductor was laid by the steamer *Goliath* on Aug. 28, 1850. Messages were exchanged between the two countries, but during the night the circuit was broken. In 1851 a four-conductor cable was manufactured and was laid by the hulk *Blazer*, under the supervision of Mr. Crampton, of the Submarine Telegraph Company. This cable was opened for public traffic on Nov. 13, 1851, and is still in use. The success of this undertaking led to the provision of submarine communication from other points in the British Isles, and in other parts of the world, e.g., between Scotland and Ireland, and England and Belgium in 1853, from Jersey to France, England to Ireland, and Spezia to Corsica in 1854, Bulgaria to the Crimea in 1855, Sardinia to Bona in 1857, England to Holland in 1858, England to Denmark, and Suez to Aden in 1859, England to Germany, Aden to Karachi, and Spain to Minorca in 1860, Malta to Alexandria, via Tripoli and Benghazi, in 1861, and Persian Gulf to Karachi in 1864.

The cables running from the United Kingdom to France, Belgium, Holland and Germany were worked by the Submarine Telegraph Company until 1889, when their undertakings were transferred to the Post Office. A great increase in traffic and lines has taken place and early in 1925 it was decided to make a clear line of demarcation between national and international telegraph services. With this end in view an Overseas Telegraph Branch was formed under the control of Mr. F. W. Phillips, Assistant Secretary. The manipulative section (the Cable Room) is under the control of Mr. F. T. Wadley, and has keenly interested and powerful friends in the persons of Messrs. John Lee and J. Stuart Jones, Controller and Deputy Controller of the Central Telegraph Office.

THE ATLANTIC CABLE.

Telegraph Engineers have always been ambitious and as early as June 16, 1845, the brothers John Watkins Brett and Jacob Brett registered a company with the object of establishing submarine communication between Europe and America. Serious discussions took place concerning the construction of the length of cable which would be required, the ocean bed, the electrical conditions and suitable apparatus. Experiments were carried out by Sir Charles Bright, who joined up the London-Manchester underground wires in series, and by Mr. Wildman Whitehouse, who utilised some of the Mediterranean cables in the same manner. A route from Ireland to Newfoundland was considered most suitable and the landlines on both sides of the Atlantic were extended to suitable points. Cyrus West Field (1819-92), deputy chairman of the New York and Newfoundland Telegraph Company had taken great interest in the project, and sailed for England in July, 1856. On Sept. 29, 1856, an agreement was concluded between Cyrus Field, John Brett and Sir Charles Bright for the purpose of forming a company to establish telegraphic communication between Newfoundland and Ireland, and on Oct. 20, 1856, the Atlantic Telegraph Company was registered. Experts in addition to those already mentioned, notably Sir Samuel Canning, Captain James Anderson, Henry Woodhouse, Wildman Woodhouse, Daniel Gooch, C. F. Varley, C. W. Siemens, Willoughby Smith, and Sir William Thomson (afterwards Lord Kelvin) worked wholeheartedly and, on Aug. 5, 1857, the European end of the cable was fixed at Valentia, Ireland. The gratification which such a feat engendered was dissipated, however, six days afterwards, when the cable broke. Telegraph men cannot be discouraged, and, on June 26,

1858, H.M.S. *Agamemnon* and the U.S. frigate *Niagara* commenced laying another cable, but this also snapped and both vessels returned to Queenstown. Another attempt was made and on Aug. 5, 1858, the two ships were successful. Messages were exchanged between Queen Victoria and President Buchanan on Aug. 16, but, on Sept. 3, 1858, the cable broke down. Another attempt was made by the *Great Eastern* in July, 1865, but a breakage took place within ten days. In July of the following year the *Great Eastern* started from Valentia with another cable, and not only achieved her object, but managed to raise and repair the cable of 1865. A cable from France to America was completed in 1869 and, before 1877, cables joining up the West Indian Islands and Central American countries were laid and brought into use.

THE PACIFIC CABLE.

The success of the Atlantic cables inspired a suggestion that attempts should be made to span the Pacific Ocean, and patriotic, sentimental and strategic considerations directed special attention to the possibility of connecting Canada with Australia. An "All British" Pacific Cable became the dominating dream of Britishers in Australia, Canada and England, but many difficulties and much opposition, had to be overcome, and it was not until Oct. 31, 1902, that the series of lines from British Columbia to Australia and New Zealand via Fanning Island, Fiji, and Norfolk Island, was complete. The Vancouver-Fanning Island section, the longest in the world, measures 3,458 nautical miles and reaches in one part a depth of about 3½ miles.

THE "IMPERIAL" CABLE.

The bridging of the Pacific by an All-British line was a big step from an Imperial point of view, but Charles Bright, son of the telegraph pioneer. Sir Charles Tilston Bright, pointed out in December, 1902, the need for a complete imperial link between the Mother Country and the Pacific Cable. Such a result could not be attained immediately, but on June 18, 1917, the British Government, through a combination of fortuitous circumstances, was able to put into operation a communication running from Penzance to Halifax, via the Azores. A second cable connecting the United Kingdom with Canada direct was purchased from a North Atlantic Cable Company and these two channels, under the personal surveillance of Mr. John Lee, have worked to great advantage and provided the long-desired "All Red" route.

CABLE CONSTRUCTION AND MAINTENANCE.

The high costs of cables necessitates paying close attention to laying and maintenance and many excellent devices have been introduced in this connection. Sir Charles Bright, Charles de Bergue and C. E. Amos invented machinery for paying out cable; Latimer Clark, Frederick Braithwaite, Longridge, Brooks, W. H. Preece, H. C. Forde, Willoughby Smith and many others devoted attention to the construction of cables; Dr. Muirhead introduced a duplex system; Sir Charles Bright, J. B. Saunders and Sir Oliver Lodge devised lightning protectors; Oliver Heaviside advocated "leak" circuits and self induction, while, more recently, Colonel A. C. Booth introduced a method of using condensers for reducing induction between the various cores of a cable.

SUBMARINE CABLE TELEGRAPH APPARATUS.

Practical experience of cable working soon proved that, although the old needle apparatus and morse key could be used on short lines, they were totally unsuitable for long submarine conductors owing to their high static capacity. To meet this difficulty Sir Charles Bright invented in 1852 a "curb" key which adapted the duration or force of the current to line requirements, while his brother Edward patented, in 1858, a key which brought reversed currents into play. The most suitable instrument devised, however, was the mirror galvanometer and signalling apparatus introduced in connection with the first Atlantic Cables by Professor Thomson (afterwards Lord Kelvin) to which reference has already been made. Excellent signals were obtained with this apparatus when, experimentally, two Atlantic cables were looped and the working current was obtained from a battery consisting of a silver thimble containing a few drops of pure sulphuric acid and a piece of zinc weighing 1½ grains. Using the principle of his galvanometer, Kelvin produced the syphon recorder, in which a tube, conveying ink to paper tape, takes the place of the mirror. The sending apparatus consists of keys which, similar to those of the single needle, send negative or positive currents as required. The Muirhead recorder is operated in a similar manner. Practically all the forms of telegraph apparatus enumerated earlier in this paper have been tried or used on submarine cables. The Hughes was worked for many years on Anglo-Continental lines, but, since 1898, has been gradually supplanted by the Baudot. The latter is in use on the Paris-Algiers circuit in which is included a cable over 400 miles in length, and an adaptation of the system has been tried on the Brest-Casablanca Cable, which is 1,600 miles long. Wheatstone transmitters, combined with Creed perforators and printers, are doing over 70 words a minute in both directions on the London-Norwegian communications, while on the London-Halifax cable the incoming signals, besides being received on the syphon recorder, are translated into Wheatstone signals on perforated slip which is run through the Creed type printer.

SUBMARINE CABLE TELEPHONY.

The securing of overseas communication by telegraph opened up the prospect of cable telephony, and, in March, 1891, the British telephone system, which had been started in 1879, was put into touch with that of France.

After a long period of successful working, communication was extended to Belgium, Holland, Switzerland and, recently, Germany, while, at the present moment, communication with Austria and Czecho-Slovakia is contemplated.

WIRELESS OVERSEAS COMMUNICATION.

We must now examine the latest phase of overseas communication, viz., the elimination of the metallic conductor. James Clerk Maxwell (1831-79) proved, in 1873, that electrical disturbance would set up and radiate waves of electro-magnetic nature, and other scientists were soon busy with research work. Heinrich Rudolf Hertz (1857-94) demonstrated the existence of electro-magnetic waves of comparatively low frequency, Branly used a tube of metal filings for detecting these waves, and Sir Oliver Lodge improved the tube and introduced a point detector. Nikola Tesla, Professor Righi, Professor Bose, Doctor Pupin, J. E. Ewing, Poulsen, Ernest Rutherford, Fessenden and many others devoted their attention to various aspects of the subject, while De Forest and Dr. J. A. Fleming designed thermionic valves. To Senatore Guglielmo Marconi, however, must be given the credit for having demonstrated the practicability of telegraphy without wires. In 1896 Marconi came to England and, under the supervision of the Post Office, Admiralty and War Office, conducted experiments in London between St. Martins le Grand and the Embankment, and then over a distance of four miles on Salisbury Plain. Successful attempts were also made between the Isle of Wight and Bournemouth, and in May 1898 apparatus was installed at Ballycastle and Rathlin Island. In 1899 South Foreland communicated with Boulogne-sur-mer and, in August of that year, 85 miles of sea were covered successfully.

TRANSATLANTIC WIRELESS TELEGRAPHY.

As in the case of submarine cables, spanning the Atlantic Ocean became the object of desire. Marconi, with his assistants, Messrs. G. S. Kemp and Paget, left England in 1901 for the old barracks on Signal Hill at St. Johns, Newfoundland, leaving instructions for signals to be radiated at certain times from Poldhu, Cornwall, where an aerial connected to masts 210 ft. high was situated. The aerial at St. Johns was held by a kite, hovering at an elevation of about 400 ft. Success attended the efforts of the experimenters and, at about noon on Dec. 12, 1901, Marconi and Kemp heard the first Transatlantic wireless signals. Much progress has been made since that date. Ships of all kinds have been equipped with wireless apparatus, islands have lost their isolation, and international communication without wires has become a permanent feature. The British Post Office, with Mr. T. F. Purves as Engineer-in-Chief, has brought several stations into use, the largest in the world being erected near Rugby under the supervision of Mr. E. H. Shaughnessy and his able assistants, Messrs. A. J. Gill, T. Walmsley, Dr. R. V. Hansford, and Lt.-Colonel A. S. Angwin.

DIRECTIONAL WIRELESS TRANSMISSION.

In 1923 Marconi and Franklin devoted particular attention to directional transmission and, their experiments proving successful, it was suggested that the system should be employed in the contemplated Imperial scheme for communication between England and Canada, South Africa, India and Australia. Experiments commenced with Canada on Oct. 8, 1926, and, during the trials a total duplex speed of 450 words a minute was attained. The service between London and Canada opened at midnight on Sunday, Oct. 24, 1926. Since that date communication with Australia has been established, and the installation of the much-desired links of Empire is well on the way to completion.

TRANSATLANTIC WIRELESS TELEPHONY.

The ambitious efforts made to establish telegraphic communication across the Atlantic were repeated in connection with the telephone. The impracticability of the present Atlantic cables for telephonic conversation turned the thoughts of experimenters in the direction of wireless, and, early in 1919, sounds emitted from Ballybunion, Ireland, were heard at Cape Breton Island, a distance of 1,800 miles. Efficient conversation was not practicable, however, until the Rugby installation with its special equipment for wireless telephony was brought into use. Experiments took place during 1925, with the station at Rocky Point, Long Island, and on Feb. 7, 1926, satisfactory conversation was held. Since then unceasing efforts have been made to perfect the arrangements for two-way speech, and regular calls have been made by well-known officials on both sides of the Atlantic. Sir Ernest Rutherford, president of the Royal Society, speaking on Nov. 30, said, "it was now possible, and would, it was expected, soon be practicable to connect any telephone subscriber in Western Europe with any telephone subscriber on the North American Continent."

TRAFFIC STATISTICS.

In the course of this necessarily short and fragmentary paper statistics have been avoided, but the time has arrived to say what has been achieved by the various overseas services which have come under review.

The British Continental telegraph cable service which opened with France on Nov. 13, 1851, possesses to-day over 130 channels and maintains direct communication with France, Italy, Switzerland, Holland, Belgium, Germany, Austria, Czecho-Slovakia and Norway. The number of telegrams exchanged during the year ended October, 1926, amounted to over eight and a quarter millions, while the number of messages handed to and received from Cable Companies reached one and three-quarter millions.

The Continental telephone cable service, which commenced in 1891, handled last year over 900,000 calls.

The London-Halifax (Imperial) Cable, opened for public traffic in July 18, 1917, during the last twelve months disposed of over 550,000 telegrams.

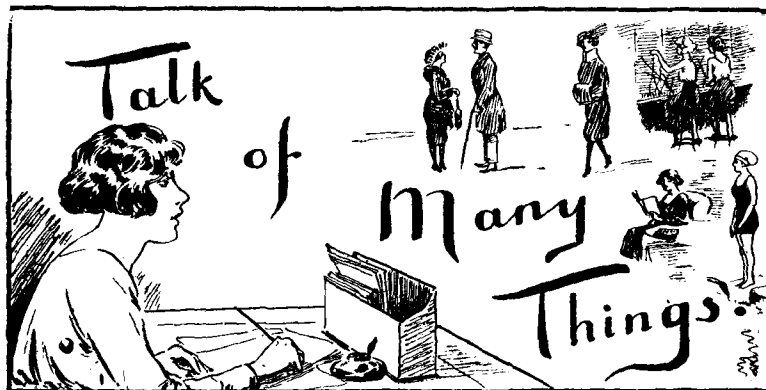
The Post Office Continental Wireless service which opened with the establishment of communication with Berlin on Jan. 27, 1921, now exchanges traffic with Italy, Hungary, Czecho-Slovakia, Poland, Esthonia, Danzig, &c., and transmitted over half a million telegrams last year.

* * * *

It has been necessary in the course of this lecture to quote many names and dates, but an attempt has been made to present a meagre recitation of facts in such a manner that you will agree that Mr. John Lee was fully justified when he described the history of electrical communication as the "Romance of Telegraphy."

Much more could have been said on a subject which is so intimately connected with the lives of Post Office telegraph and telephone officials. Prognostications as to the future could be indulged in, but, on the present occasion, I will be content, and, paraphrasing Goethe, will say, "It is a great pleasure to transport one's self into the spirit of the times, to see how wise men thought before us, and to what a glorious height we have at last carried their ideas."

WE TELEPHONISTS



Coupling.

HAVE you noticed those little couplets posted about by the Underground which tell you crisply where to live and why? I have not yet learned them all by heart but there are a few which I remember even now despite my third lesson in a course of Dispelmanism. One day perhaps I will tell you about that course. It's quite "intreiging" and briefly, it helps you to forget to remember things that you would have forgotten if you hadn't remembered to forget that you'd forgotten them. In other words—but I digress and anyway it can wait. I was speaking of those cutlets—couplets I mean—"Live in Surrey, Free from worry," "Live in Bucks, Among the ducks," "Live in Hants, And wear no—wear no—" Um! I've forgotten that one. "Live in Kent, And pay no rent." I like the last one best of all: it's so simple and yet I'd never thought of doing it. "I've always meant, To live in Kent" shall be my Coué motto, unless I choose a better one, such as "The perfect gent, Should live in Kent," or "When all is spent, Go, live in Kent."

Oh, you have noticed them—good, but you've been a long time answering, miss. Well now, don't you think we might do something similar for exchanges? For example, "We at Purley, Are never surly" and as a contrast, the subscribers' wail, "Saints of City, Show some pity." It is probable, of course, that while Purley may be content with their couplet, City will be furious. Quite so, quite so, but these are only quoted to give you the idea. Let us try again, "To Maryland, By fairyhand," or "Seven Kings, Heaven brings." How do they appeal to you—quite neat compliments, don't you agree? And again, "Banish physic, Ring up Chiswick"—there's a sort of Kruschony kick in that, I think. Rather a sad one has just occurred to me, "How we toil, Here at Royal"—there was a catch in my voice as I said it. However, let us take heart "At Walthamstow, There's mistletoe." Yes I know it's an awful rhyme, but how much worse it would be were it true. Mistletoe is dangerous and, although some escape, most of us only get a miss.

Having suggested the great thought I must leave it with you to set your poetic imaginations to work. Prizes will be offered for the best efforts. Competitors must be over ninety years of age and in their second childhood—but perhaps it is unnecessary to mention that latter condition.

PERCY FLAGE.

In an article headed "Why we shall have to learn American," a *Daily Express* writer says:—

"We may expect to hear something like this, when we ring up New York City by wireless:—

'Lo. 'Lo. Zat Lunnun? Yeah, Lunnun.
'Lo. Say, gimme Lunnun willya?

"Hallo! Hallo! I say, is that New York? What? Yes, please, Miss. Oh, that is New York, Beekman 8900. Mr. Cyrus Hambone, please
. Cyrus Hambone

"OHMYGOSH.

"Wassat? Hudjawant? How? Oh, yeah. Mister Hambone
Holdawire. Who? Nosir. Holdawire. Willya wait please
while I fetchum on the wire. Ohmygosh. Caint you
speak English? Yeah, I'm getting Mister Hambone, right now
cominonwire. Wait now kid an' shoot snappy. Here's
your party.

"Hallo, Hallo, I say is that Mr. Hambone? Mr. Hambone

"'Lo. Hamboneonwire. Zat Lunnun. Yeah. Say,
I wanna speak to Mister Smith. 'Lo. 'Lo. Say
Exchange this wire's on the blink. 'Lo Mister Smith. Zat
you Smith? 'Lo Howareya? Yeah. Gotta punk line.
Yeah, I say we gotta punk line. A PUNK LINE. CAN'T
YOU UNDERSTAND PLAIN TALK. A PUNK LINE.
'Lo. 'Lo.

"Hallo! What's that? Half-past nine? I don't care if it is, I want
to speak to Mister Hambone. Hallo.

"'Lo. Watsat? You kin play a trambone? Gosh.
Say Exchange I wanna talk with a Hobo in Lunnun an some sap slips me
the goods he kin play a TRAMBONE.

"British operator, to subscriber: "Your time's up, Sir. Ring off,
please.

"American operator, to subscriber: "Getoffa the wire, please. Time
limit.

"British and American subscribers together: Help!!!

"So now you know."

(The mistake appears to be in the heading, which should read: "Why
Americans will have to learn English"!)

Brixton.

Brixton, what of the Summer's day, what of the Winter's night?

Woe is me, that I should be here among you where social life plays no
part.

Swimmers we have, but there is no swimming club.

Book-lovers we also have, but no library.

'Buses travel to anywhere from outside the door, but where is the
Rambling Club?

Artists there are, but a Dramatic Society there is not!

Dancers there are, but no dancing, and singers but no song.

Come! let us take counsel together, that we may liven ourselves up!
Let them that swim make unto themselves a Swimming Club wherewith
to compete in the Service Galas. Let us give our silent, solemn ones a goodly
array of fine books, that their hearts may be contented. When the sun
doth give of her radiance let us assemble on top of a fifty-eight 'bus and
traverse the downs of Purley.

Let those who act and those who sing practice of their arts within the
dining room, where their voices cannot be heard by Subscribers afar off.
How sayest thou—"We have no time?" Rather let us dramatise our
lunch-times and symphonize our tea-times.

Let us provide our young bloods with song and with dance, that laughter
and merriment may resound in the Halls which we engage. Suffer them
also to invite their boys, that the young men and the young maidens may be
joyful.

Come! let us reason one with another that we might make for ourselves
a name unto all people.

GERTRUDE M. TURNER,
Brixton Exchange.

On Buying a Hat.

"I *must* get a new hat!"—those few words were uttered on Wednesday
morning—but being a Telephonist I must wait till Friday to fulfil my desire.

So, on pay day at 4.30 p.m., I sally forth on a hat-hunt. Having glued
my nose in turn to every local hat shop, I decide there's nothing for it but
to go up to town. Arrived, I inspect the windows of "Marion" and am
cautiously trying to get a glimpse of the price on a dangling ticket, without
turning a somersault, when I become aware of a pair of eyes through a flimsy

door curtain, giving me that "Come hither" look—I beat a hurried retreat!
P'raps I'd better try a bigger shop; they *might* have a few cheap, cheerful
hats among their vast collection.

Ah! this looks better—I think I'll go in—"Yes, Moddom?"—"A felt?"
—"Certainly, Moddom; this way," and I follow a waved, perfumed, and
highly manicured being, who finally hands me over to a smaller edition of
herself, who enquires in a languid tone, "What price, Moddom?" The
moment has come, I feel a cold, creepy feeling in the region of my spine as
I murmur, "Not more than a guinea" (It had been my firm intention not
to pay more than 15s. 11d.—but what can I do?—thank goodness I did
that 2.30 to 8 p.m. last Sunday!). At this the smaller edition puts down the
two smart models she had been going to show me and starts groping in a
remote drawer, presently emerging with a bright red velvet toque, and an
emerald green straw, quite regardless of the fact that I had asked for a *fawn*
felt, and obviously entirely ignorant of the fact that I possess hair that is
know as "Titian," but looks to me, more like the colour of a marigold and
a tangerine mixed.

Shall I ever escape? I am surrounded by an army of hats, some like
birds' nests, and others resembling flower gardens—still, I suppose they *must*
be fashionable, though I haven't as yet seen anyone wearing anything like
these creations. I begin to think I shall be reduced to a handkerchief with
knots in its four corners! Realising I must do something, I say: "I'm
sorry; I couldn't possibly wear any of them," and flee, leaving an irate
assistant, who probably thinks I am mad, to restore order out of chaos!
I spend the next hour gazing in West End milliners, and finally come to the
conclusion I can do better in my own home-town—so take a 'bus back and
begin all over again. I'm still trying on hats at 6.55 p.m., the shops close at
7 p.m., so I *must* make a choice here, as I'm determined to get a new hat.
I survey myself in the glass under a nondescript black felt, and wonder if
anyone else has hair like mine—it looks too long without a hat, and yet when
I put one on, lo! it disappears and I look as if I hadn't any! I've had it
bobbed, shingled and bingled, now it's a mixture of all three and the next
thing I suppose, is an Eton crop.

I buy the nondescript black felt for 25s.—I don't like it much, but it is
better than some I have seen, anyway, and I wend my weary way home.

The next day I see the *very* hat I wanted, *fawn* felt—with *such* a jaunty
angle, and only 15s. 11d!

It is still there three days later; if they don't take it away soon I shall
yield to temptation.

I've heard of raiders grabbing diamonds and disappearing in taxis, but
can you imagine me smashing a window, grabbing a hat and disappearing
in a bus? I can!

F. G. RUSSELL,
Streatham Exchange.

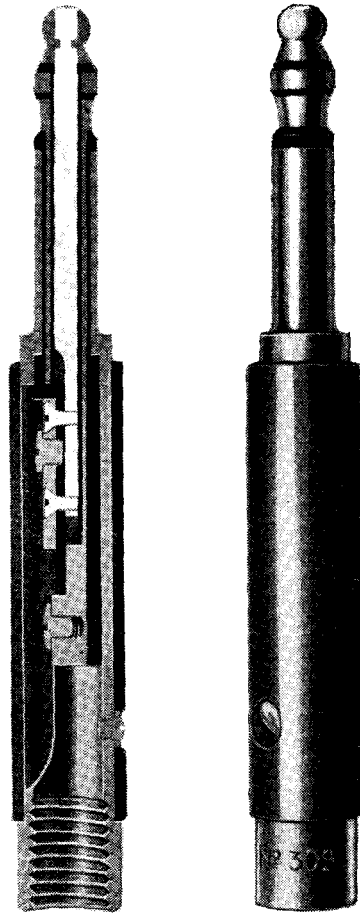
Contributions to this column should be addressed: THE EDITRESS,
"Talk of Many Things," *Telegraph and Telephone Journal*, Secretary's Office,
G.P.O. (North), London, E.C.

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 1926
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 March 31, 1927, and such applications should refer to improvements made, or suggested, during the twelve months ending Dec. 31, 1926.
- 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. At the discretion of the Council of the Institution of Post Office Electrical Engineers the Award may be withheld if, in the opinion of the adjudicators appointed by the Council, after full consideration of the applications received, 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,
Secretary.



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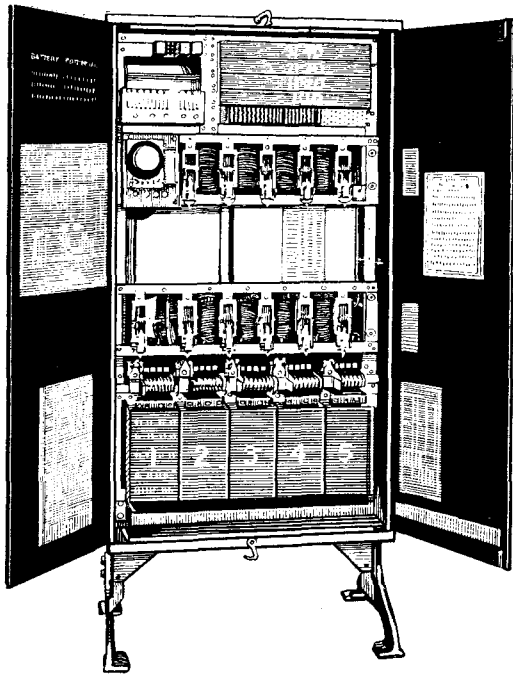
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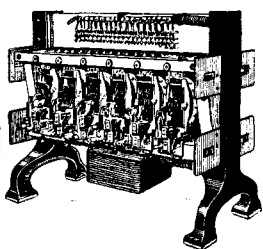
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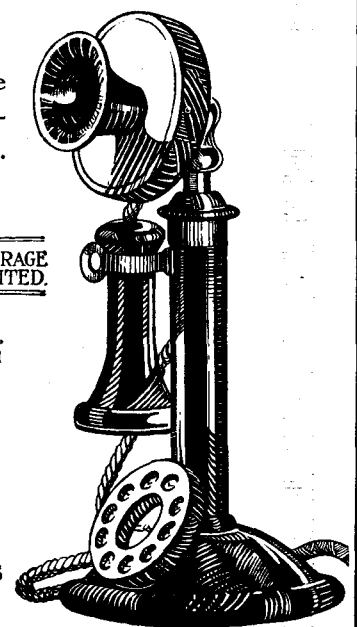
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LIVERPOOL AND DISTRICT.

ANNUAL REPORT FOR YEAR ENDED DEC. 31, 1926.
(Abridged.)

The report which follows deals with the development of the Service in the Liverpool District during the year ended Dec. 31, 1926, which, in spite of the depression caused by the coal strike, has been well sustained, considerable progress having been made in all directions.

New or Improved Exchanges.—A considerable extension has been made to the equipment at the Central and Bank Exchanges, and the equipments at many other exchanges have been increased to provide for the growing needs of the telephone users. Complete new manual exchanges of the latest type have been provided at Hoylake and Upton. A new exchange at Huyton is nearly completed, and will be ready for service early this year. Arrangements are also well in hand for providing new exchanges at Garston, Maghull and Stockton Heath. Sites have been acquired for new exchange buildings at Prescot and St. Helens, in which exchanges of the automatic type will be installed.

Telephone Progress and Increase in Number of Telephones.—During the year ended Sept. 30, 1926, 6,762 new telephones were fitted. After allowing for cessations this shows a net increase of 4,125, or approximately 7½%. The number of telephones increased from 34,910 in September, 1912, to 61,634 in September, 1926—a growth of 76% in 14 years. The provision of additional underground cables required to meet the demand for new circuits is proceeding steadily, and new services can now be given in most cases within one or two weeks from the date of the order. Isolated cases of unavoidable delay occasionally arise, owing to the spare underground plant being used up through exceptional growth in certain localities. In such cases prompt steps are taken to lay new cables.

Underground Cable Extensions.—New main cables have been brought into use from Liverpool to St. Helens, from Warrington to Wigan, and from Birkenhead to Upton, Hoylake and Neston. A new cable from Liverpool to Bootle, Waterloo, Crosby, Hightown and Formby will be completed and brought into use early this year, to provide for increased junction requirements between those exchanges. Similar additional junction cables will also be shortly provided from Liverpool to Old Swan and Huyton. An additional cable with 254 circuits is also to be shortly laid from Liverpool to Manchester.

Long-Distance Communications.—Several additional long-distance circuits from Liverpool and the surrounding industrial 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 routes. The function of a telephone repeater is to amplify the telephone speech currents

by means of thermionic valves—so well-known to the wireless enthusiasts—with the result that the volume of speech reaching the distant subscriber closely approximates to that sent out by the originating subscriber.

Telephone Traffic.—During the past year there has been a further substantial increase in the number of calls dealt with in the district, the total number approximating 62½ millions (58 million local and 4½ trunk), being an increase of 6% over the previous year.

The number of phonograms—telegrams handed over the telephone by subscribers for transmission—number 214,000, an increase of 10% on last year.

The quality of the service continues to improve. Written complaints were comparatively few and referred mainly to plant and apparatus faults which are more or less unavoidable. The total written complaints represented 1 complaint to every 36,890 calls dealt with. With the conversion of Liverpool North, Hoylake, and Upton exchanges to central battery working, the Liverpool district is now almost completely equipped with the most up-to-date manual system.

Phonogram Equipment.—The new phonogram room at the Liverpool Head Post Office has now been equipped with the latest type of ancillary panel board and it is expected that the new apparatus will be brought into use this month. The improved facilities for handling the work should greatly benefit those subscribers who telephone their telegrams for onward transmission.

Street Kiosks.—The use of street telephone call kiosks is still being extended. A new coin box permitting of shillings, sixpences, and pence being inserted, has been introduced in certain towns and, if it proves successful, its issue will be generally extended. It is anticipated that this will lead to a considerably increased use of these kiosks for the purpose of sending telegrams and making trunk calls.

Telegraphs.—The further experience of the type keyboards and automatic transmitters on the London and Paris routes, referred to in the last report, has been entirely successful and this method of working is likely to be extended to other routes.

Direct telegraph working between Liverpool and Antwerp has been introduced, and the question of further direct lines between Liverpool and the Continent has been reviewed. The circumstances, however, are not such as to justify any extension in this direction at the moment, but the matter is being kept in view.

There has been a large increase in the number of Christmas and New Year Greetings sent by the Imperial Cables and Empiradio.

We regret to record the death during the year of Mr. E. J. Hidden, who had been Telephone Manager at Liverpool for 26 years. He has been succeeded by Mr. W. E. Gauntlett, formerly Manager of the Scotland West District.

W. M. SIMPSON,
Postmaster-Surveyor.

W. J. MEDLYN,
Superintending Engineer.

LONDON TELEPHONE SERVICE NOTES.

Contract Branch Notes.

THE net increase in exchange lines for the year 1926 amounted to 28,959 or a percentage increase of 10.7, whereas the stations increased by 43,156, or 9.2%. In view of the adverse effect of the coal strike and the unsatisfactory trade conditions, these increases may be considered satisfactory. The population per telephone in the London Telephone Area at the end of 1925 was 16.2, and at the end of 1926 14.96. The last figure compares with 29 for Great Britain.

The Contract Branch had the satisfaction of closing the year by negotiating an order for what will be the largest P.B.X. in London and probably in the Kingdom. It will have a total of 944 internal extensions. It would be interesting to know how many installations of this size are in existence in New York.

It is interesting to ascertain from what classes of the community the demand comes for telephones. Some time ago one of the lecturers before the Post Office Telephone and Telegraph Society mentioned that in the United States even charwomen found it necessary to be on the telephone. A case came under notice recently in London where two charwomen were living together in a flat and had the telephone installed. Every week the Contract Branch receives evidence that the working classes are being educated rapidly in the value and usefulness of the telephone.

The population per telephone in the United States on Dec. 31, 1925, was 6.7, as compared with 32.2 in this country. It appears from statistics recently published that the population per motor-car in the United States is 5.8, as compared with 45.6 in Great Britain. It may be inferred from these figures that the motor industry, with its enormous sales organisations, is relatively further from United States standard than the telephone service.

Mr. H. C. Edwardes, a Contract Officer attached to the City District Office, retired from the Service on superannuation on Jan. 8. It is interesting to recall that Mr. Edwardes is the first Contract Officer of the original Post Office London Canvassing Staff to retire. His colleagues have subscribed to a presentation which will be made at a later date.

Letters which reach the Contract Branch between Christmas and the New Year sometimes depart from the purely formal basis and reveal the general seasonal feelings. One subscriber addressed a letter to the *Consoler* London Telephone Service but it was not clear that it was due to gratitude for benefits received!! Another subscriber expressed the hope that the service procedure would be carried out both by the exchange staff and himself. It is hoped this New Year's resolution was not made to be forgotten within a week or two.

* * * * *

Telephonists' Society.

Once again the Annual Dance of the London Telephonists' Society has taken place, and once again it has been an unqualified success. This year it was held on Jan. 1 at the usual rendezvous, Bishopsgate Institute, and though delays on a certain railway, just now notorious, caused the earlier arrivals to have an unexpected amount of room in the first dances, long before supper time 200 folk were gaily footing it to the music of Mr. Skinner's Orchestra. He and his merry men were as usual in excellent form, and soon proved that they can still play valses in the perfect time for which they were famous in the early days of the Society, umpteen years ago.

This Session's president, Mr. J. Hinshelwood, made his first appearance at these functions (but that is no reason why he should not now make a habit of it), and past presidents also present were Miss Cox, Mr. Beck and Mr. Buckeridge. The latter shares with one or two others the distinction of never having missed one of these events, which, as Social or Dance, have occurred every year since 1906, except during the war period. Indeed, one of the most enjoyable sides of this dance is the fact that a number of the veterans of the Society make a point of turning up and meeting old friends.

A very familiar bugle call about 9 p.m. sent everyone supperwards to find the tables festive with a wonderful assortment of caps and hats, which added to the ballroom gaiety later on. Auld Lang Syne came far too soon for most.

The Secretary, Mr. Thirkell, who was M.C., and his Dance Committee of two (both being of the aforementioned veterans) are to be congratulated on another successful evening.

In order not to clash with Christmas festivities next year's dance will probably be held about the middle of January, 1928. We shall all be there!

* * * * *

Accounts Branch.

Anyone wandering by chance into certain sections of the Accounts Branch after office hours, a few days before Christmas, would have wondered what had happened in that usually matter-of-fact atmosphere of ledgers, because though the ledgers were certainly put away, the staff had not gone home, but were in enthusiastic groups round tables laden with—toys! And, as thereby hangs a tale, I had better begin at the beginning.

During 1925 the Accounts Branches of the Controller's Office moved to Cornwall House, and before the Christmas of that year came round, someone discovered that in the Waterloo Road Hospital next door, there were 72 children's beds, and all would be occupied at Christmas, and there were not many outside helpers to play Santa Claus to them. So two or three enthusiastic folk got to work and spread round the news, others at once volunteered

to dress dolls, buy dolls or bring toys, with the result that on Christmas Eve 72 presents were handed over to a very grateful Matron.

This last Christmas plans were made earlier and it was soon found that the help forthcoming would do more than supply the needs of our neighbours. But nobody was discouraged for other cases of need were known, and when the time arrived for the exhibition, there was not one show, but several. Dolls predominated, dolls large and small, baby dolls that went to sleep, dolls in knitted suits and rompers, dolls in partyfrocks, and sleeping suits, fairy dolls, fashionable shingled dolls complete to the handkerchief, black dolls, brown dolls, in fact, every kind of doll. Then there were the animals, including, of course, Teddy Bear, Dismal Desmond, Pip and Squeak, Ernest the Elephant, and other old friends, while mechanical toys, games and other joy creators too numerous to mention, added to the collection.

As a result, a goodly supply of toys of all sorts was sent not only to the Waterloo Road Hospital, but also to the Queen's, Hackney, St. Mary's, Plaistow, and the South-West London Mission.

* * * * *

Paddington Exchange.

Within a stone's throw of Lord's Cricket Ground—to many of us the very centre of the British Empire—there lies the fringe of a dull sordid neighbourhood stretching outwards to the regions of Paddington and St. John's Wood, unheeded by and almost unknown to the luxurious and well-to-do. It was here that the Paddington Exchange Staff had elected to give their Annual Tea this year to 300 boys and girls of the Capland Road L.C.C. School. Consequently at an early hour on Saturday, Jan. 15, West End Caterers were busy delivering their choicest delectables and dainties at the School and ere long a large number of willing and enthusiastic helpers took possession of two of the floors of the building and soon wrought wonders with the material at hand, converting the conventional surrounds of the School interior into a fitting setting for a glorious feast. At about 4 o'clock tea was served simultaneously in two large School Halls, helpings of bread and butter, cakes, pastries, jellies, &c., disappearing with a rapidity which bespoke practical appreciation of the bountiful fare provided. The merriment of the children soon became infectious and wavelengths of enjoyment pervaded the whole atmosphere. Tea eventually gave place to an impromptu "Sing-Song" which gave scope for the native talent of the Staff; piano solos, songs with rollicking choruses lustily and spontaneously emphasised by the youngsters, and captivating recitations all being included, while a band of Rovers who had generously volunteered for general service for the afternoon delighted the audience with some hearty turns reminiscent of the breeze and verve of their seaside training camp life.

The triumph of the entertainment was finally assured by the appearance of those old-time favourites, Messrs. Wilkins and McGowan in their inimitable Living Marionette Show which went with its accustomed drollery and swing evoking an enthusiasm and applause which fairly made the welkin ring.

Mr. Cox Johnson, the Headmaster, having called for a hearty "Three times three" for the Paddington Staff, the party was reminded that on this occasion every scholar takes a prize. The children were then lined up and each one presented with a well-chosen toy while by way of a final touch there were oranges, pennies and smiles for the departing guests.

The Committee are very grateful to Mr. Cox Johnson, the Headmaster, and to Miss Worts, the Headmistress, and their Assistants for their able co-operation in everything which was done, and also to that ever-increasing number of ladies and gentlemen who, by their liberality of time, service and money, made the afternoon the great success which it deserved to be.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Promotions:—

- Miss H. HAMER, Asst. Supt., Class II, at Clerkenwell, to Asst. Supt., Class I.
- Miss A. M. FAZAKERLEY, Asst. Supt., Class II, at Primrose Hill, to Asst. Supr., Class I.

Marriages:—

- Miss F. WYATT, Asst. Supr., Class II, of Trunk Exchange.
- Miss E. P. ISON, Asst. Supr., Class II, of Clerkenwell School.
- Miss M. F. SLATER, Telephonist, of London Wall Exchange.
- Miss D. M. DUNCKLEY, Telephonist, of London Wall Exchange.
- Miss E. E. BROWN, Telephonist, of London Wall Exchange.
- Miss E. A. TURNER, Telephonist, of Museum Exchange.
- Miss F. GOODMAN, Telephonist, of Museum Exchange.
- Miss G. V. BERJEAN, Telephonist, of Museum Exchange.
- Miss V. E. M. ANDERSON, Telephonist, of Museum Exchange.
- Miss P. WOOLLVEN, Telephonist, of New Cross Exchange.
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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XXXVIII.—

SIR HENRY BUNBURY, K.C.B.

No apology need be made for presenting to our readers as a Telegraph and Telephone man Sir Henry Bunbury, K.C.B., the Comptroller and Accountant-General of the Post Office. It is true that Sir Henry Bunbury's responsibilities and activities range outside the field of telegraphs and telephones, but they are of a very substantial character within that field; and the officers at headquarters responsible for the administration of telegraphs and telephones have come to regard Sir Henry, in a very real sense, as one of themselves. His singular combination of the critical and the constructive faculties, his wide experience in the administrative and financial world, and, not least, his quickness of sympathy and his un-failing geniality have won for him a unique place in the Post



[Photo by Mullins, Ryde.

Office service. His advice as Comptroller and Accountant-General is sought, not as an official necessity, but because it is invariably helpful and far-seeing.

Sir Henry Bunbury came to the Post Office in 1920, having previously been, in succession, Treasury Officer of Accounts, Accountant and Comptroller-General of the National Health Commission, National Health Commissioner, and Accountant-General of the Ministry of Shipping. He had already made acquaintance with telegraph and telephone matters as a member of the Committee on Engineering Accounts which sat in 1910-11. He quickly settled into his new post; and there are rumours that in consequence of his appointment the Accountant-General's Department regards itself as the most fortunate department in the whole of the service.

ON SPEAKING TO NEW YORK.

THERE were three thoughts dominating my mind at the close of that first conversation with America.

I had just returned from a brief sojourn in a country where the life of the people is still largely lived under the primitive conditions which ruled hundreds of years ago. The bricks from which their houses are built are still made, by hand, of mud and straw baked in the sun: still their women sit at the house-door in the open air grinding with a hand-mill their corn into flour. Then to step from the ancient Eastern ways into an experience of the latest of those modern marvels which the Western world is so constantly discovering and converting to her service! That was the first thought—one of contrast.

The second was one of wonder—that this great thing had been done at all. It required a little imagination, because the transaction itself, while having an element of pleasure and even of the commonplace, had nothing of the wonderful to distinguish it from any other telephone conversation. One great delight was to hear the American operator say in response to the first attempt "I'm sorry, Mr. M's line's busy." It was my first experience of "the voice with the smile" to the idea of which the American service journals have by now accustomed us. It was said in a kindly tone with a distinct but not unpleasant American twang, and I wondered whether my Scottish accent caused as pleasant a thrill to the operator as her American one did to me. Unlikely! My call came through later and we talked of ordinary things. Not until it was over did one realise the wonder of it. The speech was as if only a thin partition wall divided us, and yet 3,000 miles of sea rolled between.

The third thought which appealed to one was the romance of it. Once I saw a great ocean liner crossing the Atlantic on its way to New York. We were going south to the Mediterranean; it was going west and passed across our bows its speed so great that almost as we looked it was hull-down on the horizon. Yet even at that speed it would take five days to reach where I had now got—in speech at least—in a space of time measured by seconds. We have been making history and may not realise it; and history is the romance of life.

Telephone service to America has now become a procedure more or less routine. We make out tickets, render accounts, book calls, answer enquiries and in course of time it will all be regarded as an ordinary part of the day's work. Yet in an age of marvels, this is amongst the greatest, and one likes to think, sentimental though it be, that what might otherwise be a humdrum task may become alive with interest because coloured by the spell of wonder and romance.

J. F. S.

THE C.T.O. LIBRARY.

THE Annual Report of the C.T.O. Library for last year shows the Library to be in a very flourishing condition. Record figures were established during the year, no less than 42,781 books having been issued. The membership has increased from 2,000 to 2,495, the increase in the number of women members being very marked. The total number of books in the Library is rather more than 2,800.

The Library has been in existence for 39 years, but it hides its light under a bushel and not many officers outside the C.T.O. are even aware of its existence and of its value in increasing the amenities of life in the C.T.O.

THE TELEFUNKEN-KAROLUS-SIEMENS SYSTEM OF TELEPHOTOGRAPHY.

THE basic principles and methods adopted in practice in order to realise the electric transmission of images, are along the lines that electrical currents proportional to the shades and tints of the various points of the image to be transmitted should be successively transmitted to a receiver where they are then converted into luminous values. In the design of apparatus constructed with this end in view the supports or holders of such images are spread out upon cylinders which are made to revolve in perfect synchronism with similar cylinders at the receiving station while changing in the direction of their axes. By this method the elements of the image are successively manipulated by means of a small spot of light projected on to the cylinder. Two luminous relays are used, one at the transmitting station and one at the receiving station, these two relays having the respective functions of converting the light values into values of electrical currents and converting the electrical values into light values again, the latter being received on a sensitised plate.

By the courtesy of Messrs. Siemens and Halske of Siemenstadt it has been possible to publish the following outline description of the special telephotographic system mentioned above, together with the illustrations. No attempt has been made to give minute details. The system is undoubtedly an excellent one, and will naturally receive closer attention in the technical circles interested.

The actual transmission and reception of photographed printed matter dealt with by this system were recently witnessed by a number of engineers and practical telegraph experts, and the special means adopted for ensuring perfect synchronisation when utilising the system by radio appears to be particularly sound, although in this respect there was at the moment no opportunity of proving out this interesting point.

J. J. T.

For telephotographic transmission in the widest sense of the term, in which is included not only the transmission of actual objects but also writings and impressions of all possible description, the fineness of the image of the text transmitted cannot be guaranteed to the receiver unless a very small mesh of decomposition and very small photographic designs of the received image are used.

The fineness of the mesh necessitates that any single character must be formed of a large number of separate photographic marks say 100 to 200. If we desire to attain sufficiently high speeds of transmission with such a method, in which each character necessitates a quantity of impressions, only apparatus with negligible inertia must be employed for the electrical manipulation of the transmitted image and for the creation of the received image by the luminous-ray relay actuated by the received currents.

The telephotographic system about to be outlined has been developed by the triune collaboration of Telefunken Berlin, Professor Doctor Karolus of Leipzig and Siemens and Halske of Siemenstadt.

For the decomposition of the transmitted image and for its distant reproduction on film or photographic paper, revolving drums in synchronism are used, for which rotation is simultaneously combined, with a relative movement in phase with the optical transmitting system or receiver in the direction of the axle of the drum. The manipulation of the transmitting station and the exposure at the receiving station utilise the pointed end of a cone of intense light covering a space of only $\frac{1}{25}$ m.m., which follows a fine screw-thread of $\frac{1}{5}$ m.m. over the surface of the image to be transmitted, and as a result of the combined movements described.

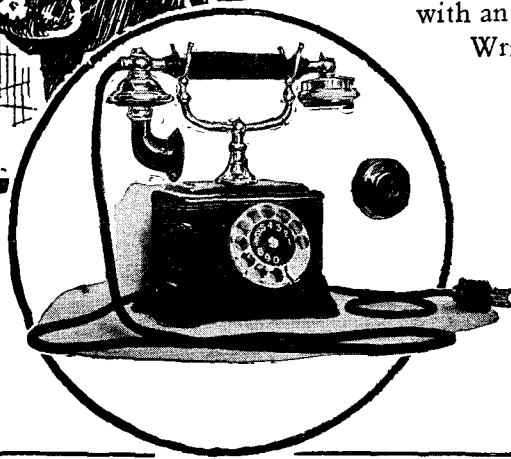


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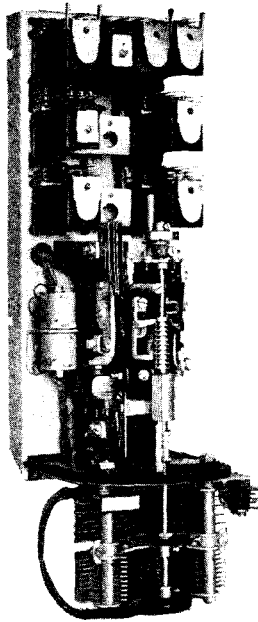
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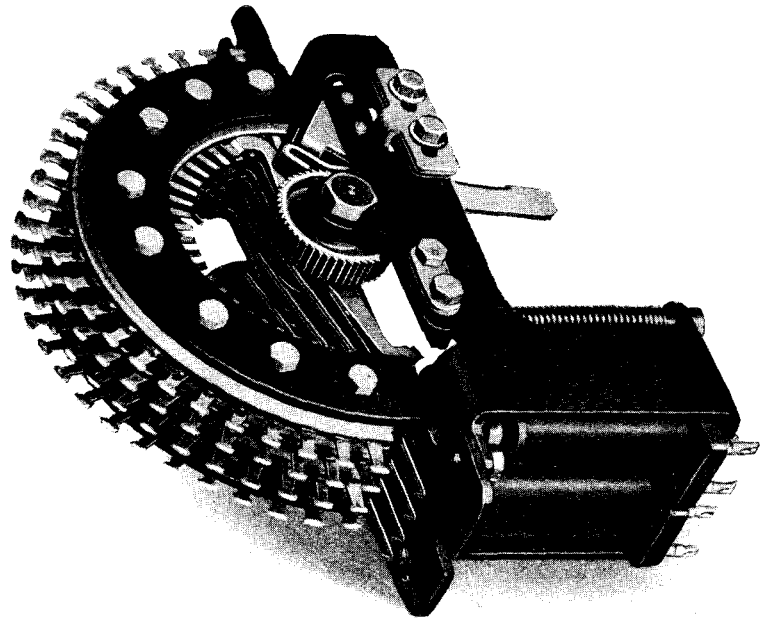
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For the electrical analysis reflection is used for the breaking up of the different tonalities of the original image, sketch, &c., to be transmitted. Thanks to the passage of the varying light and dark elements of the image under the luminous spot the rays are propor-

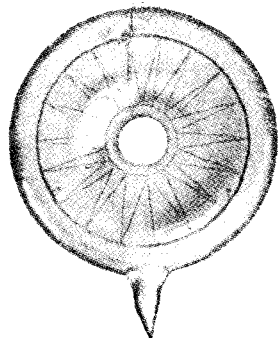


FIG. 1.—SIEMENS' PHOTO-ELECTRIC CELL.

tionally more or less reflected upon an open photo-electric cell. This cell is in ring form (Fig. 1) and is the special design of the Telefunken organisation. It permits the revolving drum which carries the original to be transmitted to be placed very near the

The oscillations of the current, due to the light in the photo-electric cell (Fig. 1) are used, after suitable amplification, for the modulation of a carrier wave either for wireless transmission or for transmission over wire circuits.

After demodulation of the carried oscillations in the receiver, the low frequency received is led to the Karolus cell (Fig. 2) after suitable amplification of its tension: this varies with the nature of the manipulation and, according to the repartition of the elements of the transmitted image, i.e. their relative light and shade.

The latter cell is of entirely new design and is named after its inventor Dr. Karolus who has brought it to a very fine stage of perfection. The professor utilises the "Kerr" effect—double electric refraction of polarised light. It permits, without inertia, action upon the break-up of the cone of luminous rays reaching the film according to the oscillations of the received current. It is in fact a miniature condenser permeable to light and filled with nitrobenzine: the amplified low frequency is led to the small plates which constitute the electrodes. The light polarised by a *nicol* arrives at an angle of 45° with regard to the direction of the field.

In this electrical field it is decomposed into two rays which travel across the fluid at two different speeds. At their exit these are intersected by a second *nicol* and by reason of the elliptical

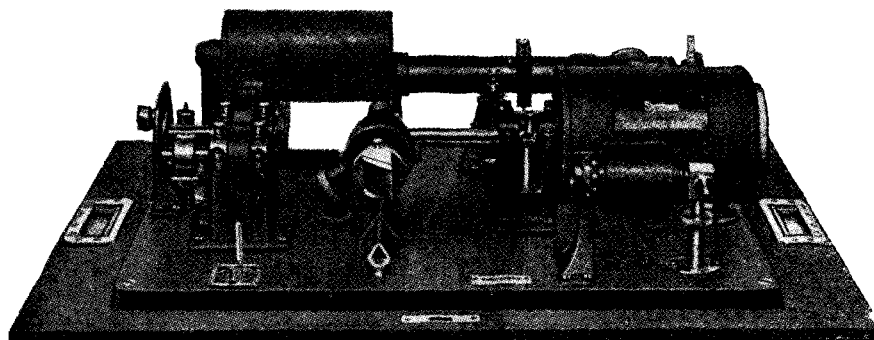


FIG. 3.—GENERAL VIEW OF EXPERIMENTAL SET OF SIEMENS' TELEPHOTOGRAPHIC APPARATUS AS USED FOR WIRELESS TRANSMISSION.

photo-active surface of the potassium which intercepts the rays. In this manner nearly all the light coming from the surface of the image across the central opening of the ring is captured by reflection and it is thus possible to transmit the original document itself and

polarisation, there results a different light intensity according to the tension of the excitation.

By reason of the absence of inertia of the "Kerr" effect up to extremely high frequencies (above 100 millions per second) it is now possible to attain very high speeds of transmission. Trials made between Berlin and Leipzig have furnished the following times of transmission. For an image 10 × 10 c.m. transmitted between Berlin and Leipzig by

- (1) A pupinised telephone circuit = 90 seconds.
- (2) By wireless on a wavelength of 850 metres } = 20 "

With the use of short waves this latter time should be capable of still further reduction. During the above-mentioned periods no less than 250,000 image-elements were actually transmitted in each case. Every detail of the sketches, small manuscript, or of the ordinary daily newspaper was reproduced with perfect definition. In the case of radio transmission to maintain absolute precision of synchronism between the transmitting and receiving apparatus a new method has been adopted by means of which synchronisation and phasing needs only to be adjusted once every 24 hours. The precision of this particular method is said to be in the neighbourhood of 1/100,000 of a revolution.

Fig. 3 shows a general view of an ordinary experimental set as used in conjunction with wireless tests between Leipzig and Berlin.

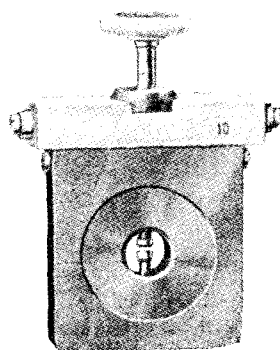


FIG. 2.—KAROLUS CELL.

to avoid the long process employed hitherto of an auxillary transparent image.

This special photo-electric cell is practically without inertia, at least up to several hundreds of thousands of frequencies, and by reason of its great sensitiveness relatively low amplification may be used.

PHONOGRAM EQUIPMENT.

BY D. H. THOMSON.

On page 71 of the January, 1927 (No. 142) issue of this JOURNAL is a brief description of the continuous panel ancillary phonogram equipment which is gradually being installed at some of the larger "appointed" offices. Further information on the subject may be of interest.

Fig. 1 gives a general view of the equipment at Sheffield which was the first office to be provided with more than twenty positions

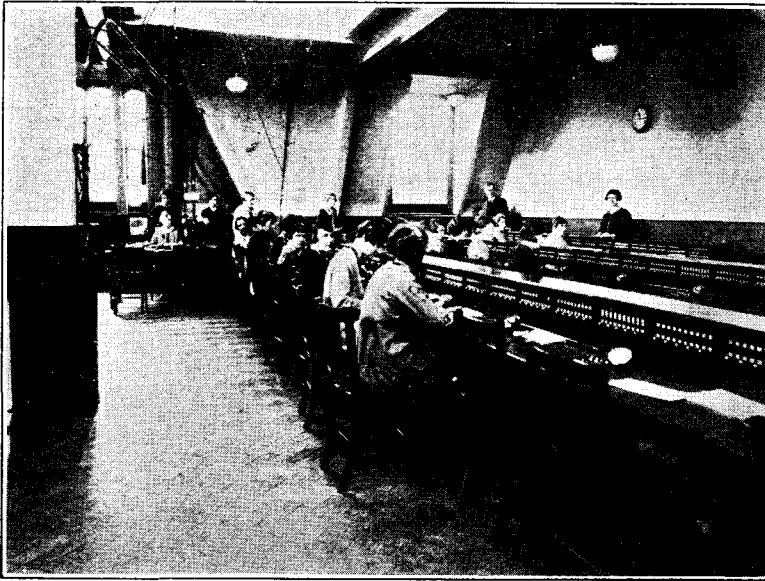


FIG. 1.—SHEFFIELD PHONOGRAM ROOM.

of the new pattern. Actually, there are equipped two "suites" each of twelve operator positions, and one of six positions (the latter can be seen in the background) but space is available on this suite for extension to twelve positions at a later date.

The panels are fixed uniformly along the back of ordinary standard telegraph tables slightly modified for the special conditions,

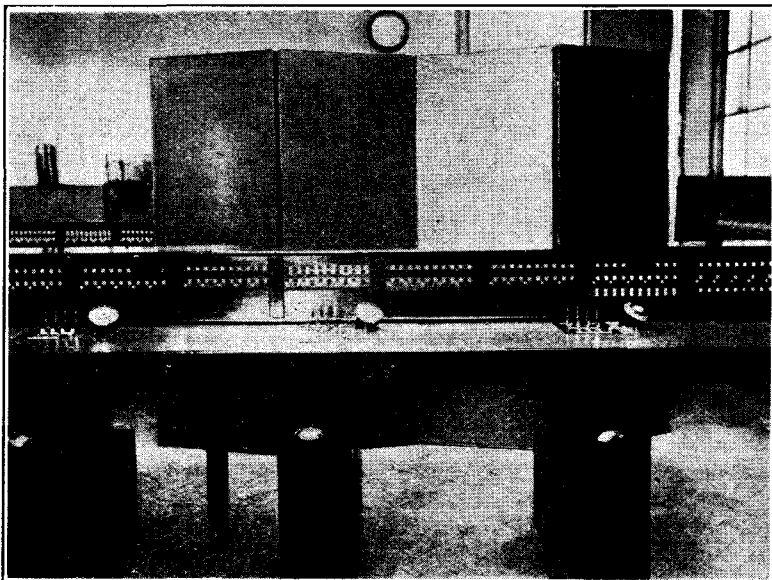


FIG. 2.

but, as the weight of the equipment is borne partly by the keyboard units, a front view of which is shewn more clearly in Fig. 2, ordinary table legs are required only at suitable intervals at the back of the tables. The keyboard units which contain the operator's cord circuit and associated apparatus, including plug and key shelf and supervisory lamps, are slipped into position by slotting the table top. A back view of the units in position is shewn in Fig. 3. Access to their interior is readily available back and front by means of

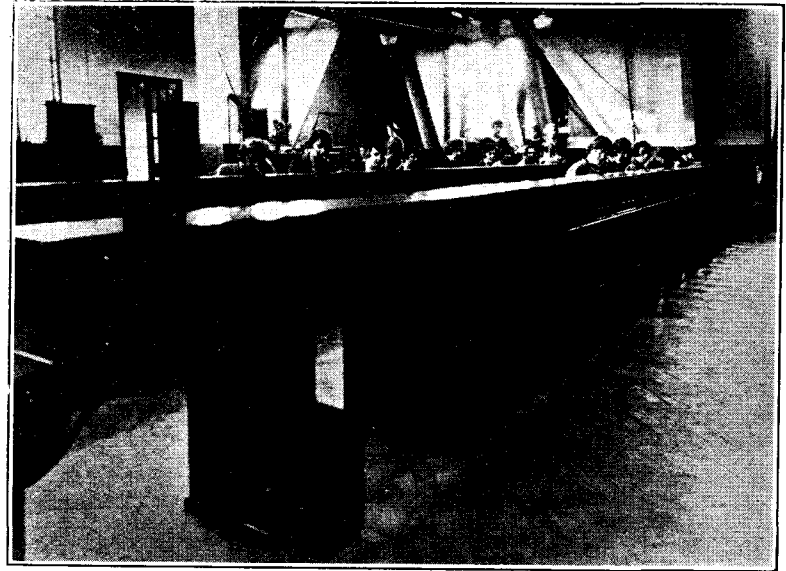


FIG. 3.

moveable panels. The position of the operator's instrument jack, in duplicate, and dial are also shewn in Fig. 2.

For concentration purposes the incoming circuits on the second and third suites are reproduced with calling lamps on two panels of the first suite and a key is associated with each circuit. These keys disconnect the calling lamps on the second and third suites and bring into use those on the concentrator positions and vice versa according to the position of the keys.

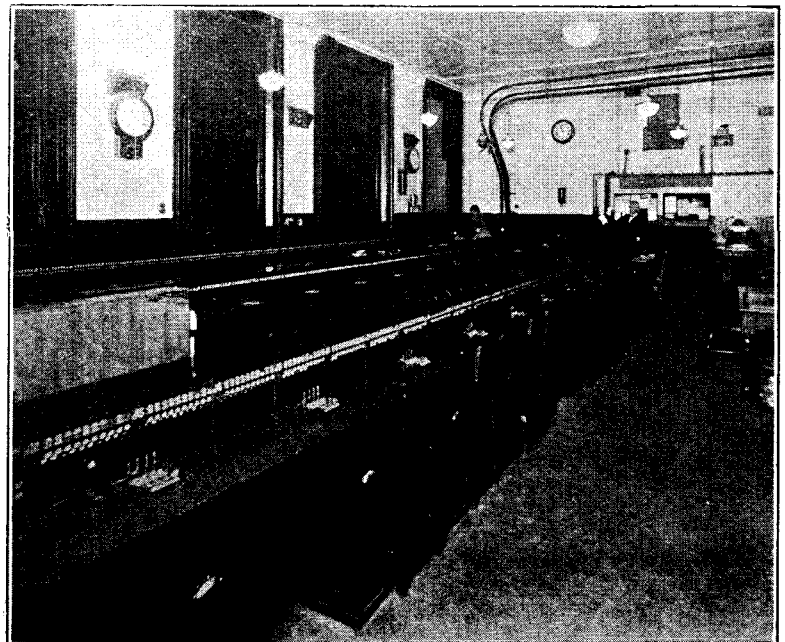


FIG. 4.—MANCHESTER PHONOGRAM ROOM.

Additional keys are provided for an extension of a group of circuits to the Telegraph Instrument Room during the periods when the Phonogram Room is closed.

An Information Desk is provided with circuits to the phonogram positions and others peculiar to the position. Calls for "Enquiries" may be received direct from the main local exchange, or from any phonogram position. Two pairs of double-ended cords are provided at each phonogram position so that when one pair is in use for extension to the Information Desk the other can be used for ordinary traffic.

On the Supervisors Desk listening lines terminating on the operators headsets are provided, in addition to other facilities.

Fig. 4 gives a general view of the new equipment at Manchester which was brought into use shortly after that at Sheffield. At

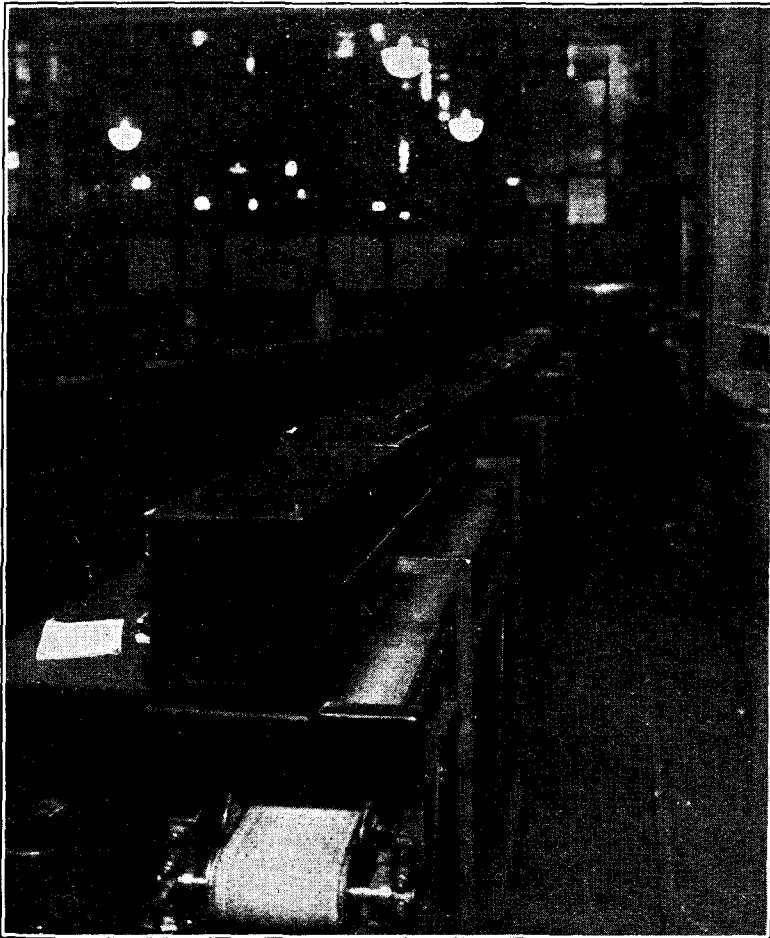


FIG. 5.

Manchester, however, forty-five positions have been provided, and, in view of the volume of A phonogram traffic the first suite of positions is fitted with a belt conveyor, which is shewn in Fig. 5. When the reception of an A phonogram is completed the relative form is "posted" on to the belt conveyor through a metal slot and conveyed to the date stamping and numbering point. A belt conveyor has also been provided at Liverpool where new equipment was brought into use on January 15.

The results obtained with the continuous panel equipment have been so satisfactory that consideration is being given to the question of installing experimentally at the Central Telegraph Office one or two suites of positions for A phonogram work.

The equipment at present in use at the Central Telegraph Office is of the concentrator type on a large scale. Until recently

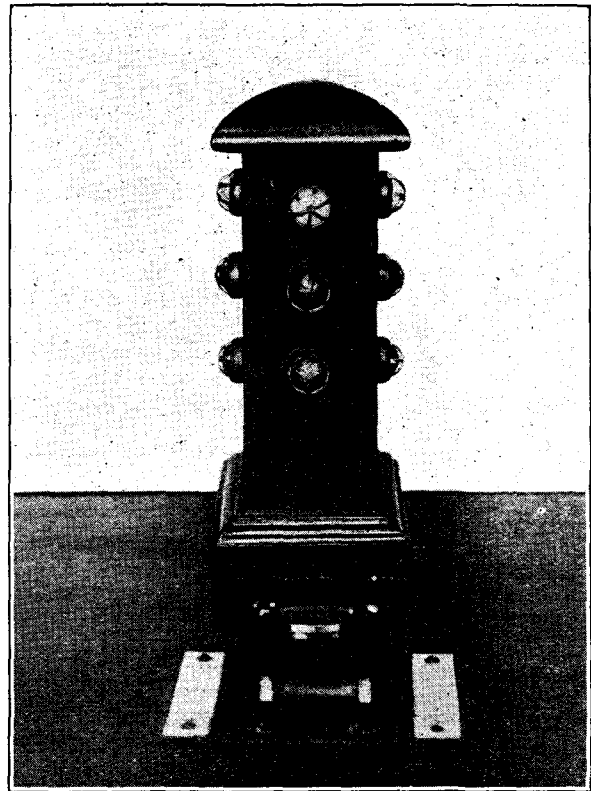


FIG. 6.

only one supervisory lamp was provided at the concentrator, and one at each phonogram operator position, in association with the operator's cord circuit; and in view of certain difficulties which were being experienced in answering and clearing it was considered desirable to modify this arrangement. Three supervisory lamps, W, G

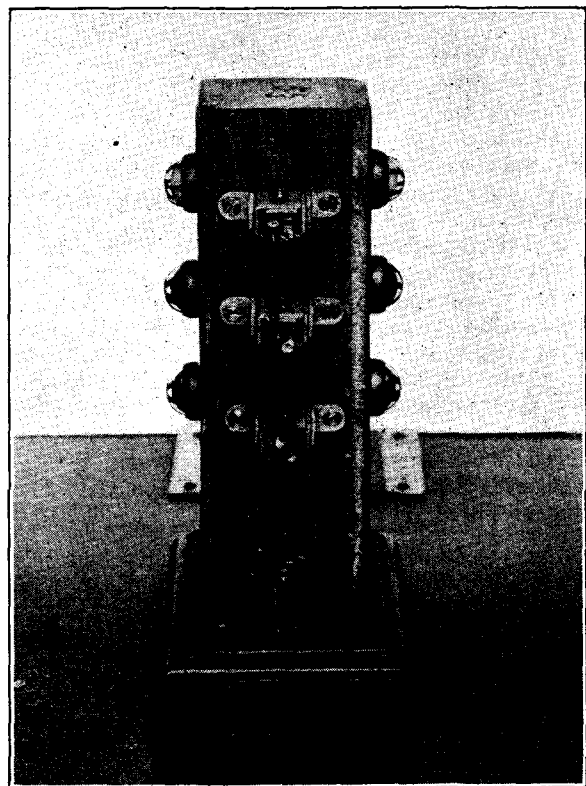


FIG. 7.

and R, Fig. 8, are now provided at each phonogram operator position P, and two, one white, W^1 , and one red, R^1 , at the concentrator, C, in association with each cord circuit. The lamps at P are accommodated in a small wooden pedestal, illustrated in Fig. 6. Three caps are associated in the same horizontal plane with each lamp, one on each side to assist supervision from any point, and one in the front of the pedestal. The top lamp cap is white, W, the centre green G, and the bottom red, R. The back of the pedestal, with cover removed, is shewn in Fig. 7. As formerly, two three-position keys A and B, locking in the forward (except B) and back positions, are provided at P, but the functions of key A have been slightly modified. When a call is received at C, the operator at that point inserts in the appropriate jack a plug on which is terminated a disengaged position P. Lamp W glows. The operator at P then presses key A to the speaking (back) position; lamp W darkens, lamp G glows, and continues to glow during the transaction until

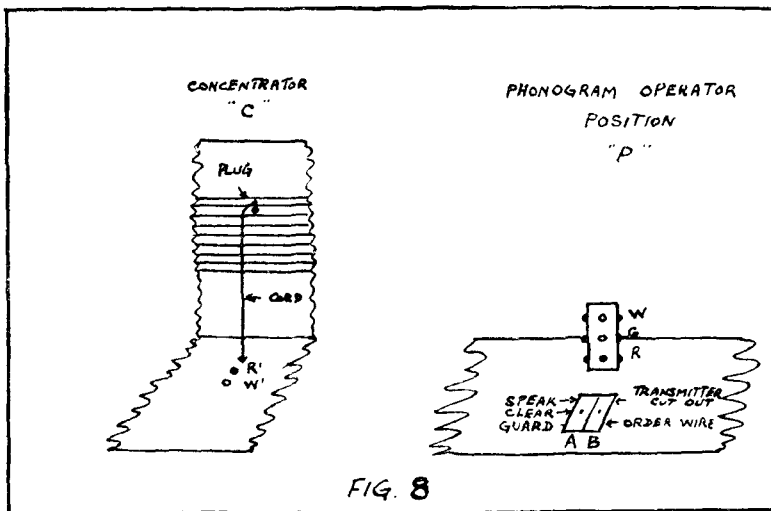


FIG. 8

the operator says "Good-bye" to the subscriber. If no further work has then to be done with the message key A should be restored to the normal or "clear" position, causing lamp G to darken, lamp W^1 at C to glow, and the calling supervisory lamp at the originating exchange to glow. If, however, there is further work to be done with the message when the operator at P says "Good-bye" to the subscriber, key A should be drawn to the forward position causing lamp G to darken, lamp R at P to glow, lamps W^1 and R^1 at C to glow and the calling supervisory at the originating exchange to glow. In other words the "clearing" signal is given to the concentrator, where the junction should be cleared, and the exchange as before but lamps R and R^1 will continue to glow until the operator at P restores key A to the normal or clear position. Lamps R and R^1 are therefore guard lamps, controlled by the operator at P, that indicate to the operator at C and the sectional supervisor respectively that the operator at P is temporarily not available, and that work incidental to actual reception is in hand. It will thus be seen that a visual indication is given of the various stages of a transaction. Further, if through inadvertence a call is extended to a position P which is not staffed, lamps W and W^1 (a clearing signal at C) will glow indicating the error to the concentrator operator and to the sectional supervisor.

These changes have proved to be distinctly beneficial to the quality of service and to the operating and the supervising staff.

PROMOTION.

Mr. W. THYNE, Staff Officer, Glasgow, to District Manager, Canterbury. Prior to Mr. Thyne leaving Glasgow he was presented with a handsome "grandmother" clock by the staff.

THE TELEPHONE TIDE.*

BY HORACE DIVE, LONDON TELEPHONE SERVICE.

"SPEECH," wrote Emerson, "is power. Speech is to persuade, to convert, to compel." It is the most potent factor in human relationship, and those of us who, in our daily work, are concerned in widening the area over which a direct interchange of speech is possible or in other ways facilitating the interchange of ideas and information through the agency of the telephone, can take pleasure in the knowledge that we are fulfilling a task of real and lasting advantage to mankind, individually and collectively.

It is of undoubted value to each one of us to marshal our thoughts for presentation to another, and the point is well made by the great Lord Bacon in the following passage:—"Whosoever hath his mind taught with many thoughts, his wit and understanding do clarify and break up, in the communicating and discoursing with another. He tosseth his thoughts more easily, he marshalleth them more orderly, he seeth how they look when they are turned into words, finally he waxeth wiser than himself."

We may surely be truly proud of assisting others to wax wiser than themselves, by placing at their disposal greater and ever greater facilities for intercommunicating speech.

I want if I may to give you yet a further quotation—this time from Charles Dickens. One can understand his feelings when he wrote "the electric telegraph will never be a substitute for the face of a man, with his soul in it, encouraging another man to be brave and true." How true and yet in a measure how false in the light of the development of this time! Out of the electric telegraph has proceeded the telephone and as you are no doubt aware television as an accompaniment of telephony is something which we may expect to experience as an accomplished fact in the quite near future. We may therefore claim that whilst the electric telegraph may never be a substitute for the face of a man, yet it has provided the key which has unlocked the door to admit us to a state wherein we shall be able, no matter at what distance, to look into the face of a man, with his soul in it, and receive from or give to him courage to be brave and true. Let us hope the facility may always be used for such noble purposes. The development illustrates the danger of prophecies and sweeping statements.

I want to turn now to the coming of the telephone. Last year was its jubilee and in London we had a luncheon to celebrate that event. Oddly enough its jubilee has coincided with one in which Birmingham is greatly interested, that of the association of the house of Chamberlain with the activities of parliament, for it was in 1876 that the late Mr. Joseph Chamberlain was first returned to the House as one of the two representatives of your City. At Harrow School they have a song which sets out (I quote from memory):—

When Raleigh rose to fight the foes
We sprang to work and will.
When glory gave to Drake the—
She gave to us the Hill,
For we began, when they began
Our times' are one.
Their glory thus shall encircle us
Till time be done.

Something of the same sort might be written of the Chamberlains and the telephone. Certain it is that the association between that family and the Post Office is intimate and cordial. I remember as quite a junior officer in the Accountant-General's Department being greatly impressed on reading a long minute in Mr. Austin Chamberlain's handwriting. He had penned it at Balmoral when acting as Minister in attendance there, and although I do not now recall the precise matter to which it related I do remember most distinctly the joy one had in finding that a Postmaster-General could write a hand of delightful evenness and one which presented no difficulty of any kind in its reading. It was also absolutely to the point, as was that same gentleman's speech in the House of Commons when the Bill for the purchase of the National Telephone Company's undertaking was presented to the House several years later.

The inventor of the telephone—Alexander Graham Bell, died comparatively recently and the circumstances of his discovery were reported at length at the time so that they are still fresh in the mind. He was professor of vocal physiology in Boston University where he was concerned with the teaching of deaf mutes, and it was in association with this work that he became interested in the possibility of transmitting human speech electrically. The story of his research is picturesquely set out in the following letter which I have culled from an American Telephone Journal, but for the veracity of which I can take no responsibility. It purports to be addressed by James Smith to his wife Janet and to have been written while on a business trip to Boston, in June, 1875. It is dated June 2 and runs as follows:—

"Dear Janet,

Not very much to say to-day. Very hot here in Boston—I walk about with my tongue hanging out like a dog's. Went to see M. this morning. After that I did a few errands—one of which took me to Chas. Williams shop on Court Street, just off Scollay Square. A

*Paper read before the Birmingham Telephone Society.

noisier place I never hope to visit. By the way I met an amusing sort of chap there, quite by accident—blundered into his workshop looking for W. 'Beg pardon'—said I, and this chap looked up from a funny little thing he was tinkering with and smiled very pleasantly in an absent-minded sort of way—tall chap—thin—big nose—black hair—funny look about the eyes as though he were all worked up about something. Before going, I asked him out of curiosity what that thing was he was tinkering with. He looked queer for a minute—hesitated—then said it was a machine to carry the voice over a wire. I laughed, and backed out . . . Interesting looking chap—a bit cracked, though, evidently. . . . 'Voice over a wire'—Imagine! Yes, really quite mad, you know.

Well, I must stop—write soon—how is Fanny?—Yours ever,
JAMES."

That very afternoon, in a tiny shop on Court Street, the full twang of a clock spring was reproduced over an electrified wire for the first time, and Alexander Graham Bell—a "tall chap—thin—big nose—black hair," had invented the Telephone.

The first audible words were received by telephone on March 10, 1876, when Bell called "Mr. Watson, come here, I want you" and those words were duly transmitted to another room in which Mr. Watson then was.

As with most entirely new inventions it was at first difficult to get it taken seriously, but its real value and undoubted possibilities could not fail to win ultimate success, and whatever may have been the case in other parts of this country it was in 1879 that the first telephone exchange was opened in London with seven subscribers. It was housed in Coleman Street and subscribers increased so rapidly that the next year further exchanges were opened at Mincing Lane, Leadenhall Street, Queen Victoria Street, Eastcheap, and Chancery Lane. By 1885 the number of exchanges had increased to 13, but so conservative were the Company in their anticipations of development that they retained one sequence of numbers for London as a whole, dividing them amongst the various exchanges. In those days each telephonist's position had accommodation for 48 subscribers arranged in consecutive order. It was a simple matter to set up a connexion when the calling and called subscribers worked on the same operator's position, but for the purpose of effecting calls through other positions and exchanges special strips were provided to afford intercommunication. It was the practice for operators wanting numbers on other positions to shout their requirements across the room. Imagine the conditions in an exchange of 500 lines (large in those days but now regarded as quite small). In these days manual exchanges to provide for as many as 10,000 subscribers are quite common with facilities for intercommunication to the whole of Great Britain and Ireland as well as large areas on the Continent, and with perhaps 250 telephonists seated at the switchboards—yet connexions will be set up rapidly and with a minimum of noise or effort.

As illustrative of the growth of the telephone service in London it is interesting to note that about 25 years ago one individual, a lad, was able to deal with the compilation of the London Telephone Directory.* He was also responsible for issuing works orders for new lines and alterations. These duties at the present time occupy more than 70 persons.

In the early days the operating was done by boys, and no very great care was exercised in their choice either, whilst nowadays (except at night) the work is almost entirely carried out by women and girls in whose selection the greatest possible care is exercised in order to secure the right type. In that connexion I was struck when reading some years ago the *Annals and Memoirs* of the Court of Pekin, in 1621, to find a suitable helpmeet for the Emperor Tsi Tsing, then aged 16, and the methods applied in the London Telephone Service in selecting telephonists.

The whole empire was notified that comely maidens between the ages of 13 and 16 were eligible, after which the examiners made an eliminating inspection. Those whose height or figure failed to reach the required standard were weeded out until the number was reduced to 4,000. On the following day a much more careful scrutiny was conducted by the two head examiners, who made copious notes of each damsel's features, size of nose, colour of hair, shape of waist and length of foot. Each maiden was required to state clearly her name, age and lineage; if the timbre of her voice did not satisfy the examiners, she was at once rejected. Stammering or thickness of speech was regarded as an insuperable defect. As a result of this scrutiny only 2,000 remained eligible, and on the following day further physical measurements were made, in addition to which each candidate was required to walk a hundred paces in order that her deportment might be observed. Any slovenliness of gait or lack of dignity disqualified the candidate: after this test only 1,000 remained. These were then taken into the Inner Palace where they were subjected to a searching scrutiny by discreet and elderly women of the Palace. Three hundred were ultimately chosen to undergo a month's probation as Palace handmaidens. Those amongst them who shewed signs of stubbornness or of frivolous disposition were weeded out until at the end of the month only 50 remained.

That description with slight modification could be held to outline very closely the course followed in securing the best possible telephone operating

*This refers to the Directory for the Post Office system in London; not to that for the larger National system.

staff for London, and, notwithstanding Press criticism, it is certain that a high standard of efficiency is secured.

I do not doubt that you in Birmingham are equally exacting in your tests and equally fortunate in your results. But good as are the recruits for the telephone service one wonders if, by the application of some of the latest suggestions of medical experts, even more excellent results might be secured. For instance, I was reading quite recently that Dr. Alfred A. Mumford, medical officer of the Manchester Grammar School, had published in the *British Medical Journal* his conclusion that schoolboys who show a greater degree of buoyancy in the swimming baths do better in examinations than boys who are less buoyant. That is a conclusion arrived at after a careful study made by the Manchester Medical Society, founded as long ago as 1834. I cannot say how far it might be possible in selecting telephonists to apply such a test, but I do know that all the larger exchanges in London and many of the less large have most successful swimming clubs, and the girls of the London Telephone Service have individually and in teams won a large proportion of the trophies open to women for aquatics. Another report which interested me greatly was that of Sir George Newman, in his capacity as Chief Medical Officer of the Board of Education, and covering the year 1925. Therein he draws attention to the remarkable effect produced (again on boys, though it is not to be doubted the results would be similar in the case of girls) by a daily drink of milk in the middle of the morning. The boys enjoying this daily draught were found to develop additional height and weight, but over and above all to acquire greatly increased vitality. In London, on certain duties, telephonists have been allowed experimentally what for want of a more exact description has been known as a milk relief. The machinery for releasing the girls in turn in the middle of the morning busy period has, however, been found difficult of organisation, and anyone who has had experience of a telephone exchange at such a time can realise the disadvantage of these interruptions to the smooth conduct of the work. If however, further experiments outside the exchange confirm the deductions set out by Sir George, one can imagine that it would be to the advantage of all—telephonists and the Post Office as an employer alike—for the latter to arrange for a daily draught of milk to be supplied to each of the staff at the board at an appropriate hour in the morning, much in the same way as I have reason to believe tea is distributed in the afternoon to our confreres of the telegraph service. I think I ought to refer to one other report before passing from this aspect of affairs, and that is the report of the Treloar Home at Alton where the little patients are given the benefit of the application of the latest theories on the curative properties of sunlight. Sir Henry Ganvain says the effects of the sunlight treatment on these children are most remarkable. It is practically unknown for them to suffer from colds, and they are mentally a year ahead of the ordinary London child. Here is certainly full justification for the practice of the post office in placing its switchrooms on the top floors of telephone buildings and as far as possible locating the welfare quarters where they may enjoy a southern aspect. When the advantages claimed for the new type of glass which admits the beneficent ultra-violet rays of the sun have been finally proved and the cost of such glass more closely approaches that of other glass, I have no doubt that we shall have it supplied as a matter of course in post office buildings. Already I make bold to say that the telephone staff of the department, of which I have a fairly close knowledge, is full of energy, vitality and an unwearied sense of service, so I can safely leave to your imagination what an atmosphere of exhilaration will pervade the switchroom of the future when the buoyancy test is regularly applied and the full effects of milk and sunshine are adding their invigorating influences to an already first class community.

This is rather a digression and I must return to the earlier years.

As the number of subscribers increased it became necessary to provide in the exchanges equipment which would facilitate the connexion of any one subscriber to any other, and the telephone engineers of the day designed what is known as the multiple type of switchboard. Under this type, as its name suggests, there was provided a multiple or multiplication of the lines on the exchange so that the operators taking calls from subscribers on that exchange were in a position to make a connexion to any other subscriber on that exchange without assistance.

The switchboard then regarded as standard (and several remain in use in London to-day) were of the "magneto" type under which the subscriber gave the signal to the exchange on an indicator which was operated by a magneto current produced by the turning of the handle of a generator fitted to the telephone. It was necessary for local batteries to be associated with each subscriber's telephone and the chief trouble was, from a maintenance point of view, the gradual exhaustion of these batteries and their necessary renewal, whilst from an operating point of view the telephonist had no supervision of the calls connected at her switchboard.

With the introduction of the central battery type, the first example of which in London was opened at Kensington in 1901, the difficulties just named were overcome. Local batteries were dispensed with and all that was necessary in order to call the telephonist was the removal of the telephone from the hook. In addition the telephonist had now the benefit of what are known as supervisory signals and was able to keep in close touch with the progress of the call.

There is no doubt that the introduction of the central battery system conferred a great benefit on the telephone subscriber, and the present vice in a large area like London could not be given with the magneto system.

All exchanges in London within the 10-mile circle of Oxford Circus now work on the central battery system, which has itself been considerably improved chiefly by the addition of automatic aids.

Within the last few years the automatic or machine switching method of making connexion between subscribers has reached a degree of importance and its early advent in London is anticipated. It will no doubt bring in its train new problems, and both in London and Birmingham (where automatics are also to arrive soon) we must prepare ourselves to meet these problems.

The Post Office, as you know, is not only at pains to secure the highest possible grade of staff for employment in its service, but also takes care that the recruits shall receive a thorough and careful training. In London we certainly have a model operating school to prepare the student telephonist for work in manual exchanges, and the department has in hand arrangements for providing an equally efficient school for training the staff in the processes necessary for handling efficiently the manual work arising in connexion with automatic exchanges. Every effort is made to simplify and make smooth the work of the telephonist by providing her with standard expressions to meet all the normal steps in the operation of a call. These expressions afford opportunities for facetious exploitation by the writers in consciously and unconsciously humorous journals, and it is possible that at times those for whose help and guidance the expressions are standardised may find them a little irksome. It is well-known that in the training of children one of the things against which many of them fight valiantly is the enforcement of standard expressions of civility. Some kindly person gives to a small boy or girl a sweetie and its mother or nurse urges it often in vain to say "ta." The same difficulty arises when the child is being taught the standard formula in which to present a request for food or other requirement—"If you please may I have." In course of time the standard expression is adopted and undoubtedly does much to sweeten the relationships in a community of individuals. The use of standard expressions being of real advantage in the wider field of ordinary human relationships it is easy to appreciate its special advantages in the conduct of a service, such as the telephone service, one definite requirement of which is that it should be conducted free from misunderstandings and with the maximum of speed which can be achieved consistently with efficiency. It is well, therefore, that the subscriber should know the terms in which a particular condition will be communicated to him; and that the telephonist should have ready an accepted form of words in which to advise the subscriber of difficulties or keep him in touch with the progress of a call. It is the unexpected that happens, and if the telephonist met by an unusual circumstance deals with it in the spirit and tone set by the standard expression she will, I am sure, gain nothing but praise from those who supervise her work. That even the most carefully worded standard expression can be mistaken at times is evidenced by an experience which a London Information Desk officer had on one occasion of general pressure, when a complaining subscriber told her that she had asked repeatedly for a particular number and all the telephonist would tell her was that "the Johnsons are engaged." "I know nothing of the Johnsons," said the complainant, "and am not interested whether they are or are not engaged." The telephonist had actually been trying to make the caller understand that the "junctions" were engaged. The story serves to illustrate how essential in telephone operating is clearness of speech.

To help the telephonist in her difficulties is the supervisor, an individual at once firm and of honeyed sweetness. If she has to correct a telephonist she does it in the spirit of Roger Ascham, who you will remember was the tutor of Lady Jane Grey and an individual of extraordinary enlightenment. "If" says he, "your scholar do miss sometimes, chide not hastily, for that shall both dull his wit and discourage his diligence, but monish him gently, which shall make him both willing to amend and glad to go forward in love and hope of learning."

(To be continued.)

MACHINE TELEGRAPHY.*

BY A. P. OGLIVIE, HEADQUARTERS TRAFFIC SECTION.

As a schoolboy I remember being greatly interested in the erection of a large building with inner walls of beautiful white glazed tiles. When I learned that this, to my eyes, beautiful structure was to be used as a model bakery, admiration and wonder are the only words which adequately described my feelings. Hitherto my experience of bakeries had been gained from illicit peeps into gloomy, evil smelling cellars, insanitary and ill ventilated, from which were emitted hot stuffy smells not always appetising and savoury.

As my fairy palace was nearing completion I overheard a conversation of which it was the subject and I was grievously pained to learn—as all proverbial eavesdroppers do—some bad news. Monsters were to be confined within the white shiny walls to steal away the livelihood of those phantom shapes which flitted to and fro in the gloom of the underground cellars; our daily bread was to degenerate to a mass resembling a piece of oily waste. This was a plot to foist on to unsuspecting housewives a conglomeration, known as "machine-made bread," devoid of taste and flavour. Wheels and levers were to take the place of hands, and—if all be true—feet, of honest and perhaps underpaid men who for years had kneaded and tramped dough in their efforts to build up worthy sons and daughters of a Merry England.

*Paper read before the Birmingham Post, Telegraph and Telephone Society on Jan. 12, 1927.

That conversation made a great impression on my young mind and I marvelled later at the apparent success of the venture. I felt guilty and hesitant the first time I ate a piece of machine-made loaf but it tasted good and, although it interested me little then, I learned that it was cheaper than the others.

Two years ago those memories came back to me as I stood before an exhibit at Wembley. White clad figures controlled the operations of another monster which gobbled up flour and water at one end and delivered at the other crisp, well-baked loaves nicely wrapped in paper. The remarks I overheard then were more complimentary—"Isn't it wonderfully clean and hygienic! I wonder why all bread is not baked and wrapped like that" and so on. The moral is, I think, obvious.

For many years the Morse alphabet has dominated our working lives. We have dwelt in an atmosphere of dots and dashes. By its aid courtships have been made and broken, lives have been sweetened and saddened. Its devotees cannot see the passing of so old a friend without a touch of tender regret and, perchance, sorrow. We fain would remember only the virtues, the glories of the past, but in truth it must be said in fairness to the friends who now woo our favour that beneath the film of sentiment and romance there lie other memories of travail and bitterness.

When all is said and done the machine telegraph has been very patient. Eighty years ago one, of the name of Highton, with a genius unrecognised in his age, suggested a system of telegraphing which contained the elements of the modern telegraphic machinery. His system consisted of a transmitter with six keys or tappers connected in three pairs, which were operated by depressing appropriate keys—as we now do Baudot keys. Permutations of an equal unit alphabet were transmitted. At the receiving station the combination was set up on a series of six electromagnets and by means of sliding rods a printer was actuated which translated the signals and printed the characters on paper. It is believed that this system contained the first hint of making use of a printer with typebars for printing on a circular platen. Poor Mr. Highton, half his application and genius devoted to the production of a typewriter for commercial purposes might have made him a millionaire and gained for him immortal glory! As it was his machine telegraph needed three wires to work and, as his inspiration did not carry him to a conception of multiplex, the Highton system remained an unfulfilled promise.

Over a long period only two machine systems achieved a measure of success, the Hughes invented in 1854 and the Baudot multiplex first introduced in 1874. Hughes machines were installed on several circuits in this country but have since been superseded except on cross-channel circuits in the Foreign Gallery of the Central Telegraph Office. The Hughes system enjoyed and continues to enjoy a much greater vogue in other European countries, but the march of multiplex threatens to sweep it from international routes at any rate. The multiplex invented by Emile Baudot had none too happy a childhood and Baudot worn out by privation, overwork, and worry, ended his days in a madhouse. His invention was not an immediate success even in his own country and it was not until 1897 that a set was installed in this country on an Anglo-French circuit. Originally the system was worked simplex, two arms on a quadruple set being employed for sending and two arms for receiving, but in 1905 Colonel Booth arranged the system for duplex working thereby doubling the capacity of line and apparatus.

Some three years prior to this date Mr. Donald Murray brought to the notice of the British Post Office a high speed printing telegraph with a five unit alphabet. Telegrams were prepared for transmission on a type keyboard machine by perforating a tape which was collected and passed through a transmitter running at high speed as in Wheatstone working. At the receiving station the perforated tape was reproduced by a receiver moving in unison with the transmitter and subsequently passed through a translating typewriter which printed the telegrams on a roll of forms. Mr. Murray's original intention was to transmit press telegrams so that the received perforated tape could be used to actuate a linotype machine, thus avoiding the operations of translation and resetting.

The Murray Automatic system was first installed in this country between London and Edinburgh and later between other offices; subsequently it was withdrawn, and Mr. Murray, profiting no doubt by the experience of these trials, developed the apparatus which is now known as the Murray Multiplex. Murray may be said to have modernised the multiplex system and Mr. H. H. Harrison, the well-known authority on printing telegraphs has said of him:—"To Donald Murray must be given the credit of first clearly laying down the broad principles on which a printing telegraph should be designed."

At this time—between 1902 and 1905—the Morse sounder held pride of place in the British and American telegraph organisations. Large centres were served by duplex and quadruplex Morse channels involving in some cases the use of from ten to fifteen wires. The standard of operating skill was high and on occasion excellent results were obtained: on the other hand perpetual key operating was baneful in its effect on the staff and the output on many circuits was quite disproportionate to the energy expended. While channels were numerous—to our minds extravagantly so—the traffic carrying capacity of each was comparatively low. Sudden fluctuations in the incidence of the work were not easily overtaken unless large reserves of staff and lines were available and as recourse to Wheatstone was discouraged congestion on the main routes was not infrequent. Some change became imperative. It was hastened by the appearance of the Creed, an invention which revived hopes in those who pinned their faith, and with much reason, to the ubiquity of the Morse. Mr. Creed may be said to have modernised Wheatstone as Murray has the Multiplex.

The appearance of the Creed Receiver and Printer ended the days of Morse operating on the main routes of the British Post Office service. Instead

of a multiplicity of hand worked channels and wires, one or two circuits equipped with high speed Wheatstone and Creed apparatus were substituted. This development was materially assisted by the production of keyboard machine perforators. Many were tried and the proverbial few chosen. Gell's machines were the first to reach the standard required and a number were brought into use. Later another perforator made by Kleinschmidt made a good impression, and it shared with the "Gell" in the continuous Wheatstone development then taking place. It may be interesting to mention here that Mr. Creed invented a type-keyboard perforator in those early days which was actuated like his reperforator by air pressure but it was not developed commercially. Within recent years however a new Creed Wheatstone perforator of an advanced design has been introduced with success.

In the midst of this renewed activity in Wheatstone there came a direct challenge from the multiplex. An underground loop between London and Birmingham was equipped with quadruple duplex Baudot apparatus, afterwards extended to afford duplex working on six arms. Satisfactory results led to other circuits being similarly equipped and there arose a rivalry between what may be described as the Morse school and the multiplex school as to which system should be standardised. To settle the matter the Postmaster-General appointed a Committee to "enquire into systems of High Speed Telegraphy and to report thereon." It was a Committee of talents, and the report was a masterly survey of the position which has been accepted ever since as a charter for the telegraph administrator.

For the purpose of this paper I should like to quote briefly a few of the conclusions:—

- (1) Systems on the multiplex principle are definitely superior to the automatic high speed systems on the large majority of main circuits for ordinary inland commercial telegraph work.
- (2) The application of type-keyboard signalling instruments to the present Baudot circuits is desirable.
- (3) Of the multiplex systems at present available the Western Electric has given the best results.

It will thus be seen that the policy of what is now referred to as autoplex or automatic multiplex working was determined by the acceptance of the Norton Report some ten years ago.

The outbreak of war led to the withdrawal of Morse operators from the Post Office and accelerated the installation of Baudot apparatus for which temporary operators could be trained more readily than for Morse, and by 1920 multiplex had replaced Wheatstone Creed and Morse sounder on all the main routes.

While this change from Morse to multiplex was generally and fundamentally successful certain detail improvements have been essential. There had to be, as in many other conversions, a process of cleaning up after the major changes were completed. The stability of many circuits fell short of the standard anticipated and a small Committee was asked in 1922 to enquire into the causes of instability in multiplex working and to make recommendations accordingly. The conclusions arrived at after consultation with supervising and dirigeur officers and representatives from the local engineering staffs throughout the country, were favourable to certain changes being made and it was arranged to standardise the use of several features such as:—

Mechanical correction
Retransmitters on divided circuits
Silver strip brushes, and
Adjustable weight vibrators.

It can now be said that these alterations, together with a more extensive experience in multiplex working on the part of the staff, have reduced the time lost owing to stoppages for apparatus trouble to less than 50% of the previous figure, and the improvement continues.

Having exploited the Baudot system successfully and having reached a degree of stability that is satisfactory it may be asked: "Why not rest content?" "If the telegraph service is decadent, why torture its last moments by innovation and change?" Reasonable questions perhaps of weary men and women numbed with a sense of disappointment but indicative of a despair as fatal as the contentment and lethargy of a victim of a narcotic. We cannot afford to stand still. In its present economic position the telegraph system must progress or perish. On the authority of the Accountant-General the cost of an inland telegram amounts to 1s. 8d. while the revenue received averages 1s. 3d.—a deficiency of 5d. on each telegram handed in. That figure may or may not be possible of reduction by allowances for public utility services but such adjustments would not materially affect the irresistible fact that viewed as a business proposition—and that is how it is viewed by the average taxpayer—the telegraph system is a subsidised industry. It would be out of place in this paper to discuss the soundness of that point of view, the fact to be faced is that it exists and will continue to exist to the detriment of the service until a more favourable balance sheet can be presented. With telephones shewing a profit and telegraphs a loss, the tendency will be for capital to be more readily available for telephones and for a more kindly eye to be turned to their development.

I am in entire agreement personally with efforts to attract traffic but it seems to me that the first step towards reducing the price of a telegram should be to produce it at less cost, in other words to make the system more productive. Can this be done?

An analysis of the items which go to make up the cost of dealing with a telegram shows that 80% of the expenditure is apportioned to staff costs, and 20% to plant costs. Granted that we all agree that a reduction in the price of a telegram is desirable, even imperative, to maintain and develop

the telegraph organism, the comparatively large proportion of costs required to meet operating charges forces attention to the question of improving output, not by additional pressure on the individual but by arranging for better machinery and improved organisation. Let me dispel any misapprehension on this point. In staffing, say, concentrator Morse sets and a Baudot position the basic standards taken would not be the same. In both cases you might have an hourly traffic of 48 telegrams, but two operator hours would be scheduled for the concentrator sets and one operator for the Baudot position. I should, I imagine, get little support if I argued that the Baudot operator in these circumstances worked twice as hard as the Morse operators or expended more mental and physical energy. Output, therefore, is largely a matter of making it easy for operators to do work for which they are fitted, and it is in the direction of providing up-to-date machinery, careful and thorough training and comfortable well organised conditions that I personally look for improvement in the economic position of the telegraphs. Until such an improvement is in evidence a reduction in charges is unlikely and without that the scope of the telegraph will be further circumscribed as competitive services become cheaper and more efficient.

Superior as the Baudot system may be to others which it has superseded it is surely not the final word in telegraphic progress. The Baudot five-tapper key for example is an anachronism. An operator skilled in Baudot key manipulation cannot apply that skill to any other system or machine and is in consequence, so much less valuable. Then the restriction to five fingers of the movements involved in signalling is not good practice: it develops the use of certain digital muscles and nerves, leaving the remaining fingers and thumbs idle and somewhat in the way. A maximum signalling speed of 30 words a minute which is dependent on the acceptance of every available cadence is also comparatively slow, especially as with the additional work of numbering, timing and signing telegrams the operator can only maintain an effective speed of approximately 25 words a minute.

These considerations have influenced the policy of newer countries and in our Dominions and in the United States the multiplex system is developed mainly on the lines suggested by Murray, that is with type-keyboard manipulation, automatic transmission and tape or column printing, an arrangement which has become known as autoplex or automatic multiplex.

The advantages are material. The total speed of the circuit can be increased without intensifying the task of the signalling operator or increasing the wastefulness of lost cadences. A type-keyboard perforator and a transmitter are available for signalling on each arm; but the perforator is not connected with the line circuit and the operator is free to work on the keyboard at his or her natural speed. The perforator mechanism will respond readily to the speed of the fastest operator and as readily to the speed of the slowest. Permutations of the five-unit alphabet—either the Baudot or the Murray arrangement—are punched across a broad tape which feeds into an automatic transmitter, fitted in close proximity to the perforator. The automatic transmitter takes the place of the five tapper key in the circuit and is driven by the cadence impulse which in manual working produces an audible signal. These arrangements in actual practice have rendered possible an increase in the circuit speed of quadruple multiplex from 120 to 140 and 160 words a minute, representing an improvement in the maximum signalling capacity of from 17 to 33%. In addition, the relationship between the operator and the line speed has altered. Instead of being controlled by cadences, many of which are ineffective from a productive point of view, the operator is free to prepare and store up telegrams in the form of perforated tape at a much faster rate than they are transmitted and so make possible the use of practically every cadence by keeping the transmitter continuously fed. The saving in line time which this feature alone has effected represents in practice an increase of about 16% in output as compared with manual signalling.

It is claimed therefore that automatic transmission on a quadruple multiplex circuit working at 140 words a minute (a channel speed of 35 words a minute) provides a traffic carrying capacity at least 30% greater than that of manual Baudot.

(To be continued.)

REPORT OF TELEPHONE PROGRESS IN THE SHEFFIELD DISTRICT

DURING THE YEAR ENDED DECEMBER 31, 1926. (ABRIDGED.)

In addition to the City of Sheffield the district comprises the towns of Rotherham, Barnsley, Chesterfield and Worksop, together with their immediate surroundings, covering altogether an area of about 750 square miles and containing a population of approximately 1,270,000.

In spite of trade depression and the coal dispute, which seriously affect the development of industrial districts such as this, the numbers of telephone stations has increased by 1,243, the total number now being 22,076.

Exchanges.—There are now 49 exchanges in the district, every part of which is well covered.

In order to provide accommodation for the increasing number of subscribers three exchanges (Gldthorpe, Grindford and Royston) have been removed to more commodious premises and switchboard extensions have been carried out at seven exchanges (Bamford, Cudworth, Dronfield, Hoyland, Maltby, Rotherham and West).

Call Offices and Street Kiosks.—

	Increase
	during 1926.
Number of Call Offices working (including Kiosks)	453 42

207 kiosks are now in use, having been installed in nearly every populous part of the district. Many have also been provided in the smaller towns and villages. The outstanding advantage of kiosks is their availability for service at any time of day or night, and judging by the extent to which they are used it is evident that they are appreciated by the public.

Local Calls.—The number of effective local calls during the year reached a total of about 14,000,000, being nearly 4% above the total during the previous year. This figure would have been higher but for the general trade depression.

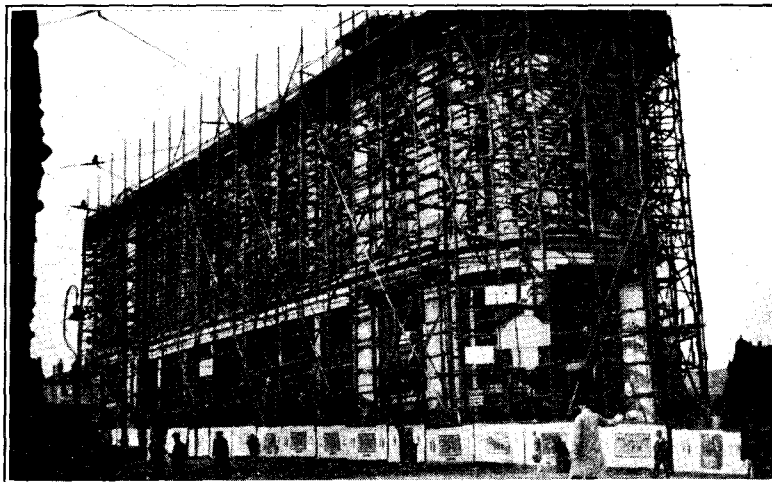
Trunk Calls.—The number of effective Trunk calls during the year amounted to about 1,500,000, being 2% above the figure for the previous year. This comparatively small increase was due to the unsettled industrial situation.

Telegrams by Telephone.—

Number of Telegrams received from the public during the year	140,656
Number of telegrams telephoned to subscribers	125,819
Total	266,475

For dealing with telegrams by telephone new and improved apparatus has been installed and is now working at the Sheffield Head Post Office.

New Trunk and Junction Circuits.—60 additional circuits connecting one exchange with another have been provided during the year and every part of the district is well supplied with circuits.



PRESENT STATE OF NEW TELEPHONE BUILDING, SHEFFIELD.

Main Underground Cables.—During 1926 a new cable was completed between Sheffield and Rotherham, providing additional direct underground communication between these two places. A new duct and cable have also been completed and brought into use between Sheffield and Worksop. The duct line has been extended from Worksop to Mansfield in preparation for a new cable which it is proposed to provide in 1927.

Wire Mileage.—Additional line plant has been provided during the past year. The mileages of open and underground wire in 1925 and 1926 are shown below:—

	1925.	1926.
Open Wire	21,034	21,316
Underground Wire	97,771	107,429

Automatic Exchanges.—During the year automatic exchanges have been opened at Chesterfield and Staveley and it is anticipated that the Sheffield automatic scheme will be working early in 1927. At Sheffield it has been necessary to provide ten new exchanges, of which nine will be purely automatic, the other one being at the Head Post Office where the whole of the operating staff will be stationed and will deal with Trunk calls, special services, enquiries, &c.

In addition to the large building now being completed at West Street, Sheffield, new buildings have had to be erected for the exchanges at Beauchief, Oughtibridge, Owlerton, Sharrow, and Woodhouse. In the other cases, existing buildings have been adapted to meet the new requirements. Over 10,000 subscribers are involved in the scheme.

Service.—The service rendered to subscribers has been kept under continuous review, the operating of 5,923 calls having been specially observed during the year. The average time of answering subscribers' calling signals was 4.89 seconds, 72.25% of the calls being answered in five seconds or less.

The average time taken by telephonists to disconnect calls after receipt of subscriber's clearing signal was 4.69 seconds.

Operating School.—During the past year 34 pupils were in training for posts in the exchanges.

Post Office representatives have visited 505 Private Branch Exchanges where they have given instruction to the subscribers' own operators in the manipulation of the apparatus.

Telephone Removals.—The work involved in removing subscribers' apparatus from one position to another, &c., is considerable, over 1,000 such items having been dealt with during the year.

E. GOMERSALL, *Superintending Engineer,* North Midland Engineering District.
A. SIRETT, *Postmaster-Surveyor,* Sheffield.

DEATH OF MISS GRAHAM, NEWCASTLE-ON-TYNE.

It is with the deepest regret that we have to record the death, on Jan. 30, of Miss Graham, Supervisor of the Newcastle-on-Tyne Central Exchange. Miss Graham was at work to within two days of her death, apparently in her usual health, and her passing came as a great shock to her many friends and colleagues.

Possessing an outstanding personality, capable and efficient, with a keen sense of humour, she had a way of extracting the best from those under her and in return took infinite pains to improve the working conditions of her staff.

When one reviews the details of her service one indeed realises the growth of the telephone system. Joining the service of the Northern District Telephone Company at Tyne Dock Exchange as a telephonist in 1889 at a time when girls were beginning to take the place of boy operators, Miss Graham was transferred to South Shields six months later, and in 1890 she was appointed Clerk-in-Charge at Newcastle. The District office at that time was at Sunderland, Newcastle being only a secondary office having less than 300 exchange lines, the exchange being housed in most unsuitable premises in the basement of Exchange Buildings, on the Quayside. In 1896 a transfer was made to the present premises which, commodious at one time, are now taxed to their limit to accommodate the thousands of subscribers' lines which have been added during Miss Graham's service. In all she has



served under seven District Managers, Mr. Clay, Mr. Bailey, Mr. Wormull, Mr. Drummond, Mr. Worte, Mr. Archer Smith, and the present District Manager, Mr. J. D. W. Stewart.

Miss Graham was a great organiser, and, apart from official duties, such institutions and charities as the Newcastle Royal Infirmary, Dr. Barnardo's Homes, "War Seals," and Poor Children's Holiday Associations have reason to thank her for her fine work on their behalf.

The funeral took place at Harton Cemetery, South Shields, on Feb. 1, and amongst those members of the staff present to pay a last tribute of esteem and affection were:—Mr. J. D. W. Stewart, District Manager, Mr. Baldwin, Asst. Superintending Engineer, Mr. Andrews, Sectional Engineer, Mr. Howieson, Traffic Superintendent, Messrs. Gwyther, Davison, Tait, McLauchlan, Wright, Brewis, Nicholson, Cooke, Gibbons, Duncan and Neville, Misses Cowburn, Beavis, Raine, Gordon, Davidson, Thompson and Mrs. Scott, of the Central and Trunk Exchanges.

Amongst the many beautiful floral tributes were wreaths from the Local and Trunk Exchanges, the District Manager's Office, the Controlling Officer's Association, the Engineering Department and the Telegraph Branch.

STATEMENT OF TELEPHONE PROGRESS IN THE LONDON AREA DURING THE YEAR 1926. (ABRIDGED.)

THERE has been no alteration in the boundaries of the London telephone area during the year. The area covers 750 square miles and extends from Reigate to Waltham Cross and from Tilbury to Hayes (Middlesex). The impending conversion of part of the London system to automatic working has rendered it desirable to regard the area as divided into two portions. The first portion, known generally as the automatic area, comprises the exchanges situated within a ten-mile radius of Oxford Circus. Exchanges in the London area, but outside this automatic area, will continue to work on the manual system.

With the opening of seven new exchanges, and the closing of Bank and Latchmere, the number of exchanges in the London area is now 112 (including Trunk and Toll exchanges) as compared with 107 last year. The Toll exchange deals with calls to the provincial towns within a radius of approximately 30 miles of London, and the Trunk exchange deals with calls to all districts in England (other than those served by the Toll exchange), Scotland, Ireland, and those countries in Europe which can be linked to the British telephone system.

The number of exchange lines connected to the London exchanges at the end of 1925 was 269,801. At the end of 1926 the number was 298,766, the net increase for the year being 28,965 or about 10.7%.

The number of telephones (the unit usually employed in comparative telephone statistics) necessarily exceeds the number of lines, as many lines have extension telephones working in conjunction with them. The total number of telephones—exchange and private—at the end of 1925 was 476,813. The number at the end of 1926 was 519,969, the net increase being 43,156 or about 9.0%. The 500,000th London telephone was installed on July 16, 1926, and the occasion was marked by a brief ceremony in the Press Gallery of the House of Commons when the telephone was formally handed over by the Controller of the London Telephone Service to Mr. Harvey, Chairman of the Press Gallery. The telephone is fitted with a small tablet bearing a suitable inscription.

During the year there has been an increase in the number of Private Branch Exchanges (P.B.X.), the total number now being 22,970 as compared with 21,000 a year ago. Of this number 97 are automatic. Orders have been placed for 18 new automatic installations and schemes have been formulated in ten other cases. With this type of P.B.X. it is still necessary to employ a telephonist to deal with public exchange calls, but the automatic P.B.X. system enables a person at any extension to get through to any other extension without the intervention of the private branch telephonist.

The largest automatic branch exchanges are those serving the Port of London Authority and the London County Council. The initial equipment for the Port of London Authority provides for 740 extensions, and this can be supplemented to cater for 1370 extensions ultimately. The installation at the County Hall has a capacity of 50 exchange lines and 800 extensions and has been working satisfactorily for three years.

Very many requests for removal from one address to another and for alterations to apparatus are received in the course of the year. The work is generally of an urgent character and is given special attention. Approximately 30,000 removals were effected during 1926.

The number of call offices working at the end of 1925 was 4,403. At the end of 1926, the number was 4,686 the increase for the year being 283.

CONVERSION TO AUTOMATIC SYSTEM.

The preliminary work incidental to the conversion of the London area to automatic working is well advanced. Owing to the great extent of the London telephone area and to the large number of exchanges by which the subscribers are served many complex problems arose for settlement. A system has been designed to meet all the required conditions. Specifications for exchanges to accommodate more than 100,000 automatic lines have been issued, and others are in course of preparation.

The installation of automatic equipment is in progress at the Holborn, Western, Sloane and Bishopsgate exchanges, and some of these should be available for service during 1927.

The installation of equipment at the "Tandem" exchange (the new Junction exchange) is rapidly approaching completion and this exchange should shortly be available for service.

A further step which formed an essential preliminary to the introduction of automatic working in London was taken during the year. The telephone numbers of subscribers working on exchanges in the automatic area were changed to four figures. Where the previous number consisted of two or three digits only, the conversion to a four-figure number was effected by prefixing two cyphers, or one cypher to the existing number. Numbers consisting of a single digit were eliminated.

EXCHANGE DEVELOPMENT.

If the anticipated rate of telephone growth is realised it will be necessary during the next five years to construct and open 60 automatic exchanges within the ten miles from Oxford Circus, and 25 manual exchanges outside

that radius but within the London telephone area. These new exchanges will provide for the replacement of worn out plant, as well as for growth.

To familiarise subscribers with the proper procedure, the first three letters of the names of those exchanges to which they will have direct access are now printed in the Telephone Directory in block type. Other changes made in the Directory consist of a three-column setting in place of a two-column setting per page, and the printing of the telephone number on the right of the column instead of the left.

Incidentally, it may be of interest to mention that the London Telephone Directory now contains approximately 268,500 entries. The number of directories issued during 1926 exceeded 700,000 and the weight handled was approximately 1,500 tons.

LINE PLANT.

Much progress has been made during the year with schemes for improving the standard of speech over telephone lines in the London area. This has involved the provision, on a large number of routes, of cables with conductors of larger gauge than that previously employed. "Loading" has also been extensively utilised to improve speech transmission, i.e. the electrostatic capacity, which is an inherent characteristic of underground wires and is detrimental to the purity of speech transmission, is neutralised to a large extent by the addition of inductance coils at suitable points.

The total mileage of single wire provided for subscribers' lines and local junctions is now 2,030,000, an increase during the year of 225,000 miles. The total mileage on Dec. 1, 1918, was 1,100,000. The greater proportion of the wires are carried in underground cables which vary in size, and contain from 20 to 2,000 copper wires. They are lead sheathed and are drawn into earthenware ducts or iron pipes to protect them from mechanical injury. There are 7,402 miles of ducts or pipes, an increase during the year of approximately 1,000 miles.

The total length of pole line in London is 5,533 miles and the length of single wire carried on these poles is 59,250 miles. It is of special interest to note that while the total length of wire increased by 225,000 miles during the year there was an actual decrease in the length of overhead wire due to the policy of substituting underground wires wherever that course is economical.

In the process of placing wires underground, a certain amount of disturbance to vehicular and pedestrian traffic is inevitable. The resulting inconvenience is reduced to a minimum by taking advantage of road repaving operations and also by providing at one time sufficient plant to ensure that the ground shall not have to be re-opened within a reasonable period. Where it is practicable to do so, Post Office works are carried out in co-operation with other authorities who require to lay mains in the same street.

A scheme of co-ordination has been entered into with the Ministry of Transport and with the London Boroughs, whereby the department's duct-laying operations are effected in conjunction with road-paving works on the basis of a twelve months' forecast of requirements.

GENERAL STATISTICS.

A tabular statement is attached giving particulars of certain items of interest in connexion with the London Telephone Service illustrating the growth and general development during the past six years.

W. A. VALENTINE, Controller, London Telephone Service. R. McILROY, Superintending Engineer, London Engineering District.

PARTICULARS ILLUSTRATING THE GROWTH AND GENERAL DEVELOPMENT OF THE LONDON TELEPHONE SERVICE DURING THE PAST SIX YEARS.

	1921.	1926.
Number of exchanges	87	112
Number of lines	181,606	298,766
Number of telephones (exchange and private)	545,797	519,969
Number of call offices	3,674	4,686
Number of originated calls	304,817,674	499,473,766
Number of Inland trunk calls originated in London	3,214,913*	4,002,603
Number of Continental calls	160,270*	265,028
Number of calls observed	106,544	111,810
Average time in seconds from commencement of call until telephonist answered	5.2	5.7
Average time in seconds from commencement of call until called subscriber answered	36.2	38.6
Percentage of calls completed on first application	78.9	82.4
Percentage of calls ineffective due to "number engaged"	14.5	11.8
Percentage of calls ineffective due to "no reply"	3.0	2.8
Proportion of telephones to population	1:21.74	1:14.96

January, 1927.

* 1923.

Across the Pacific—

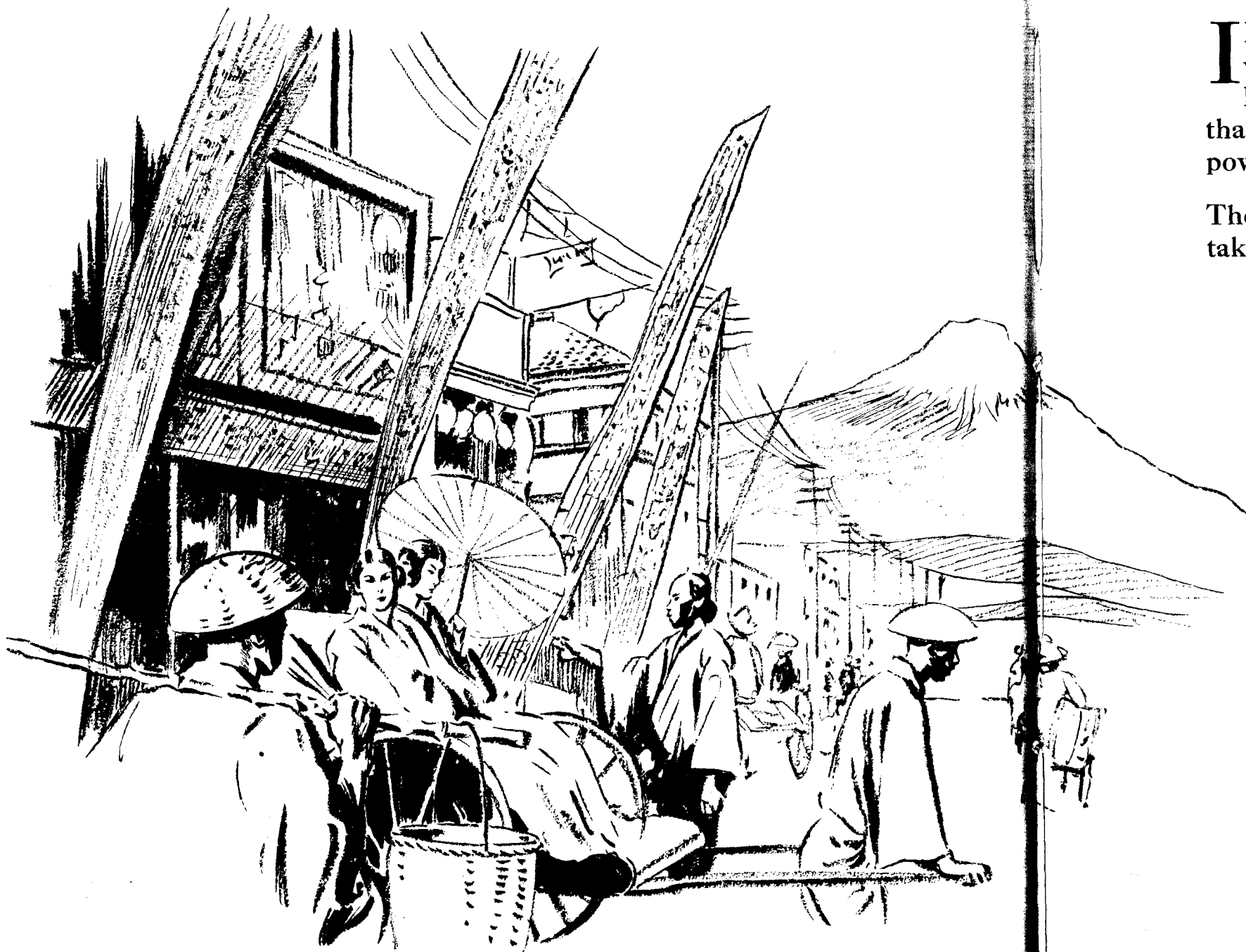
IN the years that have passed since the doors of Japan were opened to international intercourse, this island nation has made such strides in industry, commerce and education that it may well be counted among the world's foremost powers.

The modern Japanese business man is quickly learning to take advantage of every means available for the more expeditious transaction of his affairs. Typical of this process of development is the adoption by the Japanese Government of Strowger Automatic telephone equipment as the standard for future development. In Tokio, several offices have already been converted, while others are in course of construction. A recent order for a 200-line Strowger P-A-X for the Imperial Household is further evidence of official acceptance of this newer, more rapid and accurate method of telephone communication.



Automatic Electric Inc.

FACTORY AND GENERAL OFFICES: 1033 W. VAN BUREN ST.
CHICAGO, U.S.A.



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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THE USES OF STATISTICS.

IN our January and February issues we published statistics of the telephone development of the world at the latest possible date, gathered with some pains from all available official and semi-official sources. These statistics were presented in the only manner in which we consider statistics should be presented, that is to say, straightforwardly, without selection, suppression, or tendentious arrangement. They were left to tell their own tale, which, to telephone men, is an old one, varying little from year to year, of the enormous superiority of American over European development, the superiority of the development of what, for lack of a better term, we may style Teutonic countries over Latin countries, and so forth. Telephone systems grow so rapidly—varying from a 4% increase a year in highly developed states to 10% and upwards in more backward countries—that each year now shows an addition of about a million and a half telephones to the world's total. It is therefore obvious that telephone statistics only a few years out of date may nevertheless be some millions out of date, and that it is desirable to review them year by year as soon as they are available in any completeness. On this score alone one might imagine that a detailed summary of the telephonic development of the world, arranged in continents and countries, would furnish matter of interest and instruction to the lay as well as to the technical reader. Statistics of births, deaths, crimes, suicides, marriages, bankruptcies, cricket, divorce, exports, imports,

railway traffic returns, football and froth-blowing are assumed to intrigue the newspaper reader and are served up to him with circumstance and regularity. Students of the Press will, however, have observed that almost the only feature of our telephone statistics which was deemed of sufficient interest to regale the public with was the fact that the telephone development of Iceland was better per head than that of Great Britain. What moral this is supposed to point we are unable to discern. Iceland has a population numbering about the same as that of Thanet; it has no railways and few roads. It is the home of the sagas and a land for which we have every admiration, but in what way it is suitable for comparison with Great Britain we know not. Is it possible that the admirers of the Icelandic telephone system imagine that it is worked by a private company? If they do we are sorry to undeceive them. A very capable government department is responsible for the telephone system of Iceland, which possesses nearly as many telephones as Bournemouth, Southport, or similar middle-sized English towns.

HIC ET UBIQUE.

"The number of telephones in the United States," says the *Daily Express*, "is officially estimated at about 17,800,000—about sixteen times as many as the number in Great Britain." This is surmounted by the heading, 18,000,000 Telephones.

To him that hath shall be given. First of all 200,000 telephones (no inconsiderable number) are popped on to the actual total, and then we are told that the United States has about 16 times the number of telephones there are in Great Britain. To have this they would require 24,000,000 telephones, which would mean the addition of another trifle of 6 millions!

"After London to New York by wireless telephone," says the *Manchester Guardian*, "we are now told that in a new fleet of Antarctic whalers each vessel has been equipped with wireless telephony, which, it is expected, will be of great service in finding and killing whales." But not if the whale knows anything about telephone tactics. At the first glimpse of a vessel within the local exchange area all sensible whales will leave the receiver off and go to bed. Or, if they haven't time to do that, they will make answer, in a very thin, small voice: 'Hello! Hello! . . . What's that? . . . Certainly not—they've given you the wrong number again. This is a shrimp speaking.'"

An agreement has been made between the city of Smyrna and the L. M. Ericsson Co., granting a concession for 35 years for the installation and operation of a telephone service in Smyrna and the surrounding district. A special company with a capital of about \$212,000 has been formed, says *Commerce Reports*, with the city and the company as shareholders. The first telephone station, which will be automatic, will begin with 2,000 lines, to be enlarged later to 10,000.

Owing to the geographical position of America in relation to Japan, *The Christian Science Monitor*, of Boston, Mass., printed the announcement of the death of the Emperor of Japan the day before he died. The Mikado died on Saturday, Dec. 25, yet the notice appeared in *The Monitor's* issue of Friday, the 24th. This extraordinary occurrence is, of course, accounted for by the fact

that American time is so far behind that of Japan that the message sent by electricity travelled faster than did the sun, on his journey from East to West. Still, it was an unusual thing to read in a Friday's paper of an event which occurred on the following Saturday.—*Northern News Service.*

Extract from an official letter from a lady who had tried several wireless sets and found them unsatisfactory so far as she was concerned.

"I took out a wireless licence in January, but of course it is no use now. May I exchange the wireless licence for a dog licence for a new dog which I have on a month's trial."

We hope the lady will not ask us at the end of the month to exchange the dog licence for a gun licence as she wants to shoot the dog.

A further extension in America of the transatlantic telephone service took place at 1.30 p.m. (British time) on Saturday, Feb. 26, when the service became available to and from all places in the States of Washington, Oregon, California, Nevada and Arizona.

These States constitute the *Fifth* American zone.

The charge for a call from any place in Great Britain to any place in the *Fifth* American zone is £17 8s. for the first 3 minutes, and £5 16s. per additional minute or fraction thereof.

With the extension indicated above, the transatlantic service will be available from any place in Great Britain to any place in the United States of America.

OUR CHILDREN'S TEA (STREATHAM).

On Jan. 15 we gave our annual children's tea. The huge family of 110 poor children were gathered from North Lambeth, and I believe they had the time of their lives.

At 4 p.m. they all arrived armed with their tickets and smiles on very expectant faces, soon they were attacking with relish the two kinds of jelly and various kinds of cake. Several of them were espied stowing away cakes in pockets and even inside jerseys—as one boy put it, he couldn't eat more than three lots of jelly and seven cakes at one time, but he thought he'd like another feed later on! So we had to start a paper hunt, and soon every kiddie had a bulky parcel of cakes and even jelly! for various members of their respective families.

After tea they were allowed ten minutes to take home their cakes, and then the entertainment began. The "Streatham Orpheans" were arranged in state on the stage in the hall, which we had decorated with chains and balloons the previous evening, and as the kiddies filed in they struck up lively choruses which the youngsters yelled lustily, while several of them gave exhibitions of their skill in Charlestoning!

Next, we had the conjuror. How they yelled with delight and wonder at his clever performance (I believe we enjoyed it just as much as they!) By this time bags of sweets had been passed round and all were munching happily. But now, several pairs of eyes were seen to be wandering to the Christmas Tree, which was brilliantly lit up and laden with dolls, which had been dressed by members of the female staff. Father Christmas (Mr. Hopping) was meanwhile behind the scenes adjusting his whiskers and being "made up" to look rosy and mysterious. When he appeared there was great excitement and each child was presented with a toy, the Fairy Doll from the top of the tree being given to the smallest girl. As they made their way doorwards, oranges, apples and novelties were distributed among them and all departed wreathed in smiles and full of good things, to judge by their expressions our efforts were rewarded, they had enjoyed themselves.

Great thanks are due to the engineering staff, who were responsible for the illuminated tree and the "jazz" music. We're ever so proud of our "Orpheans."

After the children had gone a dance was held for the helpers, prompted by the kindness of the Vicar, the Rev. Matthews, who showed his appreciation by joining our musicians and playing a banjo.

The whole affair was a huge success, everybody enjoyed themselves immensely and I think they all join with me in saying, "Roll on, next Christmas, and let's have another tea!"—F. G. RUSSELL, Streatham Exchange.

THE DESIGN AND ERECTION OF POST OFFICE BUILDINGS.*

BY H. G. WARREN, A.R.I.B.A.

ALTHOUGH most of you may be familiar with the general lay-out of postal and telephone exchange buildings, yet there are circumstances which make it desirable for me to describe, briefly, the typical planning of these buildings in this country.

In a *Post Office Plan* the public office generally occupies the front position on the ground floor and, is approached by one or more entrances from the street. This allows the sorting office to be placed either at the rear or side of the public office. Instrument rooms should be placed on the staff side of the public counter with the messengers' room adjoining. The postmaster is provided with a room either on the ground or first floor, and in all except the smaller offices, the general public should be able to gain access to the postmaster without passing through the official part of the premises. The writing staff should have a room near that of the postmaster. The women's welfare accommodation should be placed conveniently near the points at which the women are employed. The men's welfare accommodation is generally provided at the end of the sorting office to which it forms a convenient unit for future extension. Trucks, cycles, and motors are housed in buildings erected in the yard.

The "Third Report of the Committee on Accommodation and Fittings, 1925," details certain standards which are followed in the planning of a post office. The most important of these can be summarised briefly as follows:—

Public Office:—

Length of Counter:—4 feet for each counter clerk (minimum 18 feet); additional 2 feet for each Money Order and each Parcels clerk.

Width of counter:—Minimum 3 feet.

Depth behind Counter:—For a counter less than 20 feet=5 feet; for a counter more than 20 feet=6 feet.

Depth in front of Counter:—For a counter less than 20 feet=10 feet; for a counter more than 20 feet=11 feet.

Sorting Office:—At small offices: 40 square feet per head. At large offices: 50 square feet per head.

Postmen's Offices:—27—35 square feet per head.

Instrument Room:—50 square feet per head (maximum used).

Gangways:—4 feet 6 inches in sorting office; 4 feet in instrument room and phonogram.

Postmaster's Room:—Staff 1—50=132 square feet; 51—100=144 101—200=160; above 201=180; 1st class offices=300.

Asst. Postmaster or Chief Supt.:—120—144 square feet.

Sub Postmaster:—Small separate room.

Writing Staff:—60 square feet per head for 3 or less; (100 square feet minimum) 45 square feet per head for over 3.

Locker:—1 square foot.

Wash Basin:—8 square feet.

W.C. (internal):—27½ square feet.

Urinal:—10 square feet.

Hat and Coat pegs:—2½ square feet if w.c.'s internal; 2 square feet if w.c. external.

Long Lockers:—To take place of cube lockers and hat and coat pegs. 4 square feet single; 2 square feet double tiers.

Delivery Room:—7 square feet per head; 35 square feet each supervising officer, 75 square feet minimum.

Special Room:—200 square feet maximum all offices with P.M.'s salary over £600.

Supervisor's Room:—Separate if ultimate staff 8 or more.

Sick Room:—Total ultimate staff of 40 or over.

The nucleus of a *Telephone Exchange Plan* is naturally the battery, apparatus and switch rooms. These can be either *en suite* or with the battery and apparatus rooms under the switch room. Rooms for normal stock, works order, and linemen, are provided either in the main building or the yard and the cable chamber should be in a position which enables the cables to be fed to the main distribution frame in the apparatus room. The ladder, motor van shelters, trucks, cycles and foremen's lock-ups, are erected in the yard. The women's welfare is placed conveniently to the switch room. The sizes of telephone exchange rooms depend on the layout of the equipment, and the number of staff employed and using the rooms at one time. Yard space at exchanges varies, but an average requirement is 300 square feet.

The welfare accommodation in post offices and telephone exchanges is based partly on the number of staff using the room at one time and partly on the maximum staff employed. For a total staff of 20 women approximately 420 feet super are required to provide for cloaks, cooking, and retiring rooms, whilst a staff of 28 men require approximately 320 feet super for the same purposes.

Postal and telephone exchange buildings can be either Class I or Class II. Property, the freehold of which is vested in the Crown, is known as a Class I.

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

building and post office buildings of this class are erected and maintained by His Majesty's Office of Works. It may not be known generally that departments such as the War Office and Admiralty control their own Class I. buildings.

When buildings are held on lease by His Majesty's Postmaster-General, they are known as Class II. buildings and are, with few exceptions, designed, altered and maintained by the architectural assistant to the secretary of the General Post Office.

As far as an architect is concerned, the methods employed to produce a post office building are similar to those used in the design and erection of any other class of building, irrespective of its use. This being so, to a great extent I have to deal this evening with general methods and associate these with post office buildings as far as possible.

I propose to deal only with new buildings and not with the alteration and conversion of existing premises to meet departmental requirements.

From its inception to final completion a building passes through the following well-defined stages:—

- (1) Survey of the site.
- (2) Preparation of the sketch plans.
- (3) Design of the elevations.
- (4) Preparation of the workings, drawings and details.
- (5) Writing the specification.
- (6) Commencement, progress and completion of the building work.

I want you to come with me into the architect's office and watch the progress of a case through the above stages.

(I) SURVEY OF THE SITE.

As a rule the first intimation received by the architect of a contemplated scheme is a request to inspect one or more sites.

It is necessary at the outset for the architect to be supplied with particulars of the probable accommodation required to enable him to decide the area of land required. If the scheme is large a rough outline sketch plan should be prepared with the view of ascertaining whether the sites under consideration are of sufficient size.

Experience would appear to indicate that the average provincial postal building requires a site with a frontage of 60 feet and a depth of 150 feet. No hard and fast rule can be laid down, however, and each case must be considered on its merits.

When a site has been found sufficient in area for the proposed building, it is surveyed and inspected in detail. Enquiry is made whether the site has been included in an area scheduled under the Town Planning Acts, as in such case the local authority may have a prior claim, and the class of building to be erected on the site may be restricted. The nature and positions of the boundaries must be investigated carefully. Cases are not uncommon in which it is found that small strips of what may be described as "no man's land" occur between the frontage of the site and the public road or roadways. It may interest you to know that if the boundaries are defined by hedges with a ditch on one side, in the absence of proof to the contrary, the boundary of the site is taken as the side of the ditch farthest from the hedge; on the assumption that a person digging a ditch would throw the earth, which afterwards forms the hedge, on his own land. If the site is bounded on any side by a boarded fence with wooden posts and horizontal members, the boundary is measured to the outer face of the boards. To repair such a fence, other than by acrobatic means, it would be necessary to trespass on the land of the adjoining owner.

It should be ascertained whether the roads abutting on the site have been taken over and are repairable by the local authority, as the Department might be liable for road charges, based on frontage, in the event of the local authority taking over the roads subsequent to purchase. If the boundaries are party fence or main walls, and the land is situate within the area covered by the London Building Acts, the rights of the adjoining and building owners are clearly laid down. It is necessary for the building owner to serve on the adjoining owners notices setting forth in detail any works proposed in connexion with the party walls.

It is necessary also in London, to serve a notice on adjoining owners setting forth details of the intended work in every case where it is proposed to build within ten feet of the adjoining property.

Outside the area administered under the London Building Acts, the London practice in respect of party fence and main walls is followed in most cases.

The investigation of Easements should follow that of the boundaries. In this connexion it is well to remember that an easement may be defined as a privilege enjoyed by an *owner of land* in respect of the ownership of such land in or over the *land* of his neighbour, whereby the latter is bound to submit to some definite *use* of his land or to refrain from some definite use of it himself. An easement can never exist "in gross" or apart from the ownership of land. For example, a Public Right of Way is not an easement because it is a privilege enjoyed by a community at large and is not a right attached to the ownership of land.

We are not concerned this evening with the manner in which an easement can be acquired, but passing reference should be made, perhaps, to the legal maxim that "a grantor may not derogate from his own grant." In practice this would mean that a vendor selling part of his land and retaining the other part could not by any subsequent act prejudice or lessen the rights transferred to the vendee.

The importance of easements cannot be over-estimated, and even at the risk of wearying you, the matter must be dealt with more fully.

Among the rights that may become easements are:—

- (1) Rights of light.
- (2) Rights of air.
- (3) Rights of support.
- (4) Rights of way.

(1) *Right of light* is not really a right to the light but a negative easement which curtails a neighbour's ordinary right to build as he pleases over his own land. Under the Prescription Act, 1832, 20 years' enjoyment gives absolute right, if such period of enjoyment dates immediately before the bringing of an action. Interruption must be for a period of one year, so that in practice 19 years and one day establish an absolute right.

The theory of the 45° angle of light being left unobstructed arose from the old Metropolitan Building Act which enacted that the height of a building must not exceed the breadth of the street. Such angle is not recognised by the Courts.

It has been laid down (1904) by the House of Lords that the owner of ancient lights is only entitled to the uninterrupted access through his ancient windows of such an amount of light as is necessary according to ordinary notions for the ordinary purposes of inhabitancy, or business *without* regard to the particular purpose for which he used the light.

A point which can be easily overlooked when investigating an easement of light, is that an owner of ancient lights may pull down and rebuild his house and he may bring forward the wall in which the windows are or he may set it back without losing his rights. All that he is required to shew is that the same quantity of light which passed through the old windows is passing through the new ones.

(2) *Right of Air*. It has been held that no right to the flow of air can be acquired by statute unless it comes through a defined aperture on the servient tenement. Twenty years' enjoyment would establish a *prima facie* claim to an easement of air.

An easement can be acquired for the escape of air from a building over adjoining land for the purpose of ventilation.

The position of air bricks and vents which might dominate the site must be noted therefore. It is found generally that agreement can be reached with the adjoining owner or owners by an undertaking to provide alternative means of ventilation.

(3) *Right of Support*. An owner of land has a *natural right* to the support *given to his land* by that of an adjoining owner. There can be no natural right of support to a building, such a right can be acquired as an easement at Common Law by 20 years' uninterrupted enjoyment, *if* the enjoyment has been open and without concealment.

There is an *implied grant* of support to buildings erected by a purchaser of land from any land or buildings retained by a vendor, when the vendor has sold land to the purchaser for "building purposes."

(4) *Right of Way*. We have already seen that Public Rights of Way are not easement in that such rights exist apart from ownership of land.

A Private Right of Way can be used only for the purpose of going to and from the land to which the right is attached and cannot be used as access to other land except to reach a highway.

A servient owner is not bound to keep in repair a right of way. The dominant owner is entitled to do any necessary repairs himself.

There is no rule, as is sometimes supposed, that 20 years' use establishes a *public right of way*. Twenty years' enjoyment of a Private Way gives *prima facie* right and 40 years' enjoyment absolute right under the Prescription Act, 1832.

If no easements dominate the site to an extent likely to unduly restrict its development, a measured survey of the site is made and the levels taken. These levels can be related to a local datum, such as a stone curb, iron post or some object of a permanent character, but preferably they should be related to the nearest ordnance survey bench mark, the positions of which are shewn on all ordnance survey maps and their height above ordnance datum (level of mean tide at Liverpool) given.

There is another matter which, perhaps, should have been mentioned earlier. If the site happens to be on the side of a hill, it is important to ascertain the formation of the sub-strata. Deposits of clay in layers are likely to cause the subsoil to slide when the weight of the building is placed on the site. Cases have occurred where one portion of a building has parted from the other consequent on this sliding action.

The survey of the site is completed by ascertaining the positions of any soil and surface water sewers and the depths of their inverts and also the positions and depths of any gas, water and electric light mains.

The presence of water in the subsoil is investigated at a later date by the sinking of trial holes.

The survey of the site is plotted and the levels shewn. Sufficient data are now available to enable the sketch plans to be prepared.

(II) SKETCH PLANS.

It is difficult to describe the feeling of satisfaction which accompanies the production of a sketch plan representing the correct solution of a problem. It may require days, and in large schemes, weeks, before the solution is found. In some cases the ideal solution is never found.

If on the walls of this hall were hung twenty designs for a postal building, submitted in open competition, it is almost safe to say the winning design would have a plan free from eccentricities and giving positive results to any test applied.

Experience has proved the most economical plan to be the rectangular type. Projections on a plan increase the cost because they involve the departure from simple construction. The covering of a rectangle with a pitched roof is a simple operation, but the introduction of projections would necessitate the trimming of the roof timbers, and the formation of valley gutters, with consequent cost in outlay and upkeep.

Except in small schemes it is not always possible to employ the rectangular plan, and the need for expansion produces the second or L shaped type.

By the addition of blocks we obtain the T and H shaped and finally the enclosed courtyard type. A combination of these types is employed in large schemes and consists of a rectangular plan for the ground floor with the L, T, H, shaped or enclosed courtyard type of plan for the upper floors. Maidstone and Reading Post Offices are examples of this combined type of planning.

The presence of ancient lights and other easements may influence the type of plan, as at the new Telephone Exchange in Wood Street, London. In this case we have the rectangular plan on the ground floor with the H shaped type on the upper floors.

In all these types, if pitched roofs are contemplated and the building occupies a corner site, endeavour must be made to keep the spans and heights of the blocks similar, so that no breaks occur in the ridge lines. This ensures a good mass for elevation purposes.

I am informed that nearly 80% of those present this evening are interested in the engineering side of postal work. In these circumstances, before I proceed further, it may be as well to point out that an architect works from mass to detail, whereas an engineer would appear to work from detail to mass. I mention this because I feel some of my hearers may be surprised to find the mass plan being considered before the internal details. An architect is trained to visualize his building as a whole at the outset. He cannot approach his problem in any other way. If the mass of plan and elevation are conceived on the right lines then the details of the scheme will work out satisfactorily. On the other hand let the mass of plan and elevation be conceived on wrong lines and the scheme invariably will be unsatisfactory.

When the general shape of the plan has been decided and roughly outlined, the accommodation required is scheduled and allocated to the various floors. In this manner a comparison is obtained of the superficial areas required on each floor. These areas are increased to allow for passages, staircases, and sanitary blocks.

Each of the upper floors in post office plans can approximate in area that of the ground floor minus the sorting office, yard and outbuildings. The areas of the required accommodation are compared with those available on the outline plan and any necessary adjustments made.

The floor areas are divided next into suites or groups. In the case of a combined post office and telephone exchange these would comprise (a) public office, sorting office and men's welfare accommodation (b) battery room, apparatus room, and switch room (c) women's welfare and (d) residence. These suites or groups are drawn on the floors to which they have been allocated, enabling the positions of the staircase or staircases, passages and the sanitary blocks to be decided.

The foregoing procedure gives the architect a rough plan conceived in mass. The next consideration is the layout of the steelwork, which must be settled before the plan can be considered in detail. Beams which would project into the rooms below must be placed so that the resulting ceiling panels are symmetrical. The sizes of the steelwork are not calculated until the working drawings are in hand, the requirement at this stage is simply the position of the beams, so that supports can be provided at the necessary points and stanchions in the middle of rooms obviated as far as possible.

To finish the sketch plan it is necessary to draw in the various rooms, stairs, lobbies and building fittings. Trouble may be experienced at this stage with the chimney breasts. These, being costly, must be placed in positions which allow as many flues as possible to be gathered into one stack. The stacks must not pierce the roofs in the centre of hips or similar positions and they should balance on the elevation wherever possible. Chimney stacks which do not balance or are out of centre have a disturbing effect when seen in elevation. As far as possible chimney breasts, sanitary blocks and staircases should not occupy positions required for future extensions.

When engaged on the details of a postal plan, the architect is not unmindful of the Post Office Surveyor, Engineer-in-Chief and his friends in the Traffic Branch. Experience teaches him the advantage of leaving some of the details for the consideration of others.

(To be continued.)

PROGRESS OF THE TELEPHONE SYSTEM.

A REVIEW of the past year's working shows that notwithstanding the interruption to business caused by the general strike and the dispute in the coal industry, the net increase in stations exceeded by nearly 5,000 the growth in the previous year. The effects of the general strike were particularly felt in May and June when the new orders showed a decline of 3,404 on the previous year's totals but in the latter six months of 1926 there was a marked recovery, the new stations added being 7,025 in excess of the figure for the corresponding half-year of 1925.

The total number of stations in the Post Office system on Dec. 31, 1926, was 1,477,000, an increase during the year of 119,092, or 8.8%. The figures for London, England and Wales (excluding London), Scotland and Northern Ireland are given below:—

	Total No. of Stations.			
	At Dec. 31, 1925.	At Dec. 31, 1926.	Increase.	Increase %.
London	476,813	519,969	43,156	9.1
England and Wales (excluding London)	733,840	800,016	66,176	9.0
Scotland	129,314	137,949	8,635	6.7
Northern Ireland	17,941	19,066	1,125	6.3

The total number of residence rate installations at the end of December, 1926, was 291,700, of which 110,170 were connected with London exchanges and 181,530 with Provincial exchanges. During the year 1926, the net addition in residence rate installations was 41,596, as compared with 34,536 business rate installations.

The total number of Public Call Offices working at the end of December was 21,493, an increase of 1,515 during the year. The London total increased from 4,395 to 4,686, and the Provincial total from 15,583 to 16,807.

Included in the total of 21,493 call offices are 2,716 street kiosks, 984 of which were added during the year 1926. At Dec. 31 last, there were 418 kiosks in London—practically double the number at the end of the previous year, and in the Provinces, 2,298, an increase during the year of 778.

During 1926 a further 156 new exchanges in rural areas were opened for service under the rural development scheme, making a total of 991 opened since the inception of the scheme in June, 1922.

At Dec. 31, 1926, rural party line stations numbered 9,958, a net addition for the year of 204, or 2.1%. With the increased provision of rural exchanges from which it is possible to provide exclusive line service without heavy additional charges for extra mileage, the demand for this class of service has declined.

The number of rural railway stations connected with telephone exchanges at the end of 1926 was 721, representing 803 telephones. Forty-seven circuits were added during the year 1926.

It is estimated that the number of effective calls originated during 1926 amounted to 1,072 millions, an increase of 73 millions, or 7.3%, over the total for 1925.

The number of inland trunk calls dealt with during November (the latest statistics available) was 7,796,474, an increase of 773,145, or 11% over the figure for the corresponding month of the previous year.

Calls made to the Continent during November numbered 24,288 and from the Continent, 26,958.

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

LONDON—Fitzroy.

PROVINCES—Lytham, Huyton, Brighouse, Shipley, Hexham, Camberley.

And among the more important exchanges extended were:—

LONDON—Pinner.

PROVINCES—Douglas (Glasgow).

During the month 99 new overhead trunk circuits were completed, and 120 additional circuits were provided by means of spare wires in underground cables.

TELEGRAPHIC MEMORABILIA.

THE following description of the short-wave installation carried by the *Carinthia* will no doubt be specially interesting to the C.R.O., London, and the staff who dealt with the traffic via Dollis Hill Research Station at the time.

The description, now somewhat abbreviated, is excerpted from the *Electrical Review* :—

"Before leaving this country, the vessel was fitted with a special short-wave transmitting and receiving installation manufactured by Messrs. Siemens Bros. & Co., Ltd., Woolwich, at the request of the shipowners. The apparatus was specially designed for the ship. A special single-wire aerial was erected to which the transmitter was inductively coupled, but arrangements were also made so that the ship's main aerial could be employed as an alternative. The transmitter has a wave range of from 25 to 50 metres and employs a specially-constructed 500-watt anode dissipation (intermittent rating) valve, capacity-reaction being employed to control the oscillations. The necessary high-voltage can be obtained either as rectified a.c. from the vessel's long-wave continuous-wave transmitter, or from a specially-designed d.c./d.c. high-voltage machine installed underneath the operating table. Low-voltage for the filament is obtained either from the long-wave c.w. transmitter or from a special winding on the machine referred to above. The whole of the transmitting gear is mounted in a wooden case, which is metal lined for screening purposes. The receiver consists of a simple single-valve circuit thoroughly screened.

"Through the co-operation of the British Post Office, arrangements were made for traffic to be worked through its research station at Dollis Hill, and the Radio Corporation of America also arranged for messages to be transmitted from and received at its stations at New York and San Francisco. During the Christmas season the *Carinthia* despatched 700 greetings by wireless direct to the Radio Corporation's American stations when the vessel was approaching New Zealand, at an average distance of about 10,000 miles. She is the first British vessel to handle commercial messages on short waves (i.e., under 100 metres) with a British Post Office station.

"When off Cape Leeuwin, Australia, she worked with the New Brunswick station, New Jersey, owned by the Radio Corporation of America, at a distance of nearly 12,500 miles."

The Westinghouse Electric & Mfg. Company have placed on the market a single-element oscilloscope which can be utilised as an oscillograph. Invented for the use of electrical engineers, who would thus be able to see alternating-current wave-forms and phase relations, it can be used, says a scientific review, as a phonoscope to enable totally deaf persons to understand speech by actually looking at the audio-frequency waves of any ordinary radio receiving set or telephone. A spot of light, reflected from the mirror of the galvanometer, moves back and forth on the ground glass of the "Osiso," as the new apparatus is termed, following the instantaneous changes in the current; a rotating polygon of mirrors gives a time component to the moving spot of light so that an observer may see waves of light. Each sound has a different wave shape: a pure note appears as an endless repetition of a "sine" wave. The height of the wave is a function of the loudness of the sound; the length of the wave, from crest to crest, is inversely proportional to the frequency; thus, with each sweep of each mirror, the number of oscillations that appear stretched out in a record of light are proportional to the frequency of the note. When a high note is being viewed many oscillations are apparent with each sweep of each mirror; when a low note is being viewed, only a few oscillations appear for each sweep of each mirror. The waves change with pitch and with different voices, but certain similar characteristics remain for each vowel sound. Any ordinary telephone microphone may be connected in series with dry cells and the vibrator ribbon of the "Osiso"; one may speak into the microphone and see the voice waves dance in the rotating mirrors. By certain changes in the apparatus one may hear and see the audio-frequency at the same time. No photographic action is required to receive the audio-frequency waves. A deaf person may be taught to understand speech by sight in a class and, though such instruction would take much time, it seems probable that it would be more successful than the method of reception by feeling.

The following two paragraphs, which appeared in the London *Times*, are reproduced because it is understood that the photo-telegraphic system under trial between Germany and Austria is the same Karolus system, an outlined account of which appears in the current issue of the *T. and T. Journal*. Says the *Times* :—

"A service for the exchange of pictures between Austria and Germany by wireless telegraphy will, it is hoped, be inaugurated before long. The Königswusterhausen station in Germany is to serve Rosenhügel as the return station during the preliminary experiment. The public service will be in the hands of the Austrian Marconi Co. (Radio Austria) and the Austrian Broadcasting Co., and will include within its range Great Britain and all other countries willing to co-operate. The system adopted by Austria deals with photographs and graphic reproductions of every kind, 4 in. square.

"The tests, which are being undertaken by the Austrian Marconi Co. jointly with the Telefunken Gesellschaft, of Germany, and which it is hoped will lead to the establishment of a public service for the exchange of news and

pictures, will extend over a considerable period. The experiment will be in connexion with the Karolus-Telefunken-Siemens system. Tests made last year yielded good results, but only one-way, and were therefore inconclusive."

The *Electrical Review*, commenting, adds :—"The results of the first transatlantic experiments in the transmission of pictures and writing in facsimile by the system have now become available in Europe. Messages of acknowledgment from Rio de Janeiro and Buenos Aires showed that, in spite of atmospheric difficulties, the images were received there with encouraging clearness. Two certified facsimiles were reproduced in the *Times* (of London) on Jan. 28, which explains that though most of them were rather plainly marked with the vertical lines characteristic of facsimiles received under experimental conditions and some showed slight distortion, the pictures were, on the whole, remarkably clear, and print and script passed the essential test of legibility. The Telefunken Gesellschaft is fully satisfied with the results of this 6,000-mi. transmission from the Nauen wireless station to Rio; in view of the atmospheric disturbances there was some doubt whether the images would get through at all. Transmission to Rio was begun on a wave-length of 40 metres, but owing to atmospheric disturbances a change was made to 25 metres. The time taken was from five to ten minutes, compared, it is stated, with 1½ hours required by other systems which have been tried over long distances.

"A transmitter is being built for the Rio station, and is nearly completed. Short-distance transmission in Europe is regarded as almost past the experimental stage. The average rate of transmission between Berlin and Vienna on the 1,300-metre wave-length is 30 seconds."

The only further comment that may be made at this juncture is the surmise that the experiment of Jan. 28 was not made with the Karolus-Telefunken-Siemens system, but perhaps this is not inferred.

The following, from the *P.O.E.E. Journal*, has been held over for some considerable time, but it is indeed a remarkable instance of what may be called the vitality of electrical plant when good material and good workmanship are combined.

The writer once saw half a dozen Baudot Multiplex sets after they had been standing under the roof of a corrugated iron shed exposed to a tropical sun for six months! They looked sick enough, yet recovered and worked well for years, but I do not think that they would have survived the fate of a private automatic telephone branch exchange equipment installed in the basement of a cotton mill after complete inundation due to an exceptionally heavy thunderstorm in Lancashire.

"The charging machine, ringing machine, one battery of secondary cells, and practically the whole of the automatic equipment were submerged. When the storm had abated a fire engine pumped the water out of the basement, which had been filled to a depth of about 4 ft., and, besides being soaked, the apparatus was found, on removing the relay covers, to be smothered with a film of slime and green rubbish. The idea of salvaging the equipment was formed, and mud remaining after washing with a hose was removed from the relays and cable forms by the use of fire extinguishers, and all surfaces were wiped with clean cloths. The machines, after further washing and wiping, were dismantled and placed in the boiler house to dry. The cells were emptied, cleaned, and refilled with acid and, pending the availability of the charging dynamotor, they were charged through a resistance direct from the mains. The ordinary heating apparatus of the room was found to be quite inadequate if the water were to be evaporated before the plant was damaged by corrosion. A motor desiccator, a number of blow lamps, and as many electric radiators as could be obtained were brought into use. The most efficient way of removing the moisture, however, was found to be the use of "vacuum cleaners" reversed and used as blowers, with the suction sides arranged to draw the heated air from blow lamps through metal tubes in which were placed bags of calcium chloride. The water standing on the relay springs and other parts was removed by the use of blotting paper and the cable forms that had been submerged were opened and boiled out with wax. All the relay armatures were removed and cleaned, every contact throughout the equipment was cleaned, and every spring was tested for tension and adjusted, if necessary. Immediately following the flood, notice had been given to the manufacturers of the possibility of a demand being made for plant to replace the damaged equipment, but, thanks to the quality of the original apparatus and to the initiative and the persistent efforts of the staff, the installation, as it stood, was restored to service on the morning of the seventh day after the flood. Six hundred relays, one set of secondary cells one charging machine, one ringing machine, and the associated wiring and cabling were submerged, but the whole of the plant was salvaged and is still in use, with the exception of one choke coil and three transformers in the ringing equipment and eight relays and four condensers in the automatic switching equipment. Twelve months have elapsed since the flood, and the occurrence of faults in the automatic apparatus has been at the rate of one fault per circuit per annum, a figure which, although about four times as great as the normal for this type of installation, cannot be regarded as high in the circumstances described."

A MARVELLOUS CRYSTAL SET.—By means of a 6-ft. box kite used by Dr. Ellison at the Armagh Observatory, Ulster, for experiments on atmospheric electricity, an unusual reception feat was recently accomplished. Shortly after noon on Jan. 3, while the kite was flying at a height of 2,500 ft., the observers received smart shocks from the steel piano wire to which the kite was attached, and strong cracking sparks were drawn from it. The wire was attached to an iron post and earthed, and then connected to a No. 1

crystal receiving set made by the Brownie Wireless Co., which humble instrument enabled the North American broadcast radio-telephone stations to be heard loudly and with ease. This experiment may be tried anywhere, dear readers, with every hope of success, provided you obtain permission to use an aerial over 800 yards high!

TELEGRAPHY v. TELEPHONY.—In order to bring into effect the decision of the International Commission for Aerial Navigation that wireless telegraphy instead of wireless telephony shall be used for normal communication between air liners and aerodrome ground stations, which was embodied in regulations that came into force this year, flying mechanics of Imperial Airways, Ltd., are being trained as operators at the Marconi Co.'s College at Chelmsford. Hitherto wireless telephony has been employed for the convenience of pilots who have themselves been able to speak direct to Croydon or other aerodromes. With the increasing volume of air traffic, however, it has been considered advisable to relieve the pilot of large passenger-carrying machines of this duty, and *Morse-code telegraphy is to be gradually introduced in order to speed up traffic and avoid confusion.* To provide for this change, the regulations lay down that all machines carrying 10 or more passengers must include a qualified wireless operator in the *personnel*, who will give his undivided attention to the wireless service. No change in the apparatus used on Imperial Airways machines will be involved, as the Marconi AD-6 aircraft set, which is their standard equipment, may be used either for telephony or telegraphy by the simple movement of a switch; telephony can still be used, of course, when desired. The italics were not in the original paragraph but are the only comment necessary.

Colonel R. E. Crompton, C.B., speaking some short time since on his visit last year to the U.S.A., made two small observations which throw a useful sidelight on the presumed universal efficiency and "last word" standard of American organisation. The colonel said that he went to the U.S.A. expecting to learn, but he was disappointed, for the problems that were so vital to us did not seem to concern them over there. "*Our careful and delicate control of capital costs did not exist in the U.S.A., and their wasteful use of electric lighting had no parallel.*" He also stated that, "the streets are congested with cables, producing difficulties which are not yet solved."

The London *Daily Mail* says that it is claimed that quicker communication between this country and South Africa is now possible, as the result of two years' experiment by the engineers of the Eastern Telegraph Company. By abolishing the system of relaying messages from the islands of St. Vincent, Ascension, and St. Helena, and speeding up the rate at which the signals travel along the cables, it has become possible to receive messages in Capetown at the same instant as they are dispatched by the instruments in London. The new system of regenerator working, as it is called, will enable messages to be transmitted as fast as a person can talk, so it has been called "cable telephony." There will be no increase in charges.

Query: How fast can a person talk? If this is the actual speed definition of our friends the Eastern Telegraph Company, it is certainly not up to the usual standard of their technical precision!

Congratulations to Dr. Adolphe Franke, the president of the Siemens and Halske Company, of Berlin, to whom the German Electrotechnical Society has awarded the Siemens-Stephan Memorial Plate. This is the Society's highest award and is granted every five years to the person who is considered to have rendered the greatest service to electrotechnical progress in general and to the Union in particular. Dr. Franke has been associated with the Siemens & Halske Co. for 40 years, and is known for his work in connection with high-frequency measurement apparatus for telephony and radio work.

In connexion with the Antarctic short-wave wireless, a paragraph writer in the *Westminster Gazette* makes the following pithy comments:—"Since October, 1924, when Mr. C. W. Goyder, of Mill Hill, confirmed his claim to be the first person to establish two-way communication with Britain's remotest dominion, there have remained very few long-distance wireless "records" to be set up.

"In default of land stations to be reached, however, Mr. Goyder has now added to his many wireless laurels by exchanging Morse messages, over a considerable period, with the whaler, *Sir James Clark Ross*, now some 250 miles within the Antarctic circle, just as he did with the MacMillan North Pole Expedition in August, 1925.

"It has long been obvious that any place on the earth may be reached by wireless, but Mr. Goyder's most recent achievement is notable because it shows how amateurs continue to "blaze the trail" of long-distance communication, and because it is a further proof of the superiority of the short wave for this class of work, small power only being needed."

If one wished to prove the fallacious in any particular proverb, the history of Thomas Alva Edison would surely weaken one's faith in the oft quoted, "a rolling stone gathers no moss." Edison attained his 80th birthday on the 11th of last month, and his biographer relates that he commenced his career a newsboy, was a telegrapher at 15, became printer, publisher, telephone inventor, electric light and power engineer, moving-picture and phonograph inventor, manufacturer of electric lamps, dynamos, cement, storage batteries and concrete houses.

It may really be said of Edison that money was no lure, neither had he any great conceit of himself. "Genius"? said he to someone who thus referred to him, "Genius is just one per cent. inspiration and 99 per cent. perspiration," nevertheless, genius he undoubtedly remains, and as such we place him on our humble telegraphists roll as "one of us"!

The C.T.O. will certainly be the loser by the translation of Mr. C. Harvey, Principal Clerk (Old Class) of the Controller's Office to the postmastership of Blackburn, while the latter office will be among the fortunates in obtaining so capable a chief, cheery, broad-minded and kindly spirited withal.

Mr. Arthur Simmons will also be missed from the chargeship of the Imperial Cable, as by the flux of time this long-experienced Asst.-Supt. reached the age-limit on the 11th ult.

The high technical abilities of Mr. Simmons were only to be appreciated to the full during times of difficulty, when his quiet tenacity alone inspired confidence. On these occasions he never spared himself, even meals were at times forgotten, a very reprehensible thing, Arthur!

Two other Asst. Supts. have also reached the 60th milestone, it is noted, Mr. Peapell, closely associated with the working of the Anglo-Russian cable, and friend A. F. Bullard.

The Cable Room promotions, vacancies filled, and new appointments, are as follows:—Mr. Vander Ent, Superintendent; Messrs. Halls and Symes, Assistant Superintendents; and Mr. H. C. Smith, Overseer. To these, and to Mr. E. Griffith on his retirement, the sincerest wishes for the future.

On the 8th ult. direct telegraphic communication was re-established between Liverpool and Antwerp for the first time since August, 1914. This was done by means of a split Triple Duplex Baudot and Baudot re-transmitters in the Cable Room, London. The complete scheme will give the following on a single loop between London and Liverpool, viz.: (1) Liverpool Central and London (Cable Room), (2) Liverpool (Central or Cotton Exchange), London and Havre-Bordeaux, (3) Liverpool-London-Antwerp. From sketches the writer has seen on the French side it is deduced that the Baudot installation at Bordeaux carries a further extension to Toulouse!

The necrology of ex-Cable Room men has been heavy recently, and include Messrs. Beechey, Cale and Dausques, all ex-Submarine Telegraph officers, and although the two last-named have been on the retired list for some years, it is sad to relate that Mr. Beechey had only left the service but a few weeks when he passed away.

AUSTRALIA.—Ruter's Trade Service in Melbourne stated that "The Commonwealth Government has decided to appoint a Royal Commission of Inquiry in Australia. In making the announcement, the acting Prime Minister said the question had been for some time engaging the attention of the Federal Government. The *personnel* of the Commission, which will be composed of experts, has not yet been announced; it will consider broadcasting within the Commonwealth, and will examine alterations suggested as desirable in policy and practice. The Postmaster-General said that the Government was following the steps of Great Britain, though on a smaller scale, as the Australian Commission would consist of only three members; everything, including a suggestion of Government control of broadcasting stations, would be determined according to the findings of the Commission."

The same agency also cables that "the success of the radio exhibition held in Melbourne last year was so satisfactory that it has been decided to hold another about next March or April. Larger accommodation has been secured in the Exhibition Building, Melbourne, and all interested in wireless are giving enthusiastic support.

"Following the successful practice in Great Britain, the Melbourne broadcasting station (3 LO) is to erect relaying inland stations at three different centres, probably at Ballarat, Bendigo, and Sale, or Bairnsdale. One station will be provided in Gippsland, as there is a large population to be served in that area, and observations have shown that fading is worst there. The power used will probably be half that of 3 LO, which works on five kilowatts."

The same agency is also responsible for the following two paragraphs:—"Arrangements are said to have been completed for the erection of a new broadcasting station in Melbourne, of the "B" class, on the top story of a high building in the centre of the city; it will receive no revenue from licence fees, but will rely solely on advertising for its income. The call sign will probably be 3 BO and the wave-length 255 metres, with a power of 500 watts. Provision is being made for suitable programmes of music and other special features, and one minute's advertising will be allowed between each item. The station will operate for four hours on each of six evenings a week, Mondays to Saturdays. At the present time Melbourne has two "A" class broadcasting stations (3 LO and 3 AR) and with the new station it will have two "B" class stations (3 UZ and 3 BO).

"Good progress is being made with the local manufacture of wireless equipment. One of the largest manufacturers of radio parts is the Electricity Meter Manufacturing Co., Ltd., whose lines are marketed under the name of 'Emeco.' The latest addition to its plant is machinery for the manufacture of headphones, which are now being turned out in large numbers.

Regarding the latter matter, the *Times Engineering Supplement* recently said:—

"In connexion with broadcasting in Australia a change is going on which will afford increased scope for British manufacturers of wireless apparatus. Whereas listeners—of whom there are now 165,000—formerly bought parts separately and constructed their own receiving sets, they are now buying sets ready for use. The kind most needed are four-valve super-selective sets which can be worked on either a short or long wave-length with practically a turn of a knob. Fortunately, British manufacturers are making rapid headway in the Australian wireless market. It is very significant that while American imports declined from \$1,052,000 in 1924 to \$675,000 in 1925, British imports increased in the same period from £74,355 to £148,722."

The *Electrical Review* says it is reported from Melbourne that Amalgamated Wireless, Ltd., has claimed the exclusive Australian patent rights for the principal articles used in the construction of radio receiving sets. The company has notified manufacturers that it requires them to pay royalties of 12s. 6d. and 17s. 6d. per valve in respect of each set sold. The report also states that the company is endeavouring to make this claim retrospective, and this has caused some concern among the smaller traders. The Commonwealth Government holds a large interest in the company, but is reported to have declared that it does not intend to take any action.

On the other hand, the Melbourne agent of Reuter's cables as follows:—

"Wireless dealers in Melbourne and Sydney have formed a co-operative company to contest the demands of Amalgamated Wireless (Australasia), Ltd., which claims a royalty on apparatus covered by 145 patents."

From the Trade Section of the same agency it is understood that details have been completed of important proposals for conducting organised research into problems connected with broadcasting in Australia. The Broadcasting Co. of Australia Pty., Ltd. (which operates 3 LO) recently offered the University of Melbourne a grant of £500 a year for three years to enable the University to undertake wireless research work. The offer has been accepted, and it is understood that a similar offer has been made to the University of Sydney by Farmers Pty., Ltd. (2 FC). The research work will be performed by the Faculty of Science under the direction of the Dean (Prof. T. H. Laby).

AUSTRIA.—It is understood that the official inaugural ceremony of the Klagenfurt station, wave length 272.7 metres, took place on Jan. 30; this is claimed to be one of the best relay transmitters in Europe.

BELGIUM.—*World Radio* reports that the engineers who met recently in Brussels under the chairmanship of M. Raymond Brailard, president of the Technical Commission of the International Radiophony Union, examined the subject of transmission interference on long wave-lengths; provisional regulations were decided upon and a detailed programme of tests arranged. Another matter discussed was electrical interference caused by tramways, lifts, illuminated signs, &c. The Conference coincided with meetings of the Bureau and of the Juridical Commission of the Union, presided over by Herr Giesecke and Dr. Sourek respectively, and Radio Belgique entertained the delegates (among whom were representatives of Russian broadcasting).

The Société Belge Radio-Electrique, of Brussels, in its report for last year, states that it has established a short-wave wireless telegraph service between Belgium and the Belgian Congo, which is now working satisfactorily.

BOLIVIA.—Reuter's Trade Agency at La Paz notified that a wireless station is to be erected at Lake Gaiba, in Eastern Bolivia, and the purchase completed of apparatus temporarily installed on the s.s. *Saavedra*. The Marconi Company, which holds a 25-year monopolistic contract for telegraph services in Bolivia, has undertaken to provide special apparatus for short-wave transmission.

Commerce Reports states that Brazilian trade prospects have been improved by the projected stabilisation of the milreis at \$0.125 and the subsequent adoption of a new currency unit, the "cruzeiro." Transactions in electrical goods have recently indicated considerable improvement both as regards direct importations and sales from stocks. Two American companies have been awarded contracts for the electrification of the Paulista Railways. The radio business is said to be dull in Rio de Janeiro, but satisfactory in Sao Paulo.

For the benefit of our Telegraph Money Order conversionists the new *cruzeiro* is valued at about four milreis.

BULGARIA.—A 5-kw. transmitter to replace the present one at Sofia is contemplated; it will cost £30,000 and is not likely to be ready before the end of the year. Public subscriptions are to be invited at once by the Government.

CANADA.—The *Financial News* writes as follows on the new trans-Canadian telegraph circuit:—"The Canadian Pacific system has started work on a second trans-Canada telegraph line, 3,000 miles in length, extending from Montreal to Banfield, on Vancouver Island, passing through Sudbury, Fort William, Winnipeg, Moose Jaw, Calgary, Nelson, Penticton, Vancouver and Alberni. At Banfield the line will connect with the second Pacific Cable Board undersea circuit that goes to Fanning Island, Suva, Auckland and Sydney. The work will be completed in about two months, at an estimated cost of about \$423,520, and will forge another link in the chain between Great Britain, Canada, New Zealand, and Australia."

According to *World Radio*, reception in Canada has been far from satisfactory of late, owing to the clash of wave-lengths and to the fact that, following the decision of a Chicago court, certain United States stations are poaching on Canadian channels. It is hoped that the necessary legislation conferring full authority on Mr. Hoover may be introduced at Washington. The wave-lengths of the broadcasting stations in some Canadian cities may be changed as a result of negotiations now in progress between Lieutenant-Commander C. P. Edwards, Director of Radio for the Dominion of Canada, and the Hon. Herbert Hoover, Secretary of Commerce in the United States, who has jurisdiction over the broadcasting stations in the Republic.

CHINA.—Despite all the upheaval in this wonderful land, one part of the Celestial country appears to "carry on," despite what may be happening elsewhere, and *Commerce Reports* is therefore able to report that the contract for a 2-kw. station, with a wave-length of 250 to 550 metres, for installation at Mukden, was awarded to a French firm. An American firm received the

contract for the installation of a 1-kw. station with a similar wave-length in Harbin. These two broadcasting stations should be in operation early in 1927, and a new market for receiving sets will be opened as the installation of receiving sets was previously prohibited, except for military purposes, in Manchuria outside of the South Manchuria railway zone. Receiving sets will be taxed and licensed according to type and size; the licence fee for crystal sets to be approximately \$3 a year, valve sets \$6 a year, and a tax of 10% *ad valorem*, in addition to the regular Customs duties, will be imposed on imported sets. Dealers in radio receiving sets will be licensed; a deposit of approximately \$5 will be required of all dealers prior to the issue of the licence.

DENMARK.—The law relative to annual licence fees was recently revised. All apparatus acquired or constructed after Oct. 1, 1926, is subject to a fee of 5 crowns in the case of a crystal set and of 7.5 crowns in the case of a valve set, or set in which valve amplifiers are used. These figures represent a reduction of 50%.

GERMANY.—At the end of 1926, says the *Electrical Review*, a total of 1,376,564 licences had been issued, the number of applications during December having been 39,442. Unlicensed listeners are said to be fewer in Germany than in any other country. The fee is payable monthly (2s.).

According to *World Radio*, though the power and range of all the following German stations remain unaltered, their transmitting strength will from now onwards, in accordance with the agreement recently concluded at Geneva, be stated as follows:—

	Wave-length.	Old kw. figure.	New kw. figure.
Königswusterhausen ...	1,300	10	8
Frankfurt (Main) ...	428.6	10	4
Hamburg ...	394.7	10	4
Leipzig ...	365.8	9	4
Muuster ...	241.9	3	1.5

The low-power stations, Elberfeld (468.8 m.), Bremen (400 m.), Hanover (297 m.), Dresden (294 m.), Dortmund (283 m.), Cassel (272.5 m.), Kiel (254.2 m.), and Gleiwitz (250 m.), hitherto represented by 1.5 kw. will now have each 0.7 kw. Langenberg will have 25 kw., instead of 60 on the old basis.

GREAT BRITAIN.—The following are the new wave-lengths in use at the stations mentioned hereunder:—

Station.	Old Wave-length. Metres.	New Wave-length. Metres.
Birmingham ...	491.8	326.1
Bournemouth ...	326.1	491.8
Bradford ...	254.2	252.1
Edinburgh ...	294.1	288.5
Hull ...	288.5	249
Stoke ...	288.5	249
Dundee ...	288.5	249
Swansea ...	288.5	249

The 249-m. wave is the international common wave-length.

Several Continental stations, besides those in this country, have changed and exchanged wave-lengths for test purposes recently.

The commercial accounts for the British Post Office for the year ended March 31, 1926, show, with the exception of the year 1919, the biggest surplus of any year since 1913. The surplus on the postal account amounted to £7,416,266, but there was a loss of £1,299,214 on the telegraphs. The telephone account also showed a surplus to the extent of £550,830. This gave a total surplus for the year of £6,667,882, over £1,000,000 more than the surplus for 1925, and surpassed in 1919 by the total of £7,447,556. The income side shows that postal business brought 58.36% of the receipts, telegraph business 7.82, and telephone services 25.75%.

At its second meeting, on Feb. 14, the Wireless Organisations Committee decided to ask the Postmaster-General to take an early opportunity to assure listeners that a system of high-power regional distribution effective for the transmission of alternative programmes will be fully expedited so far as his Department is concerned. The Wireless Organisations Committee, it will be recalled, is representative of four national societies, viz.: the Radio Society of Great Britain, the Radio Association, the Wireless Association of Great Britain, and the Wireless League. Capt. Ian Fraser, the blind M.P., who is prominently associated with the Wireless League and Radio Society, accepted the chairmanship of the Committee, which has as its main function the establishment of an effective liaison between the national societies of listeners and experimenters and the B.B.C. on matters of mutual interest.

The following written reply to a question in the House of Commons regarding the interpretation of the exact covering authority which was constituted by the Postmaster-General's licence will relieve the anxiety of quite a number of licensees. Lord Wolmer is reported to have said: "A receiving licence entitled the licensee to use apparatus in the premises occupied by him. One licence will cover any number of sets installed in the same premises for the use of the licensee, his family, or his servants, but any other person occupying a portion of the same house under a separate tenancy and desiring to install receiving apparatus must take out a separate licence. When a licensee runs telephone leads from his set to the house of a neighbour, or to any premises other than those in his own occupation, for the purpose of conveying broadcast programmes thereto, a separate licence is necessary for such premises."

GUATEMALA.—*Commerce Reports* gives the following interesting information regarding telegraph and telephone matters in this little-known republic :—“ The telegraph and telephone systems are operated by the Government as one unit. The combined systems reported a deficit of 13,477,666 pesos for the year 1925 (the latest figures available). There were 261 telegraph offices operating at the end of the year, of which 5 were inaugurated in 1925 ; the 11 new central telephone stations opened during the year brought the total in operation on the country to 87. Telegraph lines aggregated 6,871 kilometres, and the national telephone lines had a combined length of more than 3,603 kilometres. At the end of 1925 there were 1,992 telephones in use in the Republic, representing an increase of 775 instruments since 1923. Work on the new automatic telephone system in the capital city has begun.

INDIA.—Complaints are made regarding the inefficient telegraph service between Burma and India, and when the Director-General of Posts and Telegraphs recently visited Rangoon, the Burma Chamber of Commerce represented to him that a submarine cable should be laid between Rangoon and India ; however, the sea bed is singularly unfavourable to such an enterprise. A senior officer of the engineering branch has been instructed to inspect the lines between Burma and India, and Rs. 1½ lakhs have been sanctioned for the overhaul of these wires. It may be added that the country has always been a difficult one for overhead construction in the rainy season, and the laying of underground lines is not easily practicable.

TELEPHONES IN BURMA.—The Posts and Telegraphs Department has, during the past two years, linked outlying places by public telephone circuits. In every case this has been done by making use of the existing telegraph wires, as the traffic would not be sufficient to justify the cost of erecting special telephone wires. The facilities thus provided have been much appreciated by the public, and Mandalay has in this way been linked with Maymyo, Rangoon, with Pegu, Thanatpin, Syrian, Kauktan and Tavoy with Harmingyi.

RANGOON'S FIRST WIRELESS TELEPHONE.—The Port Authorities in Rangoon have introduced a wireless telephone, the first one in Burma, between the Port Offices and the pilot vessel *Beacon*. The telephone is fitted with an automatic calling device, and the installation is capable of communicating with vessels at sea for a distance of 200 miles.

IRISH FREE STATE.—The preliminary arrangements are being made for the establishment of the Free State Advisory Committee under the provisions of the Wireless Telegraph Act. The Provisional Advisory Committee already in existence will be superseded by the new body. The Ministries for Education, for Lands and Agriculture, and for Posts and Telegraphs, are to be represented on the Committee.

NEW ZEALAND.—The installation of powerful broadcasting stations at Auckland and Christchurch has been completed by the Radio Broadcasting Co. of New Zealand, Ltd., a subsidised company organised to operate a chain of broadcasting stations throughout New Zealand on a uniform basis. says *Commerce Reports*. The Auckland station is already in service, and the stations at Christchurch, Wellington, and Dunedin soon will be installed. It is estimated that about 8,000 licences were issued in 1926. Practically all of the equipment used in this area is American.

PERSIA.—Reuter's Teheran agency reports that a general local and foreign wireless service was established at Teheran on Jan. 28 for the first time.

POLAND.—The latest addition to European long-wave stations, says the *Electrical Review*, is that at Warsaw, transmitting on 1,013 metres with an input of 10 kw. to the main oscillator valve, which was built by Marconi's Wireless Telegraph Co., Ltd. The transmitter (a QD 8 set) was designed on the same lines as that at the Daventry station, the six main units being contained in aluminium frames : four are open and contain the valves for the independent drive, main oscillator, modulator and rectifier circuits, and the two enclosed units are the speech transformer and the coupling unit for the drive main oscillator grid circuit. The station belongs to the Polish Broadcasting Co., and has been built at Fort Mokotow on farm land belonging to the municipality. Power is obtained from the city supply at 3,000 volts, three-phase, being transformed at the station to 210 volts. The rectifiers, main modulator, and main oscillator valves are of the Marconi coiled-anode type, and the drive and sub-modulator of the glass air-cooled type. The aerial is carried on two self-supporting lattice steel masts 75 metres high, and the aerial current is 50 amperes. The range of reception in Poland is 75 miles with a crystal receiver and 375 miles with a two-valve receiver ; the station has been heard in this country, when the B.B.C. stations were closed down, on a 2-valve receiver. Short wood poles were used to carry an earth screen which was erected to compare results with those obtained with an “ earth ” proper, and the letter was found to give the better performance.

Reuter's Warsaw agency also gives a list of new radio services, thus :—“ Direct wireless communication has been opened between Poland and Syria, the Lebanon, Transjordan, Palestine, Egypt, Eritrea, and Abyssinia, and vice versa. Regular exchanges have been arranged between the central wireless station at Warsaw and the Orient Radio Co.'s station at Beyrouth.”

The British Commercial Secretary at Warsaw has informed the Board of Trade that according to statistics from the local Press the number of broadcast receiving licences issued in Poland increased from 4,977 in 1925 to 34,556 in 1926. On the other hand, the number of dealers declined from 269 to 239, indicating that Poland has also experienced the usual process common to the initiation of a wireless industry, in that numbers of small firms which went into the business, lacking both experience and capital, have not been able to withstand even favourable conditions.

PORTUGAL.—From Milan, Italy, we learn that a definite contract has lately been arranged between the Società “ Italcable ” and the Portuguese

Government for the laying of new submarine telegraph cables between Lisbon Malaga, Azores and Cape Verde. The Italian submarine cable system will, as a result, be notably increased by a new cable which, starting at Anzio, will cross the Tirreno and then continue across to Corsica and Sardinia, thence to Barcelona and on to Malaga.

SANTO DOMINGO.—Reuter's agency at San Domingo reports that a broadcasting station, the first of its kind in the Dominican Republic, is shortly to be erected at Monte Cristy in accordance with plans adopted by the Minister of Promotion and Communications. A preliminary grant of 30,000 dollars has been provided for in the 1927 budget for the installation of a 1,000-watt station. Broadcasting is to be used for literary, scientific and other educational purposes, and as a means of propaganda for commercial agricultural and sanitary measures.

SOUTH AFRICA.—The *Engineering Supplement* of the *London Times*, a few weeks ago, wrote as follows regarding broadcasting :—“ Broadcasting in South Africa has to contend with several disadvantages, one of which is the small and scattered population and another the geographical situation of the country, which makes it very difficult to receive European and American programmes. Now comes a report that the present owners of the Johannesburg broadcasting station have decided to close it. The news has a direct concern for Great Britain, in view of our substantial exports to South Africa of wireless apparatus. The growth of this trade in recent years has been considerable. Official figures (which include wireless telegraphy apparatus) are :—1923, £26,096 ; 1924, £264,313 ; 1925, £84,459. America's share of the trade is so small as to be negligible. The interest of South Africans in broadcasting is as keen as ever, and it will develop rapidly when the problem can be solved of picking up B.B.C. programmes regularly. Meanwhile, there is a scheme to keep the Johannesburg station in operation under new control, and it is to be hoped that it will prove successful.”

Just as the *T. and T. Journal* had gone to press last month, however, the news came that, “ Amid expressions of regret and appreciation, the Johannesburg broadcasting station, the most important in the Union, closed down on Jan. 31.”

“ As the result of a conference of those interested in the resumption of broadcasting, three schemes have been submitted to the Minister of Posts and Telegraphs, who had promised to issue a licence for any scheme chosen by a representative committee. The *Times* understands that the Minister favours the proposal of the Mayor of Johannesburg that the cost of broadcasting shall be borne by the Reef municipalities. He is definitely of opinion that sooner or later the service must become a State-aided enterprise. While negotiations are proceeding, the Transvaal Radio Society undertook to resume the service.”

U.S.A.—Says *World Radio* : “ ‘ Time on the air ’ is sold for from \$25 to \$400 an hour, and the average is considered to be about \$200 per hour. Few stations broadcast more than eight hours a day, and most of them no more than six. If six hours could be sold every day of the year at, say, the average rate of \$200 per hour, which is unlikely, the revenue would be \$438,000 annually. Most advertisers desire the time between the hours of 8 and 10 at night, and a station that averages one hour per day for 365 days considers it is doing well, which means an average income of \$73,000 per year.” Apparently there are likely to be very few millionaires from the radio-diffusion advertising section !

Reuter's New York agency is responsible for the two following paragraphs :—

“ The first month's operation of the transatlantic radiophone service has been a commercial success, according to the management, which states that the receipts satisfactorily exceeded the expenditure, adding that Americans lived up to their reputation as extravagant telephone users, having made an average of nine calls for every five British calls.”

“ A commercial telephone service between Chicago and Detroit and London was inaugurated on Feb. 12.”

New York City's newest station (WGL) was opened on Jan. 30, and marked the inauguration of the activities of the International Broadcasting Co., which operates the station ; its power is 1 kw., and wave-length 442 metres, which figure may be changed to 422 metres if interference occurs.

The new Atlantic Broadcasting Corporation, with headquarters in New York, has purchased the Grebe group of stations, including the new 5,000-watt transmitter WABC. The new organisation has its studio and reception rooms in Steinway Hall ; all transmitters are located at Long Island. An elaborate mixing or fading system in connection with a large number of microphones, permits, says the *T. and T. Age*, the proper blending of the various elements of the broadcast presentation. The frequency control system of the 5-kw. transmitter is of such stability that a change of even one-tenth of one per cent. in wave-length is not likely to occur.

In connexion with the recently-inaugurated transatlantic radio-telephone service, work is to start at once on the erection of a new receiving station in Fifehire, says the *London Daily Express*, on the estate of Sir Donald Makgill, Bart., of Kemback. Three lines of aerial masts will radiate from the station for a distance of three miles each, and in the event of the station proving satisfactory, substantial buildings will take the place of those now to be erected. A lead-encased cable will be laid between Kemback and Cupar Post Office.

A tentative agreement has been reached at Washington, where conferences have for months been considering the problem of air control and order regarding wireless transmission. The agreement appears to have the support

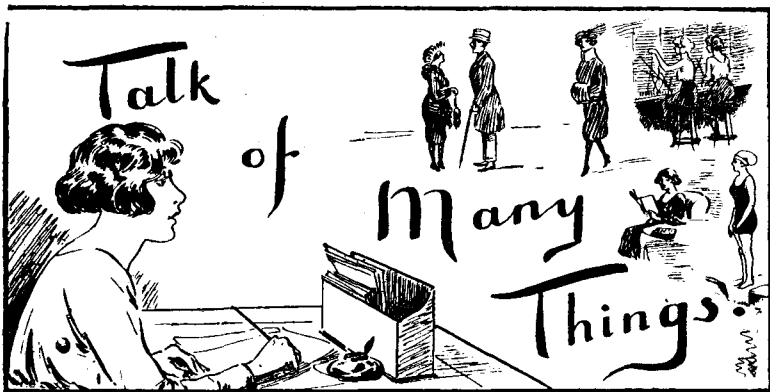
of adherents of the White Bill, which the House of Representatives passed, and of those favouring the Dill Bill, which the Senate passed. According to *World Radio*, it contains no provision for censorship, calls for the creation of a commission of five, the members of which are to be appointed by the President of the United States, and to serve for six years; each commissioner will represent one of five zones created. The Commission will have jurisdiction as to granting, renewal and revocation of all station licences and making regulations for a period of one year, at the end of which the Commission shall decide only controversial matters which the Secretary of Commerce of the United States places before it and appeals from decisions he has handed down. The decrees of the Commission are to be final, to be reviewed only by the courts. Complete control over operators and the issue of their licences is given to the Secretary of Commerce. All administrative functions are entrusted to him. After one year he will be given original jurisdiction over the granting and renewal of station licences in relation to which there is no controversy or appeal. The Commissioners will receive £10,000 a year for the first year, and thereafter \$30 a day and travelling expenses.

VENEZUELA.—Reuter's agency at Caracas cables that the Government has bought about 118 acres of high-lying land for a radio-telegraph station in the Cutia sub-division of the Federal District (population 140,000), at a cost of 600,000 bolivares (1 bolivar = 9½d.)

"And still we love the evil cause
And of the just effect complain:
We tread upon life's broken laws,
And murmur at our self-inflicted pain."
—"The Shadow and the Light," Whittier.

J. J. T.

WE TELEPHONISTS



Early Rising.

REPETITION brings conviction. Even burglars will agree that there is at least an element of danger in repetition, but I was not considering the matter from their point of view. I was thinking rather of advertisements and proverbs. They are, of course, quite dissimilar, but nevertheless they have characteristics in common. They parade in the trappings of truth, they fascinate, they have the tentacles of an octopus and, by subtle workings, they undermine the sturdiest independence of thought and action. The victim, once within their grasp, will believe anything—even that ginger is black and white. Their *modus operandi* differs, however, for while the advertisement mouths its monotonous messages from hoardings, the interior of public vehicles, and from magazines and newspapers, the bacillus of the proverb is spread by man himself by word of mouth. Of the two, the proverb is possibly the more deadly, for while there are spots on the face of the earth which as yet are free from the fungus of advertisement, there is literally no escape from the uttered or remembered proverb. Not infrequently they are in opposition. It is said that "Familiarity breeds contempt," but if that were true it would follow logically that the fewer advertisements one saw for Bink's Soap the more highly it would be esteemed and used. I use Bink's Soap simply because I was haunted by the constant recital of its virtues. No spot was free and the whole world seemed like a graveyard in which every epitaph eulogised Bink's Soap. At first I read the announcements with an air of detachment. Soap at that time did not interest me, least of all Bink's. Then a vague interest was aroused and in the naive way of a certain judge I said "What is Soap?" Later, I paused to consider whether perhaps Bink's Soap might not be freer from the alleged unpleasantnesses of all and any other soap. Then I passed through various stages of interest in Bink's Soap. Sometimes I would snort with rage when I saw it mentioned; sometimes I would laugh or emit strange oaths. Finally I crept into a chemist's shop and brought a tablet, and, reluctant to waste the money I had paid, I used it. Thus my demoralisation was completed.

At present I am worried by a proverb. It has been hammering at me for years, and I am realising that constant dripping may wear away a stone. The continual struggle to maintain my disbelief is wearing me out and I feel that my strength is fast waning. How much longer can I resist the proverb "Early to bed and early to rise, makes a man healthy and wealthy and wise?" Just why the philosopher limited his dictum to men I cannot say. He may have considered that the health, wealth and wisdom of women were such as to need no artificial stimulus. Or he may have thought that although healthy and wealthy nothing could possibly be done about their wisdom. That however, is a very base thought, and I hasten to repudiate it on your behalf, ladies. Of course, I know it's all wrong, because if it were true I should be in a terrible fix. A moderate acceptance of the saying might secure a degree of health and wealth. The great difficulty would be to determine the precise period which should elapse between rising *from* and going to bed in order to obtain the maximum amount of wisdom. I feel sure that in my case I should always be in bed—and there's a great deal of wisdom in that.

PERCY FLAGE.

A Sad Story.

Derek fell asleep; it had been a hot summer day with absolutely nothing doing; added to that he had taken a goodly number of aspirins which, as every one knows, should only be taken one at a time. So Derek fell asleep. . . . That wouldn't have mattered so much if he had awakened in time to go home: alas! 5 o'clock came—6 o'clock—the great door clanged to, and darkness crept stealthily around. Terrible as that was, all would have been well had he awakened in the morning. Albeit somewhat faint, verily might he have recovered his manly strength with the aid of yе rashers and yе eggs; but it was not to be! The days passed into weeks, the weeks into months, and at the end of five years Derek had developed a passable beard.

The effect of the aspirins at this time began to wear off and one day Derek suddenly sat up and began to take notice. His first instinctive feeling was of anger, so naturally he took up the telephone.

"Hallo there—Hallo! Hallo! Where on earth are you, Exchange. Why the deuce don't you answer!! This is what we pay you for, isn't it—keep us waiting while you fool about—Exchange, EXCHANGE!"

He paused for breath and instantly a sweet, low voice spoke to him.

"Your pleasure, Sir?"

"What—what!" he raged, "Who're you talking to? Tell me the time and look sharp about it."

He was really longing to know the time. A lacy cobweb was resting lightly on the face of the clock. But that wretched Exchange woman would not satisfy him.

"Tut, tut!" she murmured gently, "I'm willing to give you a chance, but I can't allow you too much licence. Now just what is it you want?"

"I WANT THE TIME!" he bellowed.

A faint purring sound on the line; then a different voice.

"Now then, what is this? Explain at once, Sir, why you are wasting the Operator's time."

The tears began to trickle down Derek's cheeks.

"I w'want the time," he murmured, brokenly.

"Have you not just heard the time signal? Your telephone must be out of order, or perhaps you have been asleep?"

"Yes, that's it!" he said eagerly, "I've been asleep."

"It is now three past twenty-four."

"Three past—you must be mad!"

"Dear, dear, your manners leave a good deal to be desired. The very first clause in the Agreement deals with persons like you! Beg your pardon?"

"I was just pinching myself to see if . . . you must be one of those automatic fiends trying to work your jokes on me. When does the automatic business come into force?" There was a long pause, then the voice at the other end of the line spoke clearly—deliberately—

"I dor't know whether you are in earnest, but because your telephone has not been used for many years I will give you the benefit of either having been away from civilization or of having lost your memory. Five years ago the automatic system was installed. It was eagerly acclaimed and for a time all went well. But when the busy season was at its height, the poor subscribers found no satisfaction in grumbling at a dial. It couldn't hear them; it couldn't get into trouble for answering back. Moreover, they missed the voice of the telephonist—but this of course they would not own. When matters were becoming desperate, the Great and Illustrious Men of the Country held solemn conclave thuswise:—

"Inasmuch as intelligence and courtesy should be fostered in this noble land and that the fair fame of aforementioned should not be smirched by reports of subscribers having smashed their dialling plate because it stared back at them when they shouted at it, it is considered right and proper that one call out of each ten shall be diverted to the Exchange Telephonist."

Greatly to the surprise of the Great Men the Exchange Telephonists rose in a body and declaimed:—

"Peace we have had for many moons. Why should we once again be disturbed?" Nor would they be pacified until an Agreement was drawn up, the first clause of which laid down the rule that the subscriber must modulate his voice nicely when speaking to the telephonist, and never use the telephone if he feels angry."

Derek gave a grunt, turned over and—woke!

W. M. G., Albert Dock Exchange.



PLUGS

Your requirements will be amply satisfied if your plugs are made by the T.M.C. Good workmanship and materials assure it. We make plugs of every type. Send us your next enquiry.

The
Telephone Manufacturing Company
Limited

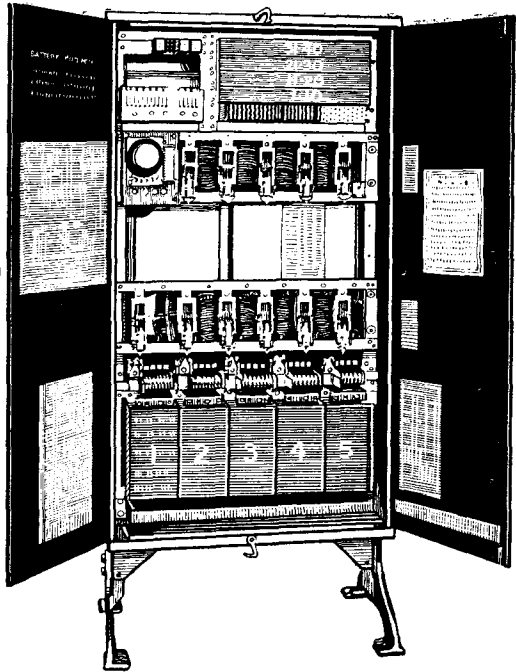
Hollingsworth Works, West Dulwich
LONDON, S.E.21

Telephone: Sydenham 2460-1. Codes: Bentley's, A.B.C., 6th Ed. Telegrams: Bubastis, Dulcrox, London.

Contractors to

British and Colonial 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.



TRAINED telephonists—men with technical knowledge and experience—are now controlling the telephone systems of the world. Their genius has replaced the manually operated exchange with apparatus far more accurate in performance and quicker in action.

Standard Automatic Telephone Systems represent the highest achievement in this modern development of science and are rapidly taking the place of older methods both in regard to commercial installations and in the wider fields of public service.

Standard Automatic Telephone Systems

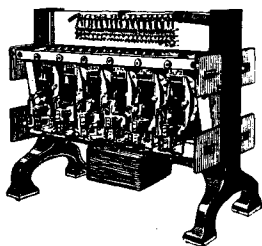
Standard Telephones and Cables Limited

Formerly Western Electric.

CONNAUGHT HOUSE, ALDWYCH, LONDON, W.C.2.
Telephone: Central 7345 (10 lines).

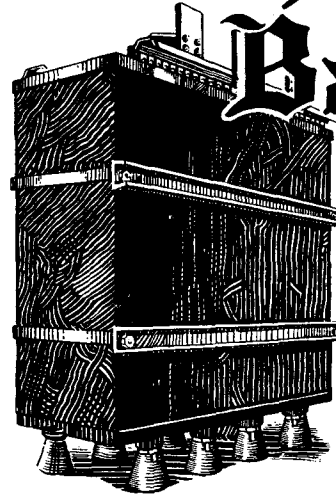
Works: Hendon, North Woolwich, New Southgate.

Branches: Glasgow, Leeds, Birmingham, Manchester,
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Chloride Batteries

for
Telephone
Exchanges



SILENT working and absolutely steady voltage are the characteristic features of Chloride Batteries in Telephone Service.

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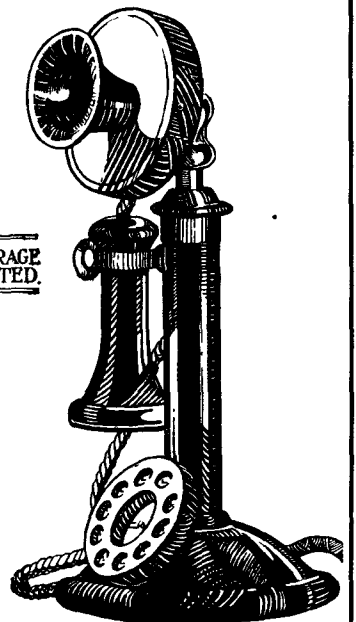
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Sydenham Tennis and Swimming Clubs.

A dance in aid of the above clubs was held at Dartmouth Hall, Forest Hill, on Jan. 20.

It proved a social and financial success,—and this in spite of the influenza epidemic.

Mr. Raison, who proved himself a popular M.C., distributed the swimming prizes won by members of the exchange staff.

The second dance of the season will be held on Mar. 9. M. A.

Putney: Poor Children's Tea.

This year the staff at Putney arranged two short plays, for the entertainment of their little guests at Fairlight Hall, Tooting.

Variety was the keynote of the evening. It was well in evidence at the tea table, but here all the "varieties" quickly disappeared, and soon the youngsters were joining in a few popular songs, led by a Jazz Band.

"The Fairies Work," a little play produced by five members of the staff, caused peals of laughter, whilst cries of admiration greeted the pretty little flower play which followed.



It was indeed a pretty sight—the girls in their flower frocks and the illuminated platform and pillars, which had been so artistically arranged by the engineers.

But time passes quickly, and after a performance by the clown, during which there was wild excitement, the evening closed with the distribution of dolls, toys, and bags, the bags containing fruit, nuts, and sweets. E. R.

The Lost Cord.

(With apologies to Adelaide Anne Proctor.)

Seated one day at the switchboard,
I was weary and ill at ease;
And my fingers wandered idly
Over the register keys.
I know not what I was saying
Or what I was dreaming then,
But I heard a mighty buzzer
Like the sound of a great Amen.
It flooded my whole receiver
Like a "Howler" long and loud,
It fell on my fevered spirit
Like the sob of a wailing crowd.
'Twas like the discordant echo
From the tongue of a scolding wife;
It seemed to contain the heart-cry,
Of a weary telephonist's life.
I have sought, but have sought it vainly,
That one lost cord divine,
Which brought from the soul of the switchboard
Such dreams to this head of mine.
It may be the supervisor
Will speak on that cord again
Or it may be that only the Test-board
Knows the truth of that loud Amen. A. G. O.

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.

LONDON TELEPHONE SERVICE NOTES.**Accounts Branch.**

IN spite of the epidemic of colds and influenza, which generally depletes the staff early in the year and has been specially virulent this year, the accounts for the current quarter were all dispatched between Jan. 10 and 28. Now that there are over half-a-million telephones in London the number of accounts to be sent out is nearly 260,000, so that the work involved in their preparation and dispatch is necessarily heavy. The highest number dispatched in any one day this quarter was 23,177.

Following the departure of the accounts, indeed coinciding with the later stages, comes the arrival of the payments which means an orgy of receipt writing and posting in ledgers and much activity on the part of the cashiers. At the time of writing the peak period has been passed, the amount of money dealt with on the heaviest day reaching the sum of £101,300.

The development of the telephone service, which has necessitated the opening of new exchanges and the extension of most of those already existing, is naturally reflected in the number of accounts to be dealt with. For some time past each quarter has shown a net increase over last quarter's figure of approximately 5,000 accounts. But this net increase does not give a real indication of the number of ledger alterations involved by cessations, new lines, removals, changes in and additions to apparatus, &c. During the quarter ending December, and therefore covering the period since the last dispatch of accounts, 24,868 advice notes were issued, and, in due course, were dealt with on the ledger sections.

Correspondence arising from the accounts is also a big item, and it is not until one comes to deal with it that one realises the great variety of queries which can be raised on a simple account. In January 12,609 letters were received and dealt with. Some correspondence has its humorous side which creates a welcome diversion. A recent example was a communication in Esperanto which, however, the combined efforts of several brains succeeded in translating into a tale of woe about an ineffective call made from a call office to the writers' own telephone. He had apparently anticipated that it would not be understood and was somewhat taken aback when called up and asked for certain details which had been omitted, no comment on the language being made. It seemed rather a pity that the joke could not be returned by a polite official communication in Zulu or Chinese!

A little party of people in the Controller's Office have specially interested themselves in the welfare of blind persons in poor circumstances, and assist in carrying on clubs for them in various districts through which they are provided with entertainment and help in time of need or illness. Funds are raised by means of concerts, &c. In November last a concert was held in aid of the blind at Hoxton which added over £13 to the funds for that district. On March 9 another concert will be held in the Refreshment Room at Cornwall House in aid of the club for the Paddington blind, and the support and interest of any members of the staff will be welcomed by the organisers.

* * * *

Contract Branch.

The following letter came to hand a few days ago:—

"Sir,—Would you oblige me by fixing a Sine [*sic*] out Side my shop you may Telephone from Here as this is anewagents [*sic*]. I feel sure it would be an adventure to both."

One cannot help suggesting that so risky an adventure should be postponed *sine die*.

A post-card advertising internal extensions in the following terms was enclosed with the last quarter's account for residential lines:—

"HAVE YOU A LIGHT IN EVERY ROOM?"

Of course you have. You would find it very inconvenient to be obliged to go to a certain room in order to get a light.

But you are doing this when you have but one telephone.

Less than ONE PENNY a day will give you an additional telephone. Think of it. IF INTERESTED kindly fill up and return this postcard.

The Controller has received a letter from the Telephone Development Association congratulating him on its production and the following appeared in *John Bull* on Jan. 29 last.

"To R. A. Dalzell, Esq., C.B., C.B.E., Director of Telegraphs and Telephones.

Dear Sir,—I heartily congratulate you on the forward move made in actually advertising your telephone service. I like the conversational method of the postcards distributed, which in perfectly clear, non-technical language informs the ordinary householder of the benefits to be secured by adequate installations. The telephone service is setting an example that should result in a big increase of revenue.—JOHN BULL."

It is interesting to find that the card has attracted the attention and approval of some outside bodies who have had a wide experience of advertising methods. Some hundreds of orders for extensions have already resulted from its issue, and arrangements are being made to follow it up by another one which will accompany the next account.

A recent announcement in the newspapers illustrates the difficulties of development study officers in estimating the demands for lines that will arise from building sites.

It is well-known that Bush House only occupies about a third of the valuable Aldwych site which belongs to the London County Council, and it has been generally anticipated that two more buildings, similar in size to Bush House, would be erected on it. It now transpires that a proposal to utilize it for the erection of four theatres is under consideration. Four theatres would not require a dozen lines apiece but Bush House at the present time has over two hundred exchange lines installed and the future demand is likely to be heavy.

* * *

London Telephonists' Society.

The London Telephonists' Society held their fifth meeting of the session at the City of London Y.M.C.A., 186, Aldersgate Street, E.C., on Friday, Feb. 4, 1927.

In accordance with what may now be considered an old established custom the meeting opened with a short concert, the items of which were provided by the staff at Holborn Exchange. The audience—about 150—were very appreciative and at the conclusion passed a very hearty vote of thanks to the artists for providing such an enjoyable programme.

The principal features of the evening were two papers, the first "Contract Work as affecting the Traffic Branch," by Mr. W. Glenny, and another "The Telephone School" by Miss A. M. Kingshott.

Mr. Glenny's paper opened with an appeal for a wider enthusiasm and a fuller appreciation on everybody's part of the mutual interdependence of the different branches of the service, and in passing referred to the extent to which Contract Branch returns were affected by the quality of the service given. The lecturer then proceeded to the main theme of the paper, namely, to describe the function of the development section and the duties of that section's personnel whom he likened to peregrinating prophets. These prophets Mr. Glenny divided into major prophets and minor prophets and an account of the joys and woes, and adventures too, of these officers added a pleasant touch of humour to the more serious details of the paper which dealt, as its title indicates, with those phases of the work of the Contract Branch which so closely interlaces with that of the Traffic Branch.

We hope that the Society will arrange further lectures on other aspects of the work of the London Telephone Service. It is all to the good that the members should be brought into closer contact with the various phases of the work and immense ramification of our most important service.

The second paper was charmingly read by Miss A. E. Reekie in consequence of the absence of the writer Miss A. M. Kingshott, who was unfortunately unable to be present. It gave a very interesting description of the school equipment and a detailed account of the progressive training of new entrants with the enrichment of many a little personal reminiscence of the feelings and trepidation of these young folk who continually pass through the school preparatory to commencing their business career.

Both papers were well received and considerable discussion followed each. The meeting closed by passing a very cordial vote of thanks to the two principals whose papers had afforded a very pleasant and instructive evening.

* * *

Traffic Branch.

Whereas last year a weekly total of ten million calls was only reached at the peak periods of the year, it would seem that this figure will characterise the slack periods of 1927. This total was exceeded for five out of the first six weeks of the new year.

There are signs that Tandem Exchange is reaching completion, for a force of supervisors and telephonists have taken up occupation at the new building.

A considerable number of telephonists have undergone a period of preliminary training in the new art of key-sending.

The experimental equipment which was working for some time at City Exchange has been removed, having served a very useful purpose from both technical and traffic points of view. Difficulties (some of them quite unanticipated) in wedding the automatic to the manual system were encountered and overcome, and much valuable knowledge was gained.

Mr. W. F. Dobson has returned from his visit to New York where he spent a month in connexion with the opening of the Anglo-American Service. He speaks in the highest terms of the hospitality and assistance he received from everyone with whom he came into contact.

On this side we have been happy to make the acquaintance of Mr. E. J. Padmore of New York, and trust that his brief stay with us has been as pleasurable to him as it has been to us.

The making of good contacts in the personal sense are as important in securing good service as well made connexions are in an engineering sense.

Culled from the Exchanges.

Central.—A second whist drive was held on Dec. 3 at which there was a good attendance. The following description has been received :—

THE WHIST DRIVE.

It was the Central whist drive,
And when our work was done,
We hid us all to Slaters'
To have a night of fun.

The prizes stood in grand array
Replete with bag and broil,
The patrons eyed the spoils with glee
And murmured "Oh how jolly."

At seven-thirty by the clock
We all sat down to play,
The M.C. rang a bell and said
These rules you must obey.

The losing gent, he moves one down,
The lady she goes higher,
The winning gent moves to the right,
That's all, now I'll retire.

Then there was silence in the room
As cards were sorted out,
Until a secret number came
Which caused a clap and shout.

The supper time soon came along
And we fell to with zest,
With sandwiches and trifle too,
The food was of the best.

But all good things are over soon
And it was quite a shock
When we just gave a passing glance
And found it ten o'clock.

And when the scores were totalled
We gathered round in flocks
To see the handsome prizes
Presented by Miss Cox.

The winners we applauded
And mourned our meagre score,
So everyone enjoyed the drive,
We hope we'll have some more.

D.D.

The Swimming Club held their second social evening on Jan. 25. The evening was a success both socially and financially, thanks to the enthusiasm of the committee. Good fun was enjoyed in the way of games, music, and dancing, to which interest was added by the awarding of small prizes. A good number of old friends joined in. A similar function has been arranged for March 1.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Promotions to Assistant Supervisorship Class II :—

Miss N. L. CURRAN, to Hop Exchange.
Miss D. L. TAYLOR, to Hampstead Exchange.
Miss B. M. AUSTEN, to Trunk Exchange.
Miss W. A. WAPLING, to Trunk Exchange.
Miss A. F. STOODLEY, to Central Exchange.
Miss A. R. E. HALL, to Sloane Exchange.
Miss E. A. MAY, to Putney Exchange.
Miss E. G. WEEKS, to Lee Green Exchange.
Miss R. WILLIAMS, to City Exchange.
Miss M. M. E. TANNER, to Gerrard Exchange.
Miss E. WAKEFIELD, to Willesden Exchange.
Miss G. M. WINKLEY, to Kensington Exchange.

Resignations on account of marriage :—

Miss M. A. PINNELL, Telephonist, of Central Exchange.
Miss G. BACKHOUSE, Telephonist, of Central Exchange.
Miss A. F. ROACH, Telephonist, of East Exchange.
Miss J. M. WESTWOOD, Telephonist, of Paddington Exchange.
Miss I. M. ROBERTS, Telephonist, of Putney Exchange.
Miss C. A. MILLARD, Telephonist, of Trunk Exchange.
Miss E. E. HAYWARD, Telephonist, of Woolwich Exchange.

Traffic Staff promotion :—

Mr. J. WEBB, Assistant Superintendent Class II to Assistant Superintendent Class I (acting).

THE Telegraph and Telephone Journal.

VOL. XIII.

APRIL, 1927.

No. 145.

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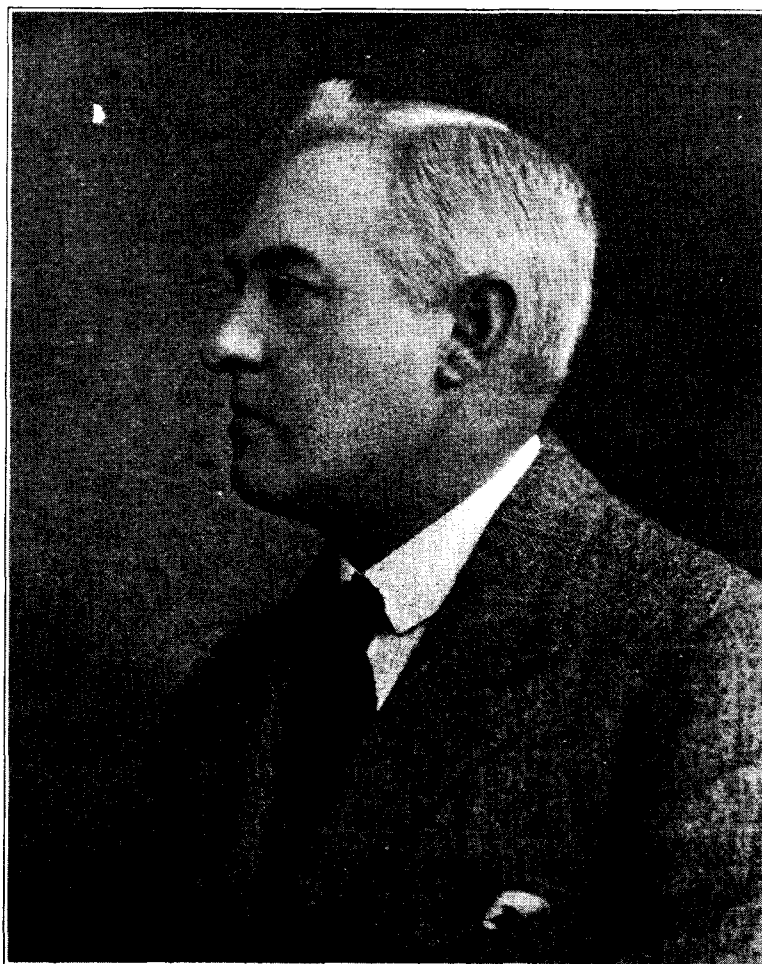
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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XXXIX.—

LT.-COL. F. N. WESTBURY,
O.B.E.

LT.-COL. WESTBURY, the present Postmaster-Surveyor of Glasgow, entered the Accountant-General's Department of the Post Office as a Second-Division Clerk in April, 1896, and joined the staff of the Secretary's Office two years later. In December, 1905, he was appointed to the Surveying Establishment. In 1919 he became an Assistant Surveyor, Class I, but three or four months afterwards he was transferred to the Ministry of Transport as a Principal Clerk. The Geddes "Axe" Committee, however, did not spare the Ministry of Transport, and,



to the joy of all Post Office men, Col. Westbury returned to the Post Office service in 1921 as Postmaster-Surveyor of Sheffield, where he remained until his appointment to the corresponding position at Glasgow, nearly a year ago.

This short recital of Col. Westbury's progress through the service gives an inadequate indication of his ability and his driving power, qualities, however, which are combined with a suavity of manner and a reasonableness which have made him extremely popular wherever he has been.

Col. Westbury served throughout the War in the Royal Engineers (Postal Service) and saw active service in France. He received his well-merited distinction for his services during the War.

TRANSATLANTIC TELEPHONY.

HE must be a very prosaic person who is not thrilled with the experience of talking through space to friends on the other side of the Atlantic. This thrill is an indication of the very real romance underlying the latest engineering achievement.

What complete isolation it seemed to those earliest settlers in the new land beyond the seas, and how tales of the Motherland were cherished and handed down from father to son. With what almost religious fervour was the name of the father's birthplace appropriated for the group of shacks which was destined to provide the foundation of a flourishing community. We over here can hardly appreciate the strength of the bonds of sentiment that bind these strong children of the West to their British forbears, and how the American Universities, inspired in the first instance by sons of the English centres of learning, honour the source of their original inspiration.

And now these new communities, in the fullness of their manhood, are able to communicate, and have so communicated, with the British sources of their origin. The sons of the Plymouth Fathers have spoken to the ancient town of Plymouth, and the people of Pennsylvania have spoken with friends living within a few yards of the last resting place of William Penn.

True it is that the telegraph provided long ago a connecting link for speeding up intercommunication, and by this means the two countries were brought nearer than they had ever been before. But after all, the telegraph, with all its wondrous development, is a machine which requires the intervention of others in the line of transmission. The radio developments of telegraphy had special thrills of their own, and the writer well remembers the sensation of something like awe at reaching the range of radio communication in mid-Atlantic on the way back from the States, and being able to send a radio message home. However, communication does not really *live* until the voice of one human being, with all its light and shade, expression and emotion, is actually conveyed directly to another being who is able immediately to respond to the subtleties of wit and emotion and feel all its human aspects. This miracle the transatlantic telephone has accomplished.

The achievement of this humanising of communication with our great neighbour of the West has many interesting aspects. It is right that we should at this stage recall the experiments between America and the Eiffel Tower in 1915, the development work since the war, and the many months during which the specialists on both sides of the Atlantic were transmitting signals in both directions, measuring the strength of those signals at all hours of the day and night throughout the year, measuring atmospheric disturbances and determining what the prospects of commercial two-way telephonic communication were. Patient investigation enabled them to schedule the conditions that transmission and reception apparatus would have to fulfil, in order that the enmity of the atmospheric legions and the evil effects of the demons of "fading" might be overcome, and that the transmitted voice might arrive at its destination unbeaten by all the opposing forces of nature which were known to be ready to lure it to its destruction.

Following the design and erection of stations, close consultations between the American and the British engineers led up to the real thrill of a two-way conversation between the radio stations on either side, and the linking up of the radio termini over land lines to the Trunk exchanges in London and New York. From this point the development of the system for commercial application went ahead at a great pace. The devoted band of engineers spent week-end after week-end in town making the most of their opportunities to build up their knowledge of the ethereal routes, staking out the separate courses that the eastward and westward waves would follow, developing the radio devices for 'policing' those courses, ensuring that the outgoing voice arrived at the terminal trunk exchange in a fit state to travel on its journey, designing the type of refreshment the voice should receive before embarking on its final journey, determining how the voice should open the door leading to the radio transmitting point, and devising

a means for ensuring that the voice incoming from the other side should not, either directly or indirectly through its own echo, open the same door as the English voice and so get out on its way back to America.

The service is now an established part of the telephone organisation, and since the last issue of this *Journal* a further link has been added by the extension of the service to Cuba. Each extension on the British and American sides has had its particular thrills and has received a certain amount of publicity in the Press, but each step only emphasizes the wonder of the achievement. There must still be millions of people in this country who do not realise that an official in Milwaukee, on the far shore of Lake Michigan, in the State of Wisconsin, has spoken with perfect articulation to London describing his town as the town of "home owners," and urging all Britishers to visit Wisconsin and see for themselves all the wonders that that State can produce. Calls have passed to and from Tennessee, Alabama, Kentucky, and the other States so dear to popular song writers, and wonderful talks have taken place with the Pacific States. Calls from telephone officials in Seattle, Portland (Oregon), San Francisco and Los Angeles on Feb. 19, to inaugurate the services with the Pacific Coast were a great success.

By the courtesy of the American Telephone and Telegraph Company, the writer had a most interesting test call to Havana, Cuba, and spoke with Mr. Alfandary, Traffic Superintendent of the Cuban Telephone Company. Many members of the London Telephone Service will remember Mr. Alfandary, who spent some months in training with us two or three years ago. He recalled happy memories of his stay and wished to be remembered to all London friends.

May we not also look forward to some arrangements in the comparatively near future whereby the various European States, who must have many links with the far West, will be able by the good offices of New York and London to share the privileges which are at present open to the United States and ourselves. The Press notices have suggested a certain amount of scepticism on the part of our Continental friends regarding the possibilities of this new service. We must hope that the growing evidence of the efficient working of this transatlantic telephone service will convince them that the service is a real scientific and commercial achievement and that their co-operation in the service will forge another link in the chain of International amity. M.C.P.

REVIEW.

"*The Director System of Automatic Telephony.*" By W. E. Hudson, B.Sc. (Sir Isaac Pitman & Sons, Ltd. Price 5s.)

This little book comes at an opportune moment in view of the appearance at an early date of Automatic Telephone exchanges in the metropolis. Author and publishers are to be congratulated on the general arrangement of the material and the quality of the production.

One must confess, however, to a sense of disappointment arising probably from the description of the purpose of the book. If the treatise had been described as an introduction to the technical side of the subject for the guidance of the general student, we should have been satisfied, for it strikes one as a good aperitif intended to precede a good meal. As, however, one learns that it aspires to make those intimately associated with the system familiar with its intricacies, it is obviously the meal itself, and one is left with a feeling of unsatisfied hunger.

We should have liked to learn something of the general considerations which make automatic telephony desirable in large areas: of the particular features of the adopted system which render it the most suitable for the purpose in view; of the economies likely to arise from the conversion; and lastly, but not least, of the effect of the change on the problem of providing a cheap and efficient public utility of the first magnitude.

The book is a milestone, but the road is still clear for a wider exploration of the problem.

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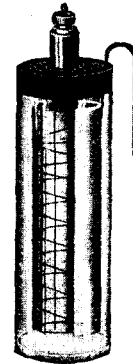
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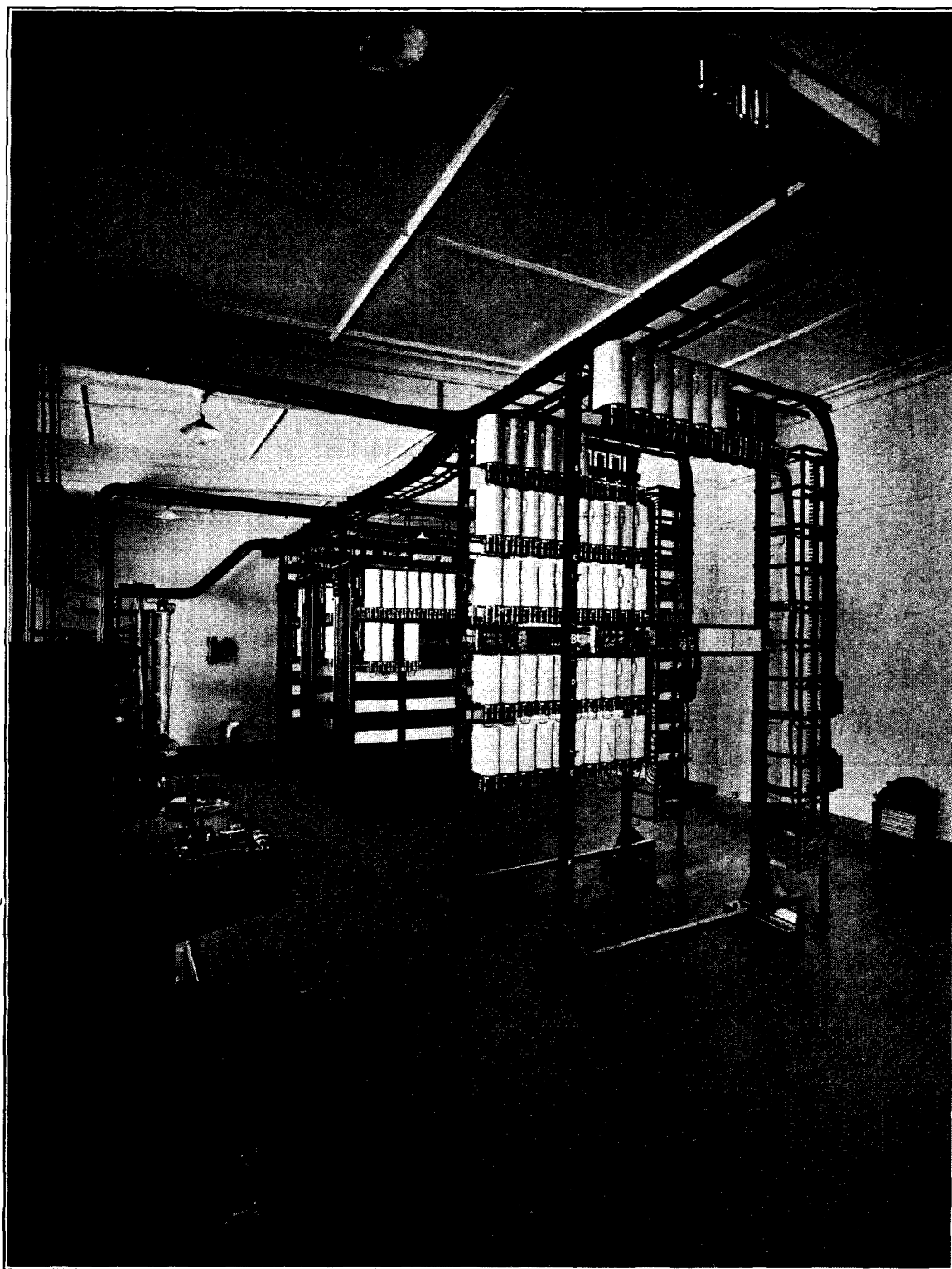
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AUTOMATIC TELEPHONY.

BY C. W. BROWN.

I.

THE decision of the British authorities to introduce automatic telephony in London has probably been, to a large extent, responsible for focussing the attention of telephone officials upon the subject. It should not be overlooked, however, that the Department has been gradually introducing automatic working in provincial areas since 1912, at the time of writing there are 65 automatic exchanges

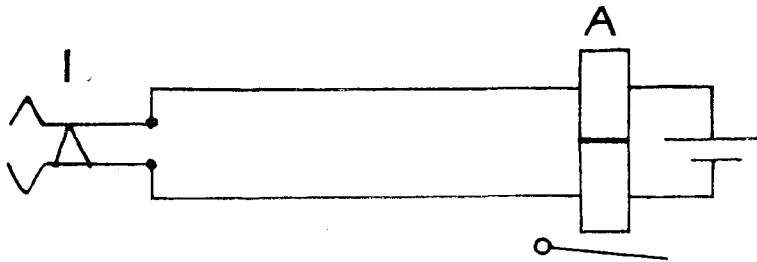


Fig. 1.

with an equipped capacity of some 100,000 lines actually in service. Several large telephone areas are included, notably Edinburgh, Leeds and Sheffield. In the London area the installation of automatic exchanges is in progress and the next few years will see the almost complete eclipse of the manual system.

A number of different automatic telephone systems exist, each having its particular merits. The Department has closely and carefully studied several of the most promising systems, the choice of a standard system finally resting upon that which bears the name of its originator—Strowger, consequently the principles

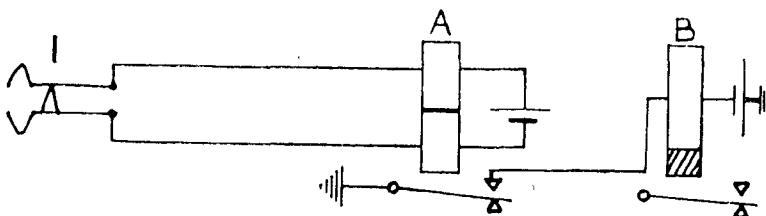


Fig. 2.

and the application of this system will be the chief concern in these notes and subsequent remarks. It is of interest to note, in passing, that although the first Strowger exchange was opened in 1892, the main principles of operating and the apparatus used have undergone very little change, a striking tribute to the pioneers.

In the Strowger system a straightforward decimal selection occurs in progressive steps during the setting up of a call as the result of the subscriber's calling operations, hence the expression "step-by-step" usually associated with the system.

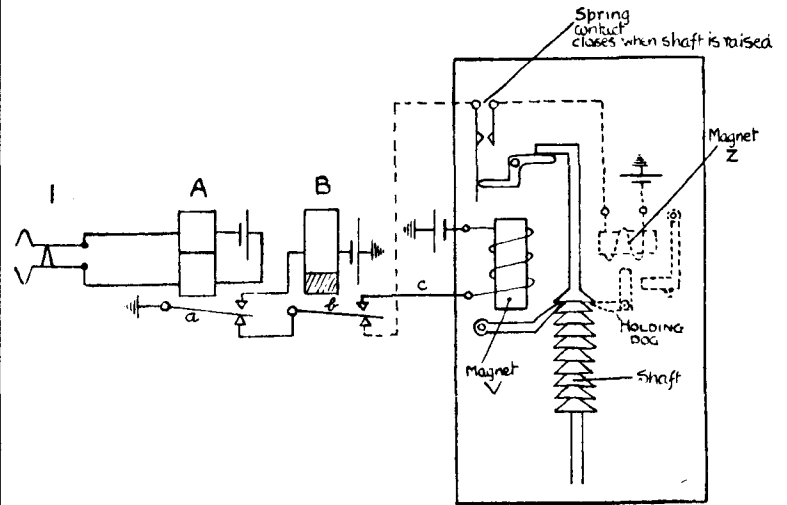


Fig. 3.

The B.E.S.A.* definition of an automatic telephone system is :-

"A system in which the calling party is enabled without the aid of an operator to complete a call through switches remotely controlled."

It follows, therefore, that means are provided on the subscriber's telephone to enable the remote control to be effected.

Before passing to details, however, some remarks upon the principle of remote control will be necessary in order to introduce the basic operating scheme of the system.

Fig. 1 is a simple electrical circuit that includes a relay (A) and interrupter (I). With the opening and closing of (I) the relay will respond to the resultant current impulses by energising and

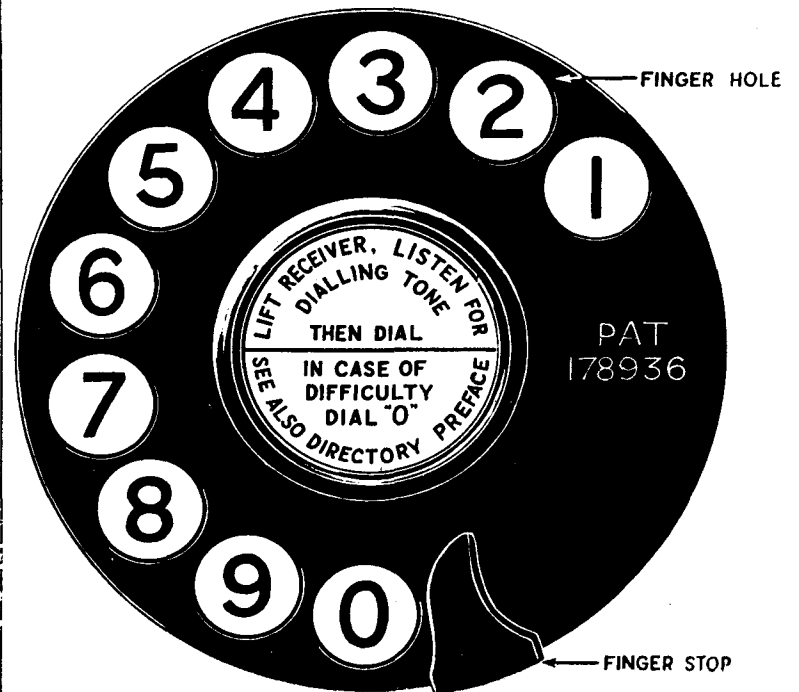


Fig. 4.

* British Engineering Association Report No. 136 (1923).

Rear View.

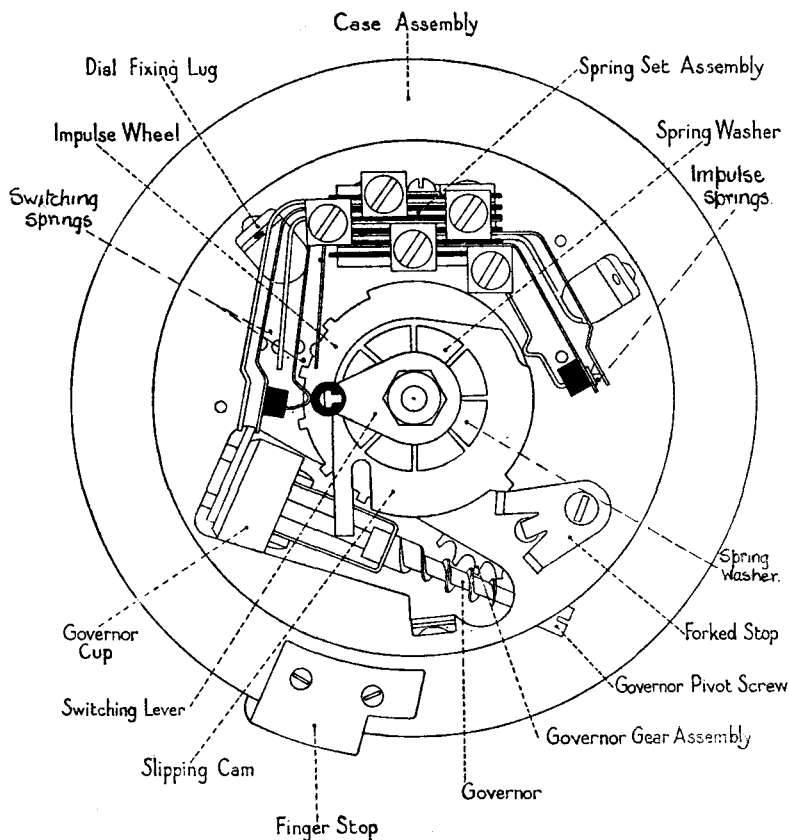


FIG. 5.

de-energising, so that spring contacts carried by the relay armature may be connected to auxiliary apparatus which may be operated in turn from a local source of power, thus in Fig. 2 an additional relay (B) is introduced. The additional relay is rendered "sluggish," the fact being indicated by "hatching" a portion of the rectangle representing the coil, the sluggish action being obtained, in conjunction with the arrangement of springs in a manner well-known i.e. by introducing a mass of copper into the magnetic circuit so that the rise and fall of the magnetic flux is delayed. The relay is an example of the practical application of Lenz law.

It will be apparent that when the circuit is closed, relays (A) and (B) will both operate, but only relay (A) will respond to

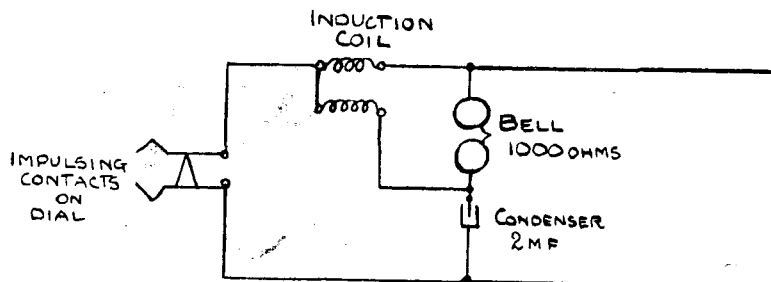


FIG. 5A.

the rapid interruptions of the circuit due to the operations of (I). Therefore a circuit connected via spring contacts of relay (B) will remain closed while current impulses are passing.

Fig. 3 carries the principle further, here mechanical apparatus is introduced in the form of a magnetically operated shaft, thus current impulses due to interruptions in the current flowing in the circuit of relay (A) are transmitted to the magnet (V) over the path a, b, c and the shaft steps up accordingly. If therefore, the interrupter (I) be operated by a person sending numbers from a distant point, the number of interruptions counted out from the interrupter can be reproduced in the form of movements on the shaft, thus the mechanism is remotely controlled. Similar means

Normal Position.

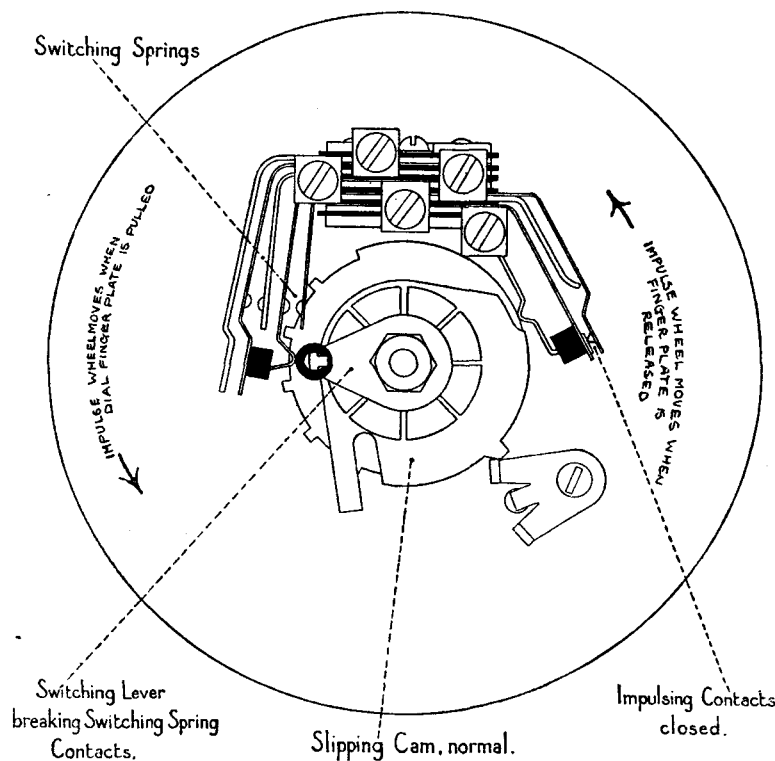


FIG. 6.

can be employed in setting up connexions between telephone subscribers, and as will be shown, this scheme of control forms the basis of the Strowger system of step-by-step automatic telephony.

Fig. 4 is a front view of the "dial" employed for the transmission of current impulses and forms part of the subscriber's telephone set. As the method of operating the dial is already well-known a brief résumé only will be given. The front circular plate with 10 finger holes can be rotated in a clockwise direction under finger pressure, rotation ceasing when the finger encounters the finger stop. This movement winds up a clock spring contained within the dial case, so that when the finger is withdrawn from the finger hole, the plate returns to its normal position under the control of a speed governor. During the return of the plate, impulse springs open and close a number of times equal to the decimal value of the digit from which the plate is pulled, thus if the digit 1 is

pulled, one impulse is transmitted (it is assumed that the receiver has been removed from the hook as a necessary preliminary operation). If therefore a dial of this type constitutes the interrupter shewn in Figs. 1, 2 and 3, numbers may be transmitted to the apparatus.

Fig. 5 shews the impulse spring combination and the impulse wheel that is responsible for opening and closing the spring contacts during the return of the finger plate to normal. The "hump" on the lower spring drops into the sections between the teeth to break the circuit and is lifted by the teeth to make the circuit. Other details appear in the figure and an explanation of their functions is desirable at this stage.

The switching springs are required to enable the correct electrical association of the impulsing contacts with the remainder of the circuit so that objectionable "clicks" are not received in the receiver during dialling, and to arrange the available apparatus in the telephone circuit so that the best impulse form is transmitted. One of the inherent objections associated with current interruptions in a circuit of high impedance (such as a circuit including a relay), is the creation of a "back e.m.f." at the moment of breaking the circuit. The voltage may easily reach a value sufficient to break down the insulation of wiring. The introduction of capacity across the interrupter contacts neutralises the "back e.m.f." to a large extent; the switching springs are so associated with the remainder of the apparatus in the telephone circuit, that the condenser, for all practical purposes, is connected across the dial contacts during dialling, thus preventing the "back e.m.f." from reaching a high figure.

One Impulse prepared.

DIAL PULLED FROM DIGIT "1"

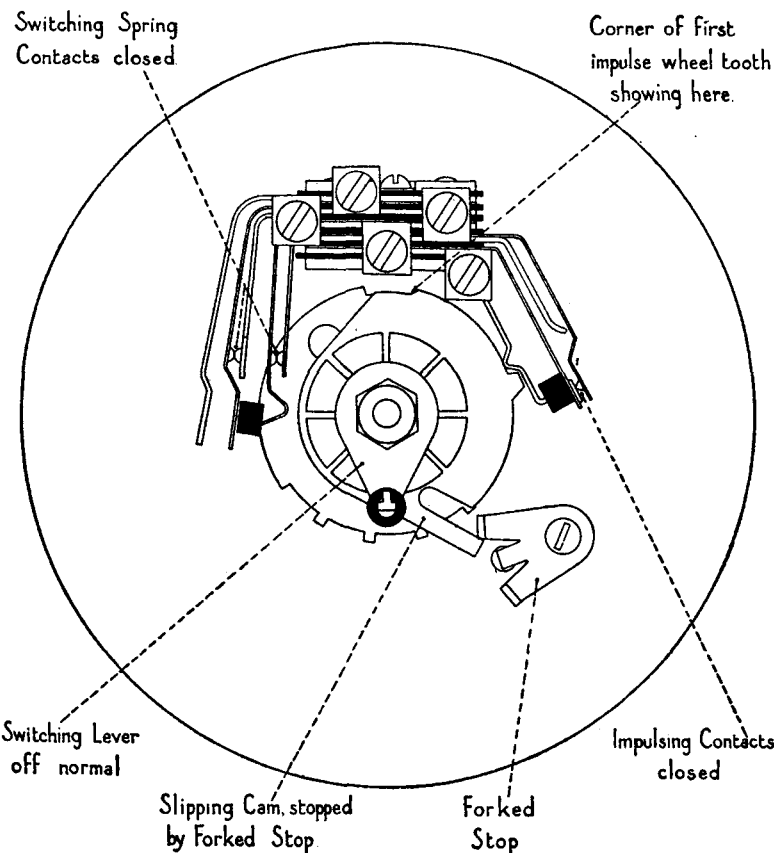


FIG. 7.

One Impulse Sending.

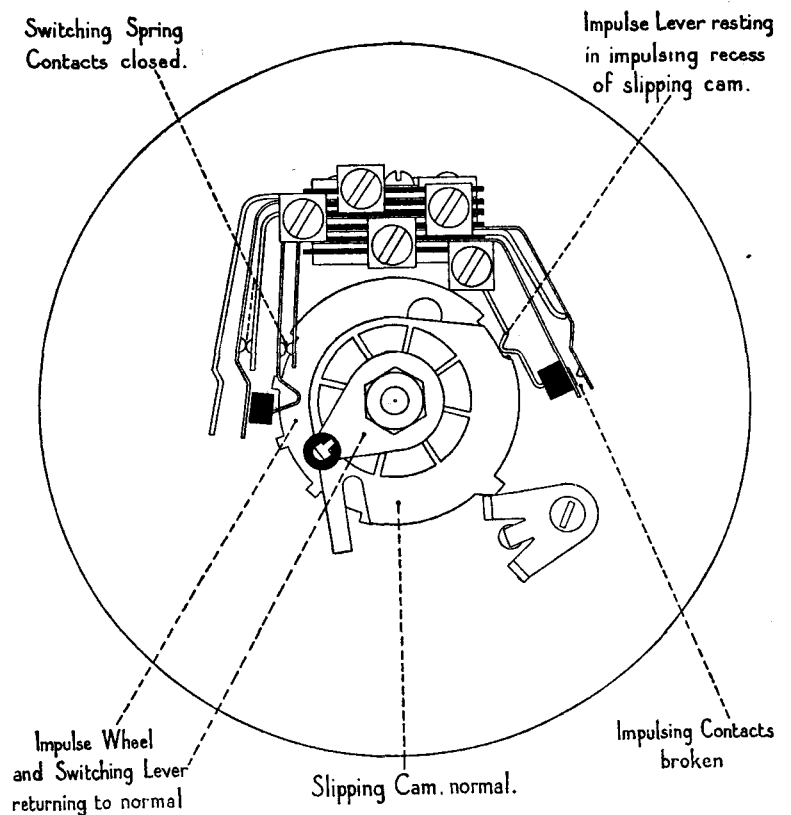


FIG 8.

The actual dialling circuit will be seen from Fig. 5A.

The slipping cam in Fig. 5 is introduced for the purpose of delaying the transmission of impulses for a short period after the finger plate is released, for reasons that will be indicated in due course. The cam is held in intimate contact with the impulse wheel by means of a spring washer, which normally presses on both cam and impulse wheel. When the wheel moves forward, the cam travels with it but ceases to move when the projection encounters the forked stop; the impulse wheel continues to move however. When the wheel is returning, the cam also returns with it, but until the cam reaches its normal position, the teeth of the wheel are screened by its edge, therefore the impulse springs will not be opened and closed by the teeth of the impulse wheel until the cam has returned to its normal position. This period is approximately equal to the period of two impulses.

The governor already referred to will also be seen in Fig. 5.

The forked stop is provided to enable the slipping cam to be rendered inoperative if necessary. In some non-standard systems, the delay feature is unnecessary. In such cases, the forked stop is turned so that one of the fork prongs is in front instead of behind the small projection of the cam, thus preventing its movement.

By referring to Figs. 6, 7 and 8, the reader will have no difficulty in following the dial operation during the transmission of the digit 1.

The relationship between the break and make portions of an impulse is of extreme importance. A reference to Fig. 3 is again necessary in this connexion. It will be seen that the magnet

responsible for operating the mechanical shaft receives current during the break portion of an impulse, also that the slow to release relay B receives current during the make period of an impulse. If the break period is shortened abnormally, the current in the magnet circuit will be clipped, thus preventing the rise of flux to full value. On the other hand, if the make period is abnormally shortened, relay (B) will be de-energised, as it will not become "saturated."

In the figure the dotted portion shews the circuit of the magnet that operates to restore the mechanism to normal. Here can be traced a condition that might arise due to an abnormal shortening of the make period of the impulse. Relay (B) will de-energise and



FIG. 9.

both (A) and (B) will provide a circuit via their contacts, for magnet Z, the operation of which knocks out the holding dog and the shaft is restored, thus premature release of the mechanism occurs.

In order to allow a reasonable variation in the make and break periods, due to distortion resulting from line condition effects, and at the same time ensure satisfactory operation of relays and other apparatus, a standard ratio break to make for impulses has been laid down. The standard specifies that an impulse shall have a break to make ratio of 66.6% to 33.3% of the impulse period, the normal speed of delivery of impulses being specified as 10 per second. Thus at standard speed, a single impulse occupies 1/10 sec. or 100 milli-secs., of which 66.6 milli-secs. is occupied by the break and 33.3 milli-secs. by the make. This specification allows a satisfactory margin of safety for relay (B) under the worst line conditions and ensures that magnets will receive current for a period sufficient for satisfactory operation.

It will have been observed from Fig. 4 that the cipher has been placed after the digit 9. Ten impulses have therefore been assigned to the cipher. This enables uniformity to be observed between the number of impulses sent and the number of steps taken by the apparatus and tends to simplification.

A complete table type of telephone is shewn in Fig. 9.

(To be continued).

INTERVIEWING.

THE Contract Officer of necessity comes into close contact with all classes of the community, and since the telephone service is becoming more popular and reaching wider and wider circles so does the variety of his interviews increase. A short description of some of these interviews may prove of interest. First, we have the Society Lady. She has been a notable beauty in her time and her picture has appeared in all the illustrated papers, at the races, in court dress, in her garden pouring out tea—the usual interesting and uninteresting items. We look forward to the interview with great expectations, but our ardour is somewhat damped by a wait whilst we cool our heels on the doormat for 20 minutes. It is true we are on the right side of the door, but that fact gives us little consolation. The lady at last appears, but we are disappointed. Her beauty is obviously to a great extent artificial and requires either distance or the glare of the footlights to give it the correct atmosphere. She has a permanent expression of discontent which is not divine, and her whole attitude conveys the idea that we are absolutely beneath contempt. We are glad to pass on to our next interview, which is with a statesman, one whose name may be found far back in the pages of history. We are rather dreading this encounter as if anything goes wrong with it, a word from him to those in authority may call down vials of wrath on our heads; but our fears are soon relieved. He invites us to sit beside him on a lounge. "Come and tell me all about it," he says, and after an interview, which it is hoped was as satisfactory to him as it was to us, he says, "Now is there anything else I can do for you?" "A seat in the Strangers' Gallery? With pleasure," and we take advantage of the opportunity to observe for a little while how our laws are made and see some of our legislators in the flesh.

At another place we call we are shown into a room the walls of which are lined with glass cases like those usually used for books or old china, but in this instance they are full of dolls of every colour and every variety of costume, from countries ranging from France to China and from Lapland to South Africa. After concluding our business we venture to remark that such a collection is somewhat unusual, and we find that the subscriber and his wife are almost constantly travelling abroad, and it is their hobby to buy a doll dressed in the national costume at every place they visit. We have to admit that it forms a picturesque and unique collection.

At another call we are in the act of taking an agreement from a lady and ask her the usual questions. Yes, she is married, she has a separate estate, in fact, the whole of the furniture belongs to her, and it is she alone who supports the family. "Yes," booms a voice through the doorway, "but the house is mine and I will not allow a telephone to be fitted." Mother and daughter join in a chorus of "Oh, Daddy, you said you would agree," but that day Daddy was obdurate. He gave way some weeks afterwards. The combination of mother and daughter is invariably too powerful for the mere father.

Our next call is the result of an urgent message from the engineers, who state that the owner of a building has objected to their erecting a telephone kiosk, on the ground that it will obscure a notice board fixed to the wall of the premises. We hurry off and find that a board has been put up since the kiosk site was originally chosen and the position is somewhat awkward. The owner appears to be a reasonable man and we quickly turn the conversation to his favourite hobby, which we are fortunate enough to hit upon by a glance round his office. When we consider he is in a thoroughly good humour we ask if he will come outside and look at the board, and then we suggest, with suitable deference, that it will be easier to move the notice board than to alter the position of the kiosk after all the necessary consents have been obtained. It strikes him as quite a good idea, and he adopts the suggestion with enthusiasm, as if we had done him a good turn.

Interviews with the officials of other public bodies are always interesting, and it is worthy of note that in the case of at least one important authority a minimum of four representatives is always considered necessary to interview one officer of the Post Office.

Unfortunately, we are frequently in conflict with small local and even personal prejudices, and it has been known that the refusal to install a Call Office has resulted in opposition on a local committee to every kiosk site proposed by the Department.

There is one golden rule for interviews, tact first, last, and all the time. The most striking instance of this was with one subscriber who commenced the interview with the remark that for two pence he would throw the contract officer out of the window, and concluded in a most friendly manner by a personally conducted tour of one of the finest private collections of oil paintings in existence.

J. R.

TELEGRAPHIC MEMORABILIA.

TELEGRAPHIC matters and those closely allied to the art of telegraphy, wire and wireless alike, appear to have been so full of interest of late that the writer is rather fearful of having overloaded these columns in the March issue of the *T. and T. Journal*.

No whisper of criticism has so far reached him, but conscience is a powerful factor at times, and endeavours will therefore be made in the current issue to reduce the amount of Memorabilia to reasonable proportions.

While in the apologetic strain I am really sorry that the name of Mr. Stokes was omitted from the list of names given in our last number in connexion with Cable Room promotions. The fault was mine entirely. Since that issue went to press events have been moving well in that department, and Messrs. Gullan, A. R. Clark, A. M. Pearson, Austin, Fauvelle, Treadaway, Nockles and W. C. Hughes have each received provisional appointments, the first-named as assistant superintendent and the remainder as overseers in connexion with the various developments which have overtaken the Foreign and Colonial portion of the Telegraphs.

Felicitations also to Captain W. G. Bouch as Higher Executive Officer vice our genial friend Harvey, now Postmaster of Blackburn, and to Mr. E. W. J. Head from Clerical to Higher Clerical Officer sequential upon the Captain's upward step.

The kindest wishes follow Mr. H. A. Betteridge, Supt. Higher Grade, T.S., into his retirement. His work on the Imperial Cable is still fresh in the memory, and certainly he safely steered the ship through some very difficult times.

To Mr. W. H. Marshall, Supt. Lower Grade, also the very best of wishes for a long and happy time of restful activity! One's personal recollections of the kindly nature of the co-operation of our two last-mentioned colleagues whenever Inland and Foreign Telegraph matters became intertwined, as needs must, will always be of the happiest.

Looking down the calendar for April I see another goodly list of worthy colleagues who are finishing the full course, but one refrains for the moment.

Widespread sympathy is felt at the very serious indisposition of the Controller of the C.T.O., and one has no hesitation in recording this as an unanimous and deep regret that the last few months of his Controllorship should be shadowed by this dark cloud which it is hoped will prove but a passing one, with much happy sunshine in his retirement to follow.

There is little doubt that the strain on administrative and controlling officers, to go no farther down the grades, is heavier to-day than it has ever been—heavier, perhaps, even than during the war in some respects—certainly in connexion with the Telegraph service, and with one whose mind has always been acutely active, the breakdown is scarcely really a surprise.

BOLIVIA.—Reuter's Trade Service advises us from La Paz that congress has granted 30,000 bolivianos for the erection of a wireless station at Magdalena the capital of the Province of Iténez. The province has a population of only 95,000, or just over 0.5 per square mile.

BULGARIA.—The same agency's Sofia correspondent states that four well-known European firms (two German, one French, and one British) have tendered for the construction and equipment of a wireless telegraph and telephone station at Sofia to cost about 30,000,000 leva, a sum greatly exceeded by many of the tenders. The German firm of Lorenz (Berlin) made two offers, one for a station costing 95,000,000 leva, and the other for a station costing 42,000,000 leva. The Telefunken firm (Berlin) also submitted two tenders, one at 54,000,000 leva and the other at 50,000,000 leva. The Marconi concern (London) submitted two tenders, one at 60,000,000 leva and the other at 45,000,000 leva; and the French concern (Telephones Sans Fil) submitted three, the first at 30,950,000 leva, the second at 32,200,000 leva, and the third at 29,000,000 leva. The offers are being considered, and a decision is expected shortly.

CANADA.—MOUNTED POLICE AND LICENCE DODGERS.—*World Radio* says that listeners who "dodge" the dollar licence fee are liable to visits by Dominion Government inspectors, accompanied by Royal Canadian mounted policemen who may ask to see the receipt for the fee. Commander Edwards, of the Radio Branch, has ordered a drive in Toronto, Ottawa, Montreal, Halifax, and Victoria to round up the fee "dodgers," who are estimated to number nearly two hundred thousand. The maximum fine is £10 and costs, but the usual fine for a first offence is £1 and costs. Of the estimated 350,000 owners of radio receiving sets in Canada only 168,000 have taken out licences.

The *Electrical Review* states that under the arrangements with the United States Department of Commerce, Canada is supposed to use 17 wavelengths, six exclusive and eleven jointly with United States stations.

CAPE VERDE ISLAND.—Marconi's Wireless Telegraph Co., Ltd., announces the inauguration of a telegraph service from London to the Cape Verde Islands.

CHINA.—*Commerce Reports* announces that radio broadcasting has been officially recognised in Manchuria and regulations for its control established; at present the facilities are very limited. The North-Eastern Wireless Long-Distance Telephone Service, an official Chinese bureau in Mukden controlling Chinese wireless communication in Manchuria, which is erecting a broadcasting station in the three eastern provinces, has promulgated regulations which

will govern broadcasting and the importation, sale, and installation of receiving sets and parts in Manchuria.

CUBA.—March 11, 1927, will be marked as a red letter day in the history of Cuban communications when a telephone service between Cuba and England was inaugurated by Dr. Martinez Ortiz, Cuban Secretary of State, who talked direct to the British Foreign Office with Mr. Locker Lampson, Under Secretary of State, and the Cuban Minister in London. The Cuban charges will be 87 dollars for the first three minutes and 29 dollars for each additional minute.

DENMARK.—It is stated officially that there are now 106,400 licensed Danish listeners: of that number, 54,743 are crystal users and the balance valve-set users.

DOMINICAN REPUBLIC.—It is understood from Port-au-Prince that broadcasting recommenced last month in the Dominican Republic under the auspices of the Radio-telegraphic Service, from H-1-one-C, installed by the Radio Club of Santo Domingo.

FRANCE.—According to Reuter's Paris Agency the Algiers Chamber of Commerce recently discussed the subject of wireless telephony between France and Algeria. After considering the conclusions arrived at by the Constantine Chamber of Commerce, the Algiers Chamber declared that it was of the opinion that wireless telephone communication between France and Algeria would offer the greatest advantages, particularly in intensifying the relations between the two countries and in relieving the cables. The Chamber expressed the wish that the French Post, Telegraph and Telephone Administration should study a plan for the establishment of wireless-telephony between France and Algeria.

GERMANY.—After a lapse of twelve years, Germany can once more telegraph direct to the United States, for on March 4 the newly-laid Emden-Azores cable was officially declared to be in service by the Minister of Posts and Telegraphs, Dr. Schaetzle, at a banquet in Berlin to celebrate the occasion. Soon after war broke out, all German cable lines to the United States were cut by the Allies, and ever since telegrams from Germany to the United States have had to be transmitted through foreign cable companies. The new cable of the German Atlantic Telegraph Co., a much faster cable than the original, runs as far as the Azores, where it connects with the lines of the Western Union and the Commercial Cable Companies, so that messages can now be sent direct from Emden to New York.

The German-Atlantic Telegraph Co., Berlin, reports net profit and balance forward amounting to 152,000 marks, as against 13,000 marks in 1925; half is transferred to the reserve fund and the balance carried forward. It is also mentioned that a dividend is expected for the current year.

"Not supervision but promotion of broadcasting" was the motto suggested by State Secretary Dr. Hans Bredow, speaking as State Broadcasting Commissioner at the inaugural meeting of the Funk Stunde (Berlin) Advisory Committee (*Kulturbeirat*)—the first of a number of committees which will advise the existing broadcasting companies and replace the Programme Council which, after a life of only three months, expired on December 15 last. Their constitution was definitely stipulated in the broadcasting concessions granted to the companies a year ago. According to *World Radio*, apprehension has been expressed as to the effect of these officially appointed bodies, exercising only vaguely defined powers (except in so far as they suppress political tendencies) and without any definite responsibility, but Dr. Bredow does not share any such fears.

GREAT BRITAIN.—In reply to a question in the House of Commons, Sir W. Mitchell-Thomson, Postmaster-General, said that for the period Jan. 7 to 31 the running costs of the British end of the Transatlantic wireless telephone service, including sundry expenses incidental to the initiation of the service, amounted to approximately £2,000; and plant charges, depreciation and interest, to a further £1,900. It was expected that the service would be self-supporting.

Sir William also gave the following interesting particulars regarding the number of wireless licences in Great Britain, &c., on Dec. 1, 1926:—Great Britain and Northern Ireland, 2,130,000; Germany, 1,337,122; Sweden, 238,000; Denmark, 114,492; Hungary, 53,070; Switzerland, 51,759.

The Postmaster-General added that as there is no licensing system in the United States and no official statistics from that country, only the number of wireless stations are available.

A form of wireless communication is at present being tried with the *leader* cable system, at the Royal Aircraft Establishment, Farnborough, and the scheme is also being tested 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 horsepower to 3 per mile, and they are sensitive to signals from a height of 1,500 feet downwards; they are, in fact, so delicate that they respond to a signal of 0.0005 microwatt.

HOLLAND.—Reuter's Agency reports as follows from Amsterdam: the Hague correspondent of *De Telegraaf* understands that the Netherlands Post and Telegraph Administration intends shortly to undertake experiments with the object of establishing wireless telephone communication with North America via London and New York by means of the short-wave Marconi "Beam" system. It is proposed to link up with the existing London-New

York wireless telephone service by means of the submarine cable between Holland and Great Britain.

The Editor of the *Electrical Review* thinks there is some confusion between the Marconi "Beam" service and the London-New York telephone service via Rugby. Other authorities seem inclined to connect this statement with one made by Senatore Marconi at the last general meeting of the company in London where he held out the possibility of telephone experiments on the Beam principle.

INDIA.—Wireless apparatus to the value of 5 lakhs of rupees was imported into India during 1926, and of this 3½ lakhs was supplied by the United Kingdom. The Indian special correspondent of the *Electrical Review* writes as follows:—"It is hoped that the preliminary work in connexion with the Calcutta station of the Indian Broadcasting Company will be put in hand within a few weeks, so far as the transmitter building is concerned, and that it will be sufficiently advanced by early April to accommodate the first shipment of transmitting machinery. The aerial masts will be 150 feet high, and the station will be of an ornamental and approved type. About five cottahs of land will be covered, while a further area will be utilised for the earthing system. Studios will be located in a carefully chosen vicinity so that interference from outside noises and any possibility of inconveniencing neighbouring residents may be reduced to a minimum. The company's manager is now engaged in examining sites that may prove suitable, and it is possible that Kyd Street or Park Street areas may offer the accommodation desired. The first programme will probably be broadcast in six months' time, but there are many difficulties still to overcome. Engineers from England are already on their way to India. As in other countries, programmes will be under the supervision of special programme boards, on which there will be Indian representatives competent to gauge the tastes of the great Indian population. Upon these boards will devolve the task of arranging programmes of wide appeal, and necessary adjustments as to the balance of the various items, such as lectures, "talks," music, &c., will be recommended by them. So far as Calcutta is concerned, interference from the spark station at Fort William is not anticipated as a serious difficulty. Technically there is little to fear in this respect because the new station will transmit on a wavelength of 350-400 metres, while the Fort William station utilises a considerably greater wavelength."

ITALY.—The Department of Overseas Trade learns from a reliable source that a Commission for the control of broadcasting services has been set up in Rome by Royal Decree. In addition to control, the Commission is charged with examining and reporting on the most suitable methods of developing and improving broadcasting from technical, artistic, and educative points of view.

MALAYA.—The *Electrical Review* records that the Malayan Wireless Committee recently submitted recommendations regarding radio regulation, which were accepted by the Government. An exclusive broadcasting licence is to be issued for a period of five years to the grantee, who will be chosen from the group of applicants after the expiration of three months from the date of first publication of the terms of the proposed licence. The broadcasting company must, within one year from the date of issue of the licence, install and operate one or more broadcasting stations with machinery of British manufacture of the latest type; renewals and replacements of operating plant need not be of British manufacture. The company must carry out a regular service, consisting of matter approved by the Postmaster-General. It will have the right to disseminate advertising matter and make charges therefor, but such broadcasting must not exceed more than 10 per cent. of the total daily broadcasting time. The Government will charge \$20 annual fee for each receiving licence and pay the broadcasting company \$18 of this sum.

NEW ZEALAND.—TELEGRAPH AND TELEPHONE REPORT.—The capital expended during the year ended March 31, 1926, on improving the telegraph facilities in New Zealand to meet the standard of modern requirements, and on extending the telephone exchanges to provide for additional business, amounted to £931,661. The telegraph and telephone revenue showed an increase of £146,642 over that of 1924-25—the previous best year in the history of the telegraph and telephone service. Pole-line and wire work carried out during the year represented the erection of 1,776 miles of pole-line and 15,640 miles of open aerial wire; in addition, 270 miles of lead-covered cable were laid for subscribers' circuits, containing 73,700 miles of wire. As a result of special efforts made during the year to overtake the arrears of telephone subscribers' services, a new record was established for new connexions the total for the year (13,368) being 64 in excess of the number connected during any previous year.

NORTH WALES.—At the Rhyl Municipal Council's meeting recently, Mr. J. Jones Williams drew attention to the British Broadcasting Corporation's intention to set up a station in North Wales, and suggested Rhyl as the most suitable position for it. During the war, he said, there was a Government wireless station at Rhyl. The Council decided to ask the B.B.C. to locate its proposed North Wales station at Rhyl. The Corporation of Bangor, after discussing the proposal for the establishment of a broadcasting relay station in North Wales, has also decided to make formal application for the station to be located in that town. The B.B.C. may find that neither are suitable for the purpose!

PARAGUAY.—From Asunción, Reuter's Trade Agency sends the following interesting item indicative of the interest in wireless in unlooked-for places:—

"When a receiving and broadcasting station at Asunción was approaching completion its range was found to be only 180 kilometres, and, as this is insufficient, another transmitter of greater power has been ordered and will

soon be installed. The country (200,000 square miles in area) is generally flat, and of the whole population (approaching 1,000,000) only 8% are tribal Indians. A radio club has already been formed with a considerable membership. Messages are received from Buenos Aires, Rosario, Sao Paulo, Rio de Janeiro, and other stations in Argentine and Brazil."

PERU.—The agency in Lima says that the Government having taken over all broadcasting in Peru, station OAX has become State property and new regulations have been issued by the Administration of Posts, Telegraphs and Wireless applying to all receiving sets. It is pointed out that a licence does not authorise the use of a set for commercial purposes; that single-wire antenna must not be over 100 feet long, nor double wire over 140 feet; that the owner of a set may not use in any way whatever information so received, and that if the owner wishes to remove his set to another locality notice must be given previously to the Director of Radio Telegraph Services. Licences will not be transferable and they may be revoked by the Director should any of the regulations be infringed.

PHILIPPINE ISLANDS.—From *Commerce Reports* we learn that the Nieto Radio Bill has become a law. In the past broadcasting in the Philippines has been hampered because the stations had no financial support save that obtained from the sale of receiving apparatus, a portion of which accrued to the broadcasting concern. Under the Nieto law, an equitable situation is created whereby every owner of a set helps to support the programmes which he hears, regardless of whether the merchant from whom he purchased his receiver is carrying on broadcasting or not. The installation of the former WJZ transmitter at the transmitting centre at Manila Heights is being expedited and should be heard with reliability throughout the archipelago. At the same time improved studio facilities and an adequate staff are being organised.

RUMANIA.—From the same reliable source it is understood that a Rumanian company is to be established which will monopolise broadcasting and the manufacture of radio apparatus, and possibly telephone and telegraph apparatus. The International Radio Broadcasting Commission of Geneva has allotted a wavelength of 236.2 metres to Bucharest, but the local director of radio communication has requested permission to use a wavelength of 460.5 metres.

RUSSIA.—*World Radio* says: "The idea of erecting a 1,000-kw. station, which has for some time been advertised widely in Soviet Russia, has been discarded as impracticable at the present moment. The Commissariat for Posts and Telegraphs has decided, however, that the immediate object of its constructive programme must still be to make multi-valve sets unnecessary by increasing the power of stations in several centres. There is much discussion as to what the power of individual stations should be, the most favoured proposal being that European Russia should have five or six stations of 25-kw. (Moscow, Leningrad, Kharkoff, Tiflis, Saratoff, and Sverdlovsk *alias* Jekaterinburg), and about the same number of 10-kw. each (Minsk, Kieff, Odessa, Kazan, and Rostoff-on-Don). Siberia presents a serious problem, being so fast and so thinly populated; the complete "radiofication" of Siberia has, therefore, been "postponed to the more distant future." A 10-kw. station is being planned for Tashkent, to serve Turkestan.

SCOTLAND.—The British G.P.O. staff at Kemback (Cupar, Fife) has made rapid progress with the erection of power house, receiving room, and antenna system, and by next month it is expected the new station will be ready to receive wireless telephony from America which will be transmitted by underground cable direct from Kemback to London. The aerial consists of three parallel wires, carried on telegraph poles, three and a quarter miles in length and two miles apart. It is perfectly directional, being in correct line with the American sending station. British and American receiving panels are being erected and 12 valves will be used on each set. A staff of 12 men will be employed, four being on each watch. An American engineer, it is understood, will take charge of the American receiving panel.

SOUTH AFRICA.—The *Daily Mail*, London, says that it is understood that negotiations have been concluded for the formation of a South African broadcasting company to take over the Johannesburg area. A share preference will be given to listeners, who will receive the first 10% of profits, the Government sharing the remainder with them and using its position to reduce costs. The company's licensing conditions provide for the erection of a powerful station within nine months. The Government is to appoint two directors and the Radio Society one. To check piracy, the sale of wireless set parts to non-licence holders will be prohibited. The Government retains the right to take over the service after five years.

HAS ANYONE HEARD "JB" SINCE FEB. 5?—Regarding this same station it has already been stated that lack of financial support has been the reason for the closing down of the "JB" (Johannesburg) station after having been in operation for over two years. Very strong efforts were made to enable "JB" to carry on, including a three-months' subsidy of £300 from the Johannesburg Municipality in the hope that some permanent arrangements would in the meantime be made to place the station on a sound footing, including Government support, but so far without effect. Feb. 1, however, was the time limit, and the station very reluctantly ceased to operate, as stated in our March issue, but it was "on the air" again on Feb. 5, the Transvaal Radio League having arranged to carry on a partial service.

SPAIN.—Reuter's Madrid correspondent says that the newspapers there report that the Government will shortly sign an agreement with the Argentine Radio Company for the establishment of direct wireless communication between Madrid and Buenos Aires by means of the station at Madrilene, Prado del Rey, which is one of the most powerful in existence. The service

will probably be opened in six months' time, and later direct wireless telephone and radio-photographic communication will be established. Experiments which have already been made are stated to have been very successful.

TURKEY.—*World Radio* emphasises the fact that Turkey has the distinction of having installed the first broadcasting station of the Near East. It is located at Stamboul and began operations last month, and it is anticipated that a second station will be working at Angora in a year's time. It was constructed by the Compagnie Générale de Télégraphie Sans Fil, Paris, with a power of 6-kw. The station is actually situated in Osmanie, but the studio is in the G.P.O., Stamboul, nine miles of cable linking it to the transmitter. Turkey's population is about 14 millions.

U.S.A.—AN UNDERGROUND AERIAL!—*World Radio* is also responsible for the statement that station WRNY, in New York City, is preparing to broadcast on a short wave below fifty metres, simultaneously with the regular broadcast on 375 metres. In addition, with the co-operation of Prof. James H. Rogers, the station will shortly go "on the air" with a buried aerial. As soon as the weather permits, a terra-cotta pipe, through which the aerial will be drawn, will be buried about 6 feet underground at Coytesville, N.J., where the transmitter is located. During the war extreme ranges were obtained by underground transmission, and WRNY will be the first station in America to broadcast on such an underground aerial.

A report issued at Washington, D.C., by the United States Department of Commerce, says that there are 164 broadcasting stations in Europe, over 700 in the United States, 85 in the remainder of North America, 38 in South America, 16 in Asia, 28 in Oceania, and 9 in Africa.

A Bill introduced by Assemblyman Edwin J. Coughlin, of Brooklyn, N.Y., at the present session of the New York Legislature in Albany, proposes the regulation and censorship of radio broadcasting. The Bill exempts from control stations owned by the Federal Government, by the State, and by a municipality. Privately-owned stations, however, would be required to obtain a certificate of necessity and convenience from the Department of Public Service. The annual licence fee for each station would be \$100, and each would be required to deposit a bond of \$10,000 as a guarantee that the rules and regulations laid down by the Public Service Commission would be observed. Under the terms of the Bill, the State would have jurisdiction over rates charged by commercial stations for broadcasting advertising matter, wavelengths, and all pertaining to the operation of a broadcasting plant.

The Wireless Control Bill, reports Reuter later from Washington, was signed by President Coolidge on Feb. 23. The Bill, which is intended to prevent any wireless interest obtaining a monopoly of the ether, provides for the establishment of a Federal Wireless Commission which will have power to make regulations and grant licences. After a year the powers vested in the Commission will be transferred to the Secretary of Commerce, but the Commission will remain in existence as a sort of court of appeal. The Bill was passed by the U.S. Senate on Feb. 18, and, according to *World Radio*, would become effective on July 1 of this year.

Mr. W. Emlen Roosevelt, chairman of the board of directors of All-America Cables, Inc., and Mr. S. Behn, president of the International Telephone and Telegraph Corporation, made the following announcement after the meetings of their respective boards. The International Telephone and Telegraph Corporation has authorised an offer to issue its stock in exchange for All-America stock at the rate of four shares of International stock for three shares of All-America stock, and the board of All-America Cables, Inc., has recommended the acceptance of the offer. The offer contemplates that the All-America stock shall be deposited with a committee nominated by the board of All-America Cables, under a deposit agreement authorising the transfer of the deposited stock to the International Co., when, in order, depositors are to receive certificates of deposit. Messrs. J. P. Morgan & Co. are to be the depositaries of the committee, and the certificates will be registered by the Central Union Trust Co. Further details of the offer will be communicated in a circular presently to be issued by each of the corporations to its stockholders. The consummation of the transaction will require a deposit under the agreement of an amount of stock deemed sufficient by the International for its purposes. It is stated that the successful operations heretofore of each of these corporations in the field of electrical communications will be materially furthered by the affiliation above proposed. The present members of the board of All-America Cables have been requested to continue as such, and certain of these directors will be elected to the board of the International Co. Mr. Merrill, as president, and the other officers and staff of All-America Cables, are to continue in its management. Representatives of the International Co. will be elected to the board of All-America Cables in due course.

VOICE-FREQUENCY TELEGRAPHY.—To those interested in this new and economical phase in the development of telegraph transmission, an illustrated article in the issue of March 18 of the *Electrical Review* should be carefully read and studied.

The diagrams of the sending and receiving sets, each for six frequencies, are extremely clear, and to the ordinary student of electricity and its application to wireless the description should offer no difficulties of comprehension.

One must be forgiven if a slight scepticism comes over one when one reads: "The apparatus at telephone repeater stations serves equally well for repeating the voice-frequency signals as for ordinary speech,"—so far good and agreed, but, "consequently there is no need for the attendants at the repeater stations to be telegraphists, or as expert as the staffs at ordinary telegraph repeater stations," does not appear to follow as a logical sequence,

especially in view of the attempted experiences of working high-speed Wheatstone wireless repeaters adjusted by non-telegraphist attendants, or by telegraphists even of mediocre attainments.

It is the word "consequently" that appears to need some amplification. This, however, is a side issue, though an important one, but the fact remains that the article mentioned is the clearest and most concise account of voice-frequency it would appear possible to write.

The proposal to build a special wireless station at Geneva in connexion with the League of Nations, put forward at the 44th session of that very useful body on March 7 last, may not bear fruit immediately, but there is little probability of the scheme being abandoned definitely. If the chief objection be the cost, as the *Daily Mail* understands, that at least should not stand in the way. The utility of such an institution is obvious.

A cable manufacturing company in India recently held its first annual Sports, and is probably the first occasion when Europeans and so many natives of all castes have ever met on a sports ground. The events comprised flat races, high jump, long jump, sack races, obstacle races, &c., &c. The representative of the company affirms that the following languages were heard on this occasion: English, Punjabi, Nepali, Urdu, Bengali, Hindustani, Santali, Ho, Tamil, Telugu, Malayalam, Kanarese, and Jujarati.

The infinitely small, infinitely repeated may become in the process of years infinitely important.—"The Life of Darwin," by Grant Allen.

J. J. T.

TELEPHONE NOTES.

In an interesting article entitled "Radio Along the Airways," the *Scientific American* describes the important part which wireless is playing in securing the safety and convenience of aircraft passengers.

It is stated that the German Air Service has recently announced that the planes will be equipped with radio telephones to enable travellers in the sky to talk with telephone subscribers in any large German city in the same manner that passengers on the trains running between Berlin and Hamburg can communicate with their homes, or offices, by a combination of radio and land-wire services.

It is planned that the radiophone will be placed first at the disposal of passengers on the routes between Paris-Berlin, Berlin-Stockholm, and Berlin-Königsberg.

* * * *

Measured telephone service was introduced at Everett, Wash., on Jan. 1, after months of experiment and re-installation of the new telephone meters. Rates are based on a readiness-to-serve charge and a unit of service, the telechrone. A minute of service between 8 a.m. and 8 p.m. constitutes a telechrone and 2 minutes the remainder of time.—*Telephony*.

* * * *

Several years ago, says *Telephony*, telephone executives realised that it would be necessary to consider the future supply of dependable, capable operators. Their study showed that the industry was already employing in some places 20% of the entire female population between the ages of 16 and 24 who had the requisite qualifications to become good operators.

They realised the telephone business was growing so fast that in a short time they would need at least 30%, and that, theoretically, at least, they had reached the limit of supply. It is expected that the situation will be somewhat remedied by the introduction of automatic machine switching, as this branch of the industry develops.

* * * *

The new telephone trunk line between Calcutta and Delhi is now ready for the use of the public. This, in conjunction with the trunk lines between Delhi and Bombay and between Delhi and Lahore, will enable Calcutta to be in direct telephone communication with Bombay and Lahore. The distance between Calcutta and Bombay via Delhi is well over 1,800 miles.

* * * *

Telephone installation fees are to be greatly reduced in Germany, and monthly rentals are to be cut from 5 to 12 marks to from 3 to 9 marks per month. Forty free calls will be allowed, after which the price per call will be 10.9 or 8 pfennings per call, according to the zone, instead of a flat rate of 15 pfennings as at present. Trunk calls for distances of 15 to 75 kilometres are to be reduced from 45, 90 and 120 pfennings, to 40, 60 and 90 pfennings, and after the expiration of the usual three minutes, conversations will be charged for per minute, instead of periods of three minutes. Between 7 p.m. and 8 a.m. long-distance calls are to be charged at two-thirds the day rates. —Reuter (Cologne). H. J. E. S.

LOOKING BACKWARD.

SEVERAL events within the last few months have induced the writer to indulge in a retrospective flight and to become reminiscent.

The retirement of Mr. T. A. Prout and the death of Mr. W. C. Owen are particularly interesting to old members of the Western Counties & South Wales Telephone Co., Ltd., of whom there cannot be many now left.

The writer has a very vivid recollection of joining that Company about 40 years ago. It brings back names now almost forgotten. Mr. H. F. Lewis was the General Manager and Secretary, Mr. Prout his Chief Clerk. Mr. G. Bean was the Chief Accountant. Mr. J. Rathbone (whose son is still in the service) was Chief Engineer. Mr. W. Howe, recently retired from the District Managership of Southampton, was Chief Electrician. These were all stationed at Headquarters, Bristol. In the provinces were the Local and District Superintendents, of which Mr. Owen was one. The Company and its staff were absorbed into the National Telephone Company in 1890.

The other item in mind was the opening of the Transatlantic Telephone Service. Wonderful, however, as that may be, it may truly be said that the first conversation between England and America probably did not raise more emotion or cause more excitement than speech over some of the first trunk lines in this country in the '80's.

The telephone men of those days were pioneers, feeling and groping their way and building up, gathering information and data which has enabled engineers and scientists to reduce telephone speech transmission and development to a formula.

These were the days when there was no telephonic communication between London and the West of England. Bristol had just been connected up with Newport, Cardiff, and Swansea. There was no connecting line north of Bristol until 1887, when the first trunk from Bristol to Gloucester was opened, followed later by an extension to Birmingham.

Taking a line from mid-west Wales across to Shrewsbury, thence south of Birmingham to Rugby, and thence due south to the east side of Portsmouth, the exchanges numbered not more than 25 in all. To-day, seeing that it embraces the whole of the South Wales, Gloucester, Bristol, Western, and Southampton Districts, and parts of Chester, Birmingham, and Reading Districts, there are probably not less than a thousand exchanges in the same area with intercommunication both with each other and the rest of the country, and now even with America. Not bad progress in 40 years.

The first trunk line connecting Bristol with Gloucester was a "single" wire, not long afterwards doubled, and later still crossed or twisted.

The local circuits were also single earth return—viz., 3/16 G.I. wire on Brights' insulators and shackles.

The switchboards are now Museum exhibits and one wonders how the system ever worked, but it did, and, considering all things, very satisfactorily.

The single-wire subscribers' circuits continued for quite a long time; the connexion to metallic trunk lines being through translators; but with the advent of electric light and power we were soon forced to adopt the return wire for subscribers' circuits also.

There were no Traffic branches, no Contract Departments, no Accounts Sections, and few engineers in the districts in those days. One often canvassed for and obtained the orders, got the wayleaves, superintended the erection of the wire, and then fitted the instrument, and made the switchboard connexion, and as books

and records had to be kept, usually put in the greater part of the evening on clerical work. They were strenuous and busy times but interesting. Small beginnings from which bigger things have sprung and still bigger things are to come.

The Editor will probably desire that this article should not be too long, but it is only intended as a reminiscent note and to remind us of what things were and to what extent the Telephone Service has advanced. One could go on more or less indefinitely when one begins to look backward, but this short article will probably awake memories in the older ones and be of some interest to the younger ones and remind them that it is in their hands that the progress of the industry is now placed, and that it must still go forward improving and developing for the next 40 years as it has done in the past.

W. E. GAUNTLETT.

THE LONDON DIRECTORY.

"THE old order changeth giving place to new." We had been so long accustomed to the two-column setting, with its spaciousness and detail that a page of three columns with its narrower opportunities for individual entries seemed both revolutionary and retrograde.

When this economy of spacing was accompanied by other important changes such as the use of capitals for the first three letters of Exchange names, the printing of exchanges and numbers at the end instead of the beginning of the line, and various abbreviations in the matter of many entries, it may have appeared that the combination was "asking for trouble."

It is interesting at the end of six months when a new Directory is just out, to know that those fears have not been realised. One great asset at the outset was that the new book had a good Press, and this no doubt influenced many intending critics to accept the new arrangement. But even so it is remarkable that apart from objections by subscribers to abbreviations to their individual entries, only 32 complaints or suggestions with regard to the general lay-out of the Directory were received.

All criticisms have been carefully considered and improvements, notably as regards the insertion of Christian names and a clearer surface on the paper, have been introduced in the April, 1927, edition. The proposed shortening where possible, of trade descriptions should cause further improvement by decreasing the number of two-line entries.

The liability of the human eye to errors of comparison is shown by some complaints of the "smaller" type used in conjunction with the new setting. As a matter of fact the type is exactly the same as that used for the two-column books, but the narrower column has apparently given certain observers the impression that the letters are smaller. One or two people have even been bold enough to assert that the entries are more difficult to read "because of the use of smaller type."

The past, present, and future of the London Telephone Directory would all make fascinating studies. In October, 1920, it had 952 pages of two columns; in April, 1926, there were 1,366 pages of two columns. That exemplifies its constant growth. Now has come machine switching in connexion with which Directory entries will be of increasing importance, as the subscriber will then be responsible when he gets a wrong number. For the future the continuous increase of the system, raising problems of printing and binding technique, facility in handling, keeping copy up-to-date must be provided for. The Directory has become so familiar and important a feature of business and social life that everything connected with it possesses an uncommon interest.

The story of its printing, binding, and distribution could be made as interesting as any "thriller." Two new printing machines for telephone Directories only are just being installed by the Stationery Office; they will each print a 64-page section in one operation and at the rate of 15,000 per hour. The machine which collects, arranges in order, and binds the sections into books is unique, it being claimed that there is no other machine of the kind in this country; it is nearly as wonderful as automatic telephone switching.

In what is flippantly called the machine age we are inclined to take for granted much which plays a daily part in our lives; it is not bad discipline for our minds occasionally to realise that there is a story attached to these common things. Then the common act of turning up a number may give us a little more patience with difficulties.

J. F. S.

ABOUT DEVELOPMENT.

By H. MORGAN, *London Telephone Service.*

THE unprecedented expansion of the Telephone Service in this country necessitated the formation of a section, staffed with a personnel, definitely trained and temperamentally adapted to deal with the provision of statistics and formulæ upon which line and exchange equipment could be provided economically.

The formulating of reliable development forecasts has been rendered difficult since the war, due largely to changed conditions of living, and also to the exceptional building development which has occurred in outer suburbs where for all practical purposes building had been suspended from about 1909 until 1919.

The Development Section of the London Telephone Service has, however, proceeded systematically and cautiously to establish a basis for the anticipation of future requirements, and definite results have been achieved in spite of the difficulties and problems encountered.

It was realised at the outset that a desideratum to be ensured was economy in expenditure, while the pitfall to be carefully avoided was any parsimonious restriction of necessary outlay, as this would inevitably react in a derogatory manner upon the earning capacity of the service and thus reduce the revenue accruing therefrom.

The demand for a commodity is largely determined by the amount of publicity given to its utility and to the extent of the direct canvassing activity expended in presenting its advantages to the community, and although the telephone "speaks for itself" the number of users has been augmented considerably by the advertising of the commercial potentialities and private amenities which it provides. This, however, is not the sole consideration in computing the future requirements of telephones, as a steady but persistent growth in the telephone habit is always taking place.

The realisation of forecasted growth can, of course, be delayed by a variety of causes, although the anticipated growth curve and definite forecast given, and the provision made in connexion therewith, are based upon a number of reasons carefully collated and analysed.

The long view is always more difficult to focus than the "close up," but the development officer must be capable of wisely determining the ultimate as well as the immediate effect of factors, widely dissimilar in perspective, divergent in operation, seemingly unrelated commercially, and yet bearing directly and drastically upon the demand for telephone facilities.

To envisage the lay-out of a neighbourhood with all its shopping and business possibilities, when all that is actually in view at the moment is a stretch of undulating pasture land, requires imagination of a somewhat exceptional order, combined with a courage born of conviction based upon known facts relating to the district and its potentialities, as well as to the telephone requirements of this particular piece of ground 20 years later.

A consideration of primary importance arises right here, as it is essential to first deal with and decide what telephones will be required in the immediate future, and allow this to have its due weight in any calculation made as to the final period covered by the forecast. If the final figure in a forecast made in five yearly periods, say from 1920 to 1950 is fixed first, the tendency will always be to underestimate the demand for the first two periods.

It follows then that optimism should first be exercised upon the "close up" view and then balanced and carefully considered judgment be concentrated upon the later periods or "long view." This will inevitably have the effect of increasing the figures given for any forecast, and the importance of this cannot be overrated. Failure to observe this will lead to under estimating with its concomitant of shortage of line plant, exchange equipment &c., &c.

Railway facilities, accessibility, status, social amenities, availability of land for building, ecclesiastical holdings, town planning schemes, density, contiguous towns or villages, rating assessments, residential attractiveness, educational provision, these are only a few of the local factors which have to be brought under review by the development officer before his computation can be made.

National crises, bank rate, business prosperity, political changes, Government policy, Treasury control, are among the general happenings which all bear directly upon the growth of the Telephone Service.

While all these things have a bearing upon all development, whether city or rural, the local factors more directly concern suburban and provincial forecasts. The general happenings more directly impinge upon the development studies made in the dense city areas, and London particularly, is affected by these considerations.

Experience reveals that it may be possible to classify property in some cases, but it must be borne in mind that exchange areas as different topographically, and in fact in nearly every particular, as Croydon in the south, and Tottenham in the north, or Albert Dock in the east and Mayfair in the west, preclude the possibility of effectively legislating by "rule of thumb" methods. Initiative and resourcefulness must have due expression in a section where so much that is speculative is involved and where the conclusions come to affect expenditure so vitally.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations working at Jan. 31, 1927, was 1,484,818. New stations during January numbered 20,677 and ceased stations 12,859, resulting in a net increase of 7,818 on the total at the end of December.

The growth for the month is summarised below:—

Telephone Stations—	London.	Provinces.
Total at Jan. 31	523,150	961,668
Net increase for month	3,181	4,637
Residence Rate Installations—		
Total	111,541	183,367
Net increase	1,371	1,837
Call Office Stations—		
Total	4,698	16,929
Net increase	12	122
Kiosks—		
Total	430	2,382
Net increase	12	84
Rural Party Line Stations—		
Total	—	9,953
Net increase	—	—
Rural Railway Stations connected with Exchange System—		
Total	—	726
Net increase	—	5

The number of inland trunk calls made during the year 1926 was 92,659,895, as compared with 83,813,868, in the previous year, an increase of 8,846,027, or 10.55%.

Calls made to the Continent during the year numbered 265,049, and from the Continent 296,415. The calls made to and from each of the five European countries concerned were as follows:—

To or From.	No. of Outgoing Calls.	No. of Incoming Calls.	Total (Bothway Calls).
France	127,037	136,811	263,848
Belgium	40,408	51,734	92,142
Holland	74,342	85,938	160,280
Switzerland	2,849	2,680	5,529
*Germany	20,413	19,252	39,665
	<u>265,049</u>	<u>296,415</u>	<u>561,464</u>

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

PROVINCES—Newbury—Automatic.
Sutton-Coldfield ,,
Gloucester ,,
Harrogate ,,

And among the more important exchanges extended were:—

LONDON—Harrow, Redhill, Waltham Cross.

PROVINCES—Blackpool, Maidenhead, Warrington, Hertford, Neath, Hyde, Stourbridge.

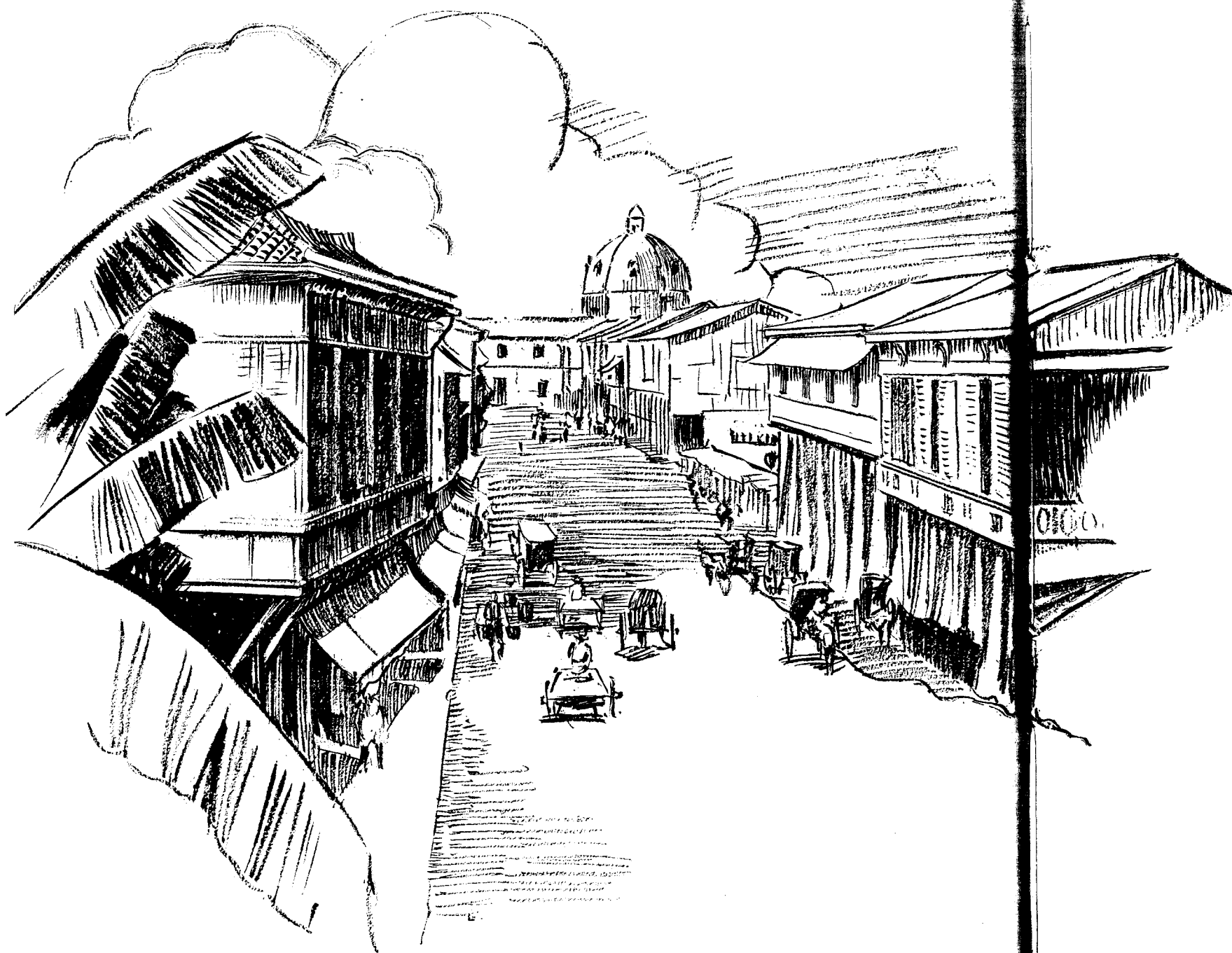
During the month the following additions to the main underground system were completed and brought into use:—

Glasgow—Paisley cable,

while 86 new overhead trunk circuits were completed and 97 additional circuits were provided by means of spare wires in underground cables.

*From Mar. 19, 1926, when direct telephonic communication between Great Britain and Germany was first established.

Where East Meets West—



FOUNDED over five hundred years ago, Manila to-day is a singular admixture of the old and the new. On one side of the River Pasig stands the old town with its ancient wall and crumbling remains of bastions and parapets; on the other side—the newer suburbs, whose wide streets and modern buildings show tangible evidence of modern American influence.

Visitors are agreeably surprised to find Manila not only a very active city commercially, but also equipped with the most modern and up-to-date telephone apparatus that it is possible to obtain. Strowger Automatic equipment has been in use in Manila since 1919, and just recently, due to increased demands for service, the Philippine Islands Telephone and Telegraph Company has placed orders for 2,900 lines of additional equipment.



Automatic Electric Inc.

FACTORY AND GENERAL OFFICES: 1033 W. VAN BUREN ST.
CHICAGO, U.S.A.

The
Telegraph and Telephone Journal.

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<i>Managing Editor - - -</i>	-	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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COMPETITION.

OUR critics often tell us that the telegraph and telephone services of the Post Office are hot-house plants, grown under the shelter of a monopoly, and that they could not thrive in the free atmosphere of competition to which the ordinary business undertaking is exposed. We are not concerned for the moment with meeting this criticism; but we should like to instance a few exceptions to the general statement that telegraph and telephone services are non-competitive.

The Post Office has no monopoly of external telegraph communications; and in the past the general line of demarcation has been that, while the cables between Great Britain and our neighbours across the Channel and the North Sea were for the most part jointly owned and worked by the Telegraph Administration of the countries on whose shores they land, transoceanic communications were in the hands of the Telegraph Companies. But within the last few years the situation has been changed in two ways. In the first place, the Marconi Company has been licensed to operate wireless services with a number of European countries, and telegraphy to the Continent has become to an increasing extent competitive. In the second place, the Post Office has since 1917 embarked on the enterprise of transoceanic telegraphy, and now owns and works two cables across the Atlantic—the sphere in which competition is more intense than in any other.

Although the Imperial Cable system entered the field late in the day, when its rivals had already consolidated their position, the system has continued to pay its way and the traffic has shown a substantial increase. The success of the system is mainly due to the efforts of a body of enthusiasts all over the country, who have built up a valuable publicity organisation. It is difficult to praise their work too highly: it is only the first (and often the easier) portion of their task to "obtain a promise of support," there remains the patient and tedious task of "watching the traffic," of seeing that vague promises are fulfilled, and of taking endless pains to ensure that some real or fancied grievance, the delay or mutilation of a single telegram, does not undo the work of years.

But the Imperial Cables are by no means the last venture of the Post Office in the field of transoceanic telegraphy. A direct Beam Wireless system has already been established to Canada, and we hope that the time will not be far distant when the Central Telegraph Office will be in direct contact by wireless with Australia, India, and South Africa. Telephony has already bridged the Channel and the North Sea, and within the last few months, with the help of wireless, it has spanned the Atlantic; it would be rash to suggest any future limits to its progress.

This brings us on to a rather difficult subject, the question of competition between different services each under the control of the Post Office. Within the limits of Great Britain, the Post Office telephone system has diminished the use of the Post Office telegraph system; and in the communications with other countries, both wireless and telephones are invading the sphere of cables. We are confronted with the problem of holding the balance true between cables and wireless, between telegraphs and telephones, of not sacrificing any of these services in the interests of any other.

A difficult but not an insoluble problem. Many municipalities control both gas and electricity undertakings to the advantage of both. Even if we were to admit that telegraphy is obsolescent, the Post Office would be shirking its responsibilities if it were to allow any vested interests to stand in the way of the progress of communications. But it is perhaps not too much to hope that the parallel of gas and electricity may hold good; that each of the services may find its respective sphere, impinging on but not coinciding with the spheres of the rest. This result is likely to be the more effectively and quickly secured from the fact that the same organisation is interested in all the services and is anxious to develop to the full the potentialities of each.

Whether or not competition is the last word in progress, it is undeniable that the competitive element in our organisation has proved of real benefit to the service as a whole. To single out one advantage among many, it has brought us into closer contact with the needs of commerce, not only as expressed by our legislators and by Chambers of Commerce, but by individual merchants and manufacturers in office and factory. We can only guess at the results from the point of view of the business community; but we can vouch for the undoubted value of such contact from the point of view of the Post Office.

THE DESIGN AND ERECTION OF POST OFFICE BUILDINGS.*

BY H. G. WARREN, A.R.I.B.A.

(Continued from page 115.)

SKETCH plans having been prepared, in due time receive official approval and are returned to the architect for the preparation of the working drawings and specifications. Before these can be prepared the elevations of the building must be designed, and this brings me to the third stage.

(III) ELEVATIONS.

It has been seen already that the elevations receive preliminary consideration during the preparation of the sketch plans. Personally, I hold the opinion that postal buildings should be of a distinctive design or mass enabling them to be recognised easily by the general public. If a town has a prevailing architectural style, this should be followed but the distinctive massing should be retained.

The Department's buildings generally occupy a prominent position in the town in which they are erected and are a centre of the life of the community. There can be no excuse for lack of architectural character or beauty in their design. They must withstand, successfully, the criticisms of those qualified to pass judgment. It is a fallacy to suppose a good design to be more costly than a bad one. The reverse is more often the case.

Beauty in architectural design is not a matter of taste, but to quote the words of Sir Edwin Lutyens, "of ascertainable facts."

What are these ascertainable facts? They represent the experience gained by the study, analysis and comparison of executed works and can be more clearly illustrated by the following examples:—

- (a) The external angles of a building should denote strength, and if the door and window openings are placed too near the angles, this sense of strength is lost. Quoins also are used to produce this effect of strength at the external angles.
- (b) Wherever possible the openings or voids in a façade should be uneven in number, this produces restfulness and repose. For the same reason ornament should be applied so that it emphasizes one feature of the façade.
- (c) Horizontal features such as cornices, string courses and bands, should not be applied in a manner which cuts the façade into equal vertical sub-divisions.
- (d) Elongated and low facades often require vertical features such as pilasters or columns. Tall buildings, on the other hand, may require the introduction of horizontal features.
- (e) Objects similar in all respects appear of different sizes if some are seen against a solid background and others against the sky.
- (f) A column is smaller in diameter at the top than at the bottom, and must be given an entasis or outward curve in its height to avoid the appearance of having a convex outline.
- (g) The effect of fore-shortening, consequent on the building being viewed in an upward direction, instead of at right angles, must be carefully studied.
- (h) The silhouette of a building is of great importance. A ragged and broken outline can ruin a design.

These examples could be amplified, but sufficient have been given to indicate the kind of matters which must receive due consideration if a good architectural design is to be evolved.

The actual style of architecture employed depends on the local circumstances, but, generally speaking, English Renaissance is the most suitable—Anglo-Classic for the larger towns and cities; and Georgian for the smaller towns.

Before leaving this part of my subject, I should like to read an extract from a recent article by Lord Gerald Wellesley on post office architecture:—

"During many epochs of the world's history, kings considered that they could do no wrong. Democracy has changed all this, and we now think that governments can do no right. And there is no branch of a government's

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

activities which is considered fairer game for criticism than public buildings. Administrative art has always been a butt for the lamponer. It is sometimes accused of being unimaginative, conventional and hidebound; at other times of being vulgar and pretentious. The rigid economy of the times we live in has probably taken away for ever any danger of the latter accusation being made in future. There is, however, and there must always be, a certain basis for the former. The first quality that is demanded of a public building is permanency. Now, work of startling originality and revolutionary newness, except when produced by a genius of the first rank, is far more likely to suffer from changes of taste than quiet, scholarly, and, if you will, somewhat conventional buildings. The official correspondence of such departments as the Treasury and Foreign Office is carried on in clear, impersonal, and direct language which is entirely suited to its purpose. It is as free from the turgid splendours of a Gibbon as it is from the disarming playfulness of a Lamb. But it takes a highly-trained and able scholar and gentleman—a terrific combination of qualities both innate and acquired—to produce those long minutes and notes, as is proved by the very different quality of the output of newly fledged bureaucrats in mushroom offices during the war. Now, at first sight, to expect and find the same qualities in a Treasury minute and a post office in a small country town might seem to be like judging the Scotch express and a Berkshire pig by the same standards. But if we look a little deeper we will realize that all the work of the permanent officials in government departments must be gauged by the measure of its success in the public service. As the Treasury clerk must put all his brains and all his training into work which brings him no personal reward or notoriety, so the architect, suppressing all private ambition, must do his best to serve a public which is but too often ungrateful and even hostile.

"Now what does the public want in a post office? Probably the first desiderata are pens and pencils that can be used for writing out telegrams, and a little less superciliousness on the part of the young ladies behind the counter. Another very common deficiency in post offices is an adequate counter-space and staff for the dispatch of telegrams. We must all of us have noticed how often there is a queue of people wanting to send telegrams, which one harassed clerk is accepting, while there are yards of counter and rows of employees doing nothing. But no architect can remedy these deficiencies, so let us confine ourselves to the quality and requirement of the fabric of a post office, in so far as they affect the public, for a layman is not in a position to judge of what is required in those portions of the building to which the public has no access. A post office must be in a prominent position. It should look dignified and permanent, and should, as far as possible, harmonise with its surroundings, though this principle should not be put so far as the erection of 'Wardour Street' half-timber architecture in towns where genuine examples of that obsolete manner of building are found. The public office, which should, of course, be of a size adequate to the number frequenting it, should, in the larger instances, have doors giving on to the street at both ends. This requirement adds a great difficulty to the satisfactory designing of the elevations of post offices, for a large entrance is instinctively sought in the centre of any public building. We shall see later how often this quality of entrances affects the design of the more important post offices. The public office must also be very well lit, and this may mean windows on the ground floor which, ideally speaking, are disproportionately large compared with those in the upstairs offices. A clock and a prominently displayed letter box are also features of a post office front."

Then follows a description of recent buildings and the article concludes by saying: "The buildings illustrated show a high level of achievement, and produce an impression of good quality, dignity and permanency, which are the attributes we demand in our public buildings."

Little can be said on the actual production of the design for an elevation. As a rule the floor heights and positions of partitions immediately behind the elevation are set up to scale (preferably 16 feet to an inch, as this scale prevents detail being considered before mass) and with the aid of tracing paper, the outline of the building is drawn and the openings blocked in.

When a satisfactory proportion and mass have been obtained, drawings to the scale of 8 feet to one inch are prepared shewing the details, and the nature and positions of any applied ornament.

The architect is now in a position to proceed with the preparation of the working drawings.

(IV) WORKING DRAWINGS.

The general scale to which these drawings are made is 8 feet to one inch. The drawings should indicate the requirements clearly and not contain unnecessary elaboration. Due regard has to be paid to the local building by-laws and regulations, as, although Crown buildings are exempt, they are seldom erected in contravention of such by-laws. I remember on one occasion a Borough Engineer remarking to me that the Crown was exempt only because it could do no wrong, and in his opinion, it would be wrong to contravene the building by-laws of his council.

The walls, chimney breasts and partitions having been drawn, plans of each floor are traced and the main and subsidiary steel beams indicated with coloured ink, each beam and stanchion being lettered and numbered. This system ensures easy identification should it be necessary subsequently to vary the loading or amend the steelwork.

It is impossible this evening to deal with the methods employed in calculating the steelwork.

It may interest you to know, however, that the sizes of steelwork are governed in many cases by the joints between the members, the theoretical sizes having to be increased to enable a satisfactory joint to be made.

When the steelwork calculations have been completed, work is resumed on the working drawings. One or more sections are set up. These are of great value and not infrequently disclose constructional difficulties and problems which otherwise might be overlooked. Sections are drawn through all stairs and staircases to ensure sufficient headroom. The "going" or ascent of the stairs should be easy, and in this connexion there is a rule to the effect that twice the "rise" plus the "going" should equal twenty-three so that a nine-inch tread or "going" would require a seven-inch "rise."

The sections naturally include the roofs, and if these are covered with slates the pitch should be not less than thirty degrees. Tiles require a pitch of not less than forty-five degrees, and corrugated iron a pitch of not less than twenty degrees. Flat roofs require a fall of 1 inch in 10 feet, and if covered with copper, zinc or lead, the rolls and drips should be spaced at distances corresponding with the sizes of the sheets, after making allowances for lapping.

The heights of the various rooms are shown on the sections. A sorting office 60 feet in length and with an open roof should be 10 feet in height to the top of the wall plate; if the length is 175 feet, the height must be 14 feet. Where a sorting office has a flat ceiling, the height is 3 feet more than the height required for a similar sorting office with an open roof.

Public offices vary from 11 feet to 14 feet in height and telephone apparatus rooms from 10 feet to 12 feet.

Some of you will remember the Building Notes issued by the late National Telephone Company in 1911. These gave heights for the apparatus rooms varying between 12 feet and 14 feet, and for the switch rooms between 16 feet and 17 feet.

Habitable rooms should be not less than 8 feet 6 inches in height.

Before leaving the question of the heights of rooms, perhaps I should mention that any height above 12 feet is disregarded when calculating cubic capacity for ventilation, unless there is some means of extraction of the air from the top of the room, for otherwise the air above 12 feet from the floor remains stagnant and is not available for the occupants.

The heights of window sills above floor levels are governed by the intended uses of the rooms in which the windows are situated.

Sorting offices require windows with sills not less than 6 feet above the floor level. The windows in the public office should be at least 3 feet 4 inches above the floor level.

The total glass area of the windows provided in any room should not be less than one-tenth the floor area.

Fireplace openings and chimney breasts should be shown on the sections and the flues indicated by dotted lines. To reduce the possibility of smoky chimneys, or down-draught, a flue must have a quick "gather-over" and steps of not less than 45 degrees in its height, and the stacks should be carried up to the level of the highest ridge. Walls 9 inches thick around flues, by keeping their inside temperature high, contribute to the prevention of down-draught.

Sections through the heating and cable chambers must show the horizontal and vertical damp-courses. Opinions are divided as to whether the vertical damp-course should be placed on the earth or outer face of the retaining walls, or the walls built in two thicknesses with a vertical damp-course between. The latter method enables the asphalt to be repaired more easily should defects appear at a subsequent date.

The thicknesses of the floors depend on their construction. Where steel and concrete are used, the upper floors, exclusive of finishings, would be generally 6 inches thick. The floors next the earth can consist of hard-core 4 inches thick, and good cement concrete from 4 to 6 inches thick.

The depths of wooden joists in floors carrying ordinary domestic loads can be found, approximately, by using the formula $\frac{S}{2} + 2$, in which S equals the clear span of the joist in feet.

For other loadings the normal procedure of equating the Bending Moment to the Section Modulus multiplied by the Safe-Stress would be followed.

The building must be stiffened by the introduction of cross walls of a thickness not less than two-thirds that of the outer wall or walls.

The width of the concrete foundations under walls is generally equal to twice the thickness of the base of such wall plus 8 inches, and the depth of the concrete equal to the thickness of the wall. These dimensions are applicable only for ordinary loading.

The drainage system should be planned so that no part passes under the building. If it is not possible to arrange this, the portion which does pass

under the building should be constructed in iron pipes resting on and surrounded by cement concrete. Drains must run in straight lines between man-holes, and all branch drains kept short. Manholes should not be further apart than 40 feet, a distance which enables them to be cleared properly in case of stoppage. The whole system should be ventilated by means of a fresh air inlet and a foul air outlet. The main line of drainage must be kept away from the walls of buildings in order to avoid the possibility of settlement.

The diameter of the drain pipes should be as small as possible, to ensure their running full-bore and so be self-cleansing.

The capacity of a drain-pipe, in gallons per foot run, can be found by the formula $D^2 \times .034$ in which D equals the internal diameter of the pipe in inches.

Sharp falls are to be avoided as they tend to separate the effluent; it is customary to give a 4-inch pipe a fall of 1 in 40 and a 6-inch pipe a fall of 1 in 60. An intercepting trap must be placed in the last manhole before the drain enters the sewer to cut off the sewer gas from the private drain.

Receptacles which discharge water in volume such as baths, &c., should be placed, whenever possible, at the head of a drainage system, so that advantage can be taken of the water discharge to flush the drains.

Among the details remaining to be shown on the working drawings are: gas-rings, mat-sinkings, skylights, roof-lanterns, access doors to roofs, door and window openings, cupboards, panelled ceilings, cornices, rainwater pipes, floor chases, public office counter, letter boxes, stamp-selling machine, writing tables, telephone cabinets, &c. In the case of a telephone exchange if the final lay-out has been received from the Engineer-in-Chief, the position of the main distribution frame, relay racks, meters and switch sections, should be dotted on the plans.

A set of working drawings includes details (to the scale of $\frac{1}{4}$ inch to one foot) of the principal elevations and entrances, lobbies, screens, stairs, roof trusses and any details of special character. Full-sized details are not provided until the work is in progress.

Working drawings cannot indicate the complete requirements in respect of a building, and for this reason a detailed description, or specification, of the whole of the proposed work is written.

(To be continued.)

OBITUARY.

ARTHUR EDGAR COTTERELL.

To most telephone men and women throughout the country with 14 years' service standing to their credit the name of A. E. Cotterell will be familiar. To some thousands his genial figure was well known, and especially so in the Midlands and South of England, in which provinces he was for more than 20 years the Assistant Provincial Superintendent.

Mr. Cotterell only retired from the service of the Post Office in May, 1924, and in 1926 he took up fresh duties as Director of Information in the British Engineering Standards Association.

It will be a shock to those who knew him best to hear that after an illness which struck him down very suddenly three months ago he passed peacefully away at his home in Beckenham, Kent, on March 2.

The funeral took place in glorious sunshine at the Beckenham Cemetery on Tuesday, March 8. The ceremony was sympathetically performed by his friend, the Rev. Canon Gerald V. Sampson, Rector of St. Paul's, Beckenham, where Mr. Cotterell had been for some years a very popular churchwarden. The profusion of beautiful floral tributes included one from colleagues at the Secretary's Office, G.P.O., and the mourners, in addition to the two Misses Cotterell (daughters) and neighbours and Kent friends included Messrs E. Hewkin and T. A. Prout from the Secretary's Office, and Mr. J. Wood from the Savings Bank.

The deceased played a big part in the development of the telephone industry in Great Britain for no less than 45 years, and his versatility in many directions, and notably in astronomy, wireless telephony and broadcasting is familiar to many readers of this *Journal*, to which he was a frequent contributor throughout its history, extending from April, 1906, to the autumn of 1926.

The premature extinction of so genial a light in the telephone firmament as A.E.C. admittedly was, is a matter for sorrow not confined to his son, who is in South America, and to his two popular daughters, Misses A. G. and M. A. E. Cotterell, to whom he was most affectionately devoted.

T. A. P.

THE TELEPHONE TIDE.*

By HORACE DIVE, London Telephone Service.

(Continued from page 108.)

COMING to the relationship of the supervisor to her controlling officer and the type which it is desirable to secure for such an office, I think I cannot do better than read to you a translation of notes concluding a paper in the September-October number of the *Annales des Postes Telegraphes et Telephones* regarding a mission of investigation in the Scandinavian countries undertaken in April, 1922 by Monsieur Drouet (the Engineer-in-Chief and Director of Telephone Services in Paris).

"The Director (i.e. the Scandinavian Director) declared to us particularly that he considered it absolutely indispensable to have the services directed by technical officers, for these services need before everything else the rational study of methods of development and the analysis of traffic based on judiciously established statistics, diagrams, curves of probability and plotted curves of achievement.

"The Scandinavian controlling officers take the view that 'the chief of the business has to count on the unrelaxed zeal of his collaborators without it being necessary for him too closely to control them, and that in order to obtain this result it is necessary to choose men of value; to give them high salaries; and to interest them closely in the business.'

"Monsieur Drouet says 'this organisation (Danish) like that of all prosperous enterprises is characterised by the importance and the competence of the headquarters staff, which assures the direction of the different services. The chief officers are all proved and specialized and technical men; they are numerous and well paid, and a very large measure of initiative is left to them. Each service has well defined lines of authority, and one has the impression that order and discipline prevail. The administrative officers and the directing services are supplied with a numerous personnel, and their equipment and their installations are the most modern and the most perfected. All technical or development references are meticulously classified and filed. The quality of the service is controlled at any moment by statistics which are converted into graphic form.'

"With such an organisation all details are studied and brought to the point which will secure that the rational utilization of material and of personnel is extracted to the fullest degree possible.

"In whatever direction one turns order, method, and security is noticed, and one feels always and everywhere the influence of a benevolent but firm authority which imposes itself by its competence and which is not disputed because it is indisputable.

"The result obtained is that the quality of service is excellent, that the output is very good, and that important benefits are fully assured.

"We take then the opportunity to state once more that the secret of success lies in a great measure in the application of this principle that it is necessary to know how to spend extensively in order to organise, and to remember that the search for economies in the services of direction and control often leads an enterprise to its destruction."

The question of leadership is an interesting one, and one of the utmost importance to the post office in its capacity as a commercial undertaking, and I will therefore before leaving it give you the views of Col. Leonard P. Ayres, Vice-President and Economist of the Cleveland Trust Co., U.S.A., on the qualities which make men leaders. He says:—

"After much careful observation, I have come to the conclusion that, despite all the apparent contradictions of observable evidence, there are four characteristics that are shared in common by almost all real leaders.

"In the first place, and as a solid foundation for their other qualities, they must possess knowledge of the field in which they work.

"In the second place, leaders have courage and in part they have it because they know their jobs. The man who is doubtful is sure to be slow and timid, while the one who knows that he knows is prompt and courageous. But leaders have an additional sort of courage which consists in being willing to take a chance. They try to be sure about what is the best thing to do, and when that is impossible they act as though they were sure and go ahead anyway.

"A third quality of leadership is activity, and this, in turn, is partly dependent on their store of general and special courage. They are continually doing something. If they do not know what to do in a situation that demands action, they do something. By doing something all the time, and being right most of the time, they get a great deal accomplished.

"The fourth common quality of leadership is the one I have characterised as being the controlling factor in the power to earn. It is the 'gift of people.' It is the ability to influence the actions of others. It is an effectiveness in contacts with one's fellow men. It is a talent for human relationships. It

might be termed a sort of social skill. In the last analysis, it might be described as the ability to see things from the other person's point of view, and to make him see things from your point of view.

"The exercise of this quality depends on the ability to speak and write. One thing that leaders can always do is to communicate their thoughts to others, and this is true even in those cases where they have the reputation of being characteristically taciturn. . . . To the man who can express his thoughts in words so as to influence the rest of us, society gives its great rewards."

These views which I have read to you are no doubt expressions of ideals, but from my experience of the post office now extending over nearly 30 years, I have no hesitation in saying that many of her controlling officers would come well out of any test for leaders, and I should say all grades of the department's staff would compare very favourably with like classes in any other undertaking, governmental, municipal, or commercial. I recall hearing a claim made by a post office man who has now retired from the service, that if he were allowed to pick any half dozen men he liked from the particular department in which he served he would be willing to undertake the conduct of any business. It was, perhaps, a sweeping statement, but nevertheless I think it a justifiable one and it would not surprise me if Mr. Scott were prepared to make such a statement here in Birmingham. In any case there are plenty of instances of post office men who have left its service for commercial enterprises and carried them to success. It is pleasant for civil servants to remember that the greatest position in the railway world in this country, that of President of the London, Midland and Scottish Railway is held by an ex-civil servant Sir Josiah Stamp, and that Dr. Cyril Norwood, the present Headmaster of Harrow School, also began his career in the service. I am not going to say that everyone employed in the post office, high and low, is a model of all he or she should be, but I do say that the percentage of excellence in every grade is so high that we can confidently expect the commercial undertakings of the department to be carried on quite as efficiently as in any non-governmental circles, and with perhaps noticeably less self advertisement.

We have seen how the ever increasing demand for telephone service secured firstly the introduction of the multiple magneto exchange, and how this in turn has been largely superseded by Exchanges of the common battery type. The next stage in the development of rapid intercommunication over extensive areas will be found in the automatic or machine switching systems. Development in this country was slow, and on January 1, 1919, approximately 40 years after the introduction of the telephone to this country, the total number of exchanges had reached 3,026, serving 820,000 stations, showing an average growth for that period of 75 exchanges and 20,500 stations per annum. The corresponding totals on Sept. 30 last were 4,108 and 1,444,302 giving an annual expansion in the later years of nearly 270 new exchanges per annum and an average addition to the stations of well over 80,500 each year. It is interesting to note also that the total number of automatic exchanges in the country on Sept. 30, 1919, was 13 only and that there had grown to 45 by Sept. 30 this year. Both London and Birmingham are scheduled for development on an automatic basis, and although I have endeavoured to keep this paper free of technical details and elaborate statistical data you will no doubt be interested to know something of the scheme proposed for your city under the automatic regime. I invite your attention, therefore, to a brief outline of the position which, by the courtesy of the Secretary's Traffic Section, I am able to place before you.

The automatic programme for Birmingham as it stands at present, contemplates the introduction of the director automatic system in the Birmingham local fee area at 1930 by the conversion of two existing exchanges, Northern and Victoria, and the opening of two new exchanges, one to be called Calthorpe—to relieve mainly the present Midland and South Exchanges—and the other which will probably be known as Aston Cross, will relieve Central and East. It is the intention, however, that all larger C.B. exchanges in the area should continue on a manual basis during their economic life and the dates of their conversion to automatic working are therefore dependent upon this factor.

The development on an automatic basis of a small self-contained area was a comparatively easy matter, but in large and scattered districts such as are embraced by the London and Birmingham telephone areas the task of providing a satisfactory automatic service presents many difficult problems. The coming of the "Director" system bids fair to provide the solution for these, the system taking its distinctive name from that portion of the equipment which receives from the subscriber's dial the details of his requirements and then directs the call through the appropriate route to the desired exchange, thereafter proceeding to select on that exchange the number dialled by the calling subscriber. It was at first intended that the director automatic scheme for Birmingham should be a six-digit one i.e. two letter exchange codes, plus the four numerical digits, but it was decided not to prejudice the possible extension of the director scheme beyond the seven mile radius, if such should prove practicable in the future, and the standard seven-digit direction scheme as in London was finally adopted. Only two existing exchange names are unsuitable under this scheme, viz.: Oldbury and Quinton.

The traffic distribution throughout the area—except for the north-west portion (which forms part of the Black Country district)—lends itself to the concentration of the manual board requirements, and to serve the main portion of the area there will be two manual boards, one carrying the Toll traffic, which will be situated in the Midland Exchange building after it has been extended to the limits of the site, and the other, at which the enquiry and assistance traffic will be handled, will be situated in a new building which is to be built on a site somewhat to the north of New Street. This new building

*Paper read before the Birmingham Telephone Society.

will be designed to accommodate two, or if the site permits, three 10,000-line automatic units.

The Black Country area presents, however, an unusual problem in connexion with automatic schemes. This area comprises in addition to a portion of the Birmingham automatic area the Dudley, Wolverhampton and Walsall local fee areas (each of which will in a few years' time have an independent non-director automatic scheme). There is very considerable traffic between certain of the exchanges in these four areas. A scheme is at present being considered to provide a system of direct dialling between those exchanges within local fee radius of each other where the community of interest is greatest, and this will mean dialling by certain exchanges in the director system out to exchanges in the three non-director systems. In this case the first three letters of the exchange code will be used as the exchange dialling code in the same manner as exchanges are dialled within the director automatic area. Calls from the non-director areas to the Birmingham director area will, however, involve the prefixing of a numerical code to the four-digit subscribers' numbers. There will still remain a considerable volume of Traffic from the Blackheath, Halesowen, Oldbury, Smethwick, Tipton, West Bromwich, and Wednesbury exchanges in the Birmingham scheme to other exchanges in the Black Country which are outside the local fee radius, and a subsidiary automatic manual board will be established at Tipton to handle the calls from these seven exchanges which do not come within the scope of the proposed scheme of direct dialling.

Special arrangements will require to be made at the new Toll exchange (which is to be situated in the Midland building) to handle the large amount of through traffic within the Toll area which is normally routed via Birmingham. It is likely, therefore, that a special type of order wire key-sender B position, which will be equipped also with plugs, will be developed for use in Birmingham. The key-sender will be used to complete calls to the automatic units and the plugs will be used to complete through calls to other exchanges outside the automatic scheme via the outgoing junction multiple.

It was anticipated that the whole of the exchanges in the Birmingham area would be converted to automatic working by 1944, but it now seems likely completion may be delayed some years beyond this date. I fear that some of you who are not closely in touch with telephone matters may find this rapid review rather difficult to follow, but to take you step by step through the various phases of automatic switching, supposing that I had the ability so to do, would occupy far more time than it is permissible to give if I am to deal even in outline with some of the more fascinating of the telephone possibilities of the near future.

We are at the moment only on the threshold of the development of automatic telephones, but it is easy to imagine a future scheme of things under which by a simple manipulation of the dial on his telephone the subscriber of the future will not only be able to reach any subscriber in his local area, but will by similar processes reach a "B" telephonist at any required exchange within a very extensive area as wide, probably, as the present Toll area. For long distance calls his dialling will bring him into direct touch with the trunk telephonist controlling calls on the particular route over which he wishes to speak. He will, save in the busiest periods, be able to reach the phonogram rooms of distant towns and dictate his messages straight-away. At this time it seems likely that Birmingham will become the recognised holiday centre for the country and in its life and gaiety surpass anything which Paris has yet provided. In its spacious hotels or guest houses will congregate the seekers after sunshine as it will make a convenient interchange station for the lines of aircraft radiating to all parts of the British coast and to the Continent. The daily weather reports will indicate just where sunshine is to be found, and hither and thither will fly the holiday maker returning at sundown to the comfort and gaiety of Birmingham.

To give you some chance of forecasting the growth of the area of effective telephoning in the future let us glance at the strides made in the last 10 years or so, years it has to be remembered of unusual restriction owing to the world war and its consequences. In the 20 years from 1904-5 to 1924-5 the continental circuits grew from 6 to 32 and the traffic grew nearly tenfold. Since 1924-5 the development has become increasingly rapid and there are direct lines to a number of towns in France, Germany, Belgium, Holland, and Switzerland, whilst experimental conversations have taken place with Vienna, Stockholm, Copenhagen, and Milan. The total of Continental circuits is now 52 and will very shortly be 60. The traffic units handled have risen from 83,000 in 1904-5 to nearly 1,000,000 at the present time. This represents a growth of nearly 30% in the traffic in the past 20 months. As the Continental engineers are able to perfect their "repeater" arrangements so the area of speech grows wider and wider, it being theoretically possible by modern methods to add additional links to the chain of speech without material transmission loss. You can understand, therefore, that there need be no limit in Europe or Asia to the spot to which you will be able to speak, granted the existence of the plant. Such speech is carried out on a wired basis, but as you know extraordinary advances have been made in wireless telephony over great distances. The Post Office engineers working in collaboration with their American brethren have already secured such a measure of success that daily conversations, many of an exceptional clearness, are taking place on an experimental basis between the two countries. I have been fortunate enough to be one of those officers enjoying the privilege of taking part in these experimental conversations, and I can tell you that one can hear America folk and be heard by them with a distinctness which but a few years ago we should have delighted to experience on some of our Inland Trunk lines. Speaking for myself, I am bound to say I recall nothing which has appealed more to my imagination than these excellent conversations with people nearly 3,000 miles away.

There is every prospect of a regular commercial service to America in the new year,* and it is likely that anyone in these islands in touch with the telephone system of the country will be able to speak to friends or relatives anywhere over a large area of America. How odd it seems in the light of this position to recall the story told of the excitement in America when Charles Dickens was publishing his novels in serial form and no advance information of the development of the plots could reach the other side of the Atlantic until the regular boat bringing copies of the latest issue came across. A graphic picture has been drawn of the crowds crushed together on the landing stage as the boat bringing copies of the latest instalment of *Dombey and Son* drew towards the quay. In the previous number the small and very lovable boy Paul Dombey had been left sick to death, and it is recorded that as the boat drew towards its berth a cry went up from the assembled multitude of Americans "Is little Paul Dombey dead?" I do not know if we have a novelist these days on one side or the other who could work up such an intense interest in the fate of his characters, but if we have there can be no repetition of such a period of suspense, for the sequence of events would no sooner be divulged on one side of the ocean than it would be a commonplace on the other. We have gained much but I'm not sure we have not lost something also.

Well, you can see that if we are speaking easily and freely with part of America next year, a similar happy condition over the whole of that appealing continent and to the uttermost parts of the earth, Australia and New Zealand is sure to follow in quick succession, and the telephone subscriber of any land will have as it were the world at his ear. When one realises that the development in television in the past few years has been as great as in telephony, one can picture a condition of things where the simple manipulation of a dial will not only enable a subscriber to speak with another in any part of the wide world but will allow him at the same time to look into his correspondent's face with his soul in it, and allow him to appreciate fully his correspondent's surroundings also. Such a condition of things is bound to make for the removal of misunderstandings and the establishment of peace. We may well be glad that as post office servants we are permitted, in however small a degree, to aid in these developments which as their ultimate achievement shall establish a reign of peace and goodwill amongst men.

It requires no argument to emphasize the point that with such glowing and delicious fruit hanging ripe upon the tree of knowledge and awaiting our plucking, we should do well to recall the words of the writer of proverbs "The son that sleepeth in harvest is the son that causeth shame." It is a stupendous task which presents itself to the Post Office, which as we know has wonderful resources and enjoys an enthusiasm for service amongst its employees which each emergency only emphasizes, but many of the problems to be faced in meeting the tide of telephones are new problems, and we can only meet them individually and collectively in so far as we have prepared ourselves for the task. The responsibility in a collective sense rests primarily in the Secretary's office, and affects perhaps few of us here, but in the individual sense, none can escape it, and I take it that one of the ways in which the individual P.O. servant at Birmingham can do something towards the necessary preparation, is by attending meetings of this Society and contributing to the general sum of knowledge which should result from these discussions. A government-controlled industrial organisation is never wanting for active critics, and if we are to confound ours it must be by continuous efforts to improve on past achievements, and I suggest that if we are to come triumphantly out of the strenuous days ahead, we shall do well to take as our motto, that suggested by Mr. Baldwin as appropriate for the Committee of Imperial Defence—"Cavendo Tutus"—Safe by taking precautions.

* This paper was read before the Anglo-American service was opened to the public.

REVIEWS.

"*The Elements of Radio Communication.* By O. F. Brown, M.A., B.Sc. (Oxon), B.Sc. (Lond.) viii + 216 pp. 146 diagrams, (London: Humphrey Milford, Oxford University Press. Price 10s. 6d. net.)

This book gives an up-to-date summary of the present situation in the world of radio activities. It presents to the reader, very satisfactorily and with the least possible use of mathematics, matter for which mathematical treatment is essential in development on more advanced lines. An elementary knowledge of electricity is assumed, but this fact need not deter the non-technical reader from studying the volume with a view to finding much that is useful and of interest.

An immense field is included under the title and, before commencing to read, it is clear that drastic curtailment of the space allocated to the various branches must have been necessary

in order to cover the ground in the 216 pages to which the author has confined himself. For this reason certain items, for instance, manufacturing processes in connexion with valves, seem to be rather unduly stressed in proportion to the remaining matter. Many readers will also find cause for criticism in the general arrangement of the book, the obscurity of the wording at times, and in the editing, particularly where the few mathematical expressions are involved. Generally speaking, however, many of these criticisms could be easily eliminated in the preparation of further editions and as it stands the volume forms a useful link between the historical and general, and the highly technical and specialised works at present in existence. Moreover it gives a clear insight into the many problems confronting radio engineers to-day.

The author is connected with the Radio Research Board, and is thus well qualified to deal with his subject on the basis of the most recent developments in all its branches.

"History of Radio Telegraphy and Telephony." Written and illustrated by G. G. Blake, M.I.E.E., A.Inst.P. xix + 425 pp. 197 Illustrations. (London: Radio Press Limited. Price 25s. net.)

The fact that Mr. Blake is not connected with any wireless company gives this book a commercial impartiality which is as welcome as it is rare in a history of radio communication.

Indeed his only partiality seems to be towards describing inventions and methods which from the fact that they have never been developed well might be omitted from a purely historical treatise. But that the author is well aware of this fact is clear from the "aim" of his book which he gives in a conclusion, but we should prefer to have seen this in a Foreword as it is disconcerting to read 340 pages before grasping the scope of a book. It may be said that no one is expected to read 340 pages of a book of reference, but Mr. Blake has given us not only a book of reference but a very readable and interesting account of the development of radio signalling, largely with the object, as he says in the conclusion, of bringing "into prominence almost forgotten schemes and devices."

As a book of reference it is excellent, and its only defect as such is the space devoted to these forgotten schemes and devices. For instance, no clear cut book of reference on radio history would contain in its index more references to the work of Mr. Blake than to the work of Mr. Marconi.

There is no use blinking the fact that we should have preferred the omission of the forgotten schemes and devices, in which case, though the author's aim might not have been met, we would have had something unique, a compact first class book of reference on the development of radio telegraphy and telephony.

No outstanding radio invention or development has been omitted, at any rate so far as this country is concerned, and though naturally less space is devoted to foreign work we cannot point to the omission of any development of international importance.

We are interested to see that the discovery of the piezo-electric effect is not so modern as we thought, as apparently Theophrastus dabbled in the matter some 2,200 years ago. This fact alone shows that Mr. Blake's work lacks no thoroughness, and if we need another single instance we can find it in his full description of the splendid pioneer work of Hughes, so seldom dealt with adequately in the history of radio development.

The whole production of the book is first class and its arrangement for reference purposes could not be bettered, as it contains a good index, full chapter headings and a table of 1,125 references to patent specifications, papers, &c.

The contents include chapters on the discovery of ether waves, the invention of the coherer and other detectors, the development of the telephone and its subsequent application to radio telegraphy; an account of the early pioneer work of Clerk Maxwell, Hertz, Lodge, Marconi, and other distinguished scientists and inventors;

the story of the Edison effect, the development of the thermionic valve, direction-finding work, Beam Wireless and an account of the first Amateur Transatlantic Tests.

There is no doubt that the book fills a large gap in the somewhat meagre historical literature of radio signalling, and, as such, will be welcomed by all who are engaged in the development of the art.

C. G. C.

MACHINE TELEGRAPHY.*

BY A. P. OGILVIE (Headquarters Traffic Section).

(Continued from page 109.)

I PROPOSE now to deal in greater detail with some features in automatic transmission around which interest and some criticism have been centred.

There is first the general question of type-keyboard manipulation. Keyboards for telegraph purposes modelled on the layout of the commercial typewriter keyboard are no innovation. We can trace efforts, more or less successful, to adapt them almost as soon as the typewriter became a business proposition, and during the past 25 years practically every new system included the type-keyboard as the medium for translating the written word into transmissible symbols irrespective of the alphabet employed. As far as I know there are no signs of future development in telegraph machinery in any part of the world other than on the lines of type-keyboard signalling. Such unanimity is no mean compliment to the ubiquity of the typewriter method, and the British Post Office cannot afford to ignore it.

Initial trials of type-keyboards in our service, mainly on Gell and Kleinschmidt machines, have not enjoyed complete success owing to the comparatively small amount of apparatus employed and the restricted opportunities for telegraphists to attain and maintain proficiency in manipulation. Neither has the question of training been tackled seriously at all offices. In this connexion the type-keyboard suffers from the fact that its keys are marked with letters and figures. At the first glance the layman is given a false impression of extreme simplicity. It is true that a word may be "picked out" by depressing appropriately marked keys, but there is as much difference between signalling in that fashion and a skilled touch operator working the keyboard as there is between a child stumbling through the "Maiden's Prayer" on the piano and, let us say, Samuel interpreting Bach.

The only sure foundation on which to build up a successful system of type-keyboard operating is to insist on "touch" manipulation from the first. Careful training and assiduous practice are essential, but a high degree of skill is required in less time by this method than by any other. The importance to the operator is of moment. "Touch" typing ensures the distribution of the work over all fingers and both thumbs, it obviates the danger of eye strain and secures a much greater degree of accuracy: in short it makes the work easier and lighter. There is also the psychological fact that a "touch" operator is conscious of the higher quality of his or her work as compared with the haphazard unscientific methods of the "sight" typist.

It has been suggested that type-keyboard manipulation is inaccurate. If that has been the experience at any office it indicates a weakness in training. In touch typing the keyboard is divided into finger territories in which one finger, and always the same finger, moves in a definite direction either upwards or downwards from an anchor or guide key. The hands remain practically stationary each finger hovering over its territory. Movement of a finger outside the prescribed area allotted to it is at once apparent to the skilled operator and the movement is arrested almost before an error is made. Persistent mistouches are due in most cases to the brain working faster than the fingers, and the remedy is usually found in practising difficult words. A capable pianist with a keyboard range much wider than that of a typewriter does not strike wrong notes even in movements of extreme rapidity and complexity, and in typing competitions where speeds of 80 and 90 words a minute are maintained for 15 minutes and over, freedom from error is a feature of the work. In my own experience I have watched the receipt of telegrams from telegraphists working keyboards for similar periods without a single error or erasure. Accuracy in the telegraph service is a first consideration, and I am sure that concentration on suitable training will secure it. Provided these conditions are satisfied, speed of operating can be left to take care of itself. Mr. H. H. Harrison, in an interesting paper on "Machine Telegraphy in America," says: "I found the work of the perforator operators had reached an extraordinarily high standard, a standard that was general and not exceptional. 45-50 words a minute was accomplished with ease and with

*Paper read before the Birmingham Post, Telegraph and Telephone Society on Jan. 12, 1927.

remarkable freedom from error. This is largely due to the efficient method of instruction and the insistence on touch typing. . . ."

Two types of keyboard perforator are being tried on multiplex circuits in this country, one which perforates the Murray arrangement of the five-unit alphabet and the other an ingenious adaptation which produces tape perforated with permutations of the Baudot alphabet. The task set both machines may seem equally simple, but this is not so. In the Murray code the letter and the numeral or symbol associated on each key on the perforator keyboard are given the same permutation in the alphabet. For example, Q and I are together on the first key on the top row and both are represented by the same permutation.

In the Baudot code, however, Q and I are not allotted the same permutation, Q is represented by units 1, 3, 4 and 5 while I is represented by unit 1. As it is essential that Q and I shall be associated on the key on the keyboard for standardised manipulation, some device is necessary to bring the different selections into operation when either letters or figures are to be transmitted. This is accomplished by a movable carriage of code bars controlled from the space keys which permits either a letter permutation or a figure permutation to be perforated from the same key according to the movable carriage position.

A universal five-unit code is one of the questions agitating the minds of European Administrations at present, and a conference was held recently at Berlin at which some progress was made towards clearing the ground for greater unification. Meanwhile it is difficult to standardise completely, and so while newer systems like Teletype employ a form of the Murray code it is possible that the Baudot code may persist on autoplex circuits for some time yet.

The automatic tape transmitter is a simple and robust machine consisting essentially of five contact levers corresponding to the levers of a Baudot key and connected to relative segments on the distribution plate. The movement of these levers is controlled by selecting pins which, as the perforated tape is fed forward above them, are permitted to rise through the holes in the perforated tape. The permutation formed is signalled by the passing of the distributor brush over the plate segments. An impulse from a cadence segment actuates the transmitter by energising an electromagnet, stepping forward a star wheel and moving the tape onwards one permutation. All the operations are timed by the setting of the distributor brushes, and consequently difficulties experienced in manual Baudot from individual idiosyncrasies in signalling do not arise. It is also much less annoying to the signalling operator to be told that his transmitter is sending "extras" than to have a charge of weak sending made against him. Changing a transmitter is easy and hurts no-one's feelings: a change of operator is another story.

A small but rather important matter in autoplex working is the seating of the operator. The correct and most comfortable position is one which permits the fingers to rest lightly on the key tops with the forearms horizontal. Should the instrument table be too high or the chair too low the elbows will droop, a position which prevents the blood circulating freely in the fingers. Standard instrument tables of 30 ins. should therefore be reduced in height by at least 3 ins. The use of high chairs, even when fitted with foot rests is to be deprecated. I consider the position of the operator in type-keyboard working much more natural and more comfortable than that which must be adopted in either Morse or Baudot signalling. The body is erect and well supported, all fingers and thumbs of both hands are brought into use and the work distributed practically equally amongst them. These conditions conduce to the production of more work with less fatigue and, what is of importance, they do not bring in their train the tendency to nervous troubles which other forms of telegraph signalling may encourage. The work of a competent keyboard operator on circuits working at channel speeds of 35 words a minute need not be arduous under normal conditions. Perforating speeds of 45 to 55 words a minute give a lead to the operator of 10 to 20 words a minute over the transmitter, and the more expert the manipulation the easier becomes the task of keeping the transmitter filled and resting or performing auxiliary operations.

Coming now to the receiving side of an autoplex circuit we have to consider the facilities offered by tape receivers—such as the Baudot—and column printers.

Modern column printers are now usually built in the form of typebar typewriters, shorn of the keyboard, the movement of appropriate typebars being controlled from selecting levers which are set by a series of five electromagnets energised by incoming signals. Telegrams are printed on a continuous roll of paper in column form, the paper being pulled across a cutting edge at the end of each telegram thus separating one message from the other. Some difficulty has been experienced in obtaining a completely satisfactory column printer at a reasonable cost, and although the position is improving this fact has favoured the retention of tape printers on autoplex circuits in this country. Moreover, Baudot receivers were already in use on the multiplex circuits converted from manual signalling, and dirigeurs and mechanics had considerable experience in their adjustment. In other respects tape printing has advantages. Standard telegram forms can be used and in the case of special services such as Imperial and Radio this is considered an advantage. Column printing is also more extravagant in the use of paper. Against these disadvantages must be placed the admittedly primitive and cumbersome arrangement of gumming tape to forms. Withall, there remains the flexibility and economy of tape reception, and at present a consensus of opinion appears to favour its retention at any rate as a first step towards column printing ultimately.

Some difficulty in dealing with repetitions has been experienced in the early stages of autoplex working in certain cases, and perhaps a reference should be made to it. On manual Baudot circuits when a repetition is necessary the transmitting telegraphist signals the particulars by operating the five tapper key. At the distant station the request is printed direct on the tape. Under autoplex conditions the perforator operator punches the request on tape which passes directly and unbroken through the automatic transmitter. At the distant station the request is printed in exactly the same manner as in manual signalling, but in the latter case the received tape sometimes mysteriously vanishes. Usually these losses grow fewer as more experience of the system is gained, but the fact that they occur at all is disconcerting. Perhaps I may forestall questions on this point by stating that searching waste-paper receptacles full of sticky tape for clues is not a task which even the most enthusiastic dirigeur has, so far as I know, undertaken, but it might be an illuminating one. Accuracy in the preparation of telegrams is of course the best remedy for errors, and accuracy on a "free" type-keyboard responsive to the mood and skill of the operator is not difficult of attainment.

Recent comparisons between manual quadruple Baudot—TS—BS—and a quadruple autoplex circuit of similar length and stability—TS—SO—shows that the number of corrections required in telegrams was 1.2% higher on the autoplex than on the manual system, a comparatively insignificant increase. The time taken to deal with corrections on autoplex is likely to be greater, but not appreciably so, owing to the fact that slack tape may exist between the perforating point and the transmitter and so prevent the immediate signalling of the request and the reply. Bearing this in mind, however, it is possible to expedite treatment by affording strict priority to all corrections.

Before concluding, a brief reference must be made to start-stop telegraph machines, many of which have been introduced on duplex-circuits during the past three years. The description "start-stop" is derived from the fact that unison in speeds between stations is maintained by starting the mechanism at the beginning of each signal permutation and stopping it when transmission is completed. In contrast to the Baudot system where the distributors at both stations revolve continuously, the distributors or their equivalent in start stop machines only revolve when required to signal a letter, and since the distributor brush or its equivalent is brought to zero at the end of each signal, a correction of any variation in speed is effected every revolution. In other words start-stop synchronism is cyclic while multiplex synchronism is continuous and variations are cumulative. Start-stop apparatus can be employed on simplex, duplex or omnibus circuits, it will operate equally satisfactorily on lines one mile or one hundred miles in length. One of the best start-stop working circuits in the British service is that between London and Carlisle: other lengthy circuits similarly are those between the London Stock Exchange and Manchester, Liverpool and Glasgow Stock Exchanges. Equally interesting, perhaps, is the fact that start-stop machines have been working by wireless between the London Trunk Exchange and New York in connexion with the transatlantic telephone service. I mention these details in order to dispel the idea that this type of apparatus is only satisfactory over short lines.

The Merkrum teletype is probably better known than others of this class which are now available, as it was the first to be exploited commercially on an extensive scale. There are two models, No. 1 which works at a maximum speed of 40 words a minute, and No. 2 which is faster, affording a maximum speed of 60 words a minute. Both machines have similar type-keyboards and are tape printers, but in No. 1 the printing unit, closely resembling that of the Baudot receiver in form, prints from a type wheel while in No. 2 a type bar printer is employed.

Messrs. Creed and Company have now entered the field with a promising British start-stop machine. The transmitting keyboard and the receiving printer are made up in two units, as the latter is a column printer and must be kept separate to permit of the receiving operator, when the circuit is duplexed, reading and handling the received telegrams easily. The apparatus will respond to maximum speeds of 80 words a minute, but for post office use it has been geared down to 65 words a minute, the greater margin of stability thus secured being considered preferable to the higher speed.

Excellent results are obtained on most of the heavily loaded start-stop circuits, averages of 70 and 80 telegrams per operator hour being frequently attained.

With these machines, as with all other forms of machine telegraphs, engineering maintenance is a matter of vital importance. Modern printing telegraph apparatus is simpler and more easily understood than the earlier types, and the tendency is towards greater simplicity and reliability. At the same time satisfactory maintenance can only be obtained when the officers selected for the work are given proper training in the principles of operation and proper methods of adjustment. It is satisfactory to know that the Engineer-in-Chief is now establishing a school at Headquarters where such training will be given to the engineering staff, and there is every reason to look forward to a steady improvement in maintenance efficiency.

The future of telegraphy undoubtedly lies in the direction of a more extensive use of type-keyboards for transmission and the employment of machine printing either on tape or in column form, and if I may summarise in a last word my own opinion of the position it would be this: the continued existence of the telegraph service as a live concern in the face of alternative services becoming more and more efficient, depends largely upon the adaptability of the system to changing conditions, the acceptance of machinery which will eliminate waste in time and effort, and the recognition that the full use of such machinery will make the organisation more productive and more efficient. That, ladies and gentlemen, is my case for machine telegraphy.

WHERE TO STAY.

The attention of our Readers is directed to the following list of Boarding and Apartment Houses.

DEAN FOREST.—SEVERN-WYE VALLEYS. Beautiful Holiday Home (600 ft. up). 70 rooms, extensive grounds, motors, golf, billiards, tennis, bowls, croquet, dancing. Electric light. Boarders 50s. to 67s. 6d.—Prospectus: Littledean House, Littledean, Glos.

HOLIDAYS IN SWITZERLAND.—THE HORSLEY PARTY will leave London on Friday afternoon, June 3rd, for Montreux and Meiringen. 16 days tour, £14 10s. 0d.—Apply Mr. J. W. Fewtrell, 48 Frewin Road, S.W. 18.

IPING near MIDHURST.—Room and Breakfast from 25s. weekly. Other meals and attendance as desired. Glorious country for excursions. Fishing, wireless, garage. Half mile from bus route.—Address Mrs. Felton, Mill House, Iping, Sussex.

LAKE DISTRICT.—Beautiful Buttermere. Near Honister Pass, Crummock Water and many easy climbs. Photographers' paradise. Victoria Family Hotel (R.A.C. & A.A.). £4 4s. (reductions up to 25% at quiet times). Taxi from Cockermouth. "A day on a hilltop is worth a week by the sea."—*Ruskin.*

SANDOWN.—"Seacroft," Private Hotel. Comfortable Board-Residence on cliff facing sea. Large grounds, Croquet, Putting free. Electric Light, Separate Tables.—L. & E. Woodford.

DEATH OF MR. L. M. ERICSSON.

By the passing away, on Dec. 17, 1926, at his residence in Tumba, near Stockholm, of Mr. Lars Magnus Ericsson, the world lost not only a distinguished engineer and fertile inventor, but the virtual founder of the telephone industry in Europe. Born May 5, 1846, at Norrtomta in the parish of Varnskog in the Varmland province of Sweden, of a family in none too prosperous circumstances, he was thrown upon his own resources at the early age of 12 by the death of his father. When he was 20 he walked to Stockholm to find work, and his keen interest in small mechanical instruments led to his engagement by a small firm in that city where he received his early training as a mechanical engineer. After six years of such work he was awarded a Government grant which enabled him to travel abroad and extend his knowledge and widen his field of action. Profiting by this assistance he spent four years in Germany and Switzerland, gaining knowledge and experience.

In 1876 he returned to Stockholm and started a small mechanical shop with a total capital of less than £50. From this modest venture was built up the great organisation bearing his name to-day, with its capital of several millions. Here in this shop, with the aid of a few workmen, he manufactured telegraph apparatus, fire alarms and scientific instruments. About this time Sweden had become very progressive and was willing to give encouragement to the development of new industries. Ericsson, with remarkable foresight, saw in the telephone great commercial possibilities, although this new invention was at that time looked upon more as a scientific plaything by Europe in general.

The introduction of the telephone system to Stockholm in 1880 by the Bell Telephone Co. of America, with apparatus of American manufacture, gave Ericsson his first real impetus forward. He now concentrated on the design and production of such apparatus with the result that in a short time he surpassed the American instruments in excellence of design and construction. Ericsson was so successful that after the Bell Co. had installed exchanges in five Swedish cities the next two large exchanges at Gavle and Nykoping were entrusted to him. The superiority of his microphone alone gave him a great advantage in the extension of his business. He received further encouragement from his friendship and association with the famous civil engineer H. T. Cedergren who in 1883 founded the General Telephone Co. of Stockholm which developed and operated telephone exchanges throughout the country until the Swedish Government acquired the provincial operating rights from them.

The expansion of telephone technique found Ericsson very much alert, and his initiative and inventive faculties found plenty of scope. Possessed of a genial disposition, he had the happy characteristic of being able to convey his ideas and suggestions to his workmen in such a manner as to awaken the interest and stimulate the imagination. Many of his constructions still hold their place to-day. He was the originator of the hand-micro type of telephone, the first experimental example of which consisted of a Bell type receiver and a transmitter, which at that time was being used as a fixed transmitter, these being tied to an ebonite rod. This was early in 1884 before the existence of the solid-back transmitter. All his life he was convinced of the importance of the hand set and regarded it as the ultimate universal type.

Under his able direction the firm which bore his name soon reached a prominent position and acquired a high reputation in the world's telephone industry. In 1900 the first expansion outside the realm of Sweden resulted in subsidiaries being formed to operate telephone networks in Moscow and Warsaw, followed later by the establishment of manufacturing companies in practically every important country in Europe and operating companies and branches in all parts of the globe, while the same sound policy has made



the name "Ericsson" synonymous with quality in telephone apparatus throughout the world. After 30 years of untiring work Ericsson retired from the directorship of the firm, living first at Ahlby and later at Hagelby. During his retirement he had the great satisfaction of following the continued growth of the firm he had founded.

In private life L. M. Ericsson was very kindly and unpretentious, beloved and respected by all who came in contact with him. When he died a very industrious and upright man passed away, leaving behind him a memorial on which he himself laboured all his life.

PRESENTATION TO MR. McFADDEN.

Mr. S. McFadden, M.A., Traffic Superintendent, Northern Ireland Telephone District, has transferred to Nottingham, and in Ye Olde Castle, Belfast, on the evening of March 3, tangible expression of their appreciation of Mr. McFadden and regret at his departure was given by a large gathering of the staff. Unfortunately, Mrs. McFadden, being ill, was unable to attend, but she was represented by Miss L. McFadden.

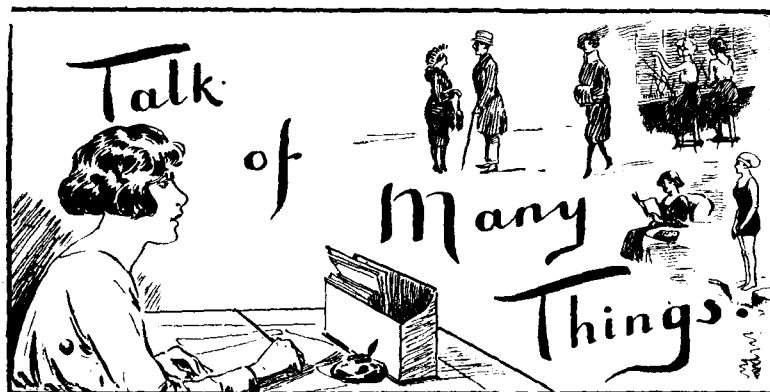
Following tea together, Mr. McQuiston (Traffic Department), who acted as chairman, voiced the feelings of those present when he said that Mr. McFadden had been a popular chief and a real friend to his staff. He was a sportsman, and had won from the staff, and any of the public who had come in contact with him, a reputation for straight dealing in all circumstances. They were all very sorry to lose him.

Mr. J. Holmes (Contract Department), on behalf of the district telephone staff, presented Mr. McFadden with a clock; Mr. J. McCormick (Traffic Department), on behalf of the traffic office staff, an epergne, and Miss Pollock (Supervisor), on behalf of the committee of the Telephone Dining Club, a wallet.

Mr. McFadden, in accepting the presentations, suitably replied to the eulogistic remarks of the previous speakers, and specially referred to the feeling which had prompted the present of a handsome bowl and flowers direct that day to Mrs. McFadden.

Mr. McFadden was then accorded musical honours, and the remainder of the evening devoted to a highly enjoyable entertainment, provided by the following:—Misses M'loughlin, Haughey, Smith, O'Leary, Martin and Mr. Stanfield.

WE TELEPHONISTS



Service.

I REMEMBER, and doubtless you remember too, the oft-repeated phrase "Many a true word is spoken in jest." This is so true that the author must have been joking when he said it. If he were not jesting at the time no one would have taken him seriously, for sermons are usually found, in the end, in the twopenny box, and then only by the earnest seeker, whilst Punch and similar humorists generally rest as bound volumes on library shelves. It is a rare and precious gift to be able to clothe solemnity in a smile, for in no other way can we be made to absorb nourishing and corrective moral diet. Presented as a plain and unsugared statement we are apt to pass it hurriedly or to forget it immediately, but set it with a cap and bells and we stay to listen and applaud. Beneath the lightest phrase, apparently frivolous, stupid, or meaningless, may be hidden a crock of gold, and careful consideration will often reveal the beauty of a human soul.

I am prompted to write thus after having heard the seemingly nonsensical, but to me the infinitely pathetic, line "Mother hold the baby while I scratch the chicken's lip." I don't know who wrote it nor how he came to conceive such an appeal but I am impressed with the significance and vivid interest of the events implied by the request. The scene, as it presents itself to me, is simple and convincing. There in the back garden we see a child—a girl of about thirteen—with tousled hair, red I think,—and flushed face, and a neat but soiled pinafore which only partly conceals a shabby dress. She is seated in an old chair and in her arms a baby is clasped protectingly and caressingly. *It is washing-day and her task is to mind baby.* The implements of amusement and instruction are around or near at hand to quell any sign of restiveness or tears. Down the garden stretches a clothes-line bearing spotless garments of varying texture and use fresh from the wash-tub. The mother, with a coarse apron about her, is pegging the line with further articles. Her hands are pink and knotted, her bare arms are wet and steaming and her hair wisps untidily from beneath her husband's old cap on to a lined and moist forehead. Suddenly the girl pauses in her nursely duties, the softened look in her face fades and glancing up she listens intently. Then she turns and glances anxiously at the chicken-run at the side of the garden. Instantly pity films her eyes, for she hears the cry of pain of an alleged dumb creature. Torn betwixt loving duty to the baby, obedience to maternal injunctions and a desire to relieve the distress of a helpless chicken she stays a moment in perplexity. Then she decides—but what thought and care in her decision. The baby, you notice, is not left upon the ground where it may be trodden upon or eat the dirt; it is not left perched precariously on the chair; it is not even surrendered to another member of the family. No; the sacred charge is handed temporarily to its mother. Then quick as thought the girl springs to the afflicted chicken, gently soothes its irritation, and resumes again her family responsibilities with a song of service in her heart. How wonderful it is, and how even more wonderful it would be if a chicken had a lip—which I very much doubt.

PERCY FLAGG.

Avenue Bazaar.

It was upon the 12th Feb. we held our grand Bazaar, and all our friends and relatives arrived from near and far.

The stalls were decked with bunting gay, and held a goodly store of dainty wares and household goods, with fruit and flowers galore.

The sale was opened by Miss Cox, supported by Miss Ashmead—and in a brief but telling speech she emphasised the cash need of both the hospitals we help—the Westminster and Shadwell—whose skilful healing ministry makes many a lass and lad well.

A vote of thanks was then proposed, and met with acclamation—both ladies being given bouquets to show appreciation.

The sale proceeded then apace, and crowds of eager buyers besieged the stalls for powder, scent, and other beautifiers.

Both dainty goods of silk and lace, and eke of household linen, were purchased by prospective brides, to make a good beginnin'.

The stationery, books and toys be sure were not neglected when eager little girls and boys these treasures had inspected.

The promenading damsels, too, with trays of tempting wares, pursued their customers perforce, both here and on the stairs.

No mere man could resist the wiles of each bewitching maiden, but blithely bought the flowers or fruit with which they all were laden.

And when towards the dining-room our patrons turned their feet, they speedily were served with tea by maidens fair and sweet.

Behind the scenes attendant sprites fulfilled their clients' wishes, and made fresh tea and toasted scones—nay, even washed up dishes!

The side-shows did a roaring trade in roulette, darts and bran-tub—the fortune tellers read our fate in diamond, heart, spade and club (!)

Then, when the eve was far advanced, our visitors departed and left us counting up the spoils, all cheery and lighthearted.

We realised £100—which sum will be divided between the hospitals concerned; for so we have decided.

We thank all friends who helped our cause, in Charity's sweet name, and with their aid another year we hope to do the same. C. A. S.

Central.

The Swimming Club held their final social at Furnival Hall, Holborn, on March 1.

A very pleasant evening was enjoyed by a good number of the staff, several of whom contributed towards an entertaining programme.

Thanks are due to our Chief Supervisor (Miss Buckwell), who kindly gave and also presented the prizes for the games. We now hope to embark upon the coming season with renewed energy and interest.

A pleasing "Extract"—

"The sum of £21 as a result of the efforts of the Central staff has been forwarded to the Bolingbroke Hospital, Wandsworth Common.

The Central Social.

On March the 8th at Central

A social eve was spent,
There joy and gladness reigned supreme
And all was merriment.

The cause was good, so all our friends
Arrived from far and near;
To help the funds of Bolingbroke
And spend a night of cheer.

The band was formed of engineers
Who left the "Right when tested";
And came to help the splendid cause
In which we're interested.

They played the Charleston and the Waltz,
And made the rafters ring,
Until the clock said ten p.m.
Then played "God save the King."

And all the evening we could buy
Both ice and chicken pasty,
The trifle too was of the best,
And everything looked tasty.

There claret cup and lemonade
Were lavishly provided,
The barley water in the tank
It rapidly subsided.

The raffle for the load of fruit
Was won by our Miss Powell;
And as she bore it from the spot
With joy we gave a howl.

Miss Gamhan and Miss Longman
Both caused much fun and laughter,
They sang "Us girls must have our fun,"
And then an encore after.

Of all the other items
I'd like to say a bit,
But though they were all splendid
The space does not permit.

And to our chief, Miss Buckwell,
Our best thanks should be given,
And all her willing helpers,
Who in this cause have striven. D. D.

"The Trivial Round"

It is surprising how the work most of us are compelled to do for a living palls at times, and how many people there are who sigh with envy when they think of the job that So and So has got, and compare it with their own. Telephonists are no exception to the rule, and probably many of them will



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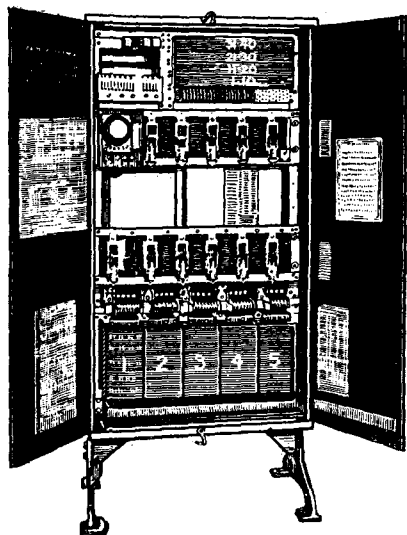
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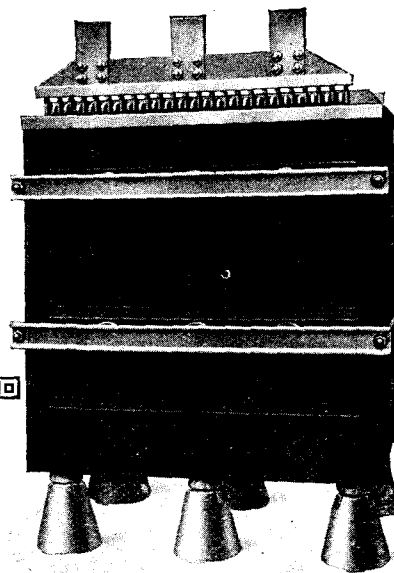
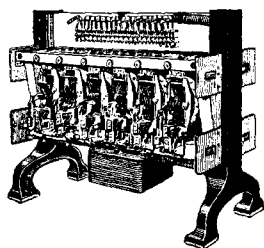
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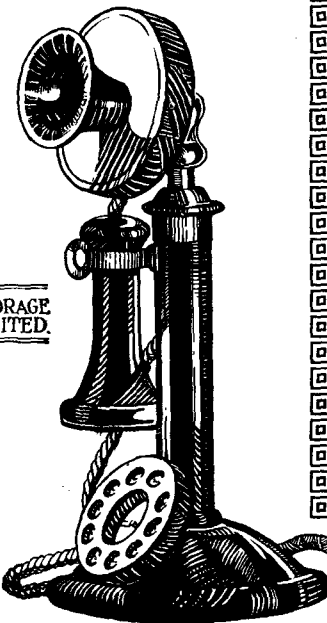
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sympathise with the girl who was heard the other day lamenting that she had ever chosen to sit each day at a switchboard. Her complaint appeared to be that whilst other girls were doing things that mattered, her work was of little or no account, and that she was, as it were, merely on the fringe, instead of being at the centre of affairs. Now this is clearly a case where everything depends upon the point of view. Let us take advantage of the listening-in facilities provided, and judge for ourselves her usefulness or otherwise to the community. The first call is from a busy doctor, ringing up the matron of his private nursing home to ascertain how his patients are this morning. With the help of the telephonist he has saved valuable time, which can be devoted to other patients, and to this extent she is a joint worker with him in the cause of suffering humanity. The next two or three calls are of little or no consequence, and then there comes a request, which is made regularly every morning, for an Exchange fifty or more miles away. Mr.—, who is a clever and successful barrister, and considered by many people to have no heart at all, is ringing up his old mother to bid her "Good morning," and to receive her assurance that "All's well." A flapper's voice is now heard, asking for "2424." That is where her darling boy condescends to employ his time, and as she knows that his chief will not have arrived she is anxious to recall again the delights of last night's dance. Nothing very important about that, of course, my dear Telephonist, but still you may have helped to swell the chorus of "Love's sweet song." Enter now "Big Business," with a cigar between his teeth, which causes him to mumble the number he requires. "Sorry; I can't hear you," says the Telephonist. He takes the cigar out of his mouth, and repeats the number slowly and deliberately, after which he is heard expressing the wish that the girls would attend to their job, and so save his valuable time. Easily irritated, but quite harmless, the dear man, and he will probably send the girls a box of chocolates at Christmas. A red light with a white dot glows on the board. This is a call from an unattended Call Office. The caller is a smart "Bookie," who brags to his friends of his ability to get his calls for less than the proper fee. "One," "two," "three," says the Telephonist. "I've put five pennies in," says he. "Only three," replies the Telephonist, whereupon he begins to argue the point. Immediately he is switched through to the Monitor, who is made aware of the dispute, and who insists, gently but firmly, on his putting in the box the full number of pennies. This time, at any rate he has not "got away with it." Next a call from a stockbroker to one of his clients, and in the course of a few minutes business involving thousands of pounds has been done. A street accident has occurred. "Ambulance, quickly!" In a flash the connexion is made, and by her quickness the Telephonist may have saved a life. And so, throughout the day, touching life at almost every point, the Telephonist carries on, rendering, in the present stage of telephone development, invaluable service to the community, and service which will bear comparison with most of that performed by her sisters in business on whom, in her moments of depression and self-disparagement, she is inclined to look with envy. G. W. BUTTERWORTH, Preston.

Two Points of View.

THE IDEAL SUPERVISOR.—By an Operator.

In all my wanderings around
Oft have I sought, but seldom found,
The person who is all perfection
As supervisor of a section.
She does not talk behind your chair
With any other Super. there,
About your habits or appearance,
But both expects—and gives—adherence
To the rule which all should run by
"Always do as you'd be done by."
She does not at her lung's full range
Shout out your name down the exchange,
Anticipating every glow
Before you've had a chance to show
That though you're working at the limit
You'll try to answer in a minute.
Juniors she does not bully
Or push authority so fully
That its pressure gives offence.
She herself possessing sense
Thinks that it is only fair
To credit others with a share.
She takes up faults with due precision
And settles with a firm decision
Any Staff or Service friction
That comes within her jurisdiction.
She has no time for favouritism
Which causes unkind criticism.
Ah me, 'twould be indeed a pleasure,
To work one day for such a treasure!

A. G. C.

AND

THE IDEAL OPERATOR.—By a Supervisor.

In all my wanderings around
Oft have I sought, but seldom found,
The person who is all perfection
As Operator in her Section.

She does not glance behind her chair
To see if you are standing there,
Then, conscience-stricken, make a clearance
Upon her board, at your appearance.
She does not, at her lung's full range,
Shout "Number, please," down the Exchange.
She does not make a hundred slips,
Talking with almost moveless lips;
Nor does she "answer back" a lot,
Nor listen in when she should not.
And when she's anything to say,
She does not speak in such a way
That her manner gives offence;
She herself possessing sense
Thinks that it is only fair
To credit others with a share.
She'll make a cheery witticism,
But has no time for criticism;
Her "tone" to subs. is clear and bright
She even thinks they're sometimes right—
And all the time, in every way,
She gets better and better every day.
Ah me, 'twould be indeed a pleasure,
To have on one's Section such a treasure!

B. Y. E.

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.

LONDON TELEPHONE SERVICE NOTES.

Accounts Branch.

Directory facts and figures.—One of the most important events of March, from the Accounts Branch point of view, was the publication of the new issue of the London Telephone Directory which is dealt with on a Section of the Branch. Few who have not at some time been attached to the Directory Section have any idea of the amount of work involved between the half-yearly publications of the Directory which grows with every issue. As is well-known, it was necessary, in the October 1926 issue, to introduce a new make-up by arranging the names and details in three columns to a page instead of two and reversing the positions of the names and numbers, and also giving certain items in an abbreviated form in order to get the whole of the subscribers in the London area into one volume, not too bulky or weighty for use.

In addition to the insertion of new names and the deletion of ceased ones, there is the far more complicated business of the people who move, or change their name or description, or want entries in a different form. Most of these matters are dealt with by Advice Notes and between the compilation of the press copies of the October 1926 and April 1927 issues, some 47,500 Advice Notes passed through the hands of the officers on this work, who also dealt with 5,706 letters and innumerable other communications.

Another matter which involves alterations in the Directory is the transfer of blocks of lines from one Exchange to another to conform with the development of certain telephone areas and the opening of new exchanges. These changes amounted to about 2,000 for the April Directory, but are often as many as 6,000.

The entries in special type, and additional matter are dealt with by the Advertisement Contractor, who notified alterations and additions to the number of 5,536 for the present issue.

The April 1927 Directory has 1,324 pages which, after allowance has been made for additional advertisements, is a net increase of 58 pages over the October 1926 issue. The number of entries is approximately 283,000 while about 9,000 subscribers, at their own request, have no Directory entry at all.

The number of copies of the Directory which it has been necessary to order this half-year is 397,600, including 5,400 for call offices. By the time these notes are in print those intended for existing subscribers should have reached their destination. An interesting development in connexion with the distribution, and one which makes estimates difficult, is the growing practice, at the newest luxury hotels, of providing a telephone for every room and a Directory for each telephone. Two recent instances are the new May Fair and Park Lane Hotels which have each requisitioned 450 copies of the April issue.

* * * * *
Contract Branch.

Some idea of the volume of work dealt with by the Contract Branch during February may be derived from the following summary:—

New business obtained	...	...	...	7,826	stations.
Ceasements	...	...	...	2,930	"
Net gain	...	...	...	4,896	"

The net gain was 447 stations more than that for January—and constituted a record for the short month of February.

The demand for exhibition lines seems to be increasing year by year. The number provided at the recent British Industries Fair at the White City was a record for this particular exhibition; so much so that it became necessary to open up a cable and bring additional pairs of wires into use.

The following table shows the percentage of exhibitors provided with lines at three recent exhibitions and indicates, incidentally, that there is still plenty of room for an increase in the demand for this type of service. Attention should perhaps be directed to the fact that the "Business Efficiency Exhibition" has the lowest percentage, but the reader must be left to draw his own inferences from this.

Ideal Home Exhibition	...	...	...	...	37.5
British Industries	...	...	...	...	27.37
Business Efficiency Exhibition	...	...	...	...	20

The percentage for the British Industries Fair in 1926 was 21.7, and that for the Ideal Home Exhibition in 1925 was 29.6.

A number of letters have appeared in an evening newspaper recently relating the writers' experiences in obtaining a telephone installed quickly. The first correspondent apparently had his line completed in a fortnight and thought that this must have been a record. The publicity he gave to the matter, however, produced a crop of emulants—and the record time was reduced to four days. Later a case was quoted from South America, where an extension was provided in an afternoon—an impossible thing for a British Government Department to do!!

Funnily enough, the record appears to be held by the London Telephone Service and the London Engineering District with a time of ten minutes for an exchange line. A few details of the case may be interesting. In 1921 the London representative of a Manchester firm exhibiting at the Agricultural Hall, discovered on arriving at the Show that he had overlooked his instructions to arrange for a telephone to be installed. He rang up the District Contract Office, poured forth his tale of woe, and asked that a line should be installed as quickly as possible. He received a promise to this effect and retired to the buffet. When he returned to the stand five minutes later a line to the North exchange was in working order—the whole thing having taken less than ten minutes.

The life of a Contract Officer is full of adventure, often amusing but sometimes the reverse, as the following incident will show:—

One of these officers recently called on a lady in connexion with her request for an alteration to her telephone. During the interview he found it necessary to consult his headquarters, and with the subscriber's consent he used the telephone in the room for this purpose. As soon as he started to speak the subscriber started to shriek violently and hysterically so that the officer at the distant end of the telephone wondered what was happening.

The Contract Officer's discomfort was extreme when the subscriber jumped up, smacked his face and then fell under the table still shrieking wildly. Fortunately her daughter arrived at that moment and relieved the Contract Officer's troubled mind by telling him not to take any notice of the incident as such scenes were of frequent occurrence.

When the October issue of the Telephone Directory was issued, London newspapers amused themselves by chipping the Department on the abbreviations introduced to enable three columns to be fitted into each page. The public soon gets accustomed to abbreviations and the user of a Telephone Directory, at any rate, has an idea of what he is looking for, and finds it with little or no difficulty. Newspapers, however, use abbreviations every day, and one may perhaps be forgiven for suggesting that it was a case of the pot calling the kettle black. One or two examples may be quoted from the City columns of a morning paper:—

A'RAT'D BR'D. AFR & E'ST.T. AG & GN.PF. AM.DNT.
BO'TS P'RE DG. N'P'R(D)O. TRN. CON. LD. &c. &c.

They are no doubt understandable to the initiated, but one may hazard a prophecy that it will be many a year before the London Directory contains such gems (?) of brevity.

London Telephonists' Society.

On Friday, March 4, a large number of the members of the London Telephonists' Society attended the seventh meeting of the session in the Lecture Hall of the City of London Y.M.C.A., 186, Aldersgate Street, E.C.1.

The meeting was preceded by the usual half-hour concert consisting of vocal and instrumental items very delightfully rendered by Miss C. D. Davidson and a few of her colleagues from Central Exchange which the audience thoroughly enjoyed.

The evening was then devoted to a paper read by Mr. E. S. Abbott, of the Automatic Designs Section, entitled "The Human Element in Automatics." The paper was, as its title indicated, an attempt to dispel the misunderstanding and misconception that exists as to the part to be played by the human as distinct from the mechanical element, and to emphasise the necessity for the co-operation of human intelligence when the Automatic Era has come to pass. Mr. Abbott dealt at length with all the various types of traffic which will be met with during the period of transition and explained the many stages of setting up of connexions which will continue to be handled manually, and in order to demonstrate the higher order of the work to be undertaken by the staff gave some rather curious examples of subscribers' possible complaints which will have to be dealt with by Telephonists.

The paper was well received, and considerable discussion followed, in the course of which one speaker referred to the anxiety expressed by an exchange cleaner as to the prospects of her being retained at her present duties when automatics were introduced at the exchange at which she was employed. On the whole, Mr. Abbott was able to convince the meeting that the staff of the London Telephone Service need take no heed of the morrow so far as a continuance of their employment under automatic conditions is concerned.

The Telephone Play.

Stimulated by the experience of the last two years, another crowded audience occupied St. George's Hall, Caroline Street, Tottenham Court Road, on Feb. 25 last, on the occasion of the presentation of the third topical telephone play, "Nothing Like the Truth," from the pen of Miss McMillan, whose gifts as an authoress are known throughout the London Telephone Service. As before, the play was produced under the direction of Mr. E. A. Pounds.

As is fitting, the subscriber is again the hero of the story. In the first act, after an unexampled display of "subscribers' irregularities"—for the results of which, as usual, he blames the exchange—he gets into touch with his friend—a professor of chemistry—and in the course of conversation playfully commends to him the idea of inventing a potion designed to improve the efficiency of the exchange staff. Later, he falls asleep; and in the land of dreams is transported to a somewhat unconventional telephonists' meeting, at which, in due course, the professor appears with his potions. These produce—*inter alia*, as official minutes say—an unlimited capacity for falling in love; which the senior telephonist and the professor promptly do.

The next act reveals the subscriber in the exchange of his undisciplined imaginings, where the "cut-off fiends," the "don't answer demons," and other creations of the comic press ply their craft uninterrupted save by intervals for reading, cross-word puzzles, and a little dancing. The professor, intent on reformation, arrives with his potions, which he distributes freely, and, of course, everyone gets the wrong remedy. The senior telephonist falls in love with one after another with delightful impartiality; while an inconvenient attack of truth-telling is only warded off by a copious draught of the love-philtre. Subscriber, engineer, and professor are soon at cross-purposes; and the complication is only resolved by burning the professor at the stake—to which lurid end the philandering senior telephonist cheerfully accompanies him. At this, the climax of the nightmare, the subscriber awakes, realising for the first time that he is "the villain of the piece." As usual, Miss McMillan's lines are full of whimsical humour, and gently poke fun at all and sundry with an impartiality equal to that of the senior telephonist.

The play was performed by a strong cast, including many of last year's players; and all gave of their best. Miss Florence Blair Street, in the dual rôle of maid and senior telephonist, sang as delightfully as ever. Mr. Arthur Hemsley in the part of the subscriber found full scope for his fine voice and humorous acting. Mr. William Beale, resplendent in the garb of an Eastern Potentate, made a grand Superintendent, and was well supported by his supervisor, Miss Ada Price, in her own inimitable style. Then comes Mr. T. A. Beck—this year in the guise of an engineer who particularly pleased the audience with his song, "R.W.T." which had been written by himself. Mr. Hugh Williams, brilliantly arrayed as a magician, sang well and alternately added tragedy and humour to the story. Next on the list is Miss Lilian Jones—the spirit of the Cauldron—who was responsible for the arrangement of all the dances and ensemble and who especially delighted an enthusiastic audience with her solo dance. The ubiquitous Charleston was, of course, in evidence; and the applause which marked the "turn" of the "Charleston Babies" attested to the popularity of this latest item from the repertoire of the darkies of the States. And lastly, but by no means least—the chorus of Operators and Fiends, whose costumes and headgear had again been beautifully designed by Miss Maud Clayton and which provided a very pretty setting to their happy faces and forms. Their singing of the bright and tuneful music to which the clever lines were linked was as fresh and charming as ever. Mention, too, must be made of the orchestra which, though unseen, did splendid work. It was led by Miss Daisy Suckling, who was ably assisted by the Misses Woodman, Cates and Liddell. The scenery and effects were admirably arranged by Mr. E. W. Cherry.

At the close of the play the author was enthusiastically called, and presented with flowers. Miss Street was also the recipient of a similar token of appreciation.

The play is to be repeated on the 28th instant, when it is expected that an even larger audience will enjoy another of those merry evenings for which the London Telephonists' Society owes so large a debt of gratitude to Miss McMillan, Mr. Pounds, and all concerned in the productions.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Promotions:—

- Miss E. L. STAFFE, Sloane Exchange, to Chief Supervisor.
- Miss E. C. BEDFORD, Park Exchange, to Chief Supervisor.

Resignations for Marriage:—

- Miss E. M. WONNACOTT, Telephonist, of Holborn Exchange.
- Miss L. E. WARNER, Telephonist, of Holborn Exchange.
- Miss I. WEBB, Telephonist, of Paddington Exchange.
- Miss E. C. JENKINS, Telephonist, of Regent Exchange.

THE Telegraph and Telephone Journal.

VOL. XIII.

MAY, 1927.

No. 146.

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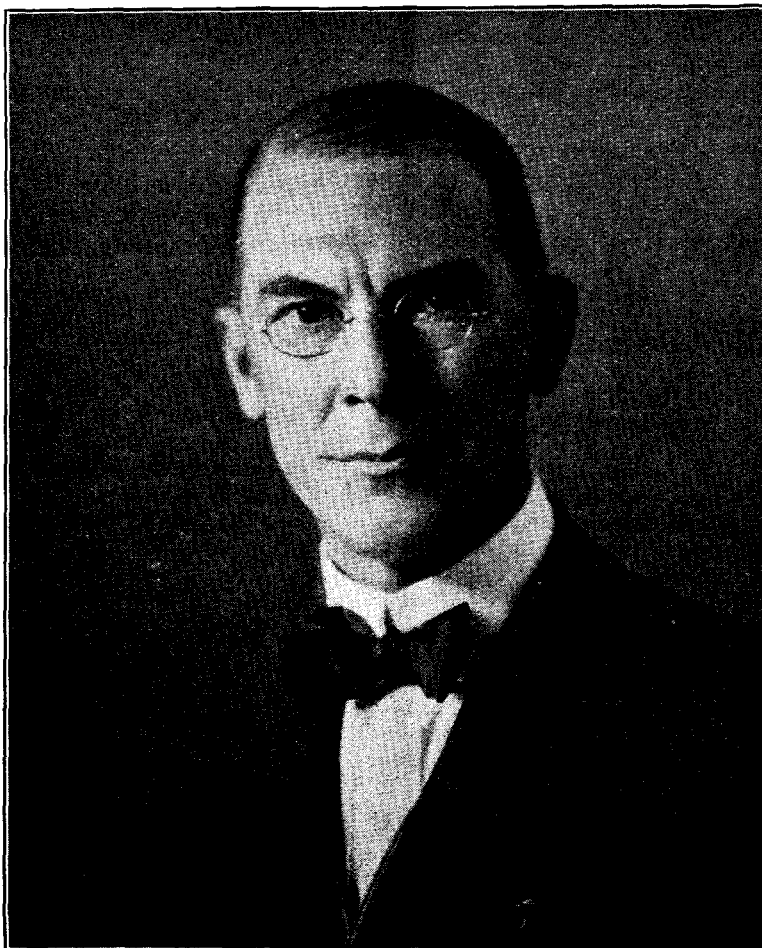
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XL.—

MR. WALTER ERNEST WESTON.

MR. WALTER ERNEST WESTON, Principal in the Secretary's Office, whose portrait we present this month, was one of the small but select band of men who, on the transfer of the National Telephone Company's undertaking to the Post Office on Jan. 1, 1912, were allotted to G.P.O. Headquarters, Mr. Weston becoming a Second-Class Clerk, Higher Grade, in the Secretary's Office.

Mr. Weston, when with the National Telephone Company, was the statistical expert, and naturally the same responsibilities were assigned to him on his transfer to the Post Office. He did much valuable



work in connexion with Parliamentary Select Committees on Telephone Rates. Indeed, Mr. Weston has such a *flair* for telephone statistics that, on his promotion to a First Class Clerkship, his separation from them in order to take up other duties presented considerable difficulty. Mr. Weston was ultimately transferred to the Overseas Telegraph Branch and it soon became clear that his ability in connexion with statistics was merely the manifestation of one side of a brain of a very high order. Mr. Weston is now concerned with the wireless services and he was the Secretary of the recent commission which dealt with the future of broadcasting. He was promoted to the grade of Principal on April 1, 1920.

Mr. Weston is interested in all forms of sport and is a golfer of no mean ability.

THE IDEAL HOME EXHIBITION,

MARCH 1-26, 1927.

BY OLI-DAILE.

No. 95 in the Main Hall at Olympia was a Telephone Development Association Stand to which thousands of visitors were attracted by the free ballot advertised in the Press.

Two officers representing the London Telephone Service were deputed to attend and secure signed contracts for exchange services required in the London area and record Provincial inquiries.

Many grievances were aired on Stand 95 during the four weeks of the Exhibition and readers of the *Telegraph and Telephone Journal* may be interested in some of the expressions of opinion of which we, the L.T.S. representatives, were the willing, or unwilling recipients.

Generally, the Post Office Telephone Service was well spoken of, one gentleman, obviously not a Civil Servant, stating that he would rather do without two suits of clothes each year than dispense with his telephone. Another gentleman, when asked if he was interested in telephones, replied: "Yes, just so far as to say that they are an infernal nuisance and the less I have to do with them the better I like it." To do justice to the grievances of one lady connected to the Redhill Exchange would need a special edition.

Inquiries regarding completion of installations on order were fairly frequent and in some cases were accompanied by strong comments. We dealt with these as tactfully as possible, sometimes finding it convenient not to reveal our identity. It was very refreshing, however, when one gentleman looked in to say how indispensable his telephone had been during illness following an accident. He was delighted because the 'phone was installed in four days.

Landlords appear to be doubtful blessings. One subscriber was in trouble on account of his landlord threatening to have all wires removed from the premises, thus endangering the continuity of his tenant's telephone service. Several enquirers, too, seemed to be worried about "whether their landlords would object to a telephone being installed"; but we think the landlord, not of British nationality, who charges his tenants 6d. for calling them to answer the 'phone after 10 p.m. has, with our help, induced one of his tenants to become a subscriber.

We interested many people in the manipulation of automatic telephone dials, but had also to deal with a constant stream of inquiries about "gadgets." One subscriber who inquired about an appliance which is not on the authorised list, on being so informed, laughingly replied: "Oh, that's alright. We know when your Engineers are coming, and the ——— is taken off before they arrive, and put back after they leave." This subscriber appealed to us more than the one who, hearing us explain the different tariffs for business and residential telephones to a friend of his, confessed that he was unaware of the different rates, adding that he originally rented a residential connexion but had had this removed to his business premises without increase in rental. The honest man flatly refused to give his telephone number!

The H.M.T. (hand-micro-telephone) type of telephone was often mentioned. Many people seem to prefer this type of instrument. One gentleman showed us his sleeve shiny at the elbow and said it was due to his having to use the present type of telephone. We sympathised: we are accustomed to shiny coat sleeves ourselves but don't blame the telephone for them. Occasionally, however,

we came across lady subscribers who prefer the candlestick pattern instrument. Sleeves, of course, are a negligible quantity with the fair sex.

Questions of all sorts were asked about the ballot. Perhaps the most humorous was this: "I am a Sviss. If I vin, do I take the telephone to Svitzerland?" A certain actor caused some amusement. He had partially filled in an entry form when, being recognised as a subscriber, he was informed that the ballot did not apply to renters of existing telephones. He jocularly said that we had blighted his life and departed, returning almost immediately to snatch up his signed entry form (which in a few minutes would have been in the wastepaper basket) with the remark: "I make a charge for my autograph."

Perhaps the culprit who walked off with the hospital box and its contents realised the odds against success in the ballot and was seeking compensation!

We must mention our imitation log fire which was a certain Gas Co.'s exhibit. Oh, that gas fire! It nearly scorched us, nearly set the stand alight on one occasion, and caused much gnashing of teeth when having, as we imagined, succeeded in interesting prospective subscribers in the all-important telephone they suddenly exclaimed, "Oh, what a beautiful gas fire." We mentally substituted another adjective and then agreed. However, it was the innocent cause of one delightful question. A caller asked, "Are the logs made of aspidistra?"

Applications from all sorts of people were dealt with. One young man was very anxious to sign an agreement for a telephone to be installed in his father's house. When it transpired that his business or occupation was "Out-of-work clerk" we tactfully suggested that it would perhaps be better if his father signed the agreement. Ladies are very keen on telephones and many were anxious to arrange for their husbands to be "tactfully" approached. We noticed that we were generally successful in obtaining orders when husband and wife were together. One gentleman who was not anxious for a private house connexion, told us that his wife was so keen on it, that for him it appeared to be either a telephone or a divorce. We obtained his order, and hope he will decide that he has chosen the lesser of the two evils.

One lady wanted the telephone installed on April 31. We regretted it could not be done but took her order for May 1. She was a L.C.C. headmistress, too!

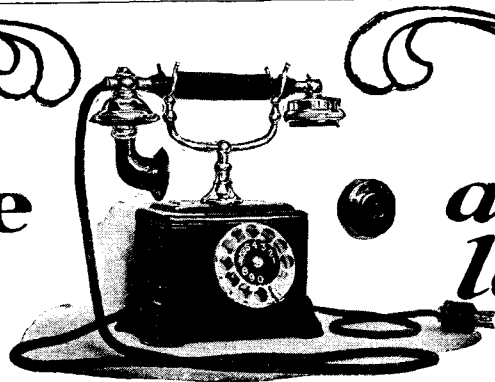
Altogether we secured over 100 signed agreements for exchange lines, and a few extensions. We also dealt with about 250 promising inquiries, most of which should result in business. We left the Exhibition on Mar. 26 feeling that we had justified our presence there. We certainly performed useful work in preparing the ground for the cultivation of the telephone habit, and exploded many of the old ideas which still exist about minimum calls, installation costs, and heavy initial charges. We also presented "the other side" to those subscribers who complained of overcharges in their accounts for calls.

BROADCASTING IN POLAND.

THE Polish Broadcasting Company (Poleskie Radio) have just placed a contract for a 10-kw. broadcasting station to be erected at Katowice. It is interesting to note that this equipment will be manufactured in London, at the works of Messrs. Standard Telephones & Cables, Ltd.

This follows on the recent successes of this Company in face of foreign competition in obtaining contracts for broadcasting equipments for the Irish Free State, Denmark, Japan and New Zealand, and is indicative of the universal reputation that British manufacture holds in this latest field of scientific endeavour.

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THE DAILY TELEGRAPH, SATURDAY, APRIL 9, 1927.

BEST TRUNK EXCHANGE.

VICTORIA VERY "POSH."

When the arbitration proceedings in regard to postal workers' wages were continued by the Industrial Court, yesterday, Miss Edith Howse, organising officer of the Union of Post Office Workers, described the working of trunk exchanges.

The chairman asked which was the worst exchange in London from the telephonists' point of view, taking into account equipment and the conditions and nature of the work.

Miss Howse: Speaking generally, I should say or I do not think even the official side could say there is much to choose between these two.

The Chairman: And if you had your choice which exchange would you prefer to work in?

Miss Howse: I should say the trunk exchange for preference, but among local exchanges I would select Victoria. It is one of the show exchanges—very "posh."

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A... Gen... trict... ral... talion... Legion... acted... the U... Black...
Colonel... Saturday... York... comm... last... ann...

THE VICTORIA telephone exchange referred to above, equipped for 10,000 subscribers' lines, was installed by the PEEL-CONNER TELEPHONE WORKS in 1913. STANDARD APPARATUS was used throughout. After 14 YEARS' SERVICE it is stated to be the BEST EXCHANGE IN LONDON !!

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AUTOMATIC TELEPHONY.

BY C. W. BROWN.

(Continued from page 128.)

II.

THE prevailing types of mechanism used in step-by-step automatic telephony fall into two classes, single motion and two motion. Such mechanism may be operated by the current impulses transmitted by a dial and provide the means by which two circuits may be connected together. Thus, in Fig. 1a a moving arm can be directed to any of the fixed points in the arc of the circle through which it moves. The moving member travels in a circular path in one plane only, so that the more the number of points in the fixed member—the arc—the greater will be the number of steps taken by the moving member in effecting connections.

The application of this principle will be seen in Fig. 1b. Current impulses are directed to the magnet (M) by the means already described. With each impulse the pawl (P) is withdrawn from its position and rests in the next tooth of the wheel (W). When the current through (M) is broken, the armature of (M) is pulled back by the spring (S) and the pawl (P) is thrust into the root of the tooth upon which it is resting, the wheel (W) is pushed forward carrying with it the radial arm which thus moves to the contacts.

The assembly of contacts is known as a "bank" of contacts, and owing to the rubbing action of the tip of the moving arm upon the contacts, the latter is referred to as a "wiper" and frequently as a "brush."

In Fig. 2a the principle of two-motion operation is given. Ten separate banks of ten contacts are placed in tier formation, thus providing a large semi-circular bank consisting of 100 contacts

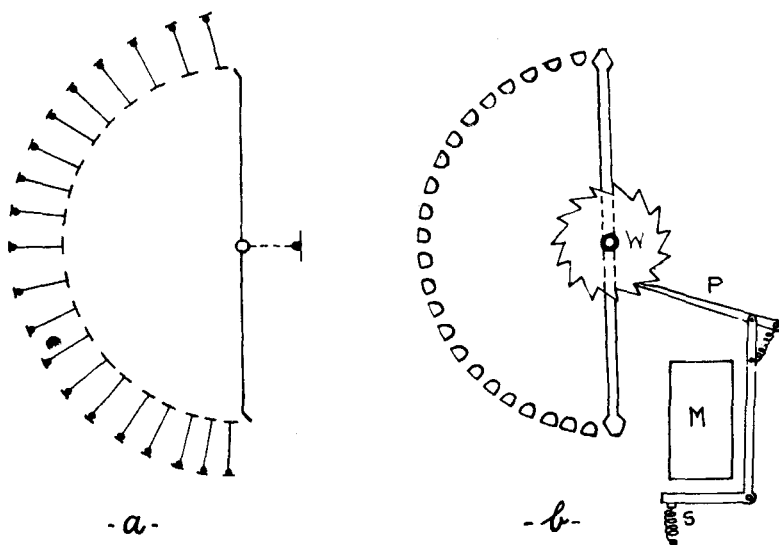


Fig. 1

in ten levels of 10. A shaft carrying radially a wiper, and capable of being lifted and rotated, is located in front of the bank, so that by first raising the shaft and then rotating it, the wiper tips can be placed in contact with any desired point in the bank. It is observed that the shaft moves in two planes in order to effect such

connexion—a vertical and horizontal, hence the expression "two motion" applied to mechanisms employing that principle of operation (one well-known system employs a horizontal before vertical movement which obviously produces the same result, but the standard adopted is a vertical before horizontal movement, frequently referred to as "up and around.")

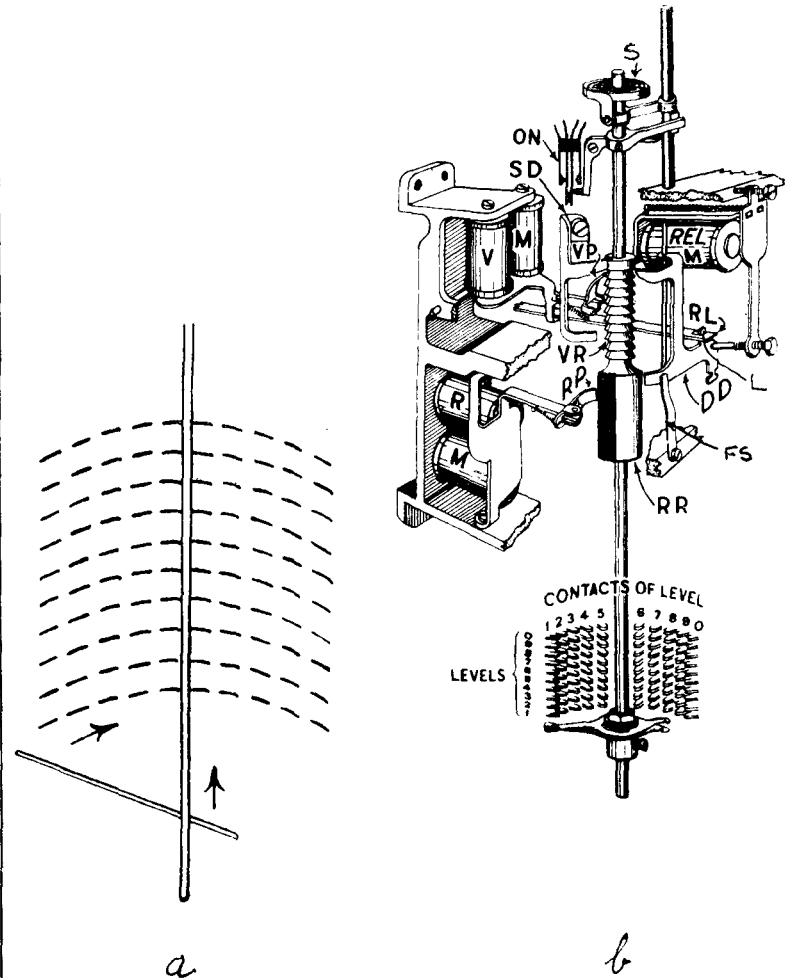


Fig 2

These movements can readily be carried out by magnets receiving energy as the result of the transmission of impulses from a dial, so that by allocating two digits to each of the bank contacts the transmission of two impulse trains is necessary in order to move the wiper to a bank contact.

This method requires less mechanical movement than in the single motion type of mechanism having access to 100 contacts numbered 0 to 99. On the other hand, it is possible to use single digits in the earlier contacts, whereas two digits are always necessary in the two-motion scheme having access to 100 circuits numbered 00 to 99, but the average number of steps taken by the single-motion mechanism is very much higher than in the two-motion type.

Providing the contacts forming the bank are in ten levels, each containing ten contacts, the two-motion scheme conforms to the decimal system of numbers. Simplicity of operation is thus obtained and numbers represented in the bank contacts are readily identified by the position of the contact. No claim is made that this method of automatic switching is the best, but where simplicity of operation and straightforward decimal selection are dominant factors, there is much that favours step-by-step switching.

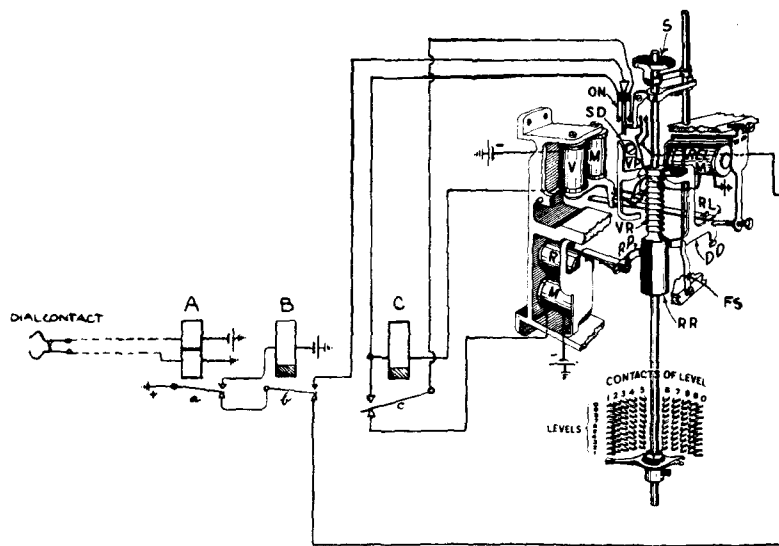


Fig. 3.

In Fig. 2b is shown a skeleton two-motion switch and a bank of contacts. The mechanism is appropriately known as a "selector," from the fact that its principal function is the selection by the wiper, of numbers associated with bank contacts.

The briefest of descriptions must suffice, at this stage, to explain the operation of the selector. The operation of complete circuits will be given in due course.

The shaft has two sets of teeth (VR) and (RR) for its vertical and rotary movements; the teeth, in association with the pawls (VP) and (RP) and the double dog (DD), provide a ratchet and pawl system of operation. With the passage of current impulses through the vertical magnet (VM), the pawl (VP) is thrust into the root of the adjacent tooth, thus lifting the shaft, which is prevented from falling again by the action of the upper portion of (DD), upon which the under side of the tooth rests. When the requisite number of impulses has passed, the shaft will have lifted the wipers to a position outside the corresponding level of contacts. A circuit change then occurs, cutting out the vertical magnet (VM) and joining in the rotary magnet (RM) for the reception of impulses. The shaft will therefore be turned by the action of the rotary pawl (RP) and the wiper will be carried to a specific contact in the level.

Level "0"	<u>01</u>	<u>02</u>	<u>03</u>	<u>04</u>	<u>05</u>	<u>06</u>	<u>07</u>	<u>08</u>	<u>09</u>	<u>00</u>
" "9"	<u>91</u>	<u>92</u>	<u>93</u>	<u>94</u>	<u>95</u>	<u>96</u>	<u>97</u>	<u>98</u>	<u>99</u>	<u>90</u>
" "8"	<u>81</u>	<u>82</u>	<u>83</u>	<u>84</u>	<u>85</u>	<u>86</u>	<u>87</u>	<u>88</u>	<u>89</u>	<u>80</u>
" "7"	<u>71</u>	<u>72</u>	<u>73</u>	<u>74</u>	<u>75</u>	<u>76</u>	<u>77</u>	<u>78</u>	<u>79</u>	<u>70</u>
" "6"	<u>61</u>	<u>62</u>	<u>63</u>	<u>64</u>	<u>65</u>	<u>66</u>	<u>67</u>	<u>68</u>	<u>69</u>	<u>60</u>
" "5"	<u>51</u>	<u>52</u>	<u>53</u>	<u>54</u>	<u>55</u>	<u>56</u>	<u>57</u>	<u>58</u>	<u>59</u>	<u>50</u>
" "4"	<u>41</u>	<u>42</u>	<u>43</u>	<u>44</u>	<u>45</u>	<u>46</u>	<u>47</u>	<u>48</u>	<u>49</u>	<u>40</u>
" "3"	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>30</u>
" "2"	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>20</u>
" "1"	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>10</u>

Fig. 4.

During rotary movement, the coiled spring (S) is wound up, but the engagement of the teeth by the lower portion of (DD) prevents the return of the shaft.

When it is desired to return the shaft to its normal position a circuit is established for the release magnet (REL M), the armature of which, by means of an extension piece, strikes the double dog (DD), this being pivoted, swings out of engagement with the teeth, the spring (S) asserts itself, the shaft returns so that the wipers are outside the level, and then drops.

Also associated with the mechanism are: a stationary dog (SD), a release link (RL) and a set of contact springs (ON). The latter are operated with the first vertical step of the shaft and connect control circuits required subsequently; the contacts remain operated until the shaft is restored to normal, hence the name "off normal" invariably associated with such spring contacts. (A typical example of the use of "off normal" springs is given in Fig. 3 of the previous article and again in Fig. 3 of the present article.)

The stationary dog (SD) is utilised for the support of the shaft during its forward rotary movement, while the shaft is held operated

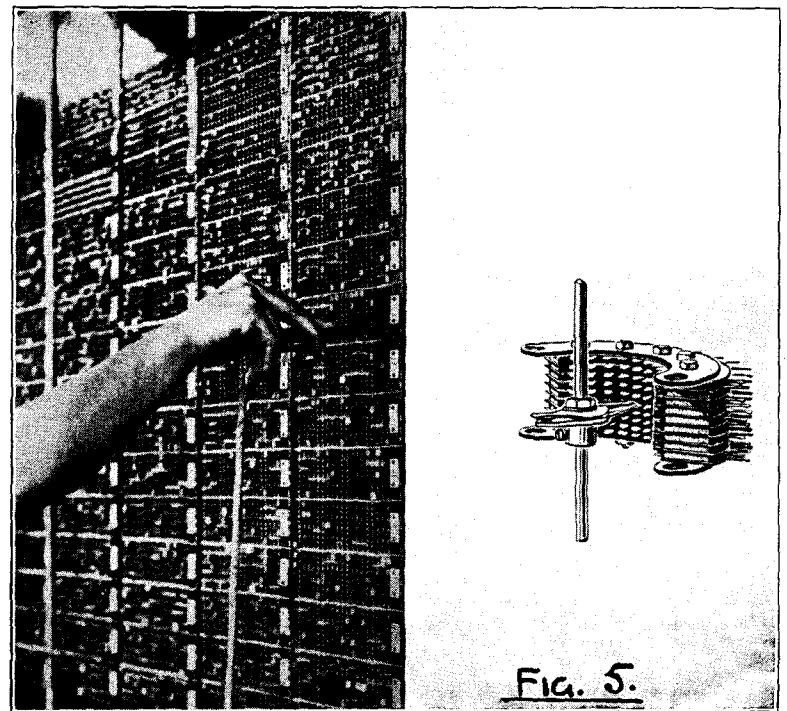


Fig. 5.

and during its return rotary movement. The dog normally rests in a slot of the vertical ratchet teeth and consequently becomes operative immediately the shaft turns, it keeps the underside of the tooth just clear of the upper portion of the double dog (DD).

The release link (RL) normally rests upon the vertical magnet armature and by means of a latch (L) keeps the double dog (DD) out of engagement with the shaft teeth, but with the first vertical armature movement the link is lifted from the latch and the double dog (DD) is pushed into engagement with the teeth by the flat spring (FS). When lifted in the first place, the link rests upon the top of the latch thereby remaining clear of the vertical magnet armature so that further movement of the armature does not affect it. When the release magnet extension knocks the double dog (DD) out of engagement with the teeth, the link latches it, so that until the vertical magnet again receives impulses, the shaft cannot be prevented from restoring. It will subsequently be seen that the circuit of the vertical magnet is disconnected until the shaft is at normal.

It will doubtless have been observed that when the shaft is operated to its final position, it is held there mechanically, thus current is not consumed for the purpose.

In Fig. 3, the selector has been associated with a dialling circuit. The change from vertical to rotary magnets is met by the introduction of a slow to release relay (C) (see also Fig. 3 in the previous article.)

The circuit operation is briefly as follows : Relay (A) is operated by a loop provided from the caller's telephone, (B) operating immediately. Impulses due to the dial operation result in interruptions in the circuit from positive, contact *a* (impulsing), contact *b* (operated), (ON) contacts of the selector, relay (C), vertical magnet, negative. As the (ON) contacts operate upon the first vertical step of the shaft—it is assumed that the (ON) contact normally making is broken and the contacts normally broken are made, with this step—impulses in the train subsequent to the first will pass to the vertical magnet via contact *c* (now operated). At the end of the vertical movement, the pause that occurs before the next digit is dialled is longer than the retaining period of

In comparing the "up and around" scheme of selection with the equivalent operation under manual conditions, an interesting similarity is observed. Fig. 5 is a view of both. In the manual case the operator raises a plug and cord to the particular strip in the hundreds block of jacks and moves the plug along the strip until the particular jack is located, into which the plug is inserted. In the automatic case, the wipers are lifted to the particular level in the hundreds bank of contacts and are then moved along the level until the particular contact is reached; thus the bank of contacts is equivalent to the block of multiple jacks, the shaft to the operator's arm and hand and the wiper and associated connections to the plug and cord.

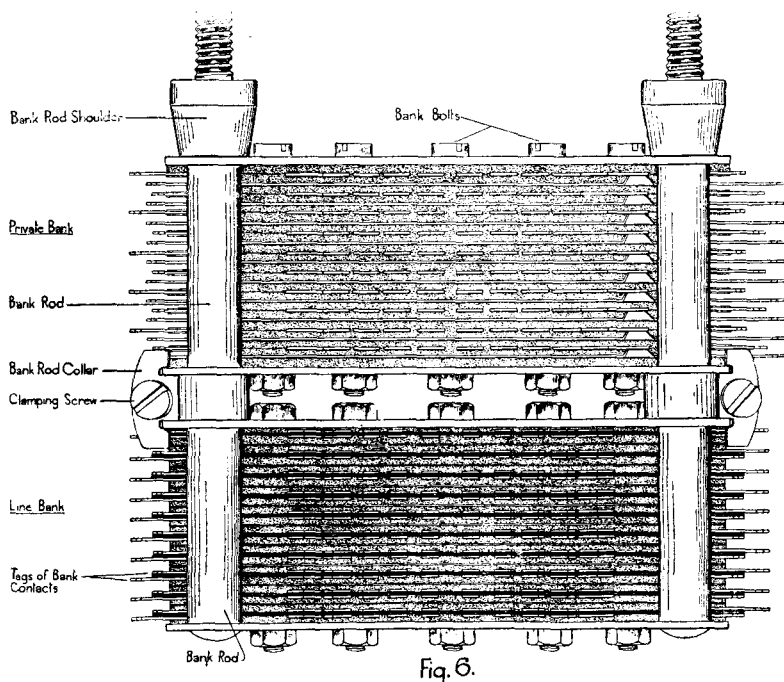


Fig. 6.

relay (C) (it will be recalled that this type of relay is designed to delay the collapse of the magnetic flux), hence its armature and contact *c* restore, thus connecting the rotary magnet via contacts *a* and *b*, (ON) springs and contact *c*. Impulses will therefore cause the shaft and wiper to be stepped into the level and to the desired contact. Upon the breaking of the loop from relay (A) (the replacement of the caller's receiver is assumed to do this) the release magnet (REL M) is energised via contacts *a* and *b* (both at normal) and contacts (ON) (still operated because the shaft is "up and in"). When the shaft reaches the normal position, the (ON) contacts will be opened and the circuit disconnected.

The arrangement of numbers in the bank of contacts is determined by the number of steps taken by the shaft and wipers. As this movement is derived from the dialling of decimal numbers and as the maximum number of impulses that can be transmitted from a single pull of the dial is ten, the bank of contacts is numbered accordingly in an ascending order as shown in Fig. 4. By contrast, a block of 100 jacks in the multiple under manual conditions is numbered in a descending order.

In order to conform to standard conditions, each of the numbers will have a pair of insulated contacts to which the line wires are connected.

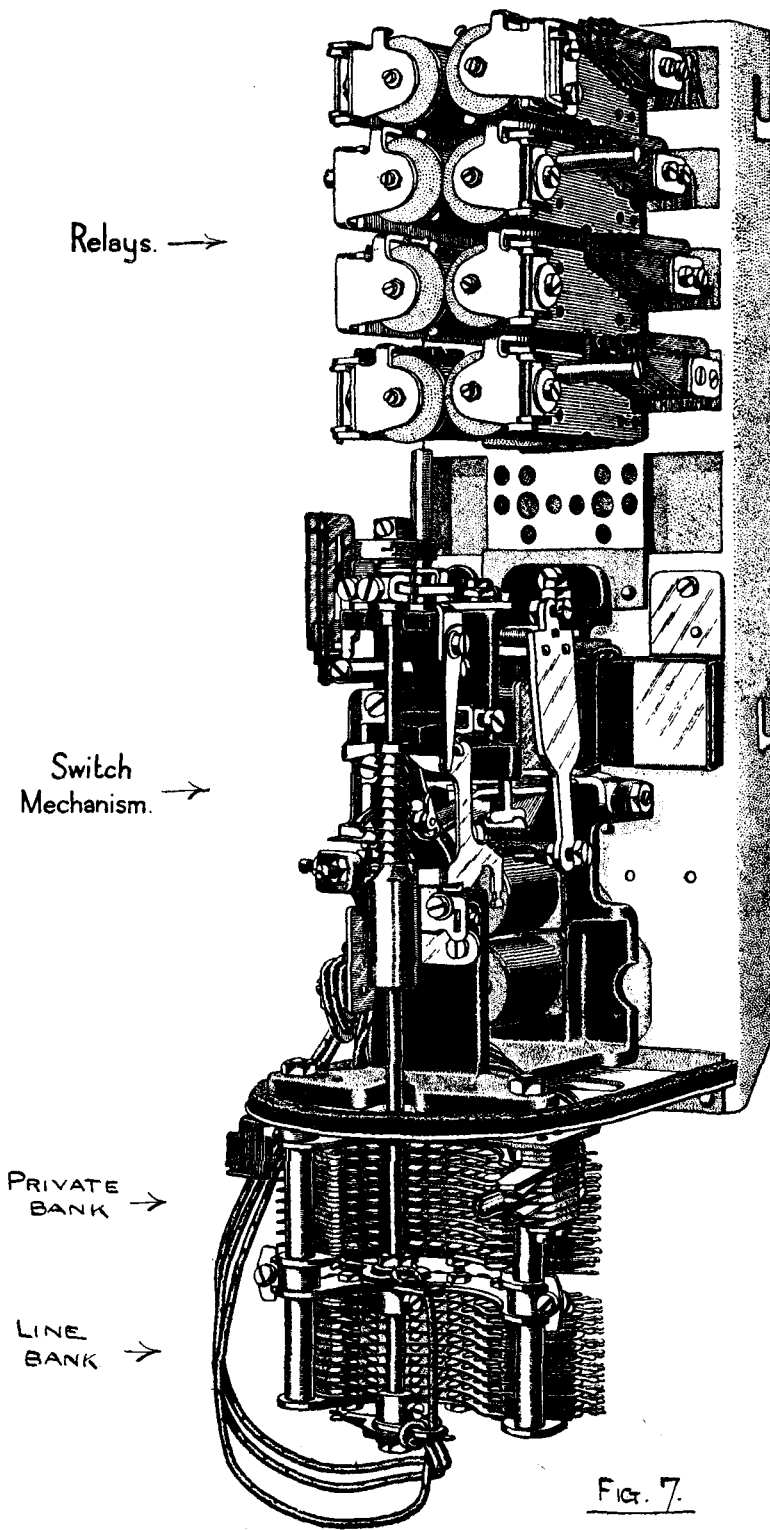


Fig. 7.

For reasons akin to those in manual practice a sleeve or test wire is necessary. Consequently the bank of contacts containing the line wires is surmounted by a similar bank of *single* contacts. The wires associated with this bank are known as the "private" wires and the bank as a "private" bank. (In the case of banks associated with group selectors, to be referred to later, the private bank consists of ten levels each having *eleven* contacts, the additional contacts being used for traffic recording purposes.)

An additional wiper is fitted to the shaft of the selector to engage with the private bank contacts. Fig. 6 is a view of a complete line and private bank and Fig. 7 a standard selector with bank. The controlling relays in Fig. 7 are normally protected by a metal dust cover.

The need for some form of convention that will represent in a simple manner banks and selectors will be obvious, and the generally accepted convention is given in Fig. 8. The rectangle represents the mechanism and relays, and the complete line and private banks by ten short thick strokes immediately below. In the same fig. the convention for a single motion switch is also given.

Readers will appreciate that in order to fulfil intercommunication requirements in a 100-line automatic system such as described, each subscriber will need a selector, the banks of which are multiplied together over the 100 selectors provided. The private bank contacts, being comparable to the sleeve connexion in manual practice, provides the necessary facility for engaged conditions, &c. In such an exchange, the subscribers' numbers available will be 00 to 99.

Such an arrangement is as unnecessary as it is undesirable, as the number of selectors in use at one time will always be a fraction of the whole. The introduction of a single-motion switch per subscriber enables the number of selectors to be reduced by making them "common" instead of individual, thus provision will be on a "calls" basis.

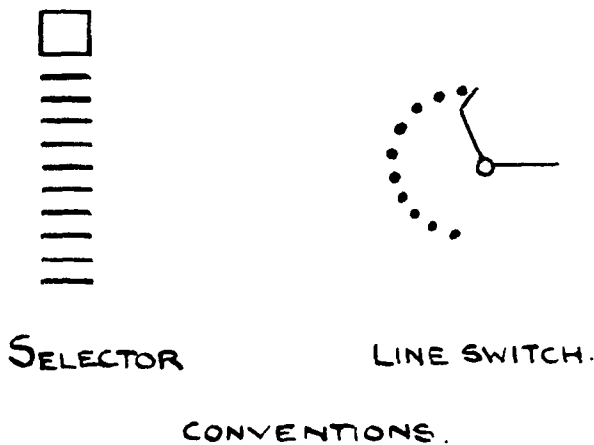


FIG. 8.

The scheme is indicated in Fig. 9. The single motion switch is known as a line switch or pre-selector. It is also frequently recognised by the title "rotary line switch" (abbrev. R.L.S.) due to the fact that the wipers move unidirectionally in one plane.

The introduction of such a switch into the scheme must not of course increase the number of digits necessary, consequently the line switch is arranged for "self drive," i.e., when the calling circuit is closed preparatory to dialling, the wipers step forward automatically until a free selector is found and the caller extended

to it. It will be appreciated that as a selector must be made available before the caller commences to dial, the speed of movement of the wipers must be high and the operation one of great precision, as the selector circuits are tested when the wipers reach a contact and if the circuit is engaged, pass on.

The standard line switch has 25 contacts in the bank arc, the first contact is used as a "normal" or "home" position. The wipers normally rest upon this contact, and return to it at the end of a call. The line switch is comparable to the subscribers calling equipment in manual practice and is rendered inoperative on incoming calls to the subscriber.

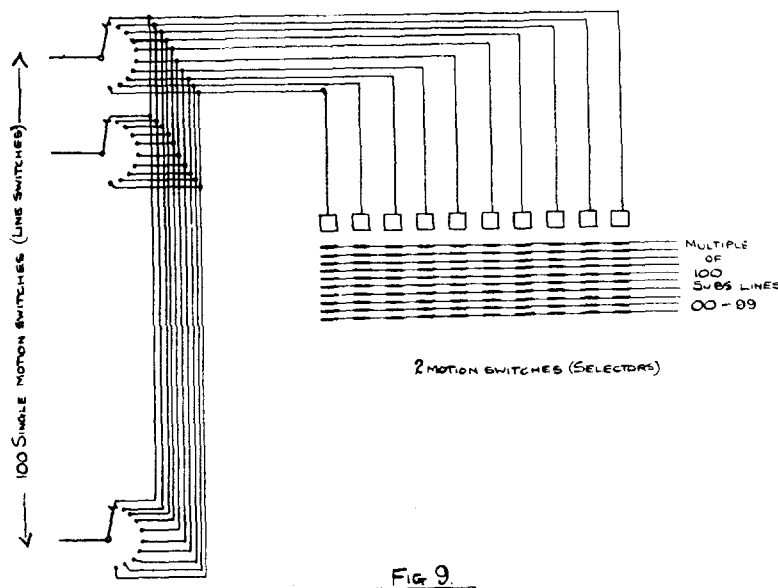


FIG. 9.

The action of the line switch wipers in searching for a free selector is known as "hunting" and the normal hunting speed is approximately 60 steps (from contact to contact is a step) per second. The whole bank of 25 contacts is therefore covered in round about 400 milliseconds.

The "homing" type of line switch has succeeded the same type of switch in which the wipers remain upon the contact last used and with a subsequent call by the subscriber move on if the circuit associated with the bank contact is engaged, otherwise the same circuit is again taken into use. In this case the whole of the 25 contacts can be connected to selectors as against 24 in the case of the "homing" type. The supersession of the "non-homing" type of line switch has resulted from the method of grouping selectors in which, *inter alia*, a higher efficiency is obtained when the selectors are served from "homing" type line switches.

(To be continued.)

RETIREMENTS: MANCHESTER DISTRICT MANAGER'S OFFICE.

The dwindling band of ex-National Telephone Company's men at Manchester has been further reduced during the current year by the retirement, owing to age limit, of Messrs. W. J. Clough and G. M. Leonard, Clerical Officers, in the District Manager's Office. Mr. Clough terminated his official career on Feb. 6 last, after a service extending over a period of 46 years, whilst Mr. Leonard, whose service terminated on April 9, completed 30 years. To show the appreciation and esteem in which "Billy" and "George," as they were affectionately known, were held by their colleagues, presentations of gold watches, suitably inscribed, were made to them with many expressions of regret at the severance of such a long association, and the best wishes of the District Manager's Office Staff were extended to them for a long enjoyment of their well-earned leisure.

A. C. G.

TELEGRAPHIC MEMORABILIA.

I WOULD wish to express my sincere thanks to those kind friends in the C.T.O. and elsewhere who have kept me so well supplied during the past four months with the local service literature, &c., and have forwarded me gratis, *The Advocate*, *The Cable Room Chronicle*, *The Cable Room Monthly*, *The C.T.O. Chronicle*, *The Post*, and *Supervising*, and also *The South African Post Office* and *Telegraph Herald*.

As I can only identify the sender in two cases, perhaps this general acknowledgment will be shared out by the remaining kindly yet anonymous donors.

The last meeting of the 1926-27 session of the T. and T. Society of London took place on the 25th ult., when Mr. E. H. Shaughnessy, O.B.E., &c., terminated his twelve months' tenure of the Chairmanship. The period covered by this tenure has been one of real telegraphic and telephonic history, with which Mr. Shaughnessy's name will always be closely associated—in due time with due honour, let us hope. Realising full well the unique pressure and the many anxious hours which must have been included during the period of his office as chairman of the London Society, it has been to many of us a wonderful revelation of the versatility and capacity of Mr. Shaughnessy that he has been able to give such willing whole-hearted and thorough service to the Committee. Never for a moment has his interest flagged, the minutest detail receiving as much attention as though "beam" working and transatlantic telephony were minor hurdles to be taken in one's stride!

The retirements from the service of the last few weeks remove from the telegraph stage the names of one or two who have well played their part as real men, whether judged as faithful servants to the State or loyal colleagues of staff and supervision. First among these is David Scott, recently postmaster of Fleetwood. To listen to David Scott at a conference or meeting thirty years ago was to hear one of the finest and best-balanced speakers the service has ever produced. He was not only an orator, however, but a splendid worker in committee, and whatever work he may have engaged in on behalf of the staff, such work was never allowed to detrimentally affect the high standard of his performance of official duties. Coming closer to London we find on the retired list Mr. R. E. V. May, Superintendent, C.T.O., who, himself a speaker of no mean repute, would not be likely to dissent from much that is written above on one of his contemporaries. Mr. May's work for the sanatorium cause should in itself make the British Post Office service his debtor, and the C.T.O. will be the poorer by the withdrawal of one who has always "dared to do all that may become a man."

In a more prescribed area, i.e., in the Cable Room, C.T.O., on the 14th ult., also upon reaching the age-limit, there quitted the telegraph service Mr. E. A. Ward, Asst. Superintendent.

"Arthur," as he was affectionately known, leaves behind him a fragrant memory of kindly deeds kindly done, an aroma of real brotherliness—without the slightest taint of cant—a love for fair dealing, and a passion for the underdog, and "all that are oppressed."

To this little group of three names there can be nothing but the very best of wishes for a long and happy autumn of retirement—not into inactivity—but into restfulness, for one cannot conceive of any one of this trio relapsing into mere idleness.

The retirement of Mr. W. G. Wood, Clerical Officer of the Controller's Office, C.T.O., and late Hon. Sec. of the P.O. Relief Fund, is dealt with at some length and will be found elsewhere in this journal.

Crossing the English Channel, it is only fitting that the retirement should be recorded of M. Tallendeau, formerly Controller of the Central Telegraph Office, Paris, and of recent years chief of the Paris Bourse Telegraph Office, a position of unique responsibility and trust, as viewed by the French Telegraphs Administration. M. Tallendeau is well known in London by the Administrative, Engineering and Traffic officers here. Entering the service as a telegraphist he steadily rose to the high position he held at the Central Office, Paris, and by those of us who have had the honour of his acquaintance and friendship it may be said that his practical and technical knowledge of telegraphy may possibly be equalled but is hardly likely to have been excelled by any other officer holding a similar position here or in France. His advancing years—he is well over 60 years as the retiring age is higher in France than in this country—have not prevented *Monsieur le Grand Chef* from keeping abreast of modern developments, including radio and tone-frequency, while his urbanity and his human sympathy have made him as well beloved at the Bourse Office as was the case when he reigned supreme in the Rue Grenelle.

Through the medium of these pages we therefore offer the very best felicitations of his English colleagues to a much respected official who has honoured both the science of telegraphy and the name of telegraphist by his long and faithful service to *la belle France*!

The *Daily Telegraph* recently drew attention to a phase of wireless broadcasting which has perturbed the French authorities for some considerable period in the fact that certain code messages were being signalled from an unauthorised station. Thanks to the art of direction-finding the transmitter was ultimately located in Paris, in the rue de l'Assomption, so it is alleged. It is further alleged that a group of financiers, having provided funds for the installation of this transmitting set, used it to send messages in code to stations in Amsterdam, Berlin, and certain places in Russia, where their agents, acting

on their instructions, engaged in exchange operations. Summonses have been issued against five bankers and two wireless operators, who are to explain to an examining magistrate their reasons for the alleged infringement of the laws which subject wireless transmission to State control. The only charge against them at present is that they have robbed the State of revenue by sending 80 messages a day for several months without payment of any tax or licence fee.

On March 30 the Pacific Cable Bill, consolidating, with amendments, the Acts of 1901-24, was read a second time in the House of Commons. The two main points on which the present measure changed previous legislation, affected the constitution of the Pacific Cable Board and the building up of the reserve fund. The Board was an organisation on which the Governments of Great Britain, Canada, Australia and New Zealand were represented. On the Board the interests of Great Britain were represented by three members out of seven, and also by the right of the Treasury to appoint the chairman. This preponderance of British control in a joint venture was due partly to the fact that the original capital of £2,000,000 required for the construction of the first cable was advanced on loan by the Treasury, and it also reflected the conception of 25 years ago with regard to the natural position of dominance which the Government should occupy. When the first cable was completed in 1902, it was provided that £77,000 a year should be devoted to payment of interest and sinking fund on the original advance of £2,000,000 made by the Treasury. During the early years between 1902 and 1914, there was a regular loss, which amounted to £713,000, but in 1914 and 1915 the situation changed, and since then the Pacific cable system had shown a regular and substantial profit. In 1911 the board thought it was desirable to supplement the original cable by an additional cable between Australia and New Zealand, and an Act of Parliament was passed enabling the reserve fund to be used for that purpose. It became evident that a further cable would be required, linking Fiji with New Zealand, and also with Australia, and that the system would have to be duplicated owing to the increased volume of traffic. In 1922 it was decided to lay a cable of the newest type, and it was completed, linking Australia and New Zealand with this country, via Canada.

Mr. Amery, Secretary of State for the Dominions, explained that, "after the present year, the sum of £10,000, or one-tenth of the year's surplus, whichever was the larger, was to be placed in the reserve, subject to the provision that the reserve might be further increased or diminished by consent of the partner Governments. In the next two years, after the present year, after that contribution was paid over to reserve, the surplus, if any, would be distributed among the partner Governments. After the next two years the surplus would be equally divided between repayment of the original capital and distribution among the partner Governments. They were now in a position to accelerate the repayment of the original £2,000,000, a sum that was now reduced to a total of £1,270,000. By so doing they would set free a larger surplus, either for a further reduction of rates or for a distribution of profits among the Governments concerned. The service was an invaluable asset to the commercial development and the security of the British Empire."

The Naval Correspondent of *The (London) Times Engineering Supplement*, writing of the Navy Estimates, emphasises the following items which should prove of special interest to wireless readers:—

The provision of remote control stations for oversea wireless bases is continued, and money is taken this year to continue such work at Matara (Ceylon), Stonecutters Island (Hong-kong), Rinella (Malta), and Kranji (Singapore). The existing wireless station at Seletar (Singapore) is to be removed to a new site at a cost of £15,000, of which a first instalment of £3,000 is voted. The modernisation of the dockyard electric generating stations is being continued, and interesting items under this head are £7,000 for new plant at the North Yard, Devonport, and £17,000 for modernising the main generating station at Portsmouth.

A wireless receiving outfit suitable for the "Press" has recently been designed by the Marconi Wireless Co., Ltd., and is intended to operate over a wave range of from 10,000 to 25,000 metres, and is guaranteed to intercept messages from any long-wave c.w. station at the extreme limit of its range. Its principal feature is the simplicity of its manipulation. It is readily tunable to any particular station with the aid of the calibration chart and instructions supplied with each instrument; the calibrated handle of each tuning circuit enables the receiver to be instantly set at the required wavelength, so that the outfit can be used by any telegraph operator, although he may be quite unskilled in wireless reception. It is specially designed for the purpose of regular long-distance reception at predetermined times each and every day with reliability, and naturally its selectivity is of a high order.

The opening of the Australian beam service will naturally be dealt with by more competent hands elsewhere, but the comment of one of the London daily newspapers after the Press demonstration that, "a good deal had to be taken for granted; much was left to the imagination," is one of the most curious criticisms coming as it does from our colleagues of Fleet Street, who surely are not so lacking in those imaginative qualities which are usually associated with both poets and pressmen as to compress the report of so momentous a demonstration into the fifteen words quoted above!

It may, however, be due to the fact that there are certain technicalities about the whole science of telegraphy which baffles "the Man in the Street," and we therefore turn to a leaderette in *The Electrical Review* of April 15 which sympathetically writes as follows on the inauguration of the Anglo-Australian wireless telegraphy: This is the first wireless channel for regular

communication between the two countries on a commercial basis to be brought into existence; it is the longest direct telegraph service in the world. It has a duplex capacity of no less than 100,000,000 words per annum, and is available by day and night.

"Do we fully realise the meaning of this stupendous achievement? Even five years ago the feat was utterly impossible—a mere dream of the future, if foreseen at all. We British are only too ready to find fault with ourselves, but slow to take credit for our triumphs. Let us try to view this event in its true light: it is, as we have said, a stupendous achievement, worthy to rank with any of the marvels of science with which the past half-century is adorned. It is the work of two associated concerns—Marconi's Wireless Telegraph Co., Ltd., and Amalgamated Wireless (Australasia), Ltd.—and has been developed under the personal guidance and supervision of Senatore G. Marconi, with the benevolent support of the British and Australian Governments. To all these, but especially to Mr. Marconi himself, we offer our heartiest congratulations."

Congratulations to the C.T.O. on their handsome remittance to Dr. Barnardo's Homes Fund, which for the year ended December last reached the remarkable amount of £124 14s. 6d. "Remarkable," particularly so when the many almost weekly calls upon the practical sympathy of the staff are taken into consideration.

From my last received copy of the *South African Postal and Telegraph Herald*, a staff paper, two or three points are noted with interest:—

- (1) The Postmaster-General advertises the advantages of the Post Office Savings Bank in the pages of the *Herald*.
- (2) The Durban office complains of the quality of the pencils supplied but adds, "they come from England, too, and one does not usually associate bad quality goods with that source of supply," a tribute which should be noted.
- (3) In connexion with the National Information Bureau the Post Office has been chosen as the medium for the dissemination of certain information, and the following are the remarks of the Auditor-General upon the financial aspect of this arrangement: "The Post Office has widened its activities by the institution of a bureau for the dissemination of information 'considered to be of national importance.' The value of telegrams despatched from 10.9.25 to 31.3.26 was £35,489 (at a rate of £63,800 per annum). No provision is made on the estimates for this expenditure, the service being treated as free on the special instruction of the Treasury."

It is a continued pleasure to read the Annual Reports of the C.T.O. Library which during the year just closed issued no less than 42,781 books to its members. For twenty-eight successive quarters the membership has risen and the latest figures give 704, viz.: 467 men and 237 women. Congratulations to the hard-working Secretary and Assistant Secretary!

Television inventors and improvers are hard at it just now, apparently in a race for the most successful system of obtaining the desired end. Whether one is to look forward with joy to the time when in order to have the pleasure of seeing, say, the writer's face while he speaks to his correspondent on the telephone, the said writer is to sit in complete darkness at the other end of the circuit is a question, but these were the conditions under one television system:

For Mr. C. Francis Jenkins, an American scientist, it is claimed that he has proved his ability to send weather maps from land to ships at sea, and he is now stated to be engaged upon an invention by means of which a picture of the landscape over which an aeroplane is flying may be transmitted hundred of miles and projected upon a screen as a moving panorama.

Belin in France, Baird in England and Dr. Alexanderson in America are also devoting their energies to the problem of the perfect system. The formation of the Baird Television Development Company in this country should permit of more complete concentration on the part of the young Scotchman, while behind Dr. Alexanderson are the General Electric Company and Radio Corporation of America.

Said Mr. Hutchinson to the *Westminster Gazette* recently: "The reception of pictures and scenes in the homes by wireless telegraphy will certainly become an actual fact within the very near future."

Dr. Alexanderson is equally sanguine but a little more guarded apparently as to the time it will take to reach the goal.

"Our work," says the doctor, "has already proved that the expectation of television is not unreasonable, and it may be accomplished with means that are in our possession at the present day. How long it will take us to attain practical television I do not venture to say," and he further adds, "It is easy enough to design a television system with something like 40,000 picture units per second, but the images so obtained are so crude that they have no practical value; an operating speed of 300,000 picture units per second will be needed to give pleasing results."

The following will give some idea of the measure of perfection at present reached in the U.S.A.:—

A television installation between New York and Washington was demonstrated in the presence of spectators recently over a distance of 250 miles. New Yorkers in the laboratories of the Bell Telephone Company heard and saw Mr. Herbert Hoover in Washington deliver a brief address. According to the daily Press, his head and shoulders were seen in a dancing shadow composed of myriad small spots flickering upon a screen less distinct than

an ordinary kinema picture. Mr. Hoover's facial expressions and movements were, however, quite visible. The installation was placed in an ordinary telephone booth, consisting of a small metal box, in which the telephone user was able to see the person with whom he was conversing. The first messages were sent by wire from Washington, and later a similar demonstration was given, utilising radio from Whippany, New Jersey.

Meanwhile the writer has received interesting correspondence from readers of the *T. and T. Journal* desirous of ascertaining what are the prospects of the ultimate success of the telephotographic transmission of ordinary telegraph traffic, and in the event of success, will the present high-speed printing telegraph system be scrapped? The rôle of the prophet is a dangerous one, especially if the expectation of life gives one, say, a decade to your credit. I have, therefore, no intention of attempting any prognostication of what may happen when developments not yet in sight are reached. The economic side of the question will be the deciding factor quite naturally, and high-speed plus the voice-frequency system has yet to have a word or two to say in the matter.

AUSTRALIA.—The La Perouse radio receiving station was opened recently says the *Electrical Review*, by Amalgamated Wireless (Australasia), Ltd. It is capable of receiving messages from Tilbury Docks, London, as well as from the docks in Vancouver and San Francisco, and has also kept in communication with ships fitted with short-wave sets between these terminal ports. It will be the official receiving centre for Sydney, and will be in direct communication with all the "beam" feeder stations in Australia, and will automatically relay the messages received direct into the head office of the company. The same procedure will be followed regarding messages received from the Federal Government stations in New Guinea and the Pacific Islands, which are controlled by Amalgamated Wireless, Ltd. All transmitting will be done from the Pennant Hills centre, about 30 miles distant. The aerial system at La Perouse consists of four 72-ft. tubular steel masts in the form of a square, with one 99-ft. mast in the centre, and land-line connexions have been installed between La Perouse and the General Post Office, Pennant Hills, and the head office of Amalgamated Wireless, Ltd.

A new station, 3DB Broadcasting Co. Pty., Ltd., has been registered at Melbourne, with a capital of £20,000 in £1 shares, for the purpose of opening a "B"-class broadcasting station, to operate from Capitol House, Melbourne, and Amalgamated Wireless (Australia), Ltd., is equipping a transmitting room on the roof. Two lattice steel towers, 45 ft. high, will be erected on the roof to carry the aerials. The initial power output will be 500 watts and the wavelength 255 metres. Revenue will be derived from advertising, no fees from listeners being allotted to "B"-class stations.

AUSTRIA.—Foreign visitors to Austria, says the same authority, whose stay does not exceed three months, and who have with them receiving sets, are not required to pay the usual licence fee of 2s. per month, but a special fee of only 1s. per month. An application form can be secured at any post office, and, on entry into the country, foreigners must deposit a given sum for customs purposes to cover the set, which is reimbursed on leaving the country.

BERNE.—The Bureau International de Télégraphie at Berne reports that during 1926 new submarine telegraph cables were laid between Bay Roberts (Newfoundland) and Plymouth (England); between Borkum (Germany) and the Azores; in the Pacific Ocean between Bamfield (British Columbia) and the Fiji Islands, and between the Cocos Isles and Australia.

DENMARK.—The fee for a receiving licence has been reduced to 10 kr. for crystal as well as for valve sets; it formerly cost about 12s. 6d. for crystal and 15s. for valve sets. *World Radio* says that listeners in Denmark, on Feb. 1, reached a total of 130,446, of which 64,231 were crystal listeners and 66,215 valve listeners. The licence for receiving apparatus with loud-speaker for use in public places has been reduced from £25 to £10 yearly. The new high-power station will be ready in July.

FRANCE.—The *Daily Mail* recently stated that on the ground that aerials might during a sudden storm fall to the ground and injure passers-by, the directors of Paris public schools have been requested to take down the aerials over their buildings. The Paris municipal authorities apparently justify their decision by arguing that the wireless sets installed in buildings used as public schools are not used by the directors for the purpose of teaching their pupils, but solely for their own personal amusement. We have not yet seen a rejoinder from the school authorities but we may be sure one has been made!

All radio stations in France are now under the general administration of the Post, Telegraph and Telephone Service and the Ministry of the Interior, says *Commerce Reports*. Private stations which receive communications other than private correspondence can be authorised by special agreement, the details of which are to be determined by decree, and after the payment of an "art tax" at rates to be determined. Places which charge for admission are, in addition, subject to an annual tax, which is also to be determined by decree. Private sending stations or receiving and sending stations may be established only by special authorisation of the Ministers of War, Marine, Interior and the Post, Telegraph and Telephone Service, with the consent of an interministerial committee. Three national and 18 regional establishments will be set up either under direct Government operation or by special concessionaires; the programmes will be under the charge of special groups approved by Government authorities. For the present it is intended that the Post, Telegraph and Telephone Service shall secure the co-operation of private groups, which will assume the financial burden of operating the large sending stations; a year hence the Government authorities will have

the power to enter into contracts with private interests which shall run not longer than to Jan. 1, 1933, for the establishment and operation of the proposed stations. The concessionaire is to pay a tax, and the capital invested is to receive a dividend not greater than the interest on the advances of the Bank of France to the State, plus 2%; after charging 10% to amortisation and payment of dividends, the surplus profits are to be divided equally between the Government and the concessionaire. At the end of the contract period the operating authority becomes the owner of the properties subject to paying the non-amortised capital cost within five years. In spite of declarations by the Government that the new regulations do not contemplate nationalisation, they contain the possibilities of very strict Government control. Private radio equipment of all sorts is to be operated only by special permission; its use may be stopped at any time on the vote of a Government commission. Free access to the markets of the world is limited in the case of both public and private sending stations by the requirement that such equipment "must be as far as possible of French manufacture." A commission of 44 members, 22 of whom are to be Government officials, is to advise on all subjects covered by the decree or delegated to them by the ministers. One of the objects is to "establish a coherent, rational, and powerful" system which can combat foreign propaganda through the dissemination of French ideas.

The Department of Overseas Trade in a recent report on the economic and industrial conditions in France says that: "A great deal of work has been done in the direction of linking up France with her colonies by means of radio-telegraphy, and a number of important stations are now working, while others are in hand." With regard to broadcasting, the report states that the number of persons with receiving sets is large and increasing.

GERMANY.—The *Transradio Company for Wireless Oversea Communication* reports that the extensions and improvements carried out in 1925 worked well during the past year. Considerable progress was made in the transmission of news to great distances by means of short waves, and a special building was established to deal with this service. The total of transmarine telegraphic traffic again experienced an increase. The accounts show net profits of 1,372,000 marks, as against 1,317,000 marks, and the dividend remains at 8%.

The use of the word *transmarine* as against *submarine* is interesting.

GREAT BRITAIN.—The Cambridge Hospital at Aldershot has recently been supplied with about 400 sets of headphones and the necessary and specially designed wireless apparatus for the use of its patients.

New transmitting apparatus has been installed at the Daventry broadcasting station; it will have a power of 20 kw. and operate on a wavelength between 300 and 400 metres. It will be the first true source of alternative programmes in this country, which, however, are not likely to become available until the autumn, for the test period will be a lengthy one. When the Postmaster-General formally sanctions the establishment of the first h.p. regional station, the new plant will be removed from Daventry to the location chosen for that purpose.

The Watch Committee of the Sheffield City Council has recommended the making of a by-law to control the use of wireless loudspeakers which cause a nuisance by their "noise." A fine not exceeding £5 is the proposed penalty. This adds to the growing list of towns which have taken similar action.

Although the B.B.C. receiving plant at Keston relays American stations on Tuesday nights, Continental relays seem to have gone out of fashion in this country; yet it appears that they are finding favour abroad, for the so-called "rapprochement" sub-committee of the Office Internationale de Radiophonie recently met at Vienna to discuss the exchange of broadcast programmes by wireless link.

One was pleased to note recently that a British wireless firm has been sufficiently progressive to publish their catalogue and booklet of instructions in no less than 16 different languages. It has not always been thus!

Among the developments now in hand for the reorganisation of the London air port at Croydon, says the *Electrical Review*, is the provision of a new wireless station, which is to be 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 telephony and continuous-wave and interrupted continuous-wave telegraphy transmission, the wave range being from 800 to 2,000 metres; independent drive circuits will be incorporated to maintain constancy of frequency and wavelength, and energy 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 been specially designed to have selective characteristics and incorporates filtering and amplifying devices; it is 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 will be erected two or three miles from the air port and operated by the "remote-control" system.

GREECE.—The construction at Athens of a new transmitting station by the Administration of Posts and Telegraphs is actually completed. With a view to choosing its wavelength, the station is now proceeding to make tests. According to *World Radio*, other stations are to be constructed at Janina, Patras, Syra, Zante and Chio.

HOLLAND.—Reuter's Amsterdam agent recently reported that twice within a few days telephone communication had been established between Holland and the Dutch East Indies. This achievement, it is claimed, constitutes a world's record for long-distance wireless telephony. A musical concert given in Eindhoven was clearly heard by a Bandoeng wireless amateur, and a telegram was received from Dr. de Groot, the head of the Dutch East Indian telephone and telegraph service, declaring that reception on the 30.92-metre wave was excellent, two speeches having been quite distinctly heard at the Government wireless receiving station in Java. As there is at present no wireless telephone transmitting apparatus in Java, the acknowledgments were by ordinary cable, or wireless-telegraphy. The transmitting installation was constructed by Dr. Balthasar van der Pol, the head of the wireless investigation department of Messrs. Philips, of Eindhoven, and Mr. Numans, and was designed for experimental purposes, the Philips' Company having been granted a special licence for this object. The regulation of the frequency is by a vibrating quartz crystal; a valve amplifier and water-cooled Philips transmitting valves are used, and the antenna consists of a single wire attached to a pole only 22 ft. from the ground. An attempt is shortly to be made to secure similar contact with the West Indies.

HUNGARY.—It is generally understood in Hungary that the Radiotelefono Hirmond Co., of Budapest, is to build a 60-kw. station similar to that at Langenberg; the scheme has the approval of the Hungarian Post Office authorities.

INDIA.—The Government of Bengal has recently issued an order to the effect that Radio-telegraphy apparatus may not be imported into British India without an import licence authorised by the Director-General of Posts and Telegraphs. From the accompanying summary it will be seen that the order is of a somewhat complicated nature! Thus:—

1. Radio apparatus may not be imported into British India without an import licence, which is issued by the Director-General of Posts and Telegraphs.
2. Persons, who are not dealers in radio apparatus, may, however, be allowed to import on temporary radio apparatus not exceeding one complete receiver (or its component parts) and necessary spares. This temporary permit may be obtained from the competent Customs officer on presentation of an application in the prescribed form to which postage stamps to the value of 10 rupees have been affixed.
3. This fee of Rs. 10 is the annual fee for an import licence, and is additional to any Customs duty which may be leviable on the imported apparatus.
4. The import licence will be forwarded subsequently to the applicant by the Director-General of Posts and Telegraphs, and will be valid until Dec. 31 of the year of issue, unless dated on or after Nov. 1 in any year, when it will remain valid for the whole of the following year. Item 4 in the application form should therefore include all apparatus that the applicant intends to import during the validity of the licence and not merely the apparatus in respect of which the temporary permit is required.
5. Transmitting apparatus may not be imported on a temporary permit, and Customs officers are not authorised to accept application forms except on the conditions contained in para. 2 above. In all other cases the application form, after completion, should be forwarded by the applicant to the Director-General of Posts and Telegraphs (Wireless Branch), Simla, to whom all other inquiries regarding importation of radio apparatus should be addressed.

IRISH FREE STATE.—A joint committee of the radio apparatus trade in the Irish Free State is urging upon the Free State Minister of Finance the abolition of the 33½% *ad valorem* duty upon imported radio sets. It is stated that incalculable harm is being done to the industry by this duty, and if it were remitted the number of licence holders would rapidly rise from the present figure of 30,000 to about 100,000.

The new broadcasting station at Cork of the Department of Posts and Telegraphs, constructed by Standard Telephones & Cables, Ltd., London, has almost completed its tests. It is located at Sunday's Well, and occupies the site of the old prison. Two 120-ft. masts support the aerial, which consists of four wires each 156 ft. long; an earth mat, composed of a network of copper wires, has been buried in the ground covering an area of approximately 20,000 square feet. The station is rated at 1.5 kw., which means that 1.5 kw. is given to the oscillators, which in turn deliver 1 kw. of unmodulated power to the aerial system, so that with 100% modulation a "peak" power of 4 kw. can be handled without distortion, assisted by the use of a condenser microphone. The frequency of the carrier wave is maintained constant within 0.01%. The power required to operate the complete station is about 9 kw., obtained from the local supply mains and used to drive motor generators. It is hoped that this station will cover the south and west of the Free State, and the *Irish Times* is informed that it is hoped formally to open the station on the 25th inst. Arrangements are in hand for the fitting up of a suitable studio and necessary office accommodation in the station premises. The wavelength is 400 metres. One programme only will be given from both the Cork and Dublin stations, trunk telephone lines being used to connect the two studios.

JAPAN.—The recent earthquake cable damage is officially regarded as surprisingly low. The Bonin cable was also broken, and cable communication between London and places in Japan beyond Nagasaki was interrupted recently. Both the Great Northern Telegraph Co.'s and the Great Eastern Telegraph Co., Ltd., services were affected.

A considerable extension of Japanese broadcasting is indicated, says the *Electrical Review*, by an order which has been placed with Marconi's Wireless Telegraph Co., Ltd., by the Japanese Broadcasting Association for three

broadcasting transmitters. They are to be designed to deliver 10 kilowatts of aerial energy, and it is understood that one is to be located in the Japanese capital (Tokio), and another in Osaka, the largest city in Japan; the situation of the third station has not yet been indicated. Tokio will be the twelfth capital city of the world in which a Marconi broadcasting station has been installed.

It is reported that an order has also been placed with Standard Telephones & Cables, Ltd., for the complete equipment of three broadcasting stations, their associated studios and the necessary machinery, for the Japanese Broadcasting Association. The stations will have three times the power of 2LO, which is of 3-kw. capacity.

JUGO-SLAVIA.—*World Radio* says that a company has definitely obtained a licence for the erection of a transmitter of 6 kw. The company began its activities with a capital of 2,500,000 dinars. The station will be installed on the top of the Académie des Sciences at Belgrade. A dinar is equal to about 9½d.

LITHUANIA.—Reuter's Trade Service informs us that the first sitting of the Exploitation Commission of the Kaunas wireless station was held recently to examine the activities of the station. Owing to lack of resources it has not hitherto been possible to develop. The number of registered subscribers in Lithuania at present is 1,500, of whom 1,000 are in Kaunas. Notwithstanding the regulations regarding the registration of apparatus, there are still many unregistered sets, it being estimated that the total number is 10,000. On the basis of the recent Cabinet decision, 75% of the receipts is assigned to programmes; the Commission therefore intends to introduce measures for the registration of all radio apparatus. Strict control will be enforced, and those who fail to register in time will be fined. Moreover, in shops dealing in wireless accessories, all apparatus and parts sold will be registered. It is proposed periodically to relay from the Kaunas station the more interesting programmes of the principal European stations.

MEXICO.—By an agreement between the telephone and telegraph companies of Mexico and America, the privileges of the transatlantic telephone service to England will be extended to Mexico in a few months.

The long-distance telephone line between Mexico City and San Luis Potosi, covering half the distance between the capital and the American border, is now open, and it is expected that the remaining half will be completed in September.

NEW ZEALAND.—From Reuter's agent in Wellington we learn that soon after dawn on March 18 New Zealand and South Africa were in direct communication for the first time, when a speaker at the Shag Valley station conversed by Morse signals for over an hour with an operator at Caledon, in the Orange Free State Province. Communication was fairly easy, although little power was used at the New Zealand end. New Zealand amateurs have been trying for years to get into touch with South Africa, but hitherto without success.

The same agency also reports that on April 25 Mr. O'Meara of Gisborne, near Wellington, established communication with a New York amateur on a twenty-metre wavelength, which is claimed to be a record feat.

The distance traversed by the signals has been estimated at between 16,000 and 17,000 miles.

SCOTLAND.—The tuning-in of the first of the three three-mile-long aeriols of the new transatlantic telephone receiving station at Kemback, near Cupar, Fife, is now complete. Daily messages from the United States are received by the staff, which includes several American experts; reception is satisfactory, and the tuning of the other aeriols will soon be complete; the three aeriols radiate towards Denham, St. Andrews, and Pitseottie.

SIAM.—Bangkok advises, through Reuter's Agency, that the German Telefunken Co. has obtained the contract for the new wireless station there. The three stations which have existed for a number of years have not been capable of transmitting messages effectively to Europe, and it was decided to have a station for short-wave, duplex, high-speed working between Siam and Europe. Tenders were obtained from the leading companies: the Marconi Company quoted £66,153 for the "beam" system and £29,163 for a system of omni-directional communication; the prices, however, were not inclusive. The Compagnie Générale de T.S.F. wanted 213,785 gold dollars, plus 20,000 ticals, plus Customs duty and landing charges; the Telefunken Co. quoted £25,000, which included everything, and secured the contract.

One tical equals 1s. 8d.

SOUTH AFRICA.—South African newspapers and *World Radio* state that an agreement has been signed between the Minister of Posts and Telegraphs and Mr. I. W. Schlesinger, of the African Theatres, Ltd., and African Films, Ltd., for the grant of the licence of the JB station to the African Broadcasting Co., which was formed by, and its capital underwritten by, Messrs. I. W. Schlesinger & Co., while listeners will be given preference in the allotment of shares. The Government has two directors and the Transvaal Radio League one. The company will control broadcasting in the Transvaal and Orange Free State. If the licences at Cape Town and Durban are at any time surrendered voluntarily they will be transferred upon application to the A.B. Co. Meanwhile the relaying of A.B. Co.'s programmes will be prohibited unless duly authorised. Within nine months the existing station will be transferred to Bloemfontein, and a licence will then be granted for transmission in the Free State, and a more powerful station will be erected

in Johannesburg. The Transvaal and Orange Free State licences are to be granted for five years with the option of renewal for another five, the Government retaining the right to take the licence during the latter period. Out of the first profits shareholders will first receive a non-cumulative dividend of not more than 10% per annum; thereafter further profits will be distributed equally between shareholders and the Government, the latter using its share to reduce fees. To check piracy, the Minister has promised to ask Parliament to pass an Act compelling traders to examine their clients' licences before the latter can purchase wireless sets or parts.

See also under "New Zealand" for other South African radio information.

SPAIN.—Reuter's Madrid agency informs us that in the course of a Cabinet Council on March 16 a Bill was considered authorising a private company to install a short-wave wireless station to connect Madrid directly with the Argentine. Three conditions, however, are attached to the authorisation: (1) That the service must not be exclusively between these two countries; (2) the company must not have a monopoly; and (3) it must not receive State aid. The Bill will now be handed to the Minister of the Interior for examination by technical experts.

[Memo.—The Spanish Cabinet approved of the establishment of this service on March 23.—Ed., T. & T. Jnl.]

Two more stations, states the *Electrical Review*, Radio San Sebastian (EAJ8) and Radio Salamanca (EAJ22) have been taken over by the Union Radio, the object being to endow Spain with a regional service, so as to enable listeners on crystal sets to enjoy a variety of programmes.

SWEDEN.—*World Radio* says that the new station in Motala, in the centre of Sweden, is expected to begin test transmission towards the end of March, having a power of not less than 30 kw.; it is of the same type as Daventry, and when opened the Karlsborg station will revert to its real purpose as a wireless-telegraph station, its broadcasting wave (1,305 metres) being taken over by Motala.

The number of licence-holders has increased to about 260,000, thus placing Sweden next to England with regard to the percentage of licensees to the population.

U.S.A.—The failure of the United States Senate to confirm the nomination of two of the five men selected by President Coolidge to be members of the new Federal Radio Commission has been followed by the President making "recess" appointments of the two men in question, says *World Radio*. The Board is handicapped, since the Deficiency Bill authorised \$120,000 for salaries and other expenses, failed to pass before Congress adjourned. Mr. Herbert Hoover, Secretary of Commerce, is co-operating with the Commission in its efforts to function. The main problems before the new body just now are overlapping and heterodyning.

WEST INDIA ISLANDS.—The report of the Pacific Cable Board for the year ended March 31, 1926, on the working of the submarine cables and wireless telegraph stations in the West Indian Islands and British Guiana shows that the excess of receipts over expenditure was £6,010, the latter amounting to £39,173. A sum of £21,309 was paid to the National Debt Commissioners during the year in respect of interest on, and repayment of, advances by way of capital for laying and equipping the system; £6,010 (surplus receipts) was available towards meeting this annuity, and the deficiency to be made good by the contributing Governments will therefore be £15,299 for the year under review. Prior to the establishment of the Government system, a subsidy amounting to £26,300 was paid annually to the West India and Panama Telegraph Co., which lapsed in September, 1924, and it is gratifying to the Board that the operations for the first complete year have resulted, even after the payment for amortisation of capital, in the deficiency falling short by £11,000 of the subsidy previously paid. During the year under review no interruptions occurred to the cables and none of the wireless stations was out of commission. The local organisation work was carried out by Mr. W. E. Rockingham (one of the Board's superintendents attached to the Pacific cable system), assisted by Mr. R. G. McLachlan and four other officers who were transferred to the West Indies temporarily, but Mr. R. G. McLachlan has since been permanently appointed to the West Indian system; the work presented many real difficulties. The news service, which is supplied free to the West Indies by the Board, has been improved, and there has been a substantial growth in the traffic since the Board's service commenced.

The Necessity for Faith in Physics.—In matters of physical theory there is in fact no end to the mystification that awaits the learner who will not begin by believing what he is told as he is told it. If he insists on believing it a bit at a time he will find the facts are many, and he is pretty sure to get some of them wrong. Perplexities of his own creation will be superimposed on those that are inherent in the new and awful conceptions with which he is wrestling, and ultimately he will be trying to tell the time by a watch that he has taken to pieces.

* * * *

Those who are new to what are now common physical conceptions may easily find themselves in a similar position. Before, for instance, they can believe that a wavelength of 300 metres corresponds to a frequency of 1,000,000 cycles per second they want to get over the strain of imagining this fantastically large number of oscillations crowded into the little unit of time.

The Times Engineering Supplement.
J. J. T.

THE DESIGN AND ERECTION OF POST OFFICE BUILDINGS.*

BY H. G. WARREN, A.R.I.B.A.

(Continued from page 136.)

(V) SPECIFICATION.

STANDARD draft building specifications have been prepared and printed for post office and telephone exchange buildings. These are amended and amplified, as may be necessary, to suit individual cases. A specification should be written with the trades following the sequence of the work. For example, excavator, concretor and bricklayer should be at the beginning, and plumber, plasterer, ironmonger, painter, and glazier at the end. My experience is that a standard specification has many disadvantages, and is conducive to conservatism and laziness. The architect should move with the times and lose no opportunity of investigating and testing new materials and methods. Incidentally, if any test is a failure, every one knows where the architect lives; if a success, some one else takes the credit.

Each trade should be prefaced by a detailed description of the materials required, followed by the description of the actual work to be carried out item by item.

A lengthy specification is not necessarily a good one. The requirements should be stated as briefly as possible and be free from ambiguity.

To avoid omissions from a specification it is a sound practice to follow an item, and its associated work, through all the trades and check the inclusion of the materials and labours in their appropriate sections.

For example, when specifying a range or grate, a check should be made with a view of ascertaining if the specification includes, under the appropriate headings, the concrete foundation of the chimney breast, damp proof course, brick openings for fireplace and range, camber arches and iron bars, front and back hearths, trimming of floor joists, mitred floor borders, formation, parging and coring of flues, soot doors, setting and flaunching of chimney pots, chimney caps, building of the brickwork of stacks in cement mortar, lead flashings around stack, damp proof course in stack, firebrick settings for the grates and ranges, overmantels, mitres of cornices, picture rails, and skirtings around chimney breasts.

By employing a method such as this omissions are reduced to a minimum. It is usual to include, in the specification for postal buildings, the letter box, the fixing of the stamp vending machine, and the attendance on the equipment, hot water, and electric lighting engineers. The public office counter, writing desks, and other fittings are the subjects of separate contracts.

Dadoes, either of glazed brick, tiles or cement, are provided in switch and apparatus rooms, sorting offices, public offices, instrument rooms, messengers' rooms and staircases. If the men's welfare accommodation is provided at the end of the sorting office, these rooms should be treated in all respects similar to the sorting office, in anticipation of the extension of the latter.

The finishings of the floors are governed by the use to which the rooms are put. Battery rooms are specified to be finished with acid resisting asphalt, quarry tiles laid in bitumen, or sheet lead laid on boarding. Switch and apparatus rooms have wood block flooring of maple, oak, Oregon pine, or pitch pine. Sorting offices, instrument rooms, and staff sides of public office counters are similarly treated. The floors in front of public office counters can be finished with Terrazzo, jointless flooring, quarry tiles, patent stone slabs, or coloured cement. Rubber tiles with an asbestos backing are now on the market; these appear to warrant a trial, especially in corridors, with the object of reducing noise. Retiring rooms, postmasters' rooms, and corridors have floors finished in cement on which linoleum is laid.

When specifying materials which can be adulterated easily, or which are known to be on the market in inferior qualities, tested proprietary brands only should be specified.

To avoid misunderstandings each coat of paint should be specified to be of a different colour.

In order to deal adequately with this part of my subject, it would be necessary to consider the individual clauses of a typical building specification; a tedious and somewhat technical procedure. Let me hasten to assure you that it is not my intention to do this, but to pass to the last stage of my subject.

(VII) COMMENCEMENT, PROGRESS AND COMPLETION OF THE BUILDING WORK.

The working drawings and specification are sent to the Quantity Surveyor, who prepares the bills of quantities. Tenders are obtained by public advertisement, investigated, and the tender of one firm recommended for acceptance.

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

It is of the utmost importance for all concerned in the erection of a postal building to keep a close watch on expenditure and be in a position to anticipate any probable exceeding of the sum allocated for the service. This is accomplished by a system of buff estimates.

Treasury authority having been obtained for the whole service, the total amount is apportioned between Architect, Engineer, and Controller of Supplies (Office of Works). Each of these officers submits buff estimates to the Secretariat and obtains covering approval before ordering any fittings or issuing instructions for the carrying out of any work. In this way a departmental check is kept on all expenditure throughout the progress of the work, and an up-to-date statement, showing the financial position of the service, is available at all times. The architect's first buff estimate is submitted when he is recommending a tender for acceptance, and this buff should show his total apportionment, subdivided into amounts for contract, variations, structural fittings, Clerk of Works, &c. The amount of the tender is buffed, and also a sum in respect of the Clerk of Works' salary. Each buff estimate is numbered, and when the Architect orders any material or work, his instructions quote the number of the buff on which the approval for the expenditure has been given. The Measuring Surveyor who settles the final building account cannot pass any item of extra work unless its relative buff number is shown, and it is a part of the Surveyor's duties to verify the number given with the actual buff.

Unforeseen circumstances, such as bad foundations, may result in the architect exceeding his apportionment. In such a case the excess expenditure is shown in red figures at the bottom right-hand corner of the buff. This is known as the architect's "red flag," and it may be necessary to review the whole work and if savings cannot be effected, to notify the Treasury of the probable total exceeding.

The contractor is paid from time to time on a certificate issued by the architect, whose duty it is to see that over-payments are not made and that the Department is safeguarded in the event of the contractor being declared a bankrupt.

The progress of the work is reported to the architect each week by the Clerk of Works. This report also shows the number of men employed in each trade, the value of the material and plant on the site, approximate value of the work executed, and the time lost due to causes allowed under the Contract.

All queries which arise during the progress of the work are submitted to the architect in writing by the Clerk of Works. Query sheets are provided for this purpose, divided into two columns, and the question is written in the left hand column and the answer given in the right hand column.

Samples of the bricks, stone, lime, sand, cement, timber, &c. are submitted and if approved are stamped by the architect and retained by the Clerk of Works, who must see that the bulk supply is up to the standard of the sample.

The names and addresses of all sub-contractors are submitted for the approval of the architect by the main contractor. On a large building, the steelwork, joinery, slating, asphalt, stonework, plumbing and glazing, may be sub-let. If the architect is dissatisfied with the work of a sub-contractor, complaint is made to the main contractor and not the sub-contractor.

It is not possible in the time at my disposal to consider in detail the inspections of a building during its erection. Needless to say, these must be made deliberately and systematically. It is not unknown for an architect to be kept "on the run" during an inspection in the hope that by this means he will omit to inspect a certain part of the work.

Among the outstanding items which need to be watched are: the packing of concrete with large bricks or stones, the omission to flush up the brickwork every third course, incorrect mixture of concrete and mortar, omission of dowels to wooden door frames, nailing of roof tiling less frequently than specified, the use of zinc soakers instead of lead; short hair in the plaster and sometimes none at all; the omission of one or more coats of paint; the omission of dampcourses in chimney stacks; fixing of door furniture before the doors are painted; fish oil in putty, instead of linseed oil.

On the completion of the works, a set of drawings is prepared showing the building as actually carried out.

A completion report is prepared and signed by the architect, giving the following particulars:—

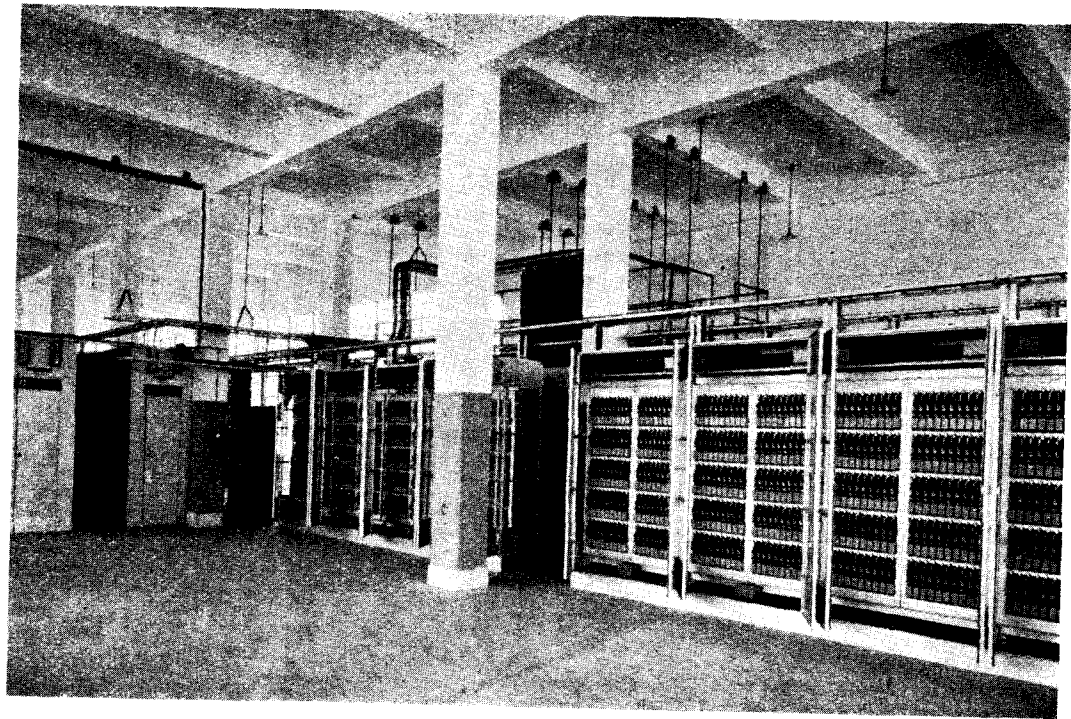
- Town.
- Building.
- Date when building commenced.
- Date when lower windows were framed.
- Date when floors over were constructed.
- Date when occupied.
- Clerk of Works.
- Builder.
- Particulars of any easements appertaining to the property at time of purchase.
- Particulars of any easements by which the property was dominated at time of purchase.
- Particulars of any arrangements subsequently made in regard to any of the foregoing easements.

This concludes my paper. I am conscious that much has been left unsaid, but my subject is so comprehensive that a somewhat long series of talks would be necessary adequately to cover the ground.

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Automatic Electric Inc.

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

TELEPHONE

EQUIPMENT

The Telegraph and Telephone Journal.

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

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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 DEVELOPMENT.

It is a matter of fairly common knowledge that about 80% of the population of this country dwells in urban districts and only about 20% in the rural areas. The percentage of rural telephones to the total number existing in Great Britain was stated by the Postmaster-General in the debate on the Civil Estimates at the end of March to be 9.3%. This figure is surprisingly high when it is remembered how much more difficult it is to serve a telephone subscriber in a remote village than one in a busy town, and how much more alive the townsman is to the need of a telephone than the average countryman. Of course, the ideal rural development has not yet been reached, and we are convinced that when public opinion has reached the point (to which it is steadily moving) of believing that the telephone is a necessity for every home, the rural telephone density will be increased. We doubt if it will ever quite reach the figure for the urban districts, for the demand for service in the towns is always likely to be more brisk than in the country. Besides, as we have already said, the country is more difficult to serve. It is easy to appreciate that to extend costly pole routes to isolated subscribers, and to provide a high-grade service to a small village exchange with 8 to 12 members at a rate which they can afford is a problem of no small magnitude. There are several different ways of affording a telephone service in rural parts. In some continental countries the subscribers have to find the premises for the exchange and even the operating

staff. In some parts of America small associations run a sort of co-operative exchange, and obtain service with the outside world, if their lines are good enough, by means of the trunk lines of one of the larger companies. In other countries the State provides the farmer with a cheap service at a heavy loss in the hope of obtaining a reward either on earth, if ever the service should pay, or else in heaven. In the meantime, of course, these good works are paid for either by the general taxpayer or by the telephone subscriber in the more remunerative areas.

The Post Office is in agreement with the principle that it is right and proper that the telephone system should carry so far as it can an unremunerative fringe of business in order to provide for constant expansion. Even in this country there is a loss of nearly £4 a year per subscriber on over 1,000 rural exchanges opened under a special scheme at unremunerative rentals.

When, therefore, any reduction in rates is suggested, it is necessary to point out that under existing conditions this course could only result in a few years in creating an economic position in which either all telephone rates would have to be raised or the general taxpayer would have to subsidise the telephone service.

It may, we think, be claimed that the Post Office has adopted a fair middle course between restricting rural development by demanding fully remunerative but prohibitive rates and unduly forcing its expansion at the expense of the urban subscriber.

HIC ET UBIQUE.

THE annual report of the American Telephone & Telegraph Company for 1926 shows further remarkable progress by that company and its associated operating companies during last year. The following are some statistics of the "Bell" system:—

No. of telephones—	1926.	Increase.
Bell Companies	12,816,252	
Companies in connexion	4,758,000	
Total	17,574,252	854,028
Exchanges	5,998	
Miles of exchange wire ...	44,564,234	4,723,394
.. toll (trunk) wire ...	6,296,916	664,216

It happened in Dale Street, says the *Liverpool Post*, as most folk were hurrying to and fro on business bent. A well-dressed man, carrying what seemed suspiciously like a frame aerial, with a phone attachment to his ear, was treading gently over the setts in a circumscribed area.

Was he trying to pick up Daventry? None dared to disturb him. He moved away, and in a very short time half a score of workmen, with a handcart laden with repair paraphernalia, appeared on the scene, and set to work evidently to repair a fault in the electrical service. Thus quietly do brains and muscle work to maintain the city's life.

It is an interesting fact that wireless receiving plant can be used to find faults in power cables—instead of or in addition to the usual measuring instruments.

We learn from Reuters Trade Service that the Allmaenna Telefonaktiebolaget L. M. Ericsson has received an order from the Government of Ecuador for the complete reconstruction of the telephone system in Quito, the capital. The new system will be equipped to serve 2,000 subscribers to begin with.

A new automatic telephone exchange has recently been brought into use at Edmonton, Canada, to serve the south district. It was manufactured and installed by Siemens Bros. & Co., Ltd., Woolwich, and is the No. 16 system with an initial equipment of 2,300 lines and ultimate capacity for 5,500. It supersedes an old 3-wire system with push-button ringing, and is the first portion of the scheme in hand to provide Edmonton with a modern fully-automatic system of 100,000 lines.

The laying of a direct telephone cable joining Budapest with Vienna, Frankfort, Munich, and other German towns is nearly finished. The development of the Hungarian telephone system is making great progress, and in about three years all towns and many villages in Hungary will be connected by telephone.

The following paragraphs appeared in many of our contemporaries:—

"WIRELESS SHERLOCKS.

Under the new B.B.C. regime a rigorous campaign of "witch-hunting" for offending oscillators is being enforced. Complaints on the score of serious interference through oscillation in the neighbourhood are received at the B.B.C. headquarters averaging about 100 per diem, and a fleet of motors, equipped with detective apparatus, is employed to search out the "criminals." Much success is reported from these energetic methods. It is a real chapter in the divine human comedy to watch what happens when a detective B.B.C. motor suddenly pulls up in some quiet suburban street. Not only is its mission apparent to all, so that a small crowd soon grows in the street, but at most upper windows anxious faces begin to show."

But the real facts are that the Post Office and not the B.B.C. has one car fitted with direction finding apparatus which is doing much useful work in detecting oscillators; and the witch-hunt by a fleet of motors and its attendant horrors are, we submit with great deference to our contemporaries, merely a pack of nonsense. In any case it must be many years since the appearance of a motor-car in a suburban street caused even the faintest throb of interest.

Direct telephone connexion between Spain and Gibraltar was inaugurated on April 5 by a conversation between the Spanish Consul at Gibraltar and a Secretary of State at Madrid. A conversation was also held between General Sir C. C. Monro, Governor of Gibraltar, and Sir Horace Rumbold, the British Ambassador at Madrid.

The cost of a message between Gibraltar and Madrid is 5s. for three minutes.

BROADCASTING IN JAPAN.

ORDERS have been placed with Standard Telephones and Cables Limited, for the complete radio equipment for three Broadcasting Stations, their associated studios and the necessary machinery, for the Japanese Broadcasting Association.

The equipments which are manufactured at the Company's London factory afford the power of 15 kilowatts according to the Geneva system of rating, so that the stations will have three times the power of 2 L.O. and more than six times that of other British stations except 5XX.

TELEPHONY FROM VARIOUS VIEWPOINTS.*

BY AGNES F. COX, LONDON TELEPHONE SERVICE.

WHEN I started to write this paper, I was met at the outset by a difficulty—in no dictionary could I find a definition of the word "Telephony."

Legally, I understand, telephony is telegraphy—at least I deduce this from the finding of the Court which, in the case of the Postmaster-General of the United Telephone Company, heard in December 1880 to decide whether the sending of a message through the medium of the telephone could be held to infringe the monopoly of the Postmaster-General, held that the Edison telephone was a telegraph within the meaning of the Telegraph Acts 1863 and 1869, although the telephone was not invented or contemplated in 1869; also that a conversation through the telephone was a "message," or at all events "a communication transmitted by a telegraph," and therefore a "telegram" within the meaning of those Acts.

Turning to the dictionary again, I find telegraphy described as the art or practice of communicating intelligence by a telegraph—the person who communicates the intelligence being described as a telegraphist.

Bearing in mind the essential difference between the work of a telegraphist and that of a telephonist, viz., that the former actually transmits messages while the latter normally only sets up such connexions as will enable other people to transmit them, I propose to discuss Telephony as the art or practice of switching telephone circuits in order that intelligence may be communicated by telephone.

Last year, the year of the Telephone Jubilee, was the occasion of many speeches, papers and newspaper articles dealing with the past history of telephones as well as with their future development; I crave pardon, therefore, for making my first viewpoint of telephony a retrospective one.

In an address entitled "The Birth and Babyhood of the Telephone," Mr. Thomas A. Watson says, "in August 1877, Professor Bell (who I believe is generally accepted as the inventor of the telephone and who therefore made telephony possible) married and went to England taking with him a complete set of up-to-date telephones with which he intended to start the trouble in that country."

In September 1877, Professor Bell's representative offered to exhibit the telephone to the British Government with a view to its adoption by the Post Office, but the offer was not accepted.

In January 1878 Professor Bell exhibited his new invention before Queen Victoria at Osborne, connexions being made between Osborne House, where the Queen was in residence, and Cowes, Southampton, and London, the notes of a bugle in Southampton and the tones of an organ in London being heard with equal success.

Although the possibilities of transmitting speech by telephone were known as early as 1876, the art or practice of telephony can hardly be held to date earlier than 1878, when the first public exchange was opened in New York; during the interval the telephone had been put to practical use, but only as "private wires" between two fixed points. It is interesting to note that one of the first of the private wires to be installed in England connected the private apartment of Queen Alexandra, then Princess of Wales, with her royal nurseries.

In August, 1879, the first telephone exchange in Europe was opened by The Telephone Company, Limited, at 36, Coleman Street, London, with seven or eight subscribers. It may interest some of my hearers to learn that one of the first undertakings to avail themselves of this new facility was the old London, Chatham & Dover Railway.

New subscribers were quickly forthcoming, and at the end of the year the Telephone Company's system served about 200 subscribers.

I do not propose to trace the history of the telephone service as it passed from one company to another until it came under the sole control of the Post Office in January, 1912, but the following facts and figures may be of interest as indicating its rapid growth:—

The first authentic printed list of telephone subscribers which can be traced is dated April 26, 1880. It contains 407 names and shows 7 exchanges as open or about to be opened. It is interesting to note that some of the subscribers in this original list are subscribers to-day, although, all the seven exchanges mentioned in the list have since been closed. The name of one, Hop, derived from the fact that the original Hop Telephone Exchange was actually located in the Hop Exchange, is retained by the existing exchange in Marshalsea Road, the third exchange to bear this name.

This first directory gives the subscribers no exchange numbers, presumably, therefore, it was customary to ask for subscribers by name—a practice which curiously enough we accept again in connexion with the transatlantic service.

Later it became the practice to call by number, but there was only one sequence of numbers for all the London exchanges, a different part of the

*Paper read before the Post Office Telephone and Telegraph Society of London, Feb. 21, 1927.

sequence being assigned to each exchange—thus all the numbers between 1 and 900 were on Coleman Street, between 901 and 1400 on Avenue and between 1501 and 1900 on Queen Victoria, &c. It is interesting to reflect that primitive though it may seem, we are in reality reverting to this system of a single sequence when we introduce automatics, although to assist the subscriber we are camouflaging the first three figures of the number by translating them into the first three letters of his exchange name.

Between 1880 and 1912, the date of the transfer of all the exchanges of the National Telephone Company to the State, the number of the exchanges in London had grown from 7 to 95, of which 62 belonged to the N.T.C. and 33 to the Post Office, and the number of subscribers from 407 to 126,668, of which 74,774 were on the N.T.C. and 51,894 on the Post Office system.

The present figures are 112 exchanges accommodating 300,970 exchange lines and 526,952 stations. The difference between the number of exchanges existing in 1912 and to-day, viz., 17, gives, however, quite an incorrect idea of the development during this period. At the time of the transfer the National Telephone Company and the Post Office were competing in many areas—at the transfer the competition ceased and in 18 places where rival exchanges existed in the same area amalgamations were effected.

During the past 15 years practically every exchange in London has been considerably extended: 38 additional exchanges have been opened and 29 existing exchanges have been transferred to new premises.

The growth of the system and the necessity for intercommunication between the various local centres which were speedily opened up in all parts of the country, resulted in the development of the Trunk system inaugurated by the opening of the first trunk line between Leeds and Bradford in 1880.

Owing to the proximity to each other of the large provincial towns in the North and Midlands, and the comparative isolation of London, the trunk system developed much more rapidly in the North and Midlands than in London. As late as 1889, London was entirely without long-distance telephone communication, with the single exception of a line to Brighton.

In 1892 the Postmaster-General purchased all privately-owned trunk lines taking them over for traffic on April 4, 1896. The total mileage purchased at this date was 28,998 miles.

The present mileage is approximately 125,000 miles, comprising 81,700 miles of trunk lines, 28,500 miles of toll lines and 14,800 miles of cables for Continental work.

In 1896, when the Postmaster-General took over the working of the trunk system, the Trunk Exchange, London, was housed in a small room off the cable room in G.P.O. West, with only one window looking into a well of the building. The comparatively small amount of traffic handled at that time may be imagined from the fact that during the day all the originated calls were received over one order wire, and that after 6 p.m. this order wire was connected to a wall telephone, the indicator of which was fixed so high up that on receipt of each call the telephonist had to mount a chair to restore it and stop the bell. At first no transfer position was provided for the completion of through calls. There were permanent connexions between the boards, each connexion being distinguished by a letter, not a number, and the standard method of asking for a through call was to call down the switchboard in this wise: "Miss Brown, can I have Glasgow on D please?"

Within a few months it was necessary to provide a much larger Trunk Exchange at G.P.O. West. This in its turn was outgrown, and in February 1904, the London Trunk Exchange found the home which it still occupies at G.P.O. South. Here it continues to grow, demanding more and more space. At present in addition to the switchroom accommodation originally assigned to it, a second switchroom known as Annexe has been opened, and the record work has been transferred to a room on the first floor of the same building. Further, it has been relieved of nearly all the traffic between London and places within a radius of 50 miles. This is now dealt with in the Toll Exchange.

Some extent of the growth of trunk and toll working may be judged from the following figures: In the month of December, 1916, the number of originated calls dealt with in the Trunk Exchange was 273,696, and the revenue earned £21,771. In December, 1926, the calls dealt with in trunks and toll (which was separated from trunks in 1921) numbered 749,608, an increase of 180%. The revenue earned was £66,167, an increase of over 200%.

Perhaps in no direction does the growth of the telephone system appeal more strongly to the imagination than in the international field; for may it not be one of the links in a chain now being forged to knit all peoples more closely together and to teach us that happiness and prosperity come from co-operation and mutual goodwill.

The first international telephone circuit to be opened was that between Paris and Brussels in 1889. This was followed by the opening of two circuits between London and Paris on April 1, 1891. For a considerable period Continental calls between England and the Continent were limited to connexions between these two cities, but it is now possible to effect calls between subscribers in all parts of the British Isles and France. Direct communication has also been opened up with Belgium, Holland, and Germany—there are now 52 circuits working between England and the Continent—and within a comparatively short period of time there is little doubt that it will be practicable to ring up subscribers in all parts of the Continent of Europe.

The following figures give some idea of the growth of the Continental Service. In December, 1904, 2,408 calls were received, this number was increased in December, 1926, by 840% to 22,609 calls, bringing in a revenue of £14,569.

But undoubtedly the greatest achievement in telephony was the opening of the transatlantic service on Jan. 7 last, which was rendered possible by wireless telephony.

It was my privilege to speak to New York and Boston, U.S.A., as early as June last, during the experimental stages, and on Christmas-eve last, I was able to convey the good wishes of the London Staff to their colleagues in New York, the speech in both directions being perfectly distinct and clear.

I am very conscious that most of the facts which I have cited up to the present are probably as well or better known to my hearers than to myself, but it seemed necessary to indicate broadly the lines on which telephony has developed, in order to introduce what I wish to make the most important viewpoint of this paper, that is, Telephony as a career for women.

Telephony as a career became possible with the opening of the first exchange in 1879, but at first the employment was given to boys. Mr. F. G. C. Baldwin, in his "History of the Telephone," writes that when the first telephone exchanges were established in this country, boys were almost invariably engaged as operators, although there were some exceptions, and for several years boys continued to be so employed. "No doubt," he says, "boys in their teens found the work not a little irksome, and it is also highly probable that under the early conditions of employment the adventurous and inquisitive spirits of which the average healthy boy of that age is possessed, were not always conducive to the best attention being given to the wants of the telephone subscriber.

"However that may be—in a few years' time girls began to appear at operators in replacement of the boys, and it was soon appreciated that the work of telephone operating demanded just that particular dexterity, patience, and forbearance possessed by the average woman in a degree superior to that of the opposite sex. In short, telephone operating proved to be just the sort of work for which girls were admirably fitted." Personally, I feel that this criticism is distinctly hard on the boys. I have a distinct recollection of being in the switchroom on one occasion (in the very early days) when all the Trunk lines running on one route were, during the period of the early morning test, connected together by the girls who listened in circuit to the various engineering officers reporting to each other the lines on which they were speaking and discussing the point at which such a full contact could have occurred. After a minute or two the lines were disconnected one by one.

There is no doubt that telephony was one of the first careers, if not the first, to be opened in the business world to women, and it has continued to provide year after year an increasing number of suitable openings.

On Jan. 1, 1912, the date of the transfer of the National Telephone Company to the State, the number of women employed in the exchanges was 3,453, including 1,472 already in the employ of the Post Office and 1,981 transferees.

The number of women employed on operating and supervising duties on Dec. 31 last had increased to 7,902, but the rate of wastage is so high that this figure gives no indication of the number of women who pass through the service.

The number of new entrants during the past 12 years (exclusive of those employed on the night staff during the war) was 13,465, an average of 1,036 yearly.

During the past three years the number of new entrants has been 3,494 an average of 1,164 yearly. During the same period the average wastage has been 686, the difference of 478 per year being accounted for by the growth of the service.

The high rate of wastage is in many respects a very satisfactory feature, as it results in a steady influx of youth, and there can be no doubt that youth is an asset in telephone operating. It is accounted for mainly by resignations for marriage and by promotions which averaged 350 and 79 per year respectively, during the last three years.

The high wastage is somewhat costly to the Department on account of the number of new entrants who have to be trained and also in respect of marriage gratuities. I always feel that the number of marriages is an indirect tribute to the ability of the interviewing officers who select the candidates.

Candidates are selected by interviewing officers who are supervisors experienced in exchange work and know from practical experience the type of girl required.

Some idea of the extent of this work may be judged from the following figures which are the average yearly for the past three years:—

Application forms received	...	...	...	7,897
Candidates interviewed	...	...	...	6,716
Candidates nominated to Civil Service Com-	...	...	...
missioners	...	...	...	1,045

The fact that only about 20% of the candidates interviewed are considered suitable for nomination reflects, I consider, very adversely on the present elementary school system, as the majority of the 80% rejected candidates are deemed unsuitable on account of defective speech or inability to spell or write clearly. A record taken recently of 200 consecutive interviews showed that 40% of the candidates spelled incorrectly at least five words out of a list of twelve—the list comprising such comparatively simple words as Urgent (usually started with an E)—Necessary—Government—Juvenile—Economy.

If one had time to compile it, a whole volume might be written on the humorous side of the recruitment work. In order to test her general intelligence, the candidate is sometimes asked to define words given in the spelling test, the following are a few definitions given recently:—

Combustibles	People who are waiting for a bus.
Civilian	A civilised person.
"	A foreigner.
Juvenile	Someone who comes after a place.
Bicycle	A thing to run "errants" on.
Leisure	Pleasure.

One bright youngster asked to define antique, promptly replied, "I don't know, but you could find it in a dictionary."

Another in answer to a question on the form of application—"Have you a strongly marked local dialect?" replied "No, but I will endeavour to acquire one." Yet another admitted to a cockney accent acquired in Liverpool.

After passing the interviewing officer the candidates are examined medically (about 10% fail to pass this examination). Those successful in passing the medical examination are nominated to the Civil Service Commissioners, and 99% of them obtain their Civil Service Certificate. The low number of rejections at this point is, I consider, a tribute to the care and efficiency of the interviewing officers.

I have endeavoured during the past few minutes to make it clear that there is a constant demand for healthy, well-educated girls between 16 and 19 years of age in the Telephone Service, and it is always a matter of concern to me that in these days when unemployment is so rife, we should have to resort to frequent advertisement to fulfil our requirements.

We obtain a certain number of candidates from the relatives of Civil Servants, and these are usually the best type, appreciating the value of a Civil Service appointment and having the traditions of the service behind them.

Our demands are constantly before the Ministry of Labour, but the rejections of applicants from this source are higher than the average, due probably to the fact that the parents of the girls up to the standard that we require still look askance at the Ministry of Labour as a means of starting their daughters in life.

But I think our handicaps are to be found chiefly in a fairly general misconception as to the social status of the girls we require, and to a still wider prejudice against the work, on the assumption that it is nerve-racking and detrimental to health.

The misconception is evidenced by the remarks of subscribers and others visiting exchanges who frequently say that they had no idea that we employed such bright bonny girls (quite evidently they had expected them to be of the factory type), and by the unsuitable candidates who are sent to us on occasions by quite highly placed people who wish to bestow a little patronage.

The prejudice is shown by the number of requests I receive for my "real" opinion as to the outlook for a girl taking up telephone work, especially from the point of view of health.

My "real" opinion is that for a girl who has made good use of an elementary or secondary school education, it is a most suitable career. It offers all the advantages of an established Civil Service appointment, which I need not detail to this audience, and girls who take it up have certain advantages over the outside public with regard to competitions for the higher appointments for women in the Civil Service.

The work is carried on in bright airy switchrooms, which are usually gay with flowers—there are pleasant recreation rooms and very satisfactory refreshment clubs, managed by the staff, where really good meals can be obtained at a reasonable cost.

Although the staff is able to remain seated during practically the whole of the day, the movements of the body required in carrying out the necessary switching operations overcome the objections to a purely sedentary occupation, and the fact that the telephonist is always in touch with human beings and dealing with calls concerning current events, give to her work a zest which is absent from such work as accounting, sorting, book-keeping, &c.

On the other hand, she never has arrears of work to worry her, or a balance that won't come right. When she takes off her telephone and leaves the switchroom, she can drop all thought of her work and thoroughly enjoy her leisure. Recently this leisure has been increased for new entrants by the introduction of a 36-hour duty during the first 2 to 3 years service. This reduction in the hours of duty of the junior staff results in a better co-ordination of staff to traffic; it should also be beneficial to the junior telephonists in that it makes the transition from school life to full duties, during the adolescent period, easier and gives more time for study for those who wish to qualify for higher posts. The 36-hour duty is regarded as established service and counts for pensions, &c.

The coming of Automatics is another bogey which scares some parents who fear that it will result in wholesale dismissals of staff, not realising that even with automatic working a certain amount of manual work is required.

In effect the introduction of automatics will transfer to apparatus operated by the subscriber only the routine portion of a telephonist's work, leaving to the telephonist the residue which requires thought and intelligence.

In London a subscriber on an automatic exchange will require to call a telephonist to operate all calls outside the first fee area; at present these comprise from 1 to 10% of the local traffic, the percentage increasing with the distance of the exchange from the centre of London; all Toll and Trunks and all foreign and transatlantic calls. Further, telephonists will still be required in each exchange to deal with all calls originated at call offices, with enquiries and complaints, at certain points, with directory work and work on the street index, while the phonogram service will, no doubt, require an increasing proportion of staff as its usefulness becomes more widely known and appreciated.

The advent of automatics will tend to upgrade the work of the telephonist, by relieving her of her more routine duties, and should further improve her status.

With the rapid development of telephones inevitable in London, the staff is never likely to be less than it is at present, in all probability it will be considerably greater, and any temporary redundancies which may be occasioned as manual exchanges are transferred to automatics will easily be met by the normal wastage and the slowing-up of recruitment for a time. In this connexion it is interesting to note the opinion of Mr. K. W. Waterson, of the Bell Telephone Company, U.S.A. Writing in the *Bell Telephone Quarterly* for October, 1926, he says: "It is interesting and important to note that, with the increasing growth and complication of the business, the requirement for telephone operators on a manual basis increases considerably more rapidly than the population. This problem has been very carefully analysed for all important cities and the number of girls estimated who have to work or wish to do so, who would be suitable for telephone work and who would like the work. From 1910 to 1920 our requirements for telephone operators in proportion to the population and number available nearly doubled, and if the manual system were continued, it would not be very many years before the requirements for telephone operators in comparison with the number of people available would present serious problems. I think it is not an overstatement to say that it would not be practicable indefinitely to give telephone service at reasonable cost in the large metropolitan areas if we had to operate on an all-manual basis. This, of course, is another strong argument in favour of the automatic system. Even with the large machine program, however, we will require more operators in 1930 than we do to-day, and it will be a long time before the operating force will be materially decreased. In fact, we will always need a great many telephone operators both for toll work, for many calls that cannot be handled by machine, for private branch exchanges and for other work, and operators need have no fear that their occupation will vanish on account of the introduction of the machine switching system. That system, however, will keep the employment problem within reasonable bounds which would have been exceeded on all manual basis."

A comparison of the growth of the population of Greater London and the increase of the number of day telephone operators employed shows that in London we are faced by practically similar conditions, for whereas the percentage increase of population in Greater London for the period Jan. 1, 1922, to Dec. 31, 1925, was 2.1%, the increase in the number of telephone staff for that same period was 27.1%.

Telephony offers careers with additional remuneration to women with a knowledge of foreign languages. At present the languages required are French and German. French is used on the French routes and English primarily on the Dutch and German, with German on the latter as an alternative. English will be used on the Scandinavian lines.

It is anticipated that as telephone communications with the various European countries are opened up they will fall into three main divisions with regard to the languages used in operating:—

- Latin countries using French;
- Teutonic countries using English primarily and German alternatively; and
- Other countries using English without question.

The language standard required of the telephonists—"ability to converse fluently over a telephone circuit with a foreigner who knows no English"—is a high one, and one of the most difficult problems of the recruitment section is to obtain suitable candidates for this work. Efforts in this direction have led me to the conclusion that in very few English schools is any real attempt made to give more than a superficial instruction in foreign languages. Before the war we had a fairly reliable field for recruitment in the Convent schools of France and Belgium, at which a certain number of English girls were educated, but this source was closed during and for several years after the war; and since it has been reopened, the number of positions for English girls with a knowledge of languages, outside the telephone service, has materially increased.

So great was the difficulty in obtaining suitable candidates that before the German cables were brought into use the Post Office found it necessary to engage an instructor for a time to build on this superficial foundation, and it is practically certain that with the rapid expansion of international work contemplated in the near future, it will be necessary to resort to this means again. It may interest some of my hearers to know that during the past year interchanges of staff took place between London and Paris, practically all the London French Operating staff, which then numbered between 20 and 30, spending two weeks in the various Paris exchanges.

(To be continued.)

REVIEWS.

"*Die Stromversorgung von Fernmelde-Anlagen*" (*The Supply of Current to Tele-communication Installations.*) By G. Harms. (Published by Julius Springer, Berlin. 137 pages. Price: paper cover, 10.20 marks; bound, 11.40 marks.)

This is a very full and up-to-date account of the various devices used to supply current to line and wireless telegraph stations, and to telephone exchanges and telephone subscribers' apparatus.

The main sections into which it is divided comprise primary batteries, secondary batteries, rectifiers, rotary transformers, pole changers, hand and power generators for ringing currents, the use of an alternating lighting supply for ringing purposes, and also, in certain cases, for the supply of current for speaking purposes, the working of telephone exchanges direct from generators, charging boards, automatic arrangements for charging secondary cells and for the supply of current only when actually wanted to telephone installations where the amount of traffic is small, and the testing of lines and batteries. The book concludes with a useful table in which are given, for every different kind of telecommunication device, from the humble house bell to the 20 kilowatt wireless station, firstly, the current consumption; secondly, the type of current source which should be employed; and lastly, a reference to the pages in the book where detailed information may be found.

The book is very fully illustrated with photographs of apparatus and diagrams of connexions. The paper is good, and the printing and the reproduction of the illustrations are excellent. It should be included in the library of every telegraph and telephone engineer, and, for the benefit of those who are unable to read the present German text, we hope that some enterprising publisher will see his way to issuing an edition in English.

"*Elements of Physics.*" By Millikan and Gale. (Published by Ginn & Co., Ltd., 7, Queen Square, London, W.C.1. 522 pp. Price 7s. 6d. net.)

The subjects included under the term "Physics" have changed so radically during recent years, that even those of us whose student days are not so very long ago find at every turn, facts and conceptions with which we are unfamiliar. The growth has been and continues to be so rapid that, unless one can keep in continual touch with the latest developments as recorded in the various scientific publications, one inevitably falls behind. Few of us, however, have the time for thus keeping our knowledge up to date, and therefore a book such as the one under review, which covers concisely the whole ground as known at present, is very welcome. The subject matter has been brought completely up to date, as examples of which we may mention the Rugby-New York telephone service, and the rotor ship, both of which are dealt with. A very attractive feature is a series of good reproductions of portraits of eminent physicists, from Dr. Gilbert to Einstein, with brief biographical notes.

The book is very fully illustrated, and the reproduction of the pictures and diagrams leaves nothing to be desired. We can confidently recommend it to those who wish to obtain an interesting introduction to the subject, and also to those, already mentioned, who wish to bring their knowledge up to date.

"*Astronomy.*" By Russell, Dugan and Stewart. (Published by Ginn & Co., Ltd., 7, Queen Square, London, W.C.1. Volume I, 470 pp. Price 10s 6d. net.)

At first sight the subject of astronomy is one with which those whose work is connected with telegraphs and telephones would not seem to need any acquaintance. Actually, however, the study

of the heavens and the business of electrical communication are by no means entirely separated from one another. The provision to the community of accurate time is a subject in connexion with which these two branches of science are closely related. The varying activity of the sun, as shown by the increase or decrease in the number of sunspots, is reflected on the earth in magnetic storms which frequently seriously affect our lines of communication, both with and without wires, and at times cause them to be completely interrupted. The mechanism of the transmission of wireless waves over the surface of the earth is probably intimately connected with effects produced by the sun, and recent research tends to show that also the moon, and possibly even the planets, may exert an influence on the efficiency of wireless communications. Finally, some knowledge of astronomy is necessary for those concerned with that application of wireless to navigation known as "direction finding."

Up to the present, however, there has been a dearth of books suitable for those who wish to acquire some knowledge of astronomy beyond the standard of the purely popular book, but at the same time have neither the time, nor possibly the necessary preliminary training, to enable them to read the standard works on the subject. For such, the present book is exactly what is required. The subject is dealt with in a thoroughly sound and scientific manner, while at the same time the treatment does not assume from the reader more than the elements of mathematics and physics.

The volume under review first deals with astronomical instruments and the observations and measurements made by their aid, and then describes in detail the various bodies which make up the solar system. The results of the latest researches have been incorporated.

After nearly every chapter a number of exercises is given which enable the reader to test for himself whether there are any points which he has not properly understood.

The style of the book is eminently readable, and its interest is enhanced by a wealth of illustrations, including actual photographs of every object described. We can thoroughly recommend it to our readers, and we shall look forward with interest to the appearance of the second volume.

"*The Practical Telephone Handbook.*" By Joseph Poole, A.M.I.E.E. (Published by Sir Isaac Pitman & Sons, Ltd. Seventh Edition. xv + 870 pp. Price 18s. net.)

We are pleased to welcome the appearance of a revised and enlarged edition of this familiar treatise on telephony. The contents of the sixth edition have been completely revised and largely rewritten, while much obsolete matter has been cut out and extensive additions made to bring the book, as far as is possible with a subject in such a state of continuous development, completely up-to-date.

The whole subject is thoroughly covered. The first chapter deals with the fundamental electrical laws on which telephone engineering is based. The second chapter deals with batteries, and the third gives a brief review of the history of the telephone. Then follows chapters on receivers, transmitters, sub-station apparatus, switches and extension working, intercommunication arrangements, switchboard apparatus, relay and lamp signalling, the various types of exchanges, junction, trunk and party line working, power plant, line construction, loading, multiplex telephony, submarine telephone cables, fault localisation, testing and measurements, repeaters, wireless telephony and telephone statistical studies. The final chapter deals with miscellaneous devices such as automatic call boxes, fire alarms, telewriters, &c. In an appendix is given a number of useful reference tables.

The book is very fully illustrated, the reproduction of the diagrams is good, and the standard of the earlier editions has been well maintained.

P.O. RELIEF FUND.

PRESENTATION TO MR. W. G. WOOD.

A MEETING of the Local Committee of the C.T.O. Branch of the P.O. Relief Fund on Wednesday afternoon, April 6, was made the occasion of a most pleasing ceremony.

The late Hon. Sec., Mr. W. G. Wood, was the recipient of a canteen of cutlery and half a dozen spoons as a small token of appreciation from the past and present members of the C.T.O. Committee.

The Chairman, Mr. F. T. Wadley, said that even in his short experience on the Committee he had, on many occasions, found how sympathetically the retiring Secretary had treated all cases coming before him.

Miss M. Tynan spoke on behalf of the female members of the Committee. She had great pleasure in bearing testimony to the splendid work Mr. Wood had done and the efficient way it had been carried out. The point that had struck her most was the intensely sympathetic manner in which Mr. Wood had handled every case, adding the personal touch to each.

Mr. J. L. Harris, on behalf of the Cable Room members, also paid a very high tribute to Mr. Wood's work. He had by his intense sympathy placed the work of the Committee on quite another plane to that of mere relief.

Mr. A. W. Edwards, O.B.E., late Deputy-Controller, C.T.O., and Chairman of the C.T.O. Branch of the P.O. Relief Fund, who had made a special journey for the presentation, spoke eulogistically. Associated as he had been from the beginning, he had seen the capable way in which the Hon. Sec. had dealt with the rapidly growing work. He had a wonderful knack of marshalling the salient points of each case. Carried out under the strain of the war period, and during a period of domestic trouble, Mr. Wood had never failed to deal sympathetically with every case that came forward. As those cases had grown in number, he had no doubt that Mr. Wood had given much of his own time to the cause of alleviating the distress of others. He had never known a man who did his work with such splendid heart as Mr. Wood. In making the presentation he hoped that he would live long in happy retirement and find the little gift of the Committee, which he trusted Mr. Wood would find useful, remind him of a very happy association on the Committee.

Mr. Wood was greatly moved by the tributes paid to him. It was with some difficulty that he could speak and reply to the various speakers. Suffering as he had suffered for many years past from the fact that his wife enjoyed but poor health and was confined to her bed practically all the winter, he had realised that there was a great bond of sympathy between himself and the dependants of his colleagues who had been killed in the war and whilst rather dubious at first of accepting the position of Hon. Sec. he later thought that he could help towards alleviating the distress of others by acceptance.

He also paid tribute to the patience and fortitude of his wife in her illness and to the devotion of his daughter which had enabled him to accomplish what he had. He also referred to the kindly consideration and quiet sympathy pervading the atmosphere of the Committee. He could assure the Committee that he was deeply grateful and appreciative not only for their expressions of appreciation of his work but for the gift itself.

After tea had been served Mr. J. J. Tyrrell, late Superintendent, Cable Room, who also had made a special journey to be present, spoke of the way Mr. Wood did the work, exalting and ennobling it by his personality and thus enhancing the value of the monetary assistance which the liberality of the donors to the Fund had made possible. E. C.

THE FORWARD MOVEMENT IN TELEPHONES.

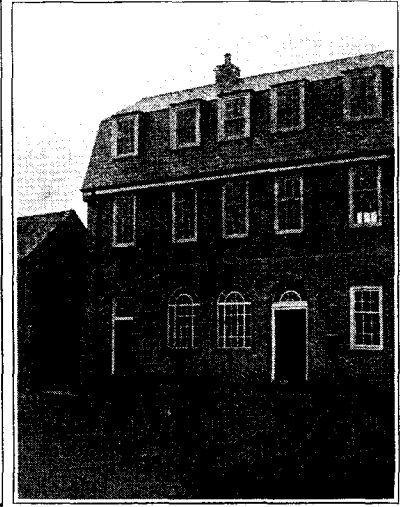
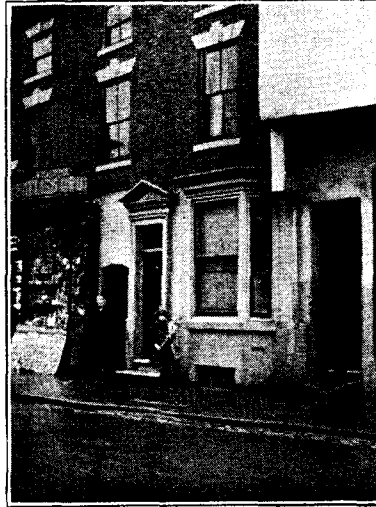
THERE are occasions when those whose duty it is to deal with the administration of telephone matters are especially conscious of a definite thrill of satisfaction in viewing signs of advance. "Here a little, there a little" the service is growing.

The recent transfer of the Exchange at Ashbourne, Derbyshire, from its former home to the newly erected Head Post Office typifies what must be a general experience in these days.

The bright and cheerful switchroom, the two front windows of which can be seen on the right of the first floor in the accompanying photograph, together with the excellent welfare accommodation, afford a welcome contrast to the old location, and there is every reason to believe that anticipations of development will be realised under the more favourable conditions.

It may interest readers of the *Telegraph and Telephone Journal* to be reminded that almost immediately opposite the old exchange building is the Green Man Hotel, which boasts eulogistic mention by James Boswell of its hospitality.

In the same street also is the house at which Dr. Samuel Johnson used to visit his friend, Dr. Taylor.



THEN.

NOW.

ASHBOURNE TELEPHONE EXCHANGE.

One wonders what Dr. Johnson would have said had he been told that at a period not so very remote he would be able from this house, so jealously preserved, to telephone to the United States of America. A stretch of the imagination, perhaps, but do we not the better appreciate the progressive modern days by their relation with the interesting past?

(Ashbourne New Post Office and Telephone Exchange was opened officially, by the Chairman of the local council on Feb. 28, 1927. The building is Georgian in character and faced with hand made multi-coloured bricks. It was designed and erected under the supervision of Mr. W. N. Ludlow, A.R.I.B.A., Architectural Assistant to the Secretary, General Post Office.)

W. L. EVELEIGH.

WHERE TO STAY.

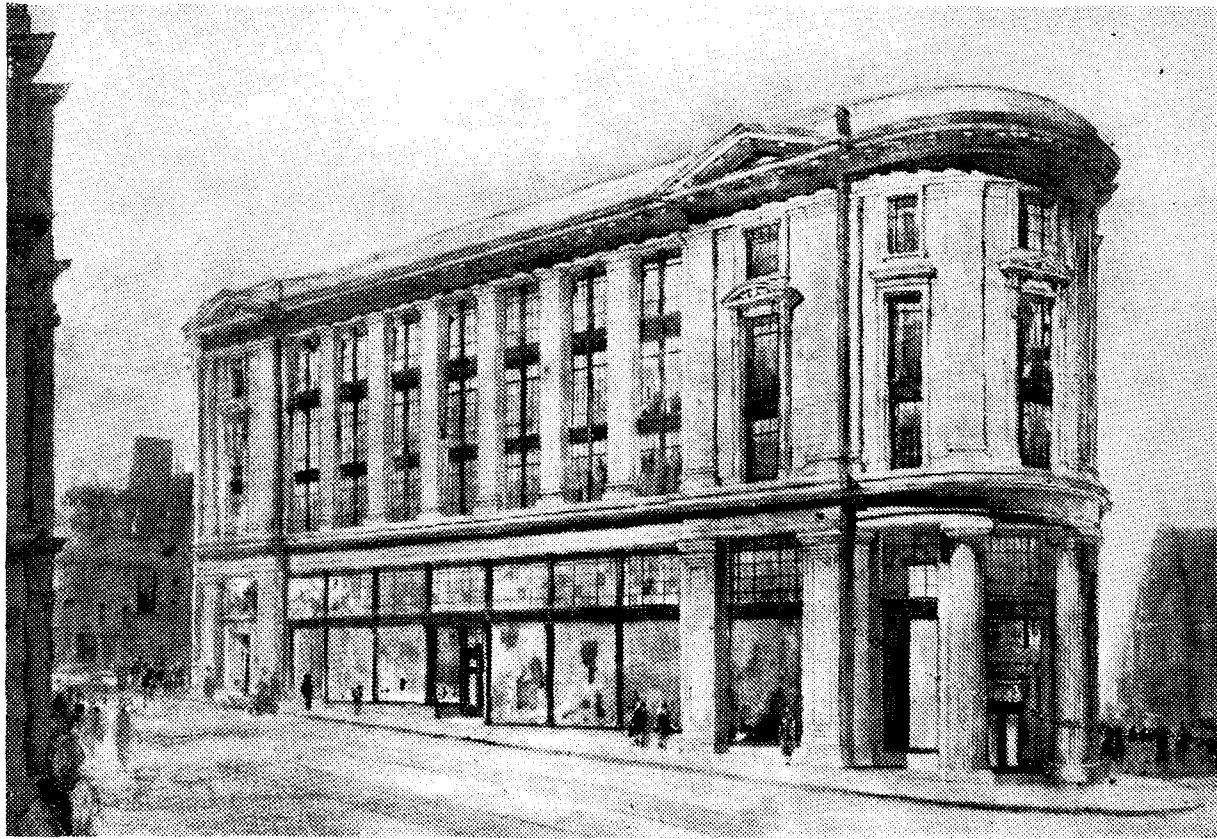
The attention of our Readers is directed to the following list of Boarding and Apartment Houses.

DEAN FOREST.—SEVERN-WYE VALLEYS. Beautiful Holiday Home (600 ft. up). 70 rooms, extensive grounds, motors, golf, billiards, tennis, bowls, croquet, dancing. Electric light. Boarders 50s. to 67s. 6d.—Prospectus: Littledean House, Littledean, Glos.

HOLIDAYS IN SWITZERLAND.—THE HORSLEY PARTY will leave London on Friday afternoon, June 3rd, for Montreux and Meiringen. 16 days tour, £14 10s. 0d.—Apply Mr. J. W. Fewtrell, 48 Frewin Road, S.W. 18.

LAKE DISTRICT.—Beautiful Buttermere. Near Honister Pass, Crummock Water and many easy climbs. Photographers' paradise. Victoria Family Hotel (R.A.C. & A.A.). £4 4s. (reductions up to 25% at quiet times). Taxi from Cockermouth. "A day on a hilltop is worth a week by the sea."—*Ruskin*.

SANDOWN.—"Seacroft," Private Hotel. Comfortable Boarding Residence on cliff facing sea. Large grounds, Croquet, Putting free. Electric Light, Separate Tables.—L. & E. Woodford.



SHEFFIELD: NEW EXCHANGE.

SHEFFIELD AUTOMATIC TELEPHONES.

SHEFFIELD had very early association with the telephone service, one of the first provincial exchanges having been opened there in 1879 by a local engineering firm, Messrs. Taskers. A few years later the National Telephone Co. opened a competitive exchange, and after 5 years of rivalry the whole system was taken over by the company and combined into one exchange, which was installed in the same premises as have been occupied up to the present time by the Central Exchange. An entry in the Central Exchange Visitors' Book reads as follows:—

"New Switchroom first tried this day, proceeding satisfactorily."
(Signed) George Franklin, Sheffield, Feb. 18, 1893.

The passage of time has rendered the Central Exchange and its numerous sub-exchanges obsolete and the whole have now been replaced by the up-to-date automatic system.

Shortly after midnight on Mar. 5-6, 1927, Colonel Purves, the Engineer-in-Chief, dialled the telephone number of the residence of Sheffield's Lord Mayor (Alderman J. G. Graves) and informed the Lord Mayor that his circuit had been transferred to the automatic equipment as the first item of the general transfer which was then in active progress, and which in a few minutes would effect the disconnexion of all the subscribers' lines in the Sheffield area from the eleven manual exchanges which had hitherto served them and their reconnexion to the nine new automatic exchanges in various parts of the area.

After preliminary words of thanks the Lord Mayor said: "We recognise that such an improvement as will facilitate quicker and surer communication, will at the same time do away with much of the nervous tension and irritation incidental to a system no longer equal to the demands which modern commercial conditions expect it to satisfy. I understand that the change over which is taking place at the moment is one of the greatest feats which have so far been accomplished in the history of automatic telephony as the whole body of subscribers within the Sheffield telephone area are being transferred at one operation and in the same instant of time."

The Lord Mayor expressed the thanks of all subscribers to the girls who had maintained the old service, and then continued: "In our impatient moments very few of us stopped to remember that every day they had to establish connexion between 180,000 subscribers on 90,000 different calls, and all the time they have done their best to satisfy everybody."

"If now and then they may have heard a nasty rude remark, we apologise, and will even go so far as to admit that the subscribers themselves were not always above making a mistake. Thank you again. Good-night and good-morning."

Four full and five Satellite Automatic Exchanges of the No. 16 type were installed by Messrs. Siemens Brothers as follows:—

Exchange Name.	Equipment.		Total working lines at transfer.
	Pre-selectors.	Final Selector Multiple.	
Sheffield (Full Automatic) ...	6,020	6,300	4,646
Beauchief	1,100	1,200	763
Broomhill	2,610	2,800	1,847
Sharrow	1,670	1,800	1,141
Attercliffe (Satellite) ...	940	1,000	661
Ecclesfield	220	300	115
Oughtibridge	50	100	44
Owlerton	770	800	575
Woodhouse	180	200	123
Sheffield Manual	—	—	13*
			9,928

* 5 Rural Party Lines.
8 .. Call Offices.

The complexity of the "change-over" arrangements was increased by the necessity for transferring to their appropriate exchanges 564 subscribers' lines working on the Central Exchange.

The Manual Exchange is provided with:—

- 3 plug-ended order wire B positions (with key-sender impulse equipment).
- 3 jack-ended B positions.
- 1 Service P.B.X. position (for dealing with "92" level calls).
- 21 A positions (for calls from the "O" level selectors and call offices).
- 16 "enquiry" positions.
- 6 position "trunk record" desk.

The manual equipment and a suite of 22 trunk signalling positions are installed at the Head Post Office where the trunk switchroom was enlarged by removing a partition wall hitherto dividing it from the old phonogram room. A new phonogram room had already been provided in another part of the building and the new continuous panel phonogram equipment has been in use there for several months.

It may be of interest to note that with one exception all the exchanges involved in the scheme were of the magneto type, and it will be appreciated that the "life-long" habit of calling the exchange by ringing *before* lifting the receiver would have resulted in subscribers "dialling" *before* lifting the receiver if the point had not been stressed on every possible occasion by the "instructional" staff, in the "Press" and on the "wireless."

During the five weeks preceding the transfer an "instructional" staff of 46 officers was employed in visiting subscribers for the purpose of explaining the new procedure, and demonstrating the various "tones."

These officers made 13,352 visits to subscribers and in addition visited all the call offices in the area.

Apart from junctions to the third selectors at the automatic exchanges and circuits to and from the phonogram equipment, there were 297 trunks and junctions to be transferred from the Central Exchange to the new Manual Exchange.

These were divided into two sections, approximately 59% of which were transferred at 1 p.m. on the day of the transfer and the remainder at midnight.

All the trunks and junctions contained in the first section had been thoroughly tested under actual working conditions before 3 p.m. and were then used for "through" traffic for the remainder of the day. This advance transfer ensured a sufficient number of circuits to all exchanges for the Sunday morning traffic whilst the remainder of the circuits was being tested.

On the Thursday following the transfer a party headed by the Lord Mayor, and including the Bishop of Sheffield, the Master Cutler, members of the City Council, public officials, and others visited the new Automatic and Manual Exchanges where they were received by Mr. A. Sirett (Postmaster-Surveyor), Mr. E. Gomersall (Superintending Engineer), Mr. W. Allen (Assistant Superintending Engineer), Mr. S. C. Smith (District Manager) and Mr. W. Lomas (Sectional Engineer).

The Lord Mayor took the opportunity during the afternoon of originating a call to The Secretary, G.P.O. London, in which, after intimating that he was present at the head of a representative party, he said:—

"We are glad to have had the opportunity of seeing the marvellous mechanism of this new exchange, and feel greatly indebted to Mr. Gomersall, to the Postmaster and to the staff for explaining to us in such a clear and interesting way how it all works. As we are all very reasonable people in

ever. He thought the scheme of inviting bodies of citizens to see the working of public departments was a step in the right direction. It tended to increase our sense of civic pride. He was glad that the Corporation departments were doing something similar by broadcasting details of the services rendered by them. It provided welcome and interesting information and aroused in people an interest in their own civic affairs that should be encouraged in every way.

The Master Cutler also expressed thanks.

Mr. Sirett said that Mr. Gomersall and his staff had had a very anxious time, and the postal authorities were indebted to them for all they had done to bring the system successfully into operation. The Department would always welcome helpful criticism from the public because they were anxious to provide a service which would be for the benefit of all.

Mr. Gomersall said that Sheffield now had a system second to none in the country, and he hoped that the citizens would make extended use of it and so enable the authorities to increase the equipment.

Thanks was expressed by the Lord Mayor to lady members of the Postal staff who helped to entertain the party to tea.

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PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of stations working at Feb. 28, 1927, was 1,495,329, a net increase of 10,511 on the total at the end of the previous month. During February new stations numbered 18,640 and ceased stations 8,129.

The growth for the month is summarised below:—

Telephone Stations—	London.	Provinces.
Total at Feb. 28	526,952	968,377
Net increase for month	3,802	6,709
Residence Rate Installations—		
Total	113,153	185,322
Net increase	1,612	1,955
Call Office Stations—		
Total	4,711	17,082
Net increase	13	153
Kiosks—		
Total	447	2,489
Net increase	17	107
Rural Party Line Stations—		
Total	—	9,953
Net increase	—	—
Rural Railway Stations connected with Exchange System—		
Total	—	729
Net increase	—	3

The number of inland trunk calls dealt with during January—the latest statistics available—was 7,715,866, an increase of 772,189, or 11.1%, on the figure for the corresponding month last year.

Calls made to the Continent during January numbered 25,336, and from the Continent 17,755.

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

LONDON—Ambassador (Mayfair Relief Exchange), Wallington.

PROVINCES—Sheffield (automatic).

Attercliffe,	Oughtibridge	} Sub-exchanges.
Beauchief,	Owlerton,	
Broomhill,	Sharrow	
Ecclesfield,	Woodhouse.	

And among the more important exchanges extended were:—

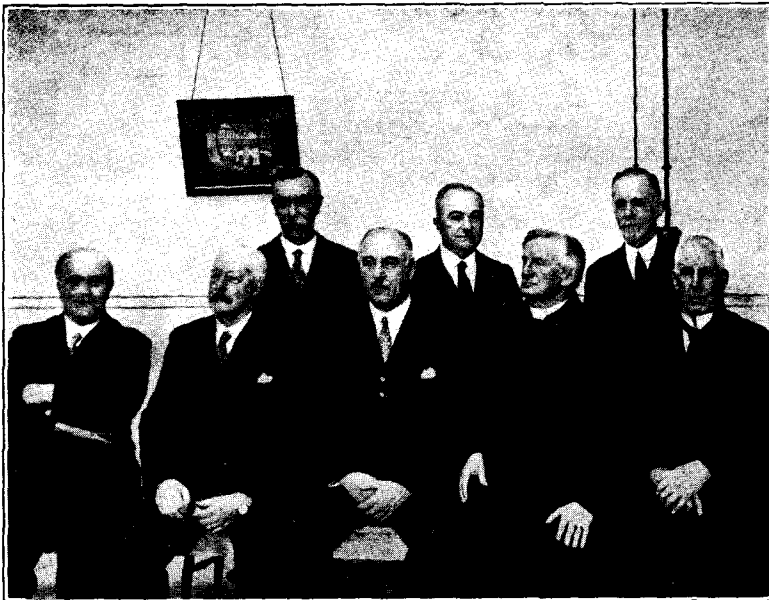
LONDON—Hendon, Ilford, Lee Green, Palmers Green, Ravensbourne, Colindale, Wimbledon.

PROVINCES—Brentwood, Chatham, Heaton Moor, Jesmond, Whitefield, Leek, Newcastle (Staff), Northwich, Roundhay (automatic).

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

Birmingham—Redditch—Evesham,
Dewsbury—Wakefield,
Belfast—Carrickfergus,

while 109 new overhead trunk circuits were completed and 95 additional circuits were provided by means of spare wires in underground cables.



VISIT OF CIVIC REPRESENTATIVES TO THE NEW SHEFFIELD AUTOMATIC EXCHANGE.

BACK ROW (left to right): Mr. W. Allan (Assistant Superintending Engineer), Mr. A. Sirett (Postmaster-Surveyor), and Mr. S. C. Smith (District Manager).

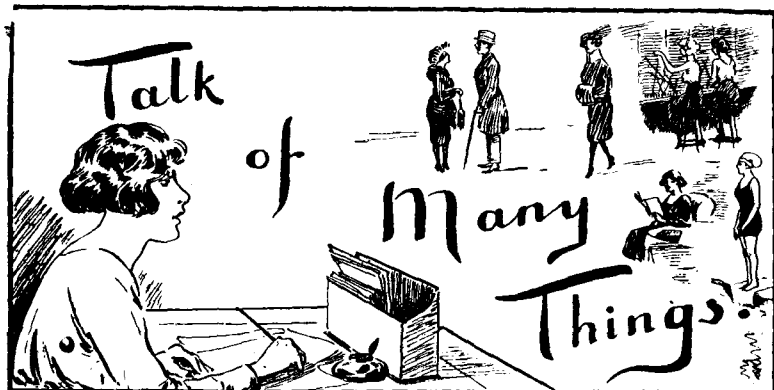
FRONT ROW (left to right): Mr. E. Gomersall (Superintending Engineer), Mr. D. Flather (Master Cutler), Alderman J. G. Graves (Lord Mayor of Sheffield), The Bishop of Sheffield, and Alderman C. H. Smith.

Sheffield and very responsive to courteous and considerate treatment, we are prepared to forget the irritation and inconvenience which we have experienced during the last two or three years, and I can assure you that we shall not be found wanting in appreciation of the generous enterprise with which your Department has now met our needs," added the Lord Mayor. "In the few days which have elapsed since I received the first call the commercial community has made ample test of the new installation, and, speaking generally, I have heard nothing but praise and satisfaction expressed."

Mr. R. A. Dalzell, Director of Telegraphs and Telephones, at the General Post Office, London, replied: "On behalf of the Postmaster-General I thank the Lord Mayor for the kind words of appreciation of the new telephone service in Sheffield, which, I agree, has through unforeseen circumstances been long delayed. I hope that the improved facilities afforded by the automatic system will do much to assist the commercial life and welfare of the City of Sheffield, not only in its local relations, but in its relations with other cities both at home and abroad. You may rest assured that the officers of the Post Office will do all in their power to maintain the service in a high state of efficiency."

At the conclusion of the visit the Lord Mayor, expressing the thanks of the visitors for the hospitality extended, said the visit had been a very delightful experience, for it had increased their respect and admiration for that great department, and they would all feel friends with it for ever and

WE TELEPHONISTS



The Gentle Art of Fencing.

IN theory it is a fairly simple matter to put up a fence or to repair what was once a fence. All that is required is a small amount of wood, twice that amount of nails and a large number of spaces—double width—to place between the palings. I used to think that the man who neglected to keep his fence in repair was a sluggard and an untidy fellow, but I have since learned that such men are those who have reaped wisdom from experience. A little experience of fence-building or repairing goes much further than any amount of fencing and leaves one appreciative of the attitude of mind of the geographers who are content that the equator shall be an imaginary line running round the earth. Indeed, the equator type of fence would be ideal for my garden, for space is free and is available in unlimited quantities and material and labour are unnecessary. Such a fence is thus entirely economical and lasting. Be the gale never so strong, the fence falls not and neither will moth nor rust corrupt it.

The tangible fence, however—one that returns splinters for caresses—has its advantages. It serves as a boundary over which one's own garden refuse may be thrown at appropriate moments; it serves as a support for the elbows when commenting upon one's neighbour's efforts at horticulture, and it prevents his circus of dogs, cats, chickens and children from intruding upon one's estate and disturbing one's seclusion. It is useful also as a training ground for ramblers and loganberries—it were sacrilege to use the wireless pole for such base purposes.

After duly weighing the advantages of what I have called the "equator" type of fence and the continuous wooden fence, it will usually be found better to adopt a middle course and erect a fence composed of equal parts of wood and spaces. If your neighbour is stout and has only a St. Bernard dog and has no cats, chickens or children the spaces may be wider. The width of the spaces should be judged by eye and not by actual measurement of your neighbour's girth or of that of his dog. Such attention to detail is liable to be misunderstood and he might jump to false conclusions if, after the measurement, he saw you digging a perfectly innocent celery trench. In building or rebuilding the fence it will be found easy with a little manipulation to add a cubit to your garden at the expense of your neighbour's estate but care is needed and it is inadvisable to be too grasping. After all, an error in judgment is human and you can explain to him afterwards that in the matter of straight lines you are a disciple of Einstein.

Possibly from this you will have gathered that I have been building a fence. Oh, no! I have reaped wisdom where I have not sown and I am at present sitting on the garden-roller watching and marvelling at the labours of my neighbour, who declines to wait any longer for me to move in the matter. I have not been idle, however, I have indicated the line which the fence is to follow, I have offered to pay for the spaces and I am supplying plenty of advice. For encouragement I have lent him a history of the Great Wall of China, and I refer to him as Hadrian.

PERCY FLAGE.

The Simple Life.

I wonder if some of us fully realise the pleasure that is to be derived from exercising out powers of observation.

While on a short visit to Thorpe Bay recently, I was afforded much amusement from various sources.

To begin with, I was much taken with many of the gardens to be seen along the front, and also in some of the private roads. One especially took my fancy. It was a mass of daffodils, forget-me-nots, and wallflowers, and as a background, a lovely sloping rock garden. Every time I passed that garden, I simply feasted my eyes.

Another time my friend and I spent some time in a park—not a very large or a very grand sort of park at all, but extremely pleasant. There was a stretch of water upon which were floating swans, geese and other birds; and two delightful baby ducks—about the size of chicks just out of their shell—gave us a great deal of pleasure, with their quaint antics. I found myself murmuring:—

From troubles of the world I turn to ducks,
Beautiful comical things—sleeping or curled,
Their heads beneath white wings, by waters cool,
Or finding curious things to eat in various mucks
Beneath the pool.

Again, on the sea front we came across a merry little urchin who was amusing himself by sliding down the side of the stone steps leading to the beach, seated on a large piece of tin; as he slid down, he gave us such a merry smile—if he had been a Duke's son, he could not have been enjoying himself more—or, perchance, as much! It made us happy to look at him.

Truly the world is full of interest, and those who have learned to use their eyes need never be dull.

L. R.

Brixton.

It is thought that those who are interested in this page, and can recall the aspersions cast upon our liveliness at Brixton, may be delighted to hear that a very happy evening was spent by a large number of the staff on Tuesday, March 29, at the Raleigh Hall, Brixton. The fact that the position of M.C. was occupied by Mr. Raison helped to ensure success for the evening. We were all most enthusiastic, and another happy evening is anticipated in the near future. We trust that all who can will join us.

Queen's Hospital, Frognal, Sidecup.

The total of the weekly subscriptions in aid of the above hospital has been forwarded to the Secretary, Mr. Baker; i.e. September to December, 1926, £15—January to March, 1927, £6 12s. This is for the purpose of supplying hot-house fruits, and other delicacies, to the patients who are still confined to bed.

A. C. V.

Central.

THE LEARNERS' HOME.

They came from the suburbs in hundreds
These learners of each degree,
And they listened to working of others
Or worked quite awkwardly.
But there were some of the learners
Who could not join in the fray,
And our training supervisor
Watched o'er them day by day.
One she had given a test to
And oh, how she smiled to see
The total irregs. for that learner
Work out at two point three.
They came again from the homesteads
In one unending stream,
And the pale, pale face of each learner
Shone through her restless dream.
And the brainy girl and the slow girl
Passed merrily side by side,
For the ways of the school are narrow
But the gates of C— are wide.
For the ways of the school are narrow,
But the gates of C— are wide.

D. D.

Sydenham.

The last dance of the season, organised by the Tennis and Swimming Club Committees, was held on March 9, at Dartmouth Hall, Forest Hill. The evening was a great success, and all who attended spent a very pleasant and enjoyable evening. This completes the second successful winter season, and no doubt the renewed efforts of all will secure the future social reputation of Sydenham.

Now for the summer! Tennis Club members, roll up in your thousands. Swimmers, beware! Brixton is waking up!

G. M. T.

Ravensbourne.

"EXCELSIOR." A NEW VERSION.

The shades of night were falling fast,
As thro' the gloomy test room passed
A youth, who clad in strange attire
Had murmured as he mounted higher
"Order wires—no pilot."



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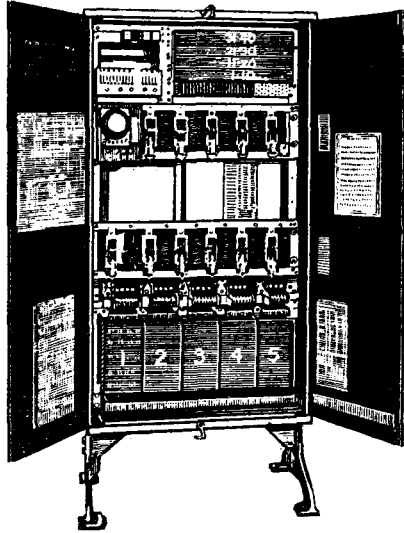
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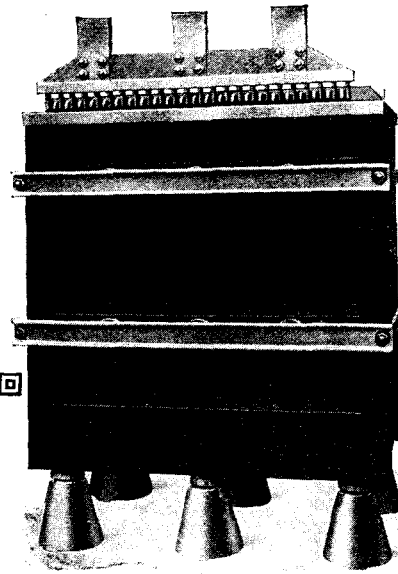
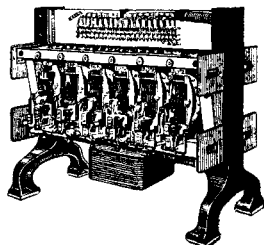
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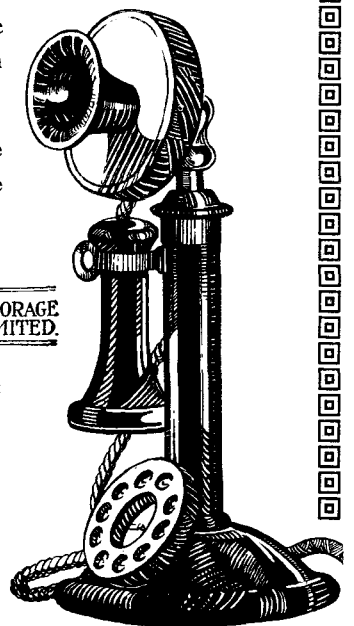
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His brow was sad and moist his eye,
He heaved a deep despairing sigh;
And as he staggered to a seat,
They heard in accents low and sweet,
"Order wires—no pilot."

In happy homes he saw the light
Of household fires gleam warm and bright;
Above no special pilot shone
And from his lips escaped a groan,
"Order wires—no pilot."

"O, bother the pilots," the super said,
And then her face went very red.
She too had heaved a mighty sigh,
Then heard that clarion voice reply,
"Order wires—no pilot."

Alas, alas, 'twas all in vain,
Those pilots would not come again.
He heard the pleasant last good-night,
Then feebly murmured up the height,
"Order wires—no pilot."

Here in the morning on the stairs,
They found him past all earthly cares;
And as his eyelids closed in death,
He murmured with his last, low breath.
"Order wires—no pilot."

H. F. T.

Paddington.

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, coming all undone,
Off came his little jacket, then there was none.

V. M. G. C.

City.

ODE TO THE NEW WAGES SHEETS.

O! sheets of lines and shaded squares
Which bewilder as I clasp thee,
O sheets of pitfalls and of snares,
Never may I hope to grasp thee.

Thy face a maze of lines and spaces,
Of columns plain, and columns shaded;
Thy virtues and thy subtle graces,
Inspire me not, but leave me jaded.

What thou givest that thou takest,
Thus an increase comes a decrease.
But that "Balance" that thou makest
Turns a decrease into increase.

So through long and tiresome stages,
Increase here, and decrease there,
We come to "Net amount of Wages,"
And at last are freed from care.

O! sheets of lines and shaded squares,
With thine attendant forms and pages,
Thine advent brings ten thousand cares,
On all who deal with wages.

E. H.

LONDON TELEPHONE SERVICE NOTES.

Accounts Branch.

THE month of May suggests cricket and the plans of the Accounts Branch Cricket Club are already well advanced. This club is one of the most juvenile of the Service clubs, as it did not come into existence until half-way through the 1926 cricket season. It, however, started off in life as a very healthy child with 31 active members and 57 honorary members and played 7 matches and 2 inter-club matches before the season was over. This season's fixtures already arranged are 6 matches at the Civil Service Sports Ground at Chiswick, one at the "Poly" ground at Chiswick and 13 at Battersea Park. Already 40 active members have announced their intention of joining for the 1927 season and a large number of honorary members are anticipated, so that if only the weather is kind the season should be a very successful one. The members are very keen.

The Controller is patron of the Club and Mr. J. Stirling and Mr. W. R. Bold, President and Vice-President respectively, while the principal officers are:—

Chairman	...	...	...	Mr. Hugh Williams.
Hon. Secretary and Treasurer	...	...	...	Mr. A. M. Hough.
Captain	...	...	...	Mr. C. E. Drabwell.

A further list of fixtures will appear in future issues of the *Telegraph and Telephone Journal*, and matches will be duly reported. It is hoped that the members of the staff interested in cricket will come along to the matches in large numbers.

* * * *

A number of the Headquarters Staff at Cornwall House celebrated April 1 with an informal dance in the Cornwall House Refreshment Club, and had a very enjoyable evening. This was the first occasion on which such a function has been held "at home," as it were, and the verdict of the 160 people who turned up was that the experiment was an unqualified success. The band was so tempting that dancers forgot that the floor was not exactly a professional one, and the caterers arranged matters in a way beyond all expectations. It is probable that this will not be the last event of this kind.

* * * *

The concert held on March 9 in aid of the Paddington Blind proved very successful. Community singing was one of the evening's specialities, while a sketch won much popular approval. The sum of £10 8s. 6d. was collected for the funds as a result.

* * * *

Obituary.

His colleagues in the Accounts Branch were shocked to learn of the death, with tragic suddenness, on March 23, of Mr. R. W. Mitchell, at the early age of 51. He had been at the office on the previous Saturday and passed away after only 3 days' illness.

Mr. Mitchell had spent practically the whole of his service attached to the Cashiers' Section, which he joined under the National Telephone Company on Aug. 6, 1904. He remained with the Cashiers on the combination of the two staffs after the transfer to the Post Office on Jan. 1, 1912, and had only been transferred to another section of the Accounts Branch a few months ago. He served with the infantry at Salonika and the East during the war, when he suffered from the diseases of that climate, and he has not enjoyed very good health since. His death from heart trouble was, however, quite unexpected.

* * * *

Contract Branch Notes.

The years 1920 to 1926 will probably be marked down in British industrial history as embracing one of the worst periods of trade depression. It is interesting to look back and see the phenomenal growth achieved by the London Telephone system during this period as indicated by the following figures:—

	Lines.	Stations.
January, 1920	168,049	308,135
January, 1927	310,488	519,969

It is not usually recognised that this growth was foreshadowed in the development study of London which was made in 1913. That study estimated that 275,910 lines would be working by January, 1921, but at the end of the war it was estimated that the attainment of this figure would be deferred to January, 1926, owing to conditions arising out of the war. It is significant that the number of lines working and on order actually reached this figure during January, 1926!

The volume of work dealt with by the Contract Branch during the last financial year may be gauged from the following summary:—

	Financial Year 1925-26.	Financial Year 1926-27.
	(Stations.)	(Stations.)
New business obtained	92,772	92,597
Ceasements	47,065	45,123
Net gain	45,707	47,474

The volume of gross new business obtained last year was appreciably reduced by the general strike and the prolonged industrial disputes as well as by a change in dealing with certain types of transfers, and it is satisfactory to note that the net gain shows a definite increase over that for the previous year, although the volume of new business obtained was slightly less.

The growth of residential lines continues to increase as the following figures indicate:—

	Financial Year 1925-26.		Financial Year 1926-27.	
	Installations.	Stations.	Installations.	Stations.
New Orders ...	24,158	28,855	26,634	32,459
Ceasements ...	8,377	10,185	9,202	11,313
Net gain ...	15,781	18,670	17,432	21,146

Efforts to introduce Kiosks along the Thames Embankment have at last met with some success, in spite of the difficulties put in our way by the authority concerned and arrangements are being made to instal four, one at the north end of Blackfriars Bridge, two in the front garden of Telephone House, and one in the front garden of the Institute of Electrical Engineers.

We can recommend the game of "Kiosking" to all lovers of sport, but we would give a warning that the game is a strenuous one and only super-sportsmen need apply. The game can be played anywhere throughout the country but there is far more sport to be had in towns.

We, in London, have our own set of rules governing the game which vary somewhat from those in force elsewhere. The players include, in addition to ourselves, local authorities of various descriptions, the Ministry of Transport the Metropolitan Police, frontagers, freeholders, leaseholders, and alleged frontagers, freeholders and leaseholders, &c. &c. &c. The play is always keen and frequently becomes involved in the traffic congestion of our too narrow and crooked thoroughfares, so that the winning of a point is quite an event.

Up to date we are 474 points up—at any rate we look at it in this light—and we console ourselves with the thought that our successes are visible to all men while our many failures are hidden away as quickly as possible in the registry.

* * * *

London Telephonists' Society.

The London Telephonists' Society held their final meeting of the current session at the City of London Y.M.C.A., 186, Aldersgate Street, E.C., on Friday, April 8, 1927.

The special feature of this meeting, which attracted a rather larger number of members than usual, was the reading of three prize papers by the successful competitors in the Society's Annual "Papers" Competition, and the distribution of the prizes by the Controller. Members of the Society are always glad to welcome Mr. Valentine to their meetings and greatly appreciate his willingness—year after year—to be present on these occasions.

The half-hour concert preceding the meeting was arranged by the staff of Thornton Heath Exchange, the items of which were exceedingly well rendered and well received. These short concerts have been very popular ever since their inauguration, and it is proposed to continue them next session. The Secretary will therefore be glad to be advised of any exchange willing to undertake the responsibility of providing the talent for one of these meetings.

At the termination of the music, Mr. Hinshelwood occupied the chair, and the following papers were read by the respective authors:—

"Recollections of a Junior Telephonist." Miss E. A. Chapman—Mayfair Exchange.

"Training of Staff." Miss C. K. Hooper—Paddington Exchange.

"Opening a New Exchange." Miss E. B. Jenkins—Maida Vale Exchange.

A short discussion followed each paper and all received many congratulations.

The Controller, rising to present the prizes, congratulated the Society on its activities during the past session and the very large membership which had been attained; he also wished Miss R. James, the incoming President, every success in her year of office. Referring to the three papers which had been read, he congratulated the authors, and said he thought the papers might well be contemporary to each other, the first dealing, as it did, with the experiences and feelings of the new telephonist, the second, the opening of the new exchange, and the third with the more mature subject, the training of staff in the many phases of exchange work. Mr. Valentine then handed the cheques to the lucky ones with a kindly word to each.

Before the meeting closed votes of thanks were enthusiastically accorded to the Controller for his kindness and to Mr. Hinshelwood, the retiring President.

* * * *

The Telephone Play.

The joyous anticipations of last month's *Journal* were fully realised on March 28 last, when Miss McMillan's Telephone Play, "Nothing Like the Truth," was presented for the second time at St. George's Hall, Caroline Street, Tottenham Court Road. Again, a crowded audience bore witness by its enthusiasm alike to the popularity of the musical play as a form of

entertainment and to the skill and resource of the author in providing for the third year in succession a bright and humorous play dealing with the work of the Telephonist.

The performance "went with a swing" from first to last, and both principals, chorus, and orchestra added to their laurels. So much so was this the case that it is difficult to particularise; but special mention should be made of the outstandingly brilliant singing of Miss Blair Street, particularly perhaps in the scene with the Professor in the first act, where her work touched heights that called for more exacting roles.

The one disappointment of the evening was the absence of Miss Lilian Jones, whose very graceful solo dancing was a much appreciated feature of the first performance. The Fates, however, were kinder on this occasion to Mr. Cherry, whose additional stage effects worked admirably.

An interesting feature of the evening was the presentation to Miss McMillan and Mr. Pounds of a gold wristlet watch and case of cutlery respectively, as visible tokens of the appreciation of the London Telephonists' Society of the skill, time, and labour so freely given in providing a Telephone Play for three successive years. The presentation was made by the Controller in a happy speech, and suitably responded to by the recipients of the gifts, the audience being reminded that the idea of a Telephone Musical Play, which had given such pleasure to members of the Society, actually originated with Mr. Valentine.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Promotions:—

Miss E. M. MELDRUM to be Assistant Supervisor, Class I at Hop.

Resignations for Marriage:—

Miss L. M. GODDARD, Telephonist, of Central Exchange.

Miss M. E. SELLS, Telephonist, of Riverside Exchange.

Miss D. LETT, Telephonist, of Riverside Exchange.

Miss E. M. PETO, Telephonist, of Museum Exchange.

Miss C. E. M. LAYTON, Telephonist, of Museum Exchange.

"THE POST OFFICE ENGINEERS' JOURNAL."

WE congratulate our contemporary on its new format (a convenient quarto), its enlarged contents, and especially on the varied character of its April issue, which lies before us. The *P.O.E.E.J.* is always replete with matter interesting to the telegraph and telephone man, and this number has upwards of 90 large pages of excellent articles excellently illustrated. Amongst them we may single out "The C.C.I. Telegraphs, 1926" and "A Keyboard Perforator for Baudot Circuits," by Col. Booth; an article on the power plant at Tandem and Holborn Automatic Exchanges, by P. B. Frost; on the Amsterdam Traffic Office, by Dr. Maitland; on the Pacific Cable Board's cable; and on Submarine Insulation (this by R. R. Williams and A. R. Kemp); and on "Some Aspects of Electric Capacity of Telephone Cables," by A. Morris. The Transatlantic Telephone Service is fully dealt with by Col. Lee, R. V. Hansford, and C. A. Beer. We have no space to refer to these interesting articles in detail, but the titles will serve to show the scope of the ample contents of the *Journal*. The price is nevertheless unchanged and is still 1s. 6d.

THE Telegraph and Telephone Journal.

VOL. XIII.

JUNE, 1927.

No. 147.

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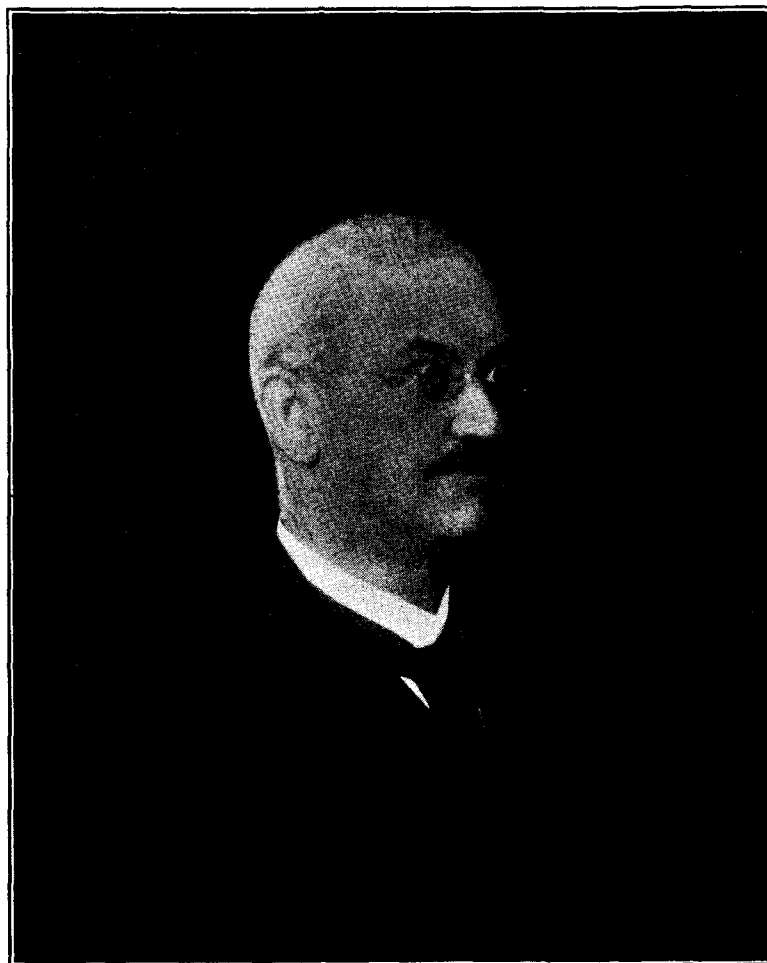
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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XLI.—

MR. R. T. VITY.

MR. R. T. VITY, the Postmaster of Preston, whose portrait we produce in this issue, was born, we believe, at Ambleside in Westmorland in October, 1868. At all events, if we are uncertain about the actual place of his nativity, there is no question that he is a dalesman in his origin, in his physique, and in his mental qualities. Mr. Vity entered the service at Kendal in 1886, and he has seen service at Blackburn, at Sheffield (where he was Superintendent of Telegraphs and subsequently Assistant Postmaster), at Doncaster (as Postmaster), then at Bolton and finally at Preston, to which town he was appointed in September, 1921. We say “finally” because Mr. Vity, when he decided not to go to Plymouth a year ago, presumably made up his mind to go no more a-roving.



Before Mr. Vity went seeking the flesh-pots of a Postmaster's career he was one of the outstanding men in the telegraph service. He possesses technical qualifications of a very high order, and was never happier than when imparting his knowledge to others. Mr. Vity's technical classes were well known; his reputation as a teacher stands high, and many men in the telegraph service owe their advancement to his enthusiasm for technical telegraphy.

He is an ex-Chairman of the Postmasters' Association, and is the Editor of the organ of that Association.

Mr. Vity is a big man in mind as in body, with a capacity for friendship which makes him one of the most charming of companions. He has been no mean athlete in his time. He is a keen bowler, and is probably still prepared to meet all comers from the Post Office in the Cumberland-Westmorland style of wrestling.

“LONDON CALLING.”

LISTENING a month or so ago to a broadcast lecture given by an American business man, who had been visiting factories and business organisations in Europe to enquire into their methods, I was struck by a statement which he made to the effect that one business house, on analysing the time of its travellers, found that only 15% of that time was spent on interviewing customers. It appeared that the balance of 85% was lost in travelling, waiting for interviews and so on.

I thought that it might be interesting and possibly instructive if a similar investigation were made into the working day of the contract officers in London. As these are very busy men and it was undesirable to add to their office work—which already is far too heavy—a two days' record only was arranged for, but as this covered the activities of 73 men, it may be taken as fairly representative and conclusive.

There are four district contract officers in London, and as it may be interesting, even to one having no direct connexion with these offices, to compare the different figures obtained, they are set out below:—

	No. 1.	No. 2.	No. 3.	No. 4.	Average.	
	Hrs. Mins.	Hrs. Mins.	Hrs. Mins.	Hrs. Mins.	Hrs. Mins.	%
Office Work ...	1 42	1 7	1 33	1 26	1 28	18.9
Travelling ...	1 49	1 53	2 7	1 41	1 54	24.5
Waiting ...	39	51	39	38	42	9.0
Interviewing ...	3 24	4 3	3 51	3 29	3 42	47.6
TOTAL ...	7 34	7 54	8 10	7 14	7 46	100.

One striking feature of the figures is the closeness with which the various districts approximate to each other. For instance, under waiting time two districts show identical figures and a third is within a minute of the first two. There are, on the other hand, differences between districts in certain other items which can be accounted for by local conditions and which it is not proposed to enter into here as they would scarcely be of general interest.

It may be contended that the time spent on office work is excessive, and with this I am inclined to agree, but it must not be lost sight of that in London the number of cases of one kind and another handed to contract officers necessitating a report, however short, is very high. In one of the districts it is no less than 18 cases per man per day on the average.

On the whole I must confess to being agreeably surprised to find that practically 50% of the contract officers' time is spent on interviewing, more especially as the large number of cases handed to him means more time spent on travelling and less on interviewing than would be the case if he could concentrate on one street or circumscribed district on any one day.

As a matter of interest it may be mentioned that each contract officer's district in London was, at the time of the record, on an average approximately 6,000 acres, or nearly 10 square miles, which in such a highly concentrated area is a very high figure.

Someone may be constrained to ask, “After all, while these figures may be very interesting, of what practical value are they?” That is a perfectly legitimate enquiry and the answer is, firstly that they have proved that a very satisfactory proportion of contract officers' time is being spent on the work for which they are employed, viz., interviewing; secondly, that the analysis of the individual records has shown weaknesses which only such a record would

have made apparent, and which will enable (a) adjustments to be effected in contract officers' areas to reduce travelling time, (b) arrangements to be made which may reduce the time spent on office work, (c) making of appointments, if this should be considered necessary, to reduce waiting time and so on. In addition it is always worth while for a chief to have concrete knowledge of what his staff is doing and if, as in this case, the facts can be obtained at no material cost, the little trouble involved is well worth while and tends to increased efficiency. W. F. T.

SERVICE ADVERTISING.

BY H. T. STEPHENS.

SUCCESSFUL advertising would to-day appear to be the main-spring or driving force of most business enterprises. Whether it be the charms of a seaside resort or the efficacy of someone's hair restorer, the claims are alike broadcast by advertisement in one form or another, and not only competitive enterprises, for we find monopolies such as Gas Companies, and the Electricity Departments of City Corporations urging the Man in the Street to make greater and yet greater uses of their services, for the obvious reason that the greater the output the less the unit cost of production.

So far as Post Office services (except Telephones) are concerned the Department can hardly be said to have entered the field, but at the Birmingham Section of the British Industries Fair (rumour has it that another section was held in a place called London) last year and this, something in the nature of an organised advertising effort has been attempted, and it has been suggested to the writer, who was in charge of the Post Office stall at the Birmingham Section of the Fair both years, that an outline of the scheme and its probable results would prove not uninteresting to many officers who were unable to see for themselves.

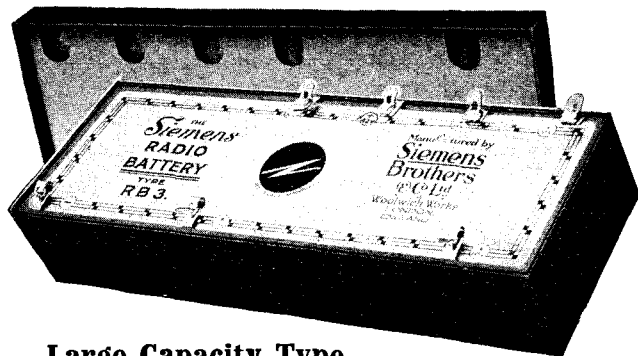
A centrally situated stand was provided by the Fair authorities with frontages in opposite directions, the one half being used as the official counter for dealing with live work and the other for propaganda work. The walls of the stand were decorated with a large number of hand-written posters designed and executed by members of the Birmingham Staff, each one featuring a different field of Postal, Telegraph, or Telephone activities. These posters, being neatly framed with oak veneer, imparted quite a bright cheerful appearance and enabled the stand to bear favourable comparison with those of the Birmingham Chamber of Commerce and the leading Steamship and Cable Companies which surrounded it. The principal attraction this year on the propaganda side was a telephone exchange, serving the subscribers in the Fair, which was worked in public. Two C.B.S. No. 2 boards were installed serving 65 subscribers and 10 call boxes. The work was mainly outward but four lines were reserved for incoming trunk calls. The number of calls originated was exceptionally high and the operators were busily occupied throughout each day, their work and the general attraction of the stall exciting so much public interest that on more than one occasion the management complained of the congestion caused thereby. Comments could be heard continuously, the tone, without exception, being complimentary, the more general remarks being “I didn't think telephone operators were such busy people. Next time I am kept waiting a few seconds, I must be more considerate,” or, “I thought telephonists read books and did needlework whilst waiting for calls, but if this is representative of general working, I am afraid I have not been as appreciative as their work deserves.”

On the propaganda counter literature for distribution was plentifully displayed and the works of a Hall multi-coin collecting

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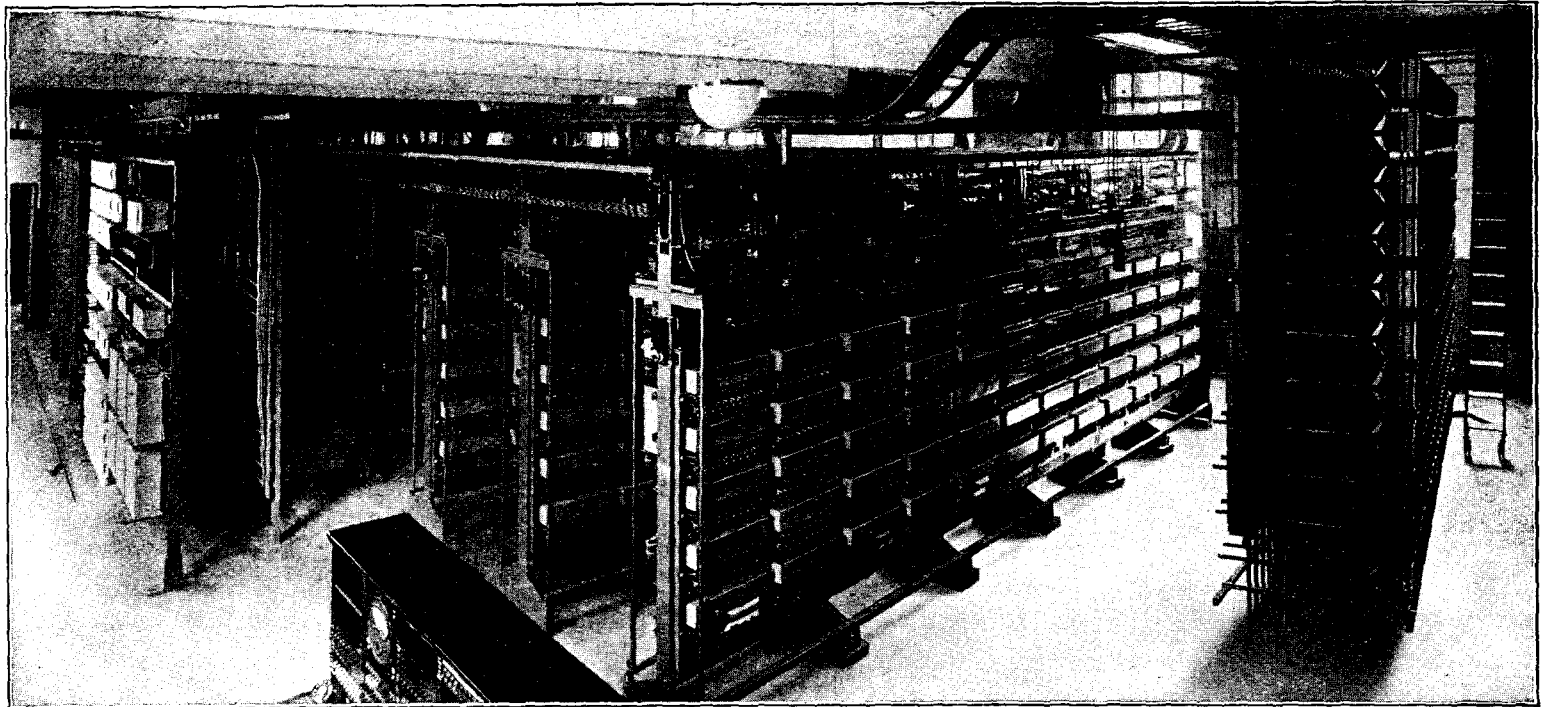
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box and those of a stamp-vending machine were exposed for the inspection of those interested. A prominent notice announced that "Enquiries are invited upon any Postal, Telegraph, or Telephone matter which is causing doubt or difficulty." The enquiries made were comprehensive and very numerous. Many people wanted conversational details regarding the Air Mail and C.O.D. Services, quite a number asked for an assurance that interest on Saving Certificates is really free of Income Tax, an idea being current that although such interest may be omitted from Income Returns, when final repayment is desired, some deductions under this heading is made. Perhaps the most frequent applications of all were for particulars of Telephones for the Home, and the relative pamphlets were taken in greater numbers than any others. Several installation orders are expected as a direct result of these conversations.

One visitor was either so kindly disposed or so conscience stricken, that he explained the method by which he had found it possible to manipulate a certain "Hall" collecting box so as to get his call and, at the same time, to obtain the return of the money. Needless to say this matter has been brought to notice in the proper quarter.

On the Telegraph side there was an exhibit, for the first time in public, of a Creed Direct (Start-Stop) Printer which was used for the live work. This instrument, described by the makers as one for typewriting by telegraph, consists in outline of an ordinary typewriter transmitter, the messages being typed at the sending station and reproduced at the receiving office exactly like an ordinary sheet of typewritten matter. A roll of paper is threaded through the receiving instrument and all spacing is controlled by the sending station, the only function of the receiving officer being to tear off the sheet when the message is completed. Working speed is limited only by the typing speed of the sending operators and quite a satisfactory rate of working was maintained. The set in use was worked simplex to Birmingham H.O. and dealt with a fair traffic in ordinary and in press work, the former including cable and radio messages. The instrument was inspected with great interest by the local district managers of the principal Cable Companies who began to visualise a duplex set, with a typist transmitting, and a messenger boy tearing off the received messages. A prominent notice stated that such machines may be rented by the public.

During the opening hours of the Fair, before buyers became too numerous, the writer visited the various stands, introduced himself, tendered an envelope containing a collection of pamphlets, offered his assistance in any little difficulties which might arise in connexion with Post Office matters during the Fair, and invited enquiries on any service matters generally. These visits were quite well received, and the idea of the Post Office getting into step with modern business practice drew many comments of an appreciative character.

The turnstiles showed an attendance of 92,376 during the Fair, and such an opportunity to get in close touch with so many of the manufacturing and trading community does not, of course, occur frequently or at as many centres as would be desirable, but when and where such opportunities offer, propaganda work might well be introduced. The public generally appeared to appreciate the opportunity of seeing behind the scenes and were well satisfied with the efficiency with which the organisation functioned. Unless the Department thrusts itself in the limelight, there is a danger of its useful work in the nation's life being largely overlooked. An actual instance occurred in the Fair. On different days the Chairman of the British Fair exchanged telephone greetings with the Chairman of the Leipzig Fair, the Chairman of the Chamber of Commerce Berlin, and the Chairman of the International Chamber of Commerce New York. In each case 30 to 36 receivers were arranged in circuit round the Committee table, and all heard the conversations as clearly as an ordinary trunk call. As propaganda, these facts were supplied to all the news agencies, but in their zeal to advertise themselves, the Committee forgot to mention the part (and no mean part either) played by the technical staff of the Department. The thoroughly satisfactory way in which these long-distance conversa-

tions were arranged was something of which all concerned had every reason to feel proud, and the management was quite generous in its personal appreciation.

As may be expected, the daily round was frequently enlightened by incidents of an amusing nature, and perhaps the Editor will be good enough to find space for just a few. A lady, who appeared interested, was invited to make a "close up" inspection of the switchboard, and the pathway of a telephone call was clearly explained to her. On leaving she warmly expressed her thanks and added "I quite understand it all now, it is just the same as the adding machine my daughter works."

A gentleman from "ayont the Tweed" gravely took out his wallet, selected the last receipt for his telephone rental and offering it to the counter clerk said, "I thought, perhaps, if I satisfied you that I am a subscriber in my own town, I might be allowed to use the telephones in the Fair without charge."

A super-optimist arrived in the person of a London gentleman, who, on the eve of the opening day came to the P.O. stand at 4.35 p.m. and asked "Can you do anything to expedite the fitting of the telephone on my stand." The writer expressed his desire to be of assistance and added "I understand a fitter has called at your stand twice this afternoon but that his calls have been at inconvenient moments." "Yes," replied the gentleman, "that is so, but it will be quite convenient now, and I should be glad if you would just hurry him up, as I want to get a trunk call through to my firm in London, and they close at 4.45 p.m." Sad to say, that with the best of will to oblige, this optimistic soul was doomed to disappointment.

Just one more story of the Canny Scot. A gentleman enquired the cost of a trunk call to Aberdeen and when told the charge (somewhere in the region of 7s. 6d.) replied "Oh! Well! Well! Well! I'll have a postcard."

It was hoped at the outset to have included a comment upon the propaganda matter provided by the Department, together with some suggestions for its improvement and some notes on the impressions formed and experience gained, but as space will not permit, this phase of the matter might, with the Editor's indulgence, be the subject of a subsequent article.

THE ART OF SUPERVISION.

THE science of the telephonists' work is taught in the Traffic Instructions issued by the Department. We know, however, that considerable practice is necessary before one who knows the science from the instructions can learn the art and become a good telephonist. Each part of the instructions must be practised at first separately or in sections, and afterwards as a whole, and gradually, with practice, facility in operation is attained, and the learner becomes first a telephonist, and then by degrees an efficient and capable telephonist.

The supervisor has learned the science of telephony from the instructions: she has also learned the art of operating and has had considerable experience in the application of the art for a number of years before she becomes a supervisor. She has passed through the work of a senior telephonist and learned to answer the queries and take up the complaints of subscribers, and she has thus acquired a point of view wider than that of an ordinary telephonist. Up to now, she has merely taken her part as a minor unit in the organisation of the exchange; now she is placed as a supervisor in charge of a number of telephonists, and from now onward she is supposed to apply the knowledge she has gained in the handling of calls, not personally, but in the supervision of others. And here is the point where a large number of supervisors fail, and where

great difficulty is experienced for a time by most. At the best, the supervisor realises that she is in charge of a number of telephonists working at a number of positions which belong peculiarly to herself, and she is definitely in charge of the service given to the subscribers on those positions. She feels herself responsible for the subscribers' service, the comfort, the happiness, the courtesy and ability of the staff under her charge, for the proper working of the apparatus, for proper co-operation between her own staff and the staff of the exchange, and the service as a whole. She senses her relation to a service which is one of the most important factors in the business and the social life of a large section of the community, and she is anxious both for the honour of her own section, of the exchange to which she belongs, and that of the London Telephone Service in its relation to the public.

At the best, the second class supervisor is the backbone of the telephone service, but to arrive at this best is an extremely difficult thing, and the ideal point of view is only attained by comparatively few.

The answer to the riddle of how this can be, is to be found in the lack of specific direction as to how one who has learned the science of supervision can acquire the art. Supervision is very interesting work, but in order to discover its interest, the supervisor must supervise.

Supervision is based on observation, and the power of observation can only be increased by practice in observing. The supervisor is supposed to practice the whole art of supervision based on the observation of all the operating points at once, but the art cannot be acquired in this way—it must be learned little by little, and it is within the powers of anyone who has been a capable telephonist to learn to be a good supervisor *if these instructions are carefully and methodically followed*. There is nothing new and wonderful in the method proposed, but its simplicity should not be despised, as experience has shown that, where followed, it has been always very effective. The method is to learn observation little by little, *taking one point at a time*.

Appended are a number of operating points which can be followed in a greater or less degree by a supervisor at the switchboard, and the idea is that she should take these points under observation one at a time as the principal point for observation during a definite period.

The power of observation is accumulative; if one learns thoroughly to observe one thing at a time one will gradually acquire the power to see more and yet more. Thus, if to-day a supervisor is observing particularly the answer to supervisory signals, tomorrow, when she is giving particular attention to the handling of cords, she will probably see also the point dealt with yesterday, and so from day to day the powers of observation will grow. But when the supervisor tries to see everything at once, without having stimulated her powers of observation by practice in seeing *one thing at a time*, the result is that she sees little, and the attempt produces weariness.

The various operating points must be divided into classes according to their importance, either general or particular. Some points such as calling and clearing and answer to supervisory signals are always important, but points which have not the same general importance may become vital on account of the weakness shown by the observation or other results, with regard to some particular exchange, section, or individual. The time given to observing a point should of course vary according to its importance.

It is a mistake, however, to spend too long at once on one point. It is better to increase the number of times that the point is dealt with rather than continue day after day giving special attention to one point. The unit of time for the observation of a point should be one day. The same point should never be observed particularly for more than two consecutive days. If the point is a very important one to the exchange it may be taken again after a day or two's interval, during which another point or points have been dealt with.

It is necessary to concentrate the attention on particular telephonists with regard to the point being dealt with, to know by actual observation that every one of the telephonists in the section concerned gives a prompt reply to supervisory signals and not merely generally to scrutinise the whole work of the section. Systematic supervision must be particular as well as general. A good supervisor learns to see a great deal in a section, but she only learns by giving particular attention at first to particular points and to particular officers. In course of time every operating point should receive attention.

The importance of this method of supervision is increased when it is organised and carried out by the supervisory staff of the exchange as a whole. The supervisor in charge should determine the point to be dealt with each day and she should arrange meetings of her supervisors from time to time so that the points arising out of the different matters observed and the application of the system should be discussed. The advantages of the combined work are briefly as follows:—The whole force of the exchange is concentrated on one point and this is more effective than when attention is given by separate individuals. Young supervisors and supervisors on probation are given something definite to do, and their progress can be gauged to some extent by the results obtained and the points raised by them. Each supervisor should keep a book in which she should note the results of observations, &c., on a particular point and the dates when the observation was made, and questions which arise in relation to it, giving a page or so for each point. When the same point arises again, she can then turn back to the previous observation and gauge whether progress has been made or faults, &c., eliminated.

It is not intended that this method should be adopted in a slavish way, or that the fact that a supervisor is concentrating on one particular point should absolve her from dealing with any other point which may arise, but whenever there is nothing else specific to do, she should concentrate on the point being dealt with.

If carried out in a proper way, the method proposed should help the supervisor in her immediate work: it should make her work easier and more interesting, and at the same time it should gradually teach her to observe every one of the important operating points.

All that has been suggested, vital as it is to the work of the supervisor, may be utterly spoiled if the attitude to the staff is a wrong one. Criticism should be given in a spirit of co-operation—of aiding the telephonist to do better rather than blaming her for doing badly. The attitude of the supervisor should not be that of a superior person, and while maintaining her own position, she should be sympathetic to the troubles and difficulties of the telephonist. She will remember from her own experience that encouragement is more effective in stimulating to improvement than condemnation and that to acknowledge good work is just as important as to point out bad work. The telephonist should be encouraged to realise that her work is the primary means for the development of her character and that her success as a telephonist has a vital bearing on her standing as a human being. The supervisor will realise also that the same applies to herself and to her work and that sympathy and proper human feeling must be developed in her before she can be a successful supervisor.

From the point of view of controlling staff the worst vice is pessimism. The optimistic supervisor helps to give her staff confidence in themselves and in things generally. Things may not be at their best to-day, but she remembers that this is only a temporary phase—a cloud over the sun. The sun is still shining and presently its light will pierce the clouds and light up all the dark places.

The best work can be given only by one who is happy in working. Such happiness results from the development of the individual in the work. To be able to produce the atmosphere which makes this possible is the hall-mark of the highest attainment as a supervisor.

J. W. KENNEDY.

AUTOMATIC TELEPHONY.

BY C. W. BROWN.

(Continued from page 150.)

III.

THE standard line switch bank has four levels when used in provincial areas and five levels when used in metropolitan areas, the extra level in the latter case is due to the scheme of metering calls which requires an extra contact per circuit from the line switch bank. The levels are designated respectively, positive, negative, private, homing, and in the case of the five level switch bank, a meter level. In each case the homing level consists of a segment, continuous except for a break at the home or normal position; the remaining levels each contain 25 insulated contacts. At the end of the bank, a set of "feeder" or "collecting" springs project radially towards the centre. The tips of these springs make a rubbing contact with the wipers at the point where they are fixed to the spindle, thus providing the necessary connexion between the permanent wiring and the wipers.

In front of the bank is situated the driving magnet and the spindle and wipers. A ratchet and pawl scheme of movement is provided, the actual movement taking place when the magnet is de-energised, this action is referred to as "reverse" or "back" and has the advantage that results from utilising the recoil of a spring to move the ratchet wheel, the range of control being fairly wide, as against the movement when it occurs due to the forward operation of the armature, when the power required for moving the wipers necessitates the full operation of the magnet armature.

The wipers are in pairs and the tips exert an inward pressure of approximately 20 to 30 grams on each side of the bank contact when in engagement, a satisfactory electrical contact is thus ensured. The private wiper has the tips flattened so that when passing from contact to contact, "bridging" of adjacent contacts

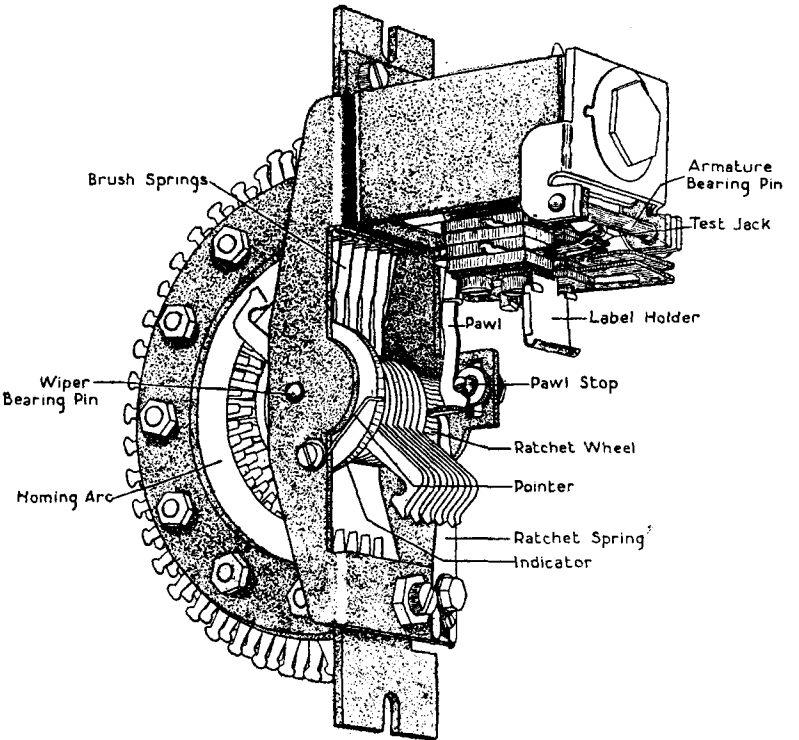


FIG. 2

occurs. The tips of the remaining wipers do not "bridge," the circuit requirements calling for the feature in the case of the private circuit only. This gives a guarding feature that prevents a caller from being extended to an engaged selector during "hunting."

The wipers each have two arms disposed at 180°, hence one half is always in the bank, thus reducing "hunting" time. A numbered indicator that moves with the wiper spindle is provided and moves against a fixed wire pointer, this enables the position of the wipers in the bank to be determined without difficulty. A small jack is also provided to which the positive and negative wires (wiper connexions) are joined. The jack is used for routine testing and speaking purposes. A label holder completes the item.

From Figs. 1 and 2 the parts indicated will readily be seen.

The need for a line switch having more than 25 contacts in the bank frequently arises. In order to retain the features of the standard line switch the scheme shown in Figs. 3 and 4 is adopted. The arrangement in effect consists of two 25-contact banks placed side by side, the wiper spindle carrying 8 wipers. It will be observed also that one arm of each of the wipers is cut off, the remaining halves being formed into two sets disposed at 180°, therefore while one set of wipers is in one bank (or one half of the complete bank) the remaining set of wipers is outside the remaining bank, thus, if the contacts in one bank are numbered 1 to 25 and in the other 26 to 50 in one complete revolution of the wipers 50 circuits can be reached. In Fig. 4 the "bridging" wiper (private) previously referred to can clearly be seen.

Messrs. Siemens Bros., in their system known as the No. 16 type, use a pre-selector which differs in many respects from the standard line switch just described. In moving the wipers over bank contacts a pawl is pushed into engagement with the ratchet wheel teeth when the driving magnet armature is energised. The interrupted currents for operating the magnet are provided by a motor-driven interrupter machine which serves a large number of

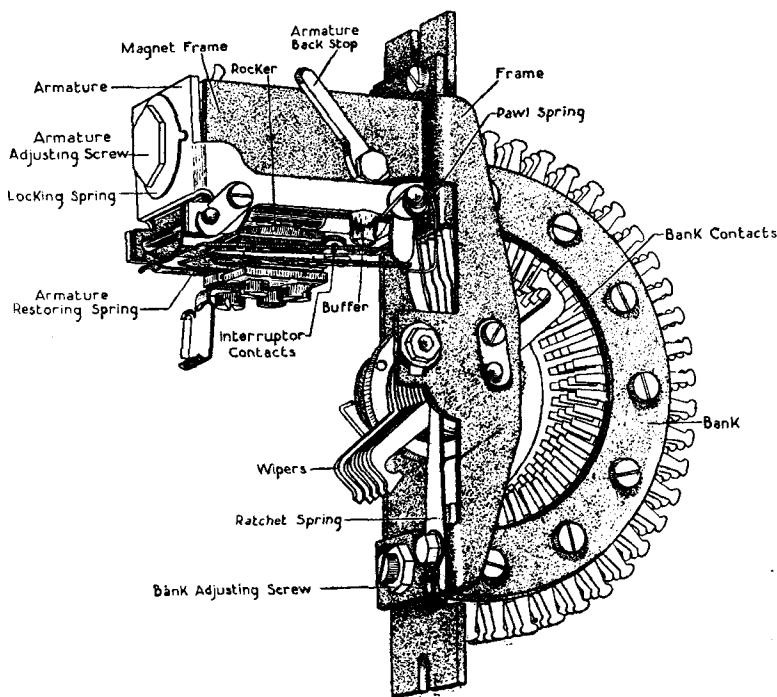


FIG. 1

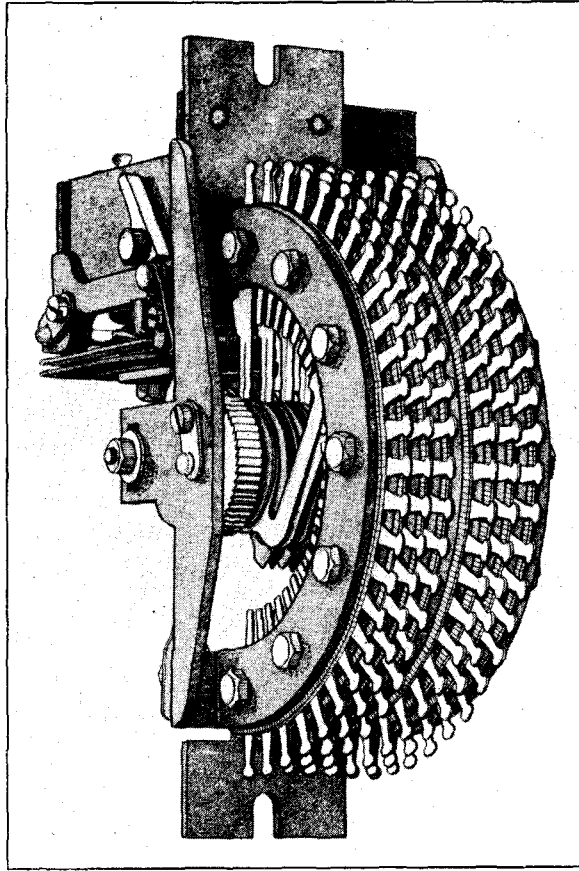


FIG. 3.

pre-selectors. This type of switch is a "forward action." Another difference occurs in the wiper arrangement; each of the wipers is provided with three arms, disposed at 120°, one of the arms is therefore always available for use as a pointer in conjunction with

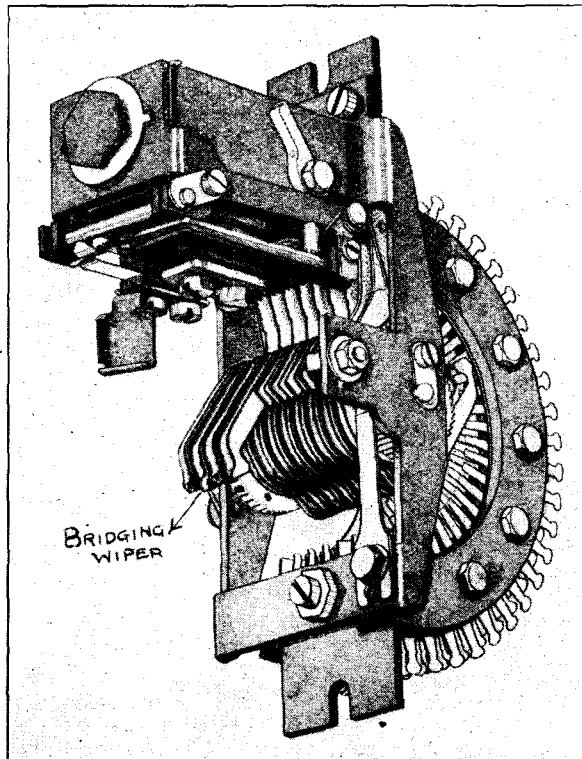


FIG. 4.

a curved number strip to indicate the position of the wipers in the bank. Fig. 5 shows the pre-selector.

There is another form of switch that is worthy of mention at this stage. It is known as a minor switch and operates on the "forward" action principle. The number of steps made by the wipers is 10 and the wipers upon release return to the normal position back through the bank. Two magnets are provided, one for stepping the wipers forward and one for returning the wipers to the normal position. During stepping a spring is wound up, a restraining detent (or dog) preventing the

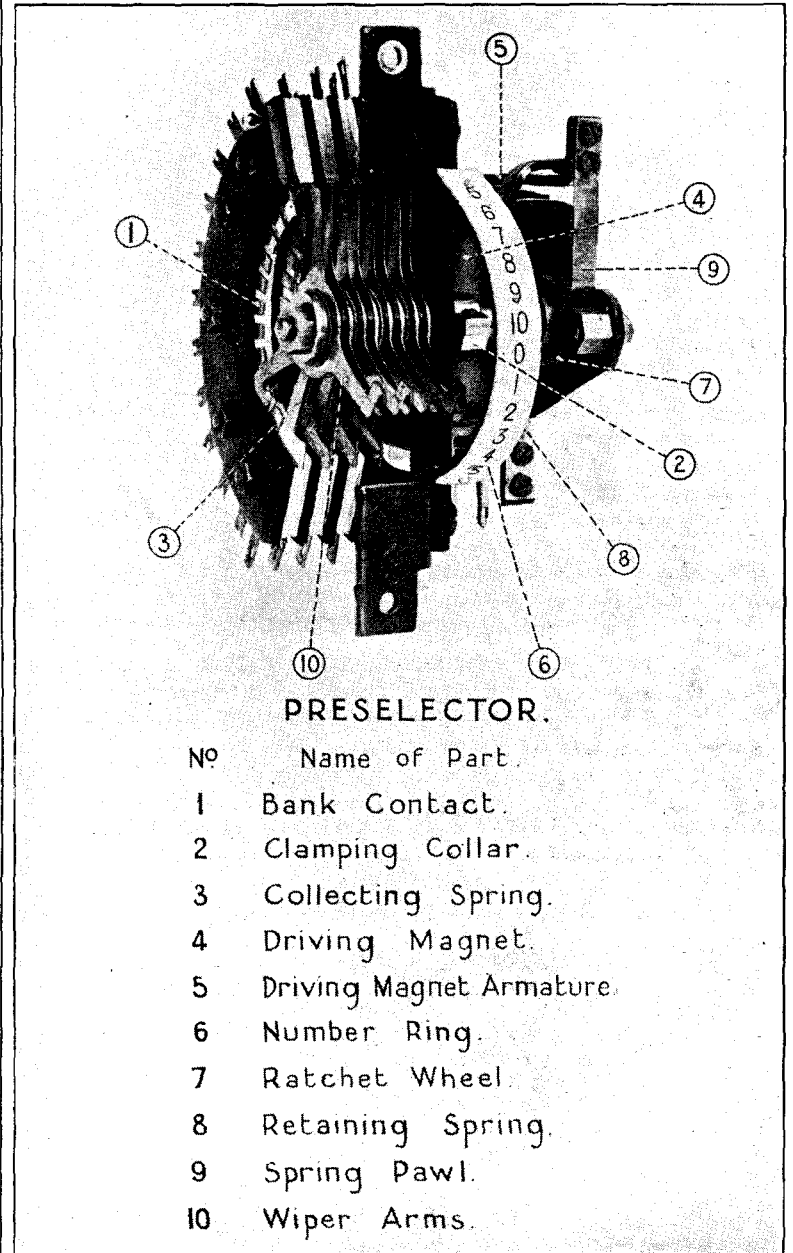


FIG. 5.

wipers from returning until it is withdrawn from the teeth by the operation of the magnet. The arrangement is shown in Fig. 6.

This type of switch is used for a number of auxiliary purposes such as distributors, registers, &c., It is used for these purposes in the translation equipment that is a feature of the metropolitan scheme.

When the number of lines exceeds the capacity of the selector bank, i.e. 100 circuits, additional stages of selection are introduced

into the switching scheme, the effect is to increase the capacity ten times. The capacity of the 100-line exchange can thus be raised to 1,000, 10,000, and 100,000 &c. lines. Additional digits are necessary, and the numbering for exchanges of different capacities will therefore be:—

For	100 lines	...	...	00 to 99
„	1,000	„	...	000 to 999
„	10,000	„	...	0000 to 9999
„	100,000	„	...	00000 to 99,999.

It follows that each subscriber will have two, three, four or five digits dependent upon the ultimate capacity of the exchange, also that the extra digits are additional to the tens and units digits. Clearly, the effect of adding digits is to divide the exchange into groups as indicated in Fig. 7.

The additional selectors are known as group selectors, the selector that accepts the tens and units digits is the Final selector or connector, for it is at this switch that the connexion with the subscriber's multiple is made.

Group selectors and banks are similar to the two-motion switch and bank already described. The shaft and wipers are stepped vertically under the control of impulses transmitted over the lines, the rotary movement is *not* controlled by line impulses, however, but occurs automatically upon completion of vertical movement. The bank contacts are connected to selectors in the next stage, the number being determined by the traffic passing in the particular channel or group. Facilities are therefore required to indicate to a caller when the outlets from the level are all engaged and to enable a record of the condition to be obtained. The latter facility is met by the provision of an eleventh contact in the levels of the private bank as previously described, to which a counting meter is connected. The transmission of a busy signal occurs as the result

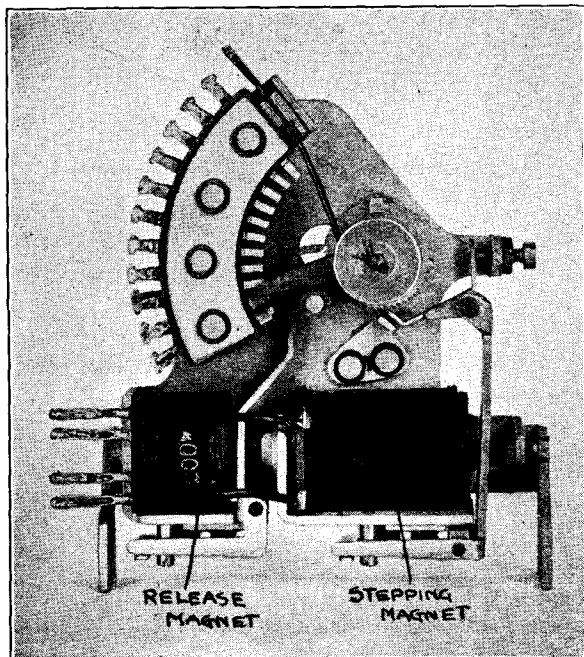


FIG. 6.

of the operation of cam springs fitted on the mechanism in such a position that they are operated mechanically when the wipers reach the eleventh position, due to the pressure exerted by a buffer attached to the shaft.

The cam spring scheme is shown in Fig. 8. The arrangement can also be seen in Fig. 9, which shows a group selector.

The need for the "lost motion," or minimum pause, feature associated with the standard dial will be more clearly appreciated in connexion with the automatic rotary hunting operation of group selectors. Unless a definite pause occurs between the transmission of digits, it is possible, when dialling small digits, to pass impulses into a selector while the wipers are "hunting," with the consequent loss of the digit. The normal speed of rotary operation is

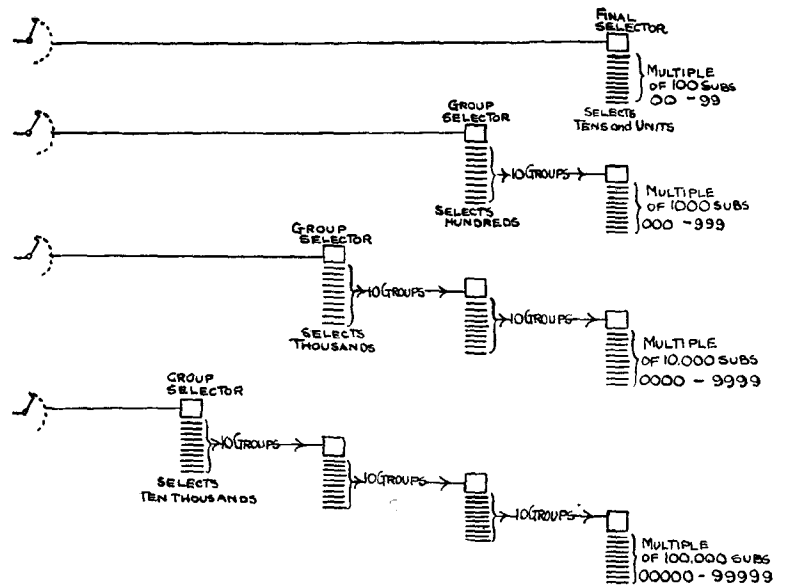


FIG. 7.

approximately 35 steps per second and if the first free outlet (by outlet is meant a circuit to a selector in the next stage) should be from the 10th contact, some 300 milliseconds will be required by the switch to reach it. When the dial is transmitting impulses at normal speed, the "lost motion" period is 200 milliseconds, to which must be added the time of the personal pause between the pulling of the dial, plus the time taken to pull the dial for the digit. The imposition of the lost motion period will thus always ensure a satisfactory margin against the possibility of "beating the switch."

Although the introduction of group selection may be continued *ad infinitum*, it will be appreciated that the need for and the difficulty in memorising large numbers of digits is detrimental to smooth working. Also, the extension of the scheme as described to multi-exchange areas (in which direct dialling occurs between subscribers connected with different exchanges) necessitates a rigid and inflexible association of junction routing and numbering.

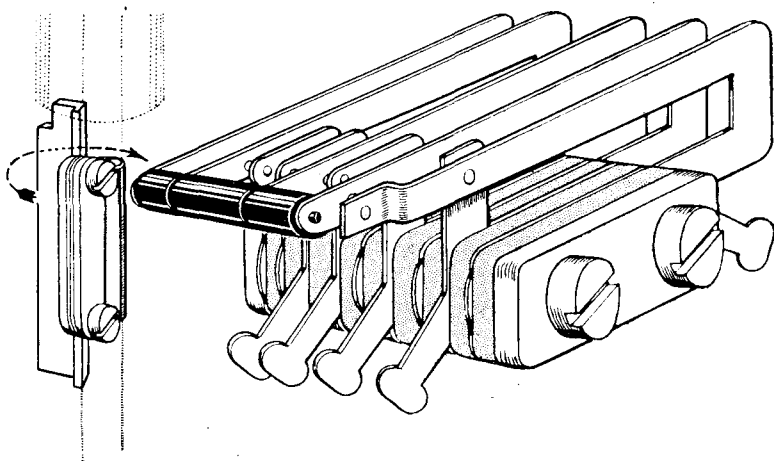
When the number of subscribers concerned in a common numbering scheme exceeds 100,000, requiring five digits, a system of translation is incorporated into the switching arrangements which permits the use of letters and figures; by thus reducing the number of figures to be dialled, the disadvantage previously mentioned, viz., the retention in the memory of a large number of figures, is eliminated. Experience has shown that subscribers are not averse to dialling five digits when setting up a call, neither do difficulties arise. The practical application of the translation scheme will be the subject of a subsequent article.

Fig. 10 is interesting and shows the disposition of the selectors when a call is actually set up.

Under automatic conditions, the responsibility for obtaining numbers having been placed upon the subscriber, it is desirable that means be provided for informing callers of the progress of

calls originated and to inform them if calls should be abandoned for any reason.

A system of tone signals is therefore provided as an adjunct to the switching scheme. As the tone system consists of a number of separate and distinct tones each having a special significance to subscribers, they must differ sufficiently to permit of easy recognition.



Selector Cam Springs

FIG 8.

The tones are provided in a well-known manner. By rapidly interrupting a current flowing through a transformer winding, the resultant inductive effect in adjacent windings gives a tone, the pitch of which depends, *inter alia*, upon the periodicity of the interruptions, so that a series of different tones are readily obtainable from motor-driven machines operating interrupters having different periods of interruption, the interrupted currents being served to the distribution points through suitable transformers. Usually the interrupters are associated with the standard ringing machines, and are thus available continuously or as required, dependent upon whether the ringing machine is running always, as in the case of a large exchange, or is started up when a call is originated, as in the case of the small exchange.

The tone signals usually provided, and their significance, are as follows:—

1. *Dialling Signal*.—This informs the subscriber that he is connected with a selecting mechanism and may proceed to dial; in the absence of the tone he should replace the receiver and call again after a short interval.
2. *Ringing Signal*.—This informs the subscriber that ringing conditions have been set up. If the tone is not removed in a reasonable time, the caller should assume that the call is ineffective.
3. *Busy Signal*.—This indicates to the subscriber that either the called subscriber is busy or that the call has failed to mature on account of a shortage of switches at some point during its progress. The call should be repeated.
4. *Number Unobtainable Signal*.—This informs the subscriber that the number called is not working and to abandon the call. The signal is given when a non-existent subscriber has been called and also if the required line is out of order. In metropolitan areas, such as London, the signal also indicates that a mis-operation has taken place or that apparatus has become faulty during the progress of a call.

In the following table, the tone characteristics are given:—

Name of Tone.	Periodicity per Second.	Continuous or Interrupted.	Nature of Tone.
Dialling	33	Continuous	Low (clicks).
Ringing	133	Interrupted secs. 0.4-0.2-0.4-2.0 on off on off	Low (note).
Busy	400	Interrupted secs. 0.75-0.75 on off	High.
Number Unobtainable	400	Continuous	High.

The ringing signal is interrupted at the same frequency at which the ringing current passes out to the called subscriber. It will be seen that a complete ringing cycle occupies one second,

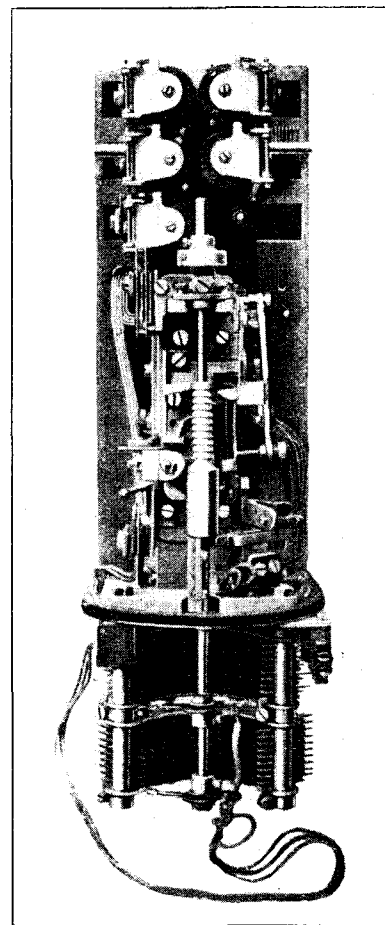


FIG. 9.

viz., 0.4-0.2-0.4, and is followed by a 2.0 seconds' pause. In order to reduce the load on the ringing machine that is providing the interruptions, the exchange is divided into three sections and ringing current is supplied to each of the sections in succession, thus one-third only of the exchange load is experienced by the machine, hence the two seconds' pause before a ringing cycle again occurs. This method of ringing distribution enables small ringers to be used, without any loss of efficiency to the service given.

The "double beat" in the ringing cycle has the effect of bringing subscribers to the telephone quickly, the effect being a psychological one, having for its object the reduction in holding time of selectors, and offsets the two seconds' pause between ringing cycles.

Is it opportune at this stage to indicate some of the operating conditions that have been standardised.

The control of a connexion is vested in the party originating a call, the switches are released only when the caller replaces the receiver. This is known as "calling party release." An exception occurs in the case of certain calls originated to an operator's position, in this case the release of the connexion cannot take place until the plug is withdrawn from the jack. This is necessary for purposes of number verification, &c.

In order that subscribers' lines shall not be held engaged for abnormal periods due to the failure of a calling party to replace the receiver, or due to faults occurring during a call that will prevent the release of a connexion, a lamp is provided on each final selector. The lamp glows when the abnormal condition exists. The lamp is recognised by the title of "called sub-held lamp," and is associated with an audible alarm which is given when the lamp is glowing for more than 3 minutes. Upon the receipt of an alarm, the attendant releases the connexion by hand. The offending line is dealt with on a fault basis.

The registration of a call takes place upon the removal of the receiver by the called subscriber, the meter of the calling subscriber then operates and remains "locked" until the caller replaces the

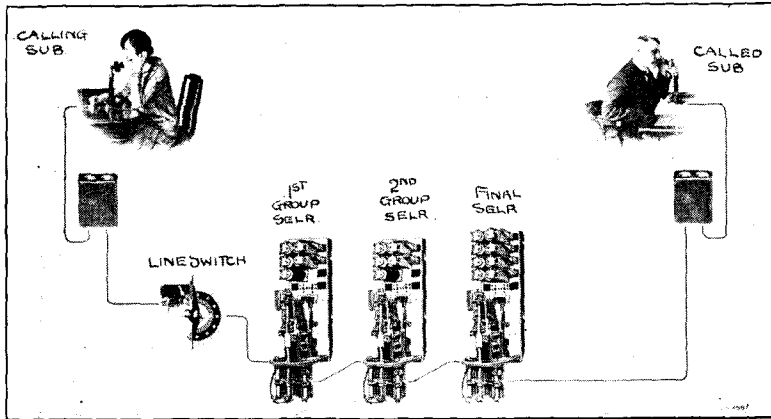


FIG. 10.

receiver. At present the metering scheme is arranged for single metering only, hence calls for beyond the unit fee area are obtained via an operator who tickets them.

Two technical methods of metering have been standardised for metropolitan and non-metropolitan (provincial) areas respectively. In the latter case the method is similar to that used in modern manual systems. The normal current flowing in the "private" circuit (with which the meter is associated) during the setting up of a call, is augmented when the called subscriber removes the receiver. The meter is designed only to respond to the higher current value, but when fully energised will remain operated at the lower current value. The higher current is, therefore, only applied for a very short period—approximately 300 milli-seconds.

In the manual case, the depression of the meter key causes an increase in the value of the current in the sleeve circuit with which the meter is associated. This method is generally known as "booster" metering.

In the metropolitan case the method adopted is known as "reverse" battery metering. A special relay, having two windings (the more recent type is known as a shunt field relay) is located in the apparatus at the outgoing end of the circuit, and is associated with the line wires. During the setting up of a call, the potential across the windings is such that the resultant currents are in a non-operating direction, when the called subscriber removes the receiver the line potential—and consequently the potential across the coil

concerned—is reversed, thus the direction of current is reversed and the relay armature operates. A contact of the relay completes the circuit of the meter which locks by the action of a local contact. The scheme requires a separate meter wire which is extended to the switching apparatus via the line switch, hence the necessity for a meter level and wiper, referred to in connexion with the standard line switch.

In order that faults which operate the subscribers' calling equipment, and in consequence engage a selector, shall come under notice immediately they occur, a lamp is provided on each selector connected to the banks of line switches, it is known as a P.L. (permanent loop) lamp and is associated with a retarded audible alarm which is brought in after a period of 4 minutes for use when an attendant is not patrolling the selectors during slack periods.

It has been assumed that the whole of the levels of the selectors reached by subscribers upon removing the receiver, are available for subscribers' numbers. In practice this is not the case. Level 1 is not generally used. If, as frequently occurs, the switch-hook of the telephone is mis-operated before dialling, an impulse is transmitted over the lines, and the selector wipers will be raised to the first level. In such an event, the first digit dialled will be received upon a switch in the next stage, and a wrong number will result. The level is therefore connected to number unobtainable tone.

Levels 9 and 10 (0) are reserved for calls requiring the services of an operator and for service numbers, hence the levels are not used for subscribers' numbers.

As a result of the restrictions mentioned, the practical capacities of the two-digit, three-digit, four-digit and five-digit exchanges to which reference has already been made will be 70, 700, 7,000 and 70,000 lines respectively.

(To be continued.)

REVIEW.

"La Poste Militaire en France (Campagne 1914-1919)," Par A. Marty, Inspecteur-Général des Postes et Télégraphes, Chargé de la Poste Militaire aux Armées au Grand Quartier General. (Librairie de l'Enseignement Technique, Paris. 138 pp. 9 francs.)

A very interesting account of the growth of the French Army Mail system and its transformation from the somewhat crude arrangement devised as a result of experience gained in the war of 1871, to the highly complicated and efficient organisation required to satisfy the needs of the French armies during the late war.

It deals fully, in successive sections, with, amongst other subjects, the Organisation of the Military Post at the beginning of the Campaign, First Measures of Improvement, Creation of Postal Sectors, the nature of Military Correspondence, the Service at the Central Military Bureau, Postal liaison between the Armies, Parcels posts, the service of letters and parcels for prisoners of war, methods of dealing with complaints of non-delivery, and the special measures taken at demobilisation.

The book is written in an attractive style and is well worth the attention of both technical and lay readers.

MANCHESTER DISTRICT MANAGER'S OFFICE.

MESSRS. J. J. Green and R. J. Stafford, Assistant Traffic Superintendents, were presented by their colleagues with wedding gifts consisting of an Oak Clock and a Case of Cutlery, respectively.

CORRESPONDENCE.

TOURS ABROAD.

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

SIR,—I have just returned from a delightful fortnight's holiday, with a privately conducted party, in Holland; and feel sure that some of your women readers who are obliged to take their summer leave at inconvenient times, would be glad to know about the organisation.

This was my first venture abroad with a party, and I naturally felt rather nervous about joining one alone. However, I need not have been anxious, for a genial spirit of comradeship and goodwill prevailed and we spent a delightful fortnight. Individual comfort and convenience was studied in every possible way, and, though there was no "rush" of any sort, numerous and varied excursions were made to places of interest and beauty. I have never spent so enjoyable a holiday.

These "Goodwill" tours for women and girls continue throughout the summer, and I shall be glad to assist anyone who is at a loose end about her leave and give her any information she would like. All the terms quoted are inclusive, and I can, from personal experience, thoroughly recommend the tours for comfort and interest.—Yours faithfully,

Ardington,

Wantage, Berks.

May 9, 1927.

GRACE E. COOMBS.

TELEPHONE DEVELOPMENT OF TOWNS CONTAINING UPWARDS OF 100,000 INHABITANTS.

BY W. H. GUNSTON.

SUBJOINED is a table showing the telephonic development at the end of 1926 of all towns in Great Britain and Northern Ireland containing upwards of 100,000 inhabitants. For the purposes of this table it will be seen that Birkenhead is included with Liverpool, Salford with Manchester, Gateshead with Newcastle, while various boroughs adjoining the metropolis are included in the London Telephone area.

Hitherto, since the abolition of the old trunk exchange areas, the telephone areas have been defined by 5-mile radii in the case of most large towns and by 7-mile radii in the cases of Manchester, Liverpool, Glasgow and Birmingham.

Some inconvenience arose from the practice of adopting radial areas for the purpose of ascertaining the telephonic development of a city and its suburbs in that in many cases, especially in Lancashire, Yorkshire and Staffordshire, the circles overlap, and the same suburb may be included in 2 or even 3 telephone areas. It has therefore been decided to adopt as a telephone unit the geographical or administrative boundaries of the larger towns and cities together with such adjacent towns or urban districts as are closely related or stand in the relation of suburbs to the larger towns in question. These are clearly specified in the following list. A clear-cut geographical boundary is thus obtained, and the exact population of the area can readily be ascertained without resorting to estimates. Figures for the London Telephone area, as well as for Administrative London, have been included, as the London telephone area is by now a well-established entity.

The figures for Hull refer to Hull city. The number of telephones in the Hull telephone area is 15,073.

As the average for the whole country is 1 telephone to 29.2 inhabitants, it will be seen that all the towns after No. 20 do not come up to that average. It is not necessarily, however, in the large towns—as distinct from the largest—that the best results from a telephonic point of view are to be found. A city with numerous commercial offices and a large good-class residential district will stand high in the list, but a town of factories populated largely by factory hands or a mining centre will stand correspondingly low. It should be observed that many towns with less than 100,000 inhabitants show a very high telephone development: Chester and St. Albans, for example, and residential towns such as Guildford, Woking and Maidenhead, and pleasure resorts such as Harrogate, Eastbourne, Torquay and Tunbridge Wells, all have a development ranging between 13 and 20 inhabitants per telephone.

TELEPHONE DEVELOPMENT OF TOWNS CONTAINING UPWARDS OF 100,000 INHABITANTS AT DEC. 31. 1926.

	Population.	No. of telephones.	Inhabitants per telephone.
1. London (City and Administrative County)	4,483,200	401,902	11
(London telephone area, containing City and County of London and upwards of 60 boroughs and urban districts, including <i>West Ham, East Ham, Croydon, Leyton, Willesden, Walthamstow, Tottenham, Hornsey, Kingston, Richmond, Ealing, Acton, Enfield, Edmonton, Hendon, Wood Green, Wimbledon and Reigate</i>)	7,406,000	519,969	14
2. Bournemouth (including Poole and Christchurch)	142,422	8,910	16
3. Cardiff (including Penarth)	217,359	13,042	17
4. Edinburgh	420,281	22,321	18.8
5. Bradford (including Shipley)	314,268	15,656	20
6. Blackpool (including St. Annes-on-Sea)	114,681	5,595	20
7. Manchester (including <i>Salford, Eccles and Stretford</i>)	1,055,473	50,254	21
8. Brighton (including Hove)	188,946	9,085	21
9. Leicester (including Wigston)	242,780	10,967	22
10. Huddersfield	110,120	4,801	23
11. Liverpool (including <i>Birkenhead, Bootle and Wallasey</i>)	1,115,939	48,349	23
12. Glasgow (including Clydebank, Renfrew and Rutherglen)	1,119,489	47,649	23.5
13. Nottingham (including Arnold and Carlton)	292,969	12,407	23.6
14. Aberdeen	158,969	6,142	26
15. Southend-on-Sea	106,021	4,091	26.4
16. Bristol (including Kingswood)	390,018	14,477	27
17. Birmingham (including Smethwick and West Bromwich)	1,068,956	39,642	27.3
18. Leeds (including Morley)	482,255	17,575	27.4
19. Newcastle-on-Tyne (including <i>Gateshead, Gosforth and Wallsend</i>)	458,201	16,468	27.7
20. Dundee	168,217	6,012	28
21. Norwich	120,653	4,079	29.6
22. Swansea	157,561	5,293	29.8
23. Preston	117,426	3,939	30
24. Dewsbury (including Batley and Ossett)	105,118	3,472	30
25. Coventry	128,205	4,218	30.4
26. Stockport	123,315	4,009	31
27. Sheffield	490,724	15,550	31.7
28. Belfast	415,007	12,785	32.4
29. Southampton	160,997	4,963	33
30. Blackburn	126,630	3,817	33.3
31. Grimsby (including Cleethorpes)	110,489	3,300	33.4
32. Oldham	145,001	4,122	35
33. Bolton	178,678	4,912	36
34. Derby	129,836	3,470	37
35. Plymouth	209,857	5,066	41
36. Rochdale (including Heywood)	117,498	2,762	43
37. Wolverhampton (including Bilston, Cosely, Darlaston, Sedgely, Tettenhall, Willenhall and Wednesfield)	222,276	5,033	44
38. Greenock (including Gourock and Pt. Glasgow)	112,270	2,385	47
39. Middlesbrough (including Eston)	161,737	3,428	47.4
40. Burnley	103,175	2,173	47.4
41. Dudley (includes Rowley Regis, Brierley Hill and Oldbury)	145,337	3,009	48
42. Sunderland (including Southwick)	173,742	3,454	50
43. Portsmouth (including Gosport)	280,931	5,561	50
44. Stoke-on-Trent (including Newcastle-under-Lyme and Wolstanton)	290,098	3,232	55
45. Hamilton (including Motherwell and Wishaw)	108,289	1,854	58
46. Chatham (including Gillingham and Rochester)	127,964	2,073	62
47. Wigan (including Ince)	112,312	1,778	63
48. St. Helens	102,675	1,433	72
49. South Shields (including Jarrow)	152,257	1,990	77
50. Merthyr Tydfil (including Aberdare)	135,171	1,175	115
Hull (Corporation system)	287,013	13,732	21

(The places in *italics* enclosed in brackets are boroughs or urban districts with upwards of 100,000 inhabitants.)

PROGRESS OF THE TELEPHONE SYSTEM.

A REVIEW of the telephone statistics for the past financial year shows that the total number of stations working at March 31 last was 1,508,786, an increase of 118,633, or 8.5%, on the previous year's total.

The table below shows the growth for the year in London, England and Wales (excluding London), Scotland and Northern Ireland :—

	Total Number of Stations		Increase.	Increase %.
	At Mar. 31, 1926.	At Mar. 31, 1927.		
London	488,499	532,066	43,567	8.9
England and Wales (excluding London)	751,876	817,356	65,480	8.7
Scotland	131,474	140,013	8,539	6.5
Northern Ireland	18,304	19,351	1,047	5.7

The total number of residence rate installations at the end of March, 1927, was 303,061, of which 115,278 were connected with London exchanges and 187,783 with provincial exchanges. The net increase in residence rate installations for the year was 41,755, as compared with an increase of 33,477 in business rate installations.

The number of public call offices working at March 31 last was 21,934, the net addition during the year being 1,634, or 8%. The London total increased from 4,445 to 4,724, and the provincial total from 15,855 to 17,210.

Included in the total of 21,934 public call offices are 3,051 street kiosks, 1,122 of which were provided during the past year. At the end of March there were 465 kiosks in the London area and 2,586 in the Provincial towns, compared with 245 and 1,684 a year ago.

A further 148 new exchanges were opened for service during the year 1926/27 under the rural development scheme, making a total of 1,030 exchanges opened since the inception of the scheme in 1922. In addition there were 50 exchanges in course of construction.

The rural party line stations at the end of March last numbered 10,040, the net addition in 1926/27 being 167. The demand for this class of service has declined during the last two years, probably because of the increase in the number of rural exchanges provided in outlying districts.

Trunk statistics for the year are not yet complete. The February figures are the latest available and during that month 7,192,382 inland trunk calls were dealt with, an increase of 667,279 (10.2%) on the figure for the corresponding month last year.

Calls made to the Continent during February numbered 24,181, and from the Continent 26,589.

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

PROVINCES—Chichester, Dartford.

And among the more important exchanges extended were :—

LONDON—Barnet, Putney, Southall.

PROVINCES—Amersham, Aylestone, Barry, Birmingham (North), Carlisle, Headingley (automatic), Lancaster, Newton Abbot, Pendleton, Rickmansworth, Selly Oak, Weston-super-Mare.

During the month 79 new overhead trunk circuits were completed, and 73 additional circuits were provided by means of spare wires in underground cables.

REVIEW.

"Astronomy." By Russell, Dugan and Stewart. Published by Ginn & Co., Ltd., 7, Queen Square, London, W.C.1. Volume II. 470 pp. Price 10s. 6d. net.)

In our last number we reviewed the first volume of this book. The second volume has now been published, and it quite comes up to the expectations raised by the first.

During the last half-century the addition of the spectroscope and other light-analysing and measuring instruments to the telescope has revolutionised Astronomy and has enabled investigations to be carried out which before would have been quite impossible. The greater part of modern astronomy is concerned with such investigations. The second volume accordingly opens with the analysis and measurement of light and other forms of radiant energy. The next chapter deals with the interpretation of the solar spectrum, the composition of the sun, and the formation of those curious markings which appear from time to time on its surface, and which are known as sunspots. This is a particularly interesting chapter to telegraph engineers, as there is little doubt that the activity of the sun has a profound effect on the electrical state of the earth, with its resultant magnetic storms and disturbances from atmospherics.

The third chapter deals with the sun's light and heat.

In the fourth chapter is given a very interesting summary of the modern theories concerning the structure of the atom, the production of the characteristic lines in the spectrum of an element, and the quantum theory. This chapter concludes with the application of the foregoing theories to the investigation of the constitution of the sun and stars.

The following two chapters are devoted to the stars, their nature, number and designation, star catalogues and maps, and the sizes, distances and motions of the stars. The next chapter deals with double and multiple stars.

In the seventh chapter variable stars and new stars are described, and the theories which have been advanced to explain them are given.

The next two chapters deal with the star clusters, the Milky Way and the nebulae.

In the tenth chapter the results of the work which has been done to discover the constitution of the stars are given, and the final chapter is devoted to an account of the various hypotheses which have been advanced to explain the probable course which the evolution of the stellar universe has followed in the past, and which it appears likely to follow in the future.

The whole subject is covered as fully as possible in the available space, and, as in the first volume, the results of the latest researches have been incorporated.

The book is fully illustrated with clear diagrams and excellent photographs, and the printing leaves nothing to be desired. It is certainly the best exposition of the subject available to-day for those who wish to obtain a comprehensive view without going into the minute detail necessary to the specialist.

MANCHESTER.

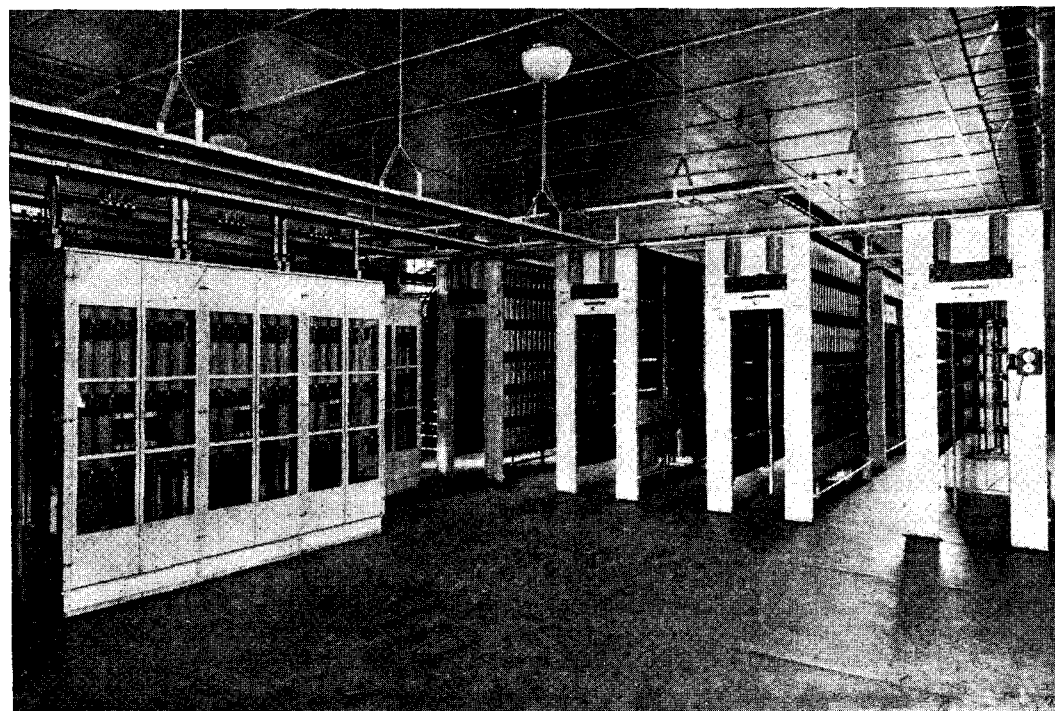
MR. P. MACINTOSH and Miss M. Johnson, Clerical Officers in the District Manager's Office, Manchester, having decided to link their fortunes by marriage, their colleagues decided that some tangible expression of the good will felt toward them should be forthcoming. Hence an informal meeting of the staff in the dining room on Thursday, May 19th resulted in the District Manager, in a short racy speech, presenting the happy couple with a Canteen of Stainless Cutlery, Fish Eaters and Tea Knives.

Individual members of the staff supplied many choice gifts.

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TELEPHONE

EQUIPMENT

The Telegraph and Telephone Journal.

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

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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. XIII.

JUNE, 1927.

No. 147.

EMPIRE BROADCASTING.

FROM time to time we hear murmurs about the need for an all-Empire broadcasting service, and as there seems some possibility at the moment of writing of an agitation for the creation of such a service, we make no apology for referring in this column to some of the difficulties of the situation. We grant that it is a great idea to supply every Britisher in a far-off clime with means of enjoying an opera or a play from dear old London, or a "Burns night" from Glasgow! But we wonder at times whether the stay-at-homes are not inclined to over-estimate the demand, or, dare we say it, the degree of home-sickness, and to under-estimate the real live interests of the Britisher beyond the seas in his home life, his daily task, his sports and other amusements.

The chief opponent of a universal British broadcast programme is, however, "old Sol," and we cannot hope to overcome him. He insists on bringing us out of bed and sending us back there without any consideration whatever for the ideas of those sentimental folk who cannot realise that the actions of their kinsfolk in the Greater Britain do not synchronise with theirs; and he gives us winter nights with all their fireside attractions, while "down-under" is enjoying all the delights of summer evenings with their insistent urge for the open air.

These differences alone would make the compilation of a universal programme almost an impossibility. To us a "jazz"

band from 11.30 to midnight may be delightful; but in New Zealand during the morning's work it would be a nuisance, in Perth (W.A.) at breakfast time it would be a bore (one cannot eat eggs and bacon, or even passion fruit, to syncopated time without risk of disaster), and in Calcutta or Colombo at 5 a.m. it would be a perfect tragedy. A chat on butterflies would fail to enthuse one at the dead of night in midwinter. The subtleties of Bach or the humour of a Harry Lauder would not be appreciated when one's sole desire was to exterminate a mosquito and get back to bed, while the children's hour and what little Willie would find in the coal-box would leave one cold in the wee sma' hours.

The life of a Director of Programmes would not be a happy one. He must find it difficult under present conditions to satisfy the varied tastes of the many readers of the *Daily Mail*, and if he were to be subjected to world-wide criticism of his "rotten" programmes, he would require the hide of a rhinoceros.

Some difficulties could perhaps be met by extending the programmes to cover the twenty-four hours; but, unless a successful scheme for "bottling" programmes can be evolved, the expense for artistes alone would be enormous. And with bottled programmes comparisons would inevitably be made with "tinned" music, as our U.S. friends call gramophone records! In any case the transmission of programmes continuously would be a costly matter, and who is to pay? The British licensee might not unreasonably object to the diversion of his licence fees for the purpose, and our far-off fellow countrymen do not want charity.

If therefore we make the somewhat large assumption that short-wave telephony is sufficiently advanced at present to render Empire broadcasting a technical possibility, there are many other practical questions which must be settled before a regular service could be provided.

TELEPHONE DEVELOPMENT OF LARGE TOWNS.

THE tables showing the proportion of telephones to population which we publish in another column shows that a steady improvement is taking place on the development of our great towns. Fourteen of them show a ratio of less than 25 inhabitants to each telephone. In 1921 only London (16), Hull (24), and Cardiff (24) were below this figure. This standard is reached by all the five telephone areas with upwards of a million inhabitants, with the exception of Birmingham, where the ratio is 27 to 1. Comparison is obviously invited with the great cities of Europe, and it is by no means unfavourable to this country. According to figures recently published in the *Journée Industrielle*, there are 350,000 telephones in the Paris district with its population of 6,300,000, or 1 telephone to 18 inhabitants. The figure for the London telephone area is 1 to 14. The development of Paris proper is 1 to 12, while that of London County is 1 to 11. The following is the ratio of

telephones to inhabitants of the city telephone areas of Europe with a population of upwards of a million :—

Hamburg	1 to	9
Berlin	1 „	9
London	1 „	11
Paris	1 „	12
Vienna	1 „	18
Manchester	1 „	21
Liverpool	1 „	23
Glasgow	1 „	23
Birmingham	1 „	27
Moscow	1 „	30
Constantinople	1 „	100

Constantinople, which made a late start and was hindered in its progress by more than one war, makes a very creditable show under its exceptional conditions.

HIC ET UBIQUE.

In our April issue, we published a paragraph quoted from the Press, to the effect that telephone rates in Germany were to be reduced. This is not correct. In fact the new rates are higher than the old. The subscriber in Berlin, Hamburg, Munich, Dresden, Leipzig, Cologne, Frankfort, and other large cities, now pays 96 marks a year basic charge, and has to make at least 40 calls a month at 10 pfennige each, amounting to 48 marks a year, or 144 marks in all = £7 4s. 0d. for 480 calls as against the former rate of £4 10s. 0d. for 600 calls.

An American journal, referring to the opening of an automatic exchange in Egypt, says "It will be interesting to see how the Arabic-speaking users will manage the dialling, as their method of expressing a number differs from that employed in most other countries. For example, 1234 is spoken of as one, two, four and thirty." It imagines there will be trouble with illiterate servants using the line.

We doubt if the really illiterate in any country could use the dial successfully. For instance, we call the number in question twelve hundred and thirty-four, which the "illiterate" might try to dial with 12, 100, 30 and 4. And how about the French who express 195 by "hundred, four-twenty, fifteen?"

A writer in the *Hendon Times* says :—

SIR,—It would be of interest to the telephone subscribers of the district if you could publish the average time taken by the Hendon Exchange to obtain each telephone call, as the P.G. has done for the whole of London (this works out at about five seconds per call) for the past year.

At a rough guess I think the average for the Hendon Exchange would be about ten minutes. I should be glad to be proved wrong.—Yours faithfully,
A SUBSCRIBER.

Tests taken over a period of five months show that the average speed of answer at the Hendon exchange varies between 6.1 and 9.4 seconds. We are glad to be able to prove this correspondent wrong by the slight difference between 600 and 9.

We believe, says the *Manchester Daily Dispatch*, that it is the high charges, and nothing else, which prevent hundreds of thousands of householders from being "on the telephone." To pay a high rental year after year on top of the initial installation

costs, and then to have to pay a fee for each call, is one of those illogical things which irritate the average man. Let us have something more sensible and fairer.

Initial installation costs are paid by subscribers on the Continent and not in England. Let the *Daily Dispatch* get hold of the facts, and let us know something more sensible and fairer in criticism of the rates.

We are long past the days when it was considered by mistresses to be an outrage for the general servant to require house-room for her bicycle. The *Liverpool Post* tells this story of a modern maid :—

"A suburban shopkeeper has recently had a telephone extension installed in his private house. The family, eagerly waiting to be rung up, were naturally rather disappointed when the first call proved to be for the maid. Their disappointment developed into annoyance during the following weeks, when by far the greater number of calls continued to be for the same person.

The climax, however, was reached when the maid inquired of the mistress of the house whether it would cost very much to have a direct line telephone put in. Her friends, she said, found it inconvenient to have to ask to be put through every time they rang up!"

The *Christian Herald* has discovered that His Majesty The King, like Ministers of State and Ambassadors, enjoys priority on trunk calls. As our contemporary puts it: "King George gets it (the trunk call) at once, and holds it, not for three minutes, which is the limit for his subjects, but as long as he pleases. Moreover, he is not on any account to be interrupted by an operator in his conversation. I wonder if that is what occurs when the King of Kings calls up on the telephone of the universe?"

We may remark that His Majesty's subjects may have more than 3 mins. if they pay for an extension; but the answer to the last conundrum we leave to the *Christian Herald* which is something of an authority on these matters.

The second instalment of Miss Cox's paper on "Telephony from Various Viewpoints" is held over until next month, owing to pressure on space.

C. B. CLAY FOOTBALL CHALLENGE CUP.

The final match for season 1926/7 was played on Friday, April 22, 1927, on the ground of the Tufnell Park Football Club. The competing teams were the Engineer-in-Chief's Office and the North-West External Section.

A splendid game was witnessed by about 500 enthusiasts. The teams were very evenly matched and after a hard struggle the Engineer-in-Chief's team were successful by four goals to one.

In the unavoidable absence of Colonel C. B. Clay, the Cup and medals were presented to the winning team at the conclusion of the match by Mr. J. Sinnott, O.B.E., Asst. Engineer-in-Chief.

The whole of the profits of the competition are always devoted to charity, and this season the sum of £18 13s. 2d. was divided between the Royal Northern and the Willesden General Hospitals.

It may be stated that the competition is open to teams representing the staff of any one 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, particulars of which can be obtained from the trustees—C. J. Head, London Engineering District; A. E. Wild, London Telephone Service and F. Woollard, Engineer-in-Chief's Office.

The Annual General Meeting of the competition will be held at Denman Street (Refreshment Room) on Monday, July 11, 1927, at 5r45 p.m. All interested in the welfare of sport are invited to be present.

THE LONDON POSTAL SERVICE.*

BY LT.-COL. W. T. BRAIN.

Introduction.—Let me say at once that in the short time I have at my disposal I am not going to attempt a detailed history of the London Postal Service, but rather to try and interest you and to give you a rough idea, at least, of some of its work. In fact, my story will largely be one of the London Postal Service as I know it. I shall include certain historical particulars to illustrate the evolution of the London Postal Service *Department*, but I do not guarantee that references to the past will be strictly chronological or that they represent more than a few isolated items in the chain of events of bygone years.

The development of the L.P.S.—as, indeed, in the case of the Post Office generally—has been a romance, and whilst I hope to give you in a general way some idea of its practical work, it is the romantic side which you will probably find more appealing.

Genesis of London Postal Service Department.—For many generations prior to 1882 when the first controller of the London Postal Service Department was appointed, there existed a headquarters office known as the Circulation Office. This office had its Controller and he and his staff were regarded as the authority on all questions of circulation, traffic, collection, delivery and categorisation of correspondence. He was in charge of the Central Office in the old G.P.O. This old building, known as St. Martin's-le-Grand, and later, when its sister buildings came into existence, as G.P.O. East, took the place of the old G.P.O. in Lombard Street, and was built from the plans of Sir Robert Smirke and opened in 1829. It was no doubt regarded as a wonderful place in its early days and it housed the *whole of the Post Office Departments* for many years. It stood on a part of several City parishes; in fact it was hemmed in by churches on three sides, and I remember one room which had a brass plate on one wall stating that it marked the boundary of the parish of St. Michael le Querne, which church used to stand at the junction of Cheapside and Newgate Street. The G.P.O. contained a residence for the Secretary and many bedrooms for clerks.

From this building was despatched all the London correspondence for the provinces and abroad, and it must have been a fine sight to witness the departure of the night mail coaches (seen in the picture). Some of these had rough trips in all kinds of weather (second picture). Mounted post-boys were used to distribute correspondence off the mail coach "roads," and, as will be seen by the next picture, they were not always of prepossessing appearance.

In view of its ecclesiastical neighbours it is rather refreshing to know that opposite Smirke's G.P.O., on the other side of St. Martin's-le-Grand, there stood, until it was pulled down to build G.P.O. North, a typical coaching inn—the Bull and Mouth—whence passenger coaches started from London. Over the portals of this inn some of you will remember, as I do, there was the inscription:—

"Milo the Cretonian an ox slew with his fist,
And ate it up at one meal
Ye gods, what a glorious twist!"

I have said that all the provincial and foreign correspondence posted throughout London was despatched from St. Martin's-le-Grand (the old Circulation Office) but what is more remarkable is that all correspondence for London received from the provinces and abroad, even up to 1854, when, of course, there were night mail trains instead of coaches, was brought to this central office and distributed from there, i.e., the Post Office treated the whole of London as one town and served it postally from one office. The majority of the letter carriers worked to and from this Central Office! Just imagine what this meant in days when there were no tubes, trams or anything like the omnibus system. There were "receiving houses" in the suburbs, or what were then the outskirts of London, and these collected letters and sent them, for despatch, to the Central Office. A postman ringing a bell also traversed the main streets and collected letters at *Id.* each, and I have one of these old postmen's bells in my room.

This system of centralising the work not only applied to correspondence for the provinces and abroad but also to that posted in one suburb for another.

Sir Rowland Hill divided London into 10 districts about 1835, and set up a kind of local home rule in each under the jurisdiction of a Metropolitan Surveyor. The head of each district had, in fact in 1860, the dignified title of Deputy Controller. There were also Inspectors of Suburban Districts.

Such a division of London was undoubtedly necessary for the purposes of organised distribution and collection and it remained until 1882,

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

when the Metropolitan Surveyor's Office was abolished and the whole postal control of London and its suburbs was vested in the Controller of the London Postal Service as Head of a Department. There were a good many difficulties of establishment to be overcome after that, and it was not until 1897 that the sorting establishment of London was amalgamated—the clerical staff being merged into a common list in 1905.

Following the appointment of a Controller L.P.S., the old Circulation Office, consisting of (a) the large distributing office for London—the E.C. Section, (b) the provincial distributing centre for provincial work—the Inland Section, and (c) that for foreign correspondence—the Foreign Section, became subordinate under the charge of a Sub-Controller. The Districts had been placed under Postmasters, and each one had absorbed, for control purposes, its adjacent suburbs in which had been opened sub-district sorting offices manned entirely by postmen.

Extent of L.P.S. Territory.—Thus the Controller L.P.S. had supreme charge postally—subject only to the Secretary, G.P.O., of a territory measuring about 20 miles from N. to S. and 20 miles from E. to W. (map shown on screen). This comprised an area of about 225 square miles. It is territorially practically the same to-day and now contains the following offices:—

Non-public	Inland Section	1	
	Sub-district offices	104	
			105
Public	Head offices (including E.C. and Battersea	10	
	B.O.'s	127	
	T.S.O.'s	866	
			*1,003
			1,108

* Including 574 telegraph offices.

The number of posting receptacles is 4,747.

Before going any further I would like to give you some figures to indicate the growth of postal work in London.

A Few Statistics.—In 1829 there were 564 Postmen in London and the villages round, e.g., Islington, Camden Town, Kensington, Brompton. Now there are 11,854.

In 1859, less than 70 years ago, the chief office, i.e., the Circulation Office, had a staff of 1,500, and in the Districts there were 3,300, a total of 4,800. The whole Post Office staff throughout the British Isles (including, of course, Ireland) was 24,802. Now, in the London Postal Service alone there are 32,729 employees, of whom about 6,000 are unestablished.

In 1859 the number of letters and newspapers delivered throughout the United Kingdom was estimated at 615½ millions, and in 1879, 1,586,937,300. The latest count showed the number delivered in the London Postal area alone during a year was 1,838,931,900, whilst the number posted was 2,035,415,356, and parcels posted were 45,429,614.

Even as recently as 1900 the corresponding figure to 1,838,931,900 was 964,200,000, so that it will be seen the work has practically doubled in just over 25 years.

Transfer of Inland Section to Mount Pleasant.—It is clear that it would have been impossible to have dealt with such traffic as is represented by these figures in one Central Office and the District Offices. Some rearrangement therefore became necessary when the upward curve of work was beginning to be apparent towards the end of the last century, or about 30 years ago, and almost concurrently with the building of the Mount Pleasant office to relieve the G.P.O. East of provincial work, a system of decentralisation so far as the despatching of correspondence to the provinces was concerned was taken in hand. The removal of the Inland Section (dealing with work for the provinces) to Mount Pleasant, took place in 1900, and since then some of the District Offices have become Divisional Offices—a term which I shall explain later.

King Edward Building.—Even with provincial work removed, the old G.P.O., which from a sorting office point of view became the E.C. and Foreign Section, was uncomfortably crowded and out of date. Accordingly, a new site for a central G.P.O. was acquired on the removal of Christ's Hospital to the country, and King Edward Building (named after the late King, who laid the foundation stone) was opened as the Headquarter Office of the Controller and a sorting office for town and foreign work in 1910. (Pictures shown.)

Last year the Inland Section extended into a fine new building which has been erected by the side of the old one, thus leaving room for the expansion of the Parcel Post Section into the old letter office floor.

General Organisation.—Having made you acquainted with the principal central buildings occupied by the L.P.S. at the present time, I think it would be well to give some rough outline of the general organisation of the Department and its functions.

The Controller is directly responsible to the Secretary in common with the heads of other Departments, and whilst in many matters he is in-direct

touch with other Postal Departments on subjects of importance and of larger policy his contact is by way of the Secretary.

To deal with the mass of postal work coming to, despatched from, and passing through the London area the Controller has his own internal organisation. He has divided his Headquarter Staff functionally and the main branches are :—

- (a) Revisions Branch ... } under an Assistant Controller
- (b) Circulation and Mail Van Branch } with two Chief Supts.
- (c) Buildings and Telegraph Staff and } Under an Assistant Controller
Establishment Branch ... } with two Chief Supts.
- (d) Travelling Post Office Section ... Under a Chief Supt.

The Assistant Controllers pass papers of supreme importance to, or consult with, the Vice-Controller or Controller, whilst the Chief Superintendent, T.P.O., who has a measure of independence, keeps in close touch with the Assistant Controllers of (a) and (b).

Just briefly I will describe the work of these Branches.

(a) *Functions of Revisions Branch.*—The work of the Revisions Branch is mainly concerned with sorting office organisation: that is to say, broadly, with the proper adjustment of staff to work; with the adoption of efficient sorting office methods, with the maintenance of scheduled arrivals, despatches and connexions, and with the adequacy of premises and fittings. In these respects, the Branch is concerned with the E.C., Inland Section and all Head, Sub-District and Branch Offices in London (but not with T.S.O.'s) and necessarily works in close touch with the Assistant Controllers in charge of the E.C. and Inland Sections, Postmasters and their organising staffs. It deals also with a variety of general questions affecting London as a whole and arising out of these activities.

For convenient working the Branch is divided into groups, each group being allotted a certain number of offices for inspection purposes and general control of organisation. The officers (1 Higher Executive, 1 Executive, 1 Clerical) on each group make frequent inspections of the duties at the offices attached to the group, deal with all matters affecting the working arrangements at those offices so far as they are proper to the Controller's Office, and subject interim and full revision proposals to critical examination before amendment or approval. A "general questions" group handles matters of general application to all London offices.

The work of the Branch requires on the part of each group officer a good general knowledge of sorting office working and a particular knowledge of the working of the offices attached to the group. As the activities of the Branch touch, at some point, the functions of every other Branch of the Controller's Office, it will be clear that a wide range of information and experience is required.

Full revisions of staff in relation to work are carried out at London offices approximately once in five years or more frequently in certain circumstances. Revision proposals are first prepared in the Assistant Controllers' (I.S. and E.C.) or Postmasters' Offices after detailed inspections of all duties, and are then examined in the Revisions Branch, not alone as regards their details but in the light of the part which the particular office under review is required to play in the general scheme and the obligations which the Department assumes in relation to the working conditions of the staff.

Minor revisions of force and methods may, and frequently do, become necessary in the intervals between the periodical revisions, and these are carried out on similar lines.

Adjustments of staff are determined primarily by expert inspections of working conditions, but for purposes of comparison between one office and another and to test the relation between staff and work, it becomes necessary to reduce to a common basis the various operations involved in that work. For this purpose, each operation performed is given a unit value. The numbers of articles of each class are ascertained annually for each office by means of Returns taken specially for this purpose. With the figures of units of work obtained we can establish a direct relation between growth of work and growth of staff costs, or, alternatively, obtain comparative figures of cost per unit (or more usually, per 1,000 units) of work done. At Counter and Branch Offices the main transactions are far more varied but an appropriate unit value is given to each.

The functions of the Branch also include (1) the maintenance of establishment and traffic records, (2) the settlement of postal boundaries and the maintenance of the necessary maps, and (3) the development of the use of departmentally-owned motor transport.

One of the great difficulties with which we have to contend, in common, of course, with the rest of the Post Office, is the "rush" character of the work. If postings could be spread evenly staff troubles would largely disappear, but you will see from the following diagrams (1) how sharply the posting line rises to a peak between 5 and 6 p.m. and (2) how the posting work is affected by industrial trouble (May, 1926), and its variation throughout the year. During the summer or holiday months there is a decided drop in the line.

At the end of each month, quarter and half-year—the times of accounting activity for the commercial world—the Post Office pulse always beats stronger and postings, &c., are heavier.

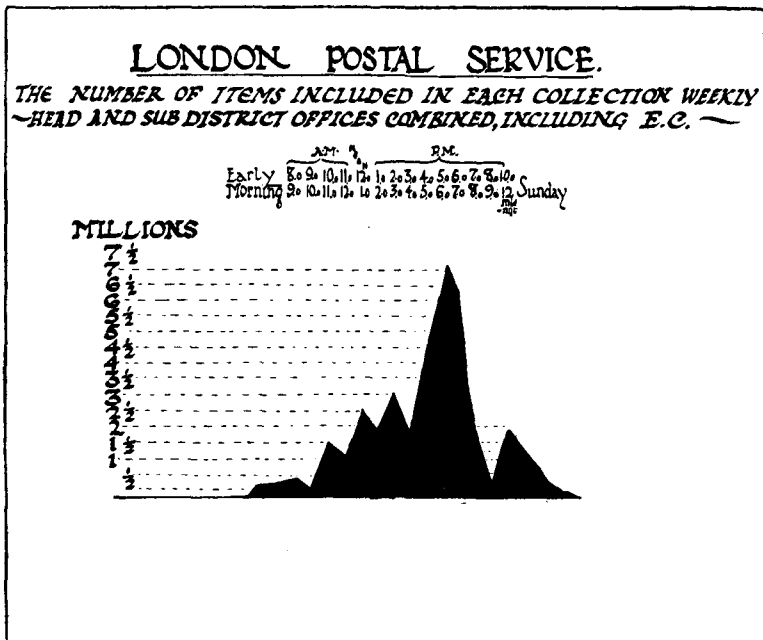


Fig. 1.

Christmas is a special anxiety although the fixing of a "latest posting time" for delivery up to Christmas morning and a well-organised control system have done much to rob this period of its postal terrors. Traffic figures naturally rise tremendously, but a good deal depends upon the incidence of Christmas Day and the absence of fog or very severe weather.

You may be interested to know that the number of ordinary letters posted in the Head and Sub-Districts on Dec. 23 last was 9,338,000, as against an average day of 5,000,000. Parcels collected (Dec. 22) rose from 144,823 to 526,312, and the delivered number from an average of 71,900 to 336,699.

The estimated number of letters, packets and newspapers posted in London during the Christmas period (Dec. 17 to Jan. 1 inclusive) was 107,797,922.

(b) *Functions of Circulation Branch.*—The old Circulation Office used to be the authority on all general questions affecting Circulation, and it kept a fairly complete record of all despatches from and arrival at every post town in the United Kingdom. With the growth and development of postal traffic throughout the kingdom it became necessary to establish a co-ordinating centre with more extensive powers, and the Traffic Section of the Secretary's Office was therefore formed, taking over a good deal of the administrative work formerly done in the Circulation Office.

The main principle of "Circulation" is to secure the most expeditious transit of letters and parcels from the office of Posting to that of Delivery.

Next the aim is simplicity of sorting, and attention is paid to uniformity so far as the disposal of correspondence for counties and groups of counties is concerned. Important considerations are cost of transport and the avoidance of circuitous routes on this account.

If a direct mail is not made to the office of delivery, letters and parcels are sent through an Intermediate Office.

The Intermediate Office may be either (a) a Distributing Office or (b) a Forwarding Office.

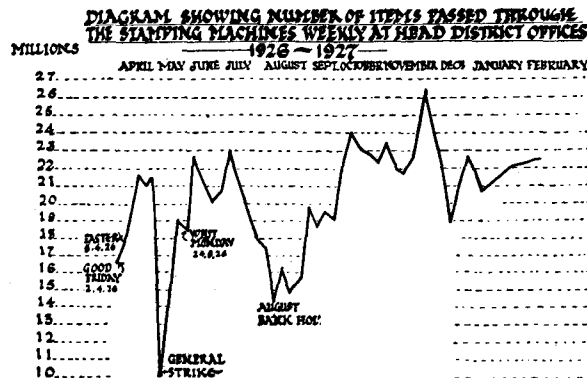


Fig. 2.

A *Distributing Office* is one selected as a convenient centre for distributing mails—usually direct to the delivery office—for a recognised area—e.g., Carlisle.

A *Forwarding Office* acts as an Intermediate Office between a despatching office and a *Distributing Office* or the office of delivery, e.g., Crewe.

An office may be a *Distributing Office* for an area as well as a *Forwarding Office* for other areas.

A *Forwarding Office* should not be used when a *Distributing Office* affords equal facilities. It will be clear even to the uninitiated that complete and accurate records must be kept by Surveyors, and to a smaller extent by Postmasters, if confusion and delay to correspondence are to be avoided. In addition, copies of most of the principal records are maintained by the Secretary (Postal Traffic Section) and the Controller, London Postal Service, to whom all provincial offices send particulars of alterations. The manner of recording alterations in mail work has been highly systematized. Certain standardised considerations govern the establishment or discontinuance of mails.

The Circulation Branch of the Controller, L.P.S., is regarded as an expert Branch, and a good many of the major problems and questions of Inland or Foreign Circulation are referred to it by the Secretary and Surveyors. It deals with all circulation questions in which London, or any office in London, is concerned. It makes proposals and considers those submitted to it for the establishment or discontinuance of letter, newspaper or parcel bags; investigates complaints of delay in transit, and is constantly seeking to expedite the transmission of mails of every kind—Inland, Foreign or Air Mails.

A sub-section of the Circulation Branch deals with *Mail Van Services*.

The road vehicles used on postal services in London fall mainly into two categories:—

- (a) Vans—horse and motor—of 20 cwt. and 30 cwt. capacity, supplied and worked by contractors and driven by trade drivers.
- (b) Motor-cycle combinations of 3 cwt. and motor vans of 8 cwt., 15 cwt. and 20 cwt. capacity, owned and worked by the Post Office and driven by postmen drivers.

The allocation of work between the two categories is broadly that purely transport services—i.e., the conveyance of bags of mails from one point to another—are performed under contract, while collection and delivery work is done by departmental van. The allocation is not a rigid one; there is overlapping on each type of work, especially in Central London, where the collections and deliveries are so heavy that many of the services connected with them are more of the nature of transport services than ordinary collection and delivery. On the other hand, a number of small services, particularly in the outer areas which might be regarded as purely transport, can more conveniently be linked with collection and delivery work, by departmental van.

The mail van contracts are at present four in number—one for letter mail work in Central London, one for parcel mails also in Central London, and two for combined letter and parcel work mainly between the Head District Offices and the Sub-Districts.

The total payment made by the London Postal Service in respect of contract services is over £300,000 a year. In 1911 it was £200,000 a year. Payment is calculated on the basis of *loaded mileage* in the case of ordinary transport work, and on the basis of *occupied time* in the case of collection and delivery work. Contracts are made on ordinary commercial lines, tenders being invited by means of advertisement in the motor trade press and the daily press.

The system of payment mentioned may appear strange in view of the usual commercial practice of engaging vehicles by the day or hour, but there are advantages as well as disadvantages in it, and the London Postal Service has had experience of the ordinary commercial practice.

There has been a steady process of motorisation on contract services over the past few years and when a new suburban contract comes into force in October next the number of horse vans will be a comparatively small proportion of the whole. It is still a very open question whether horse-drawn vehicles or motors are more suitable for such Post Office work as they have to do in the City of London for example, and another difficulty with which we have to contend lies in the fact that there are two pronounced traffic peaks of postal van work in the 24 hours, at both of which mileage work is preceded or followed by collection or delivery work. The peak point of collection or posted work previous to the despatch of night mails already referred to is one, and the other is the arrival of the up night mails, followed by the first morning delivery. Economy in the use of vans, therefore, entails much dovetailing of the two classes of work.

Postmen-driven motors are of post-war introduction. They are generally of the smaller type and their main functions are to replace foot and handcart services, particularly on collections and on parcel deliveries, especially in the Districts as well as in certain other special circumstances which perhaps need not be detailed.

The total number of motor and horse vehicles employed at the moment on mail services in the L.P.S. area is 770, and the annual mileage is in the neighbourhood of three-and-a-half millions.

(c) *Function of Building, &c., Branch.*—The main function of the Buildings Branch is to attend to the housing, maintenance and equipment of L.P.S. offices (Headquarter Offices, Branch Post Offices and Sorting Offices).

The most important items with which it deals are:—

- (1) the building or acquisition of new premises;
- (2) the enlargement or alteration of existing premises;
- (3) questions of lighting, heating, ventilation, cleaning, renovation, &c.
- (4) questions of welfare accommodation (including refreshment branches);
- (5) the provision of fittings of all kinds;
- (6) the introduction of labour-saving devices, e.g., conveyors;
- (7) the provision of stores, uniform, stationery, &c.;
- (8) the revision of forms, draft letters, &c.;
- (9) the consideration of suggestions for improvements in fittings, forms, &c.

This list explains the scope of the Buildings Branch activities in general terms, but the following brief observations may be of interest as illustrating the procedure in certain types of cases.

Much of the work is of a technical nature, and in framing schemes for large building works or for the introduction of labour-saving plant (such as that which is to be used in connexion with Tube workings) it is necessary for the Buildings Branch officers to maintain close co-operation with the technical officers of the Office of Works and the Engineering-in-Chief's Department in order that the most useful line of action may be settled before the proposals are submitted for authority to proceed.

It is not only with suggesting, considering or carrying out of such schemes as come under its purview, however, that the Buildings Branch is concerned. It has to produce satisfactory financial or other justification for any scheme it puts forward.

In matters concerning Accommodation and Fittings the Buildings Branch is largely guided by the recommendations of a Committee (composed of representatives of the Official and Staff Sides) which has until recently been sitting. This Committee, known as "The Fittings Committee," has recommended certain standards of accommodation (e.g., superficial areas, amenities, &c.) in relation to the nature of the work performed and the number of staff occupying the buildings or rooms concerned. The Committee has also evolved standard types of fittings which have been adopted for use in sorting offices and public post offices, some of which I shall show you later.

The *Telegraph Branch* is responsible for the telegraph working at all L.P.S. offices and for the delivery of telegrams throughout the London postal area. (Except the portions of the City delivered from the C.T.O. and Threadneedle Street B.O. during the day, and the night delivery of the eastern half of London which is effected from the C.T.O.)

Telegrams are accepted at 570 L.P.S. offices, and delivery is effected from 158 offices. At the latter offices 1,700 boy messengers are employed and 540 bicycles are in use.

Forty of the larger offices in the central areas are connected with the Central Telegraph Office by pneumatic tubes, while at the other offices the telegraph work is dealt with over morse telegraph circuits or telephone circuits. Exceptionally, Morkrum teletype circuits are in use at two offices (Knightsbridge and Boro' High Street).

Inter-London traffic, which formerly was dealt with direct via the telegraph inter-communication switch, is now transmitted direct by telephone from certain offices, and an extension of this system is contemplated.

Special arrangements have to be made for race meetings, e.g., at Alexandra Park, for miscellaneous exhibitions and shows at Olympia and the Agricultural Hall, and for Test Matches and other special events.

Besides telegraph work the Telegraph Branch exercises a general oversight over the facilities provided throughout the London postal area for the transaction of Post Office business by the public. This business is carried on at 137 Head and Branch Offices and 865 Town Sub-Offices. With the growth of London the number of offices is continually increasing, while old offices are frequently replaced by new ones, and changes are continuously taking place in the appointments at Town Sub-Offices. The maintenance of Town Sub-Offices is dealt with entirely by the Telegraph Branch, but the responsibility for the maintenance of Head and Branch Offices is shared with the Buildings and Revisions Branches.

Public telephone facilities provided at all London post offices, together with service lines for telegraph traffic or for use in the Controller's Office and in the District Postmasters' Offices and Sorting Offices, are also under the care of the Telegraph Branch.

It is impossible to give an exhaustive list of the many other classes of work which are dealt with, but the following are some of the more important items:—

- (1) New classes of business transacted at post offices.
- (2) Training of probationary C.C. & T.'s.
- (3) Suitability of books, forms, &c., used at branch and town sub-offices.
- (4) Rules for working at post office counters.
- (5) Public complaints against staff or arrangements at branch and town sub-offices.
- (6) Special attention to Imperial cable and Empiradio work.
- (7) Educational classes for boy messengers.
- (8) Messengers' institutes and general welfare work among boy messengers.

(To be continued.)

TELEGRAPHIC MEMORABILIA.

AUSTRALIA.—It is officially announced that the number of broadcast receiving licences held throughout the Commonwealth at the end of February was 197,872, which represents 3.2% of the population. Victoria was first amongst the States with a total of 114,428 licences, compared with 51,154 in New South Wales, 20,425 in Queensland, 15,773 in South Australia, 4,014 in West Australia, and 2,078 in Tasmania. The number of persons per 100 of the population in each State who held receiving licences at the end of February were as follows:—Victoria, 6.1; South Australia, 2.7; Queensland, 2.3; New South Wales, 2.2; West Australia, 1; Tasmania, 1.

BOLIVIA.—The *Electrical Review* states that under a twenty-years Government contract, Marconi's Wireless Telegraph Co. has undertaken the control and operation of the entire postal telegraph and wireless services of Bolivia; the services were taken over on the 1st ult. This is the second contract of its kind entered into by Marconi's Co. in South America, the first being with the Peruvian Government in 1921. Modern apparatus will be introduced.

BULGARIA.—Reuter's Agency in Sofia informs us that Bulgarian citizens have hitherto not been allowed to use wireless, the only sets permitted in the country being those belonging to Government administrative bodies, the Ministry of War, and Bulgarian merchant vessels. The Government has now, however, decided to permit their use by the general public, although transmission will remain a State monopoly. Owners of receiving sets will be required to pay a fixed subscription and to undertake to conform to such regulations as may be made.

COLOMBIA.—Through Reuter's Trade Service we learn that in his message to Congress, the President of Colombia, South America, announced the immediate provision of an improved broadcasting service. Twelve sets are to be used, all of high power (the international call letters assigned being HJA-HKZ). The message has attracted much favourable attention, as hitherto there has been no broadcasting in Colombia, where static is bad during most of the year in the greater part of this extremely mountainous country. The best reception is obtained from January to March. The recently-opened stations at Caracas (Venezuela) and Balboa (Panama) are expected to benefit broadcasting in Colombia.

FINLAND.—A station is to be built in Lahtis, says the *Electrical Review*, at a cost of about \$200,000, which is part of a loan granted the country by an American concern. At present there are only two radio stations in Helsingfors and one in each of the following towns:—Tammerfors, Bjorneborg, Lahtis, Jyvaskyla, and Jakobstad. The stations in Helsingfors belong to the Army and those in the other towns are privately owned. None of them is equipped for modern broadcasting, says *Commerce Reports*, and it is expected that the new station will stimulate interest and increase the sale of equipment.

FRANCE.—The official inauguration of direct wireless communication between France and French Equatorial Africa took place on April 29. The station at Brazzaville is another link in the chain of wireless stations which are being constructed in accordance with the plans of the Government; it will not only be used for the transmission of commercial messages, says Reuter, but will also serve for the dissemination of weather forecasts, time signals and all information of use to shipping. The construction of the new station was begun in 1920; it will be staffed by nine Frenchmen, aided by natives.

GREAT BRITAIN.—The *Electrical Review*, London, says that Capt. P. P. Eckersley, chief engineer of the B.B.C., and M. Eraillard, the Belgian president of the Technical Committee of the Union Internationale de Radiophonie have recently co-operated in carrying out tests to ascertain the amount of wavelength separation needed between long-wave, high-power stations in order to avoid interference between them. At its meeting at Geneva this month the Union will consider the results of the investigation. A 10-kilocycle interval between stations is apparently as essential in the case of long-wave stations as it is in that of the shorter band, while it seems to be not really sufficient between two powerful stations geographically "near" to each other.

PARLIAMENTARY QUESTIONS.—On April 27 Sir F. Wise asked the Postmaster-General if he could state the number of wireless calls between Great Britain and the United States of America from Jan. 1 to the most convenient date; and if the service was paying its way.

Sir W. MITCHELL-THOMSON said that the total number of calls up to and including April 24 was 769. The service was not yet self-supporting. Receipts at present covered working costs, but not interest and depreciation.

On April 12, Mr. Montague asked the Postmaster-General whether his attention had been called to the effect of spark signals sent out constantly by the Lloyd's station at Niton, Isle of Wight, which made the wireless receiving sets for which licence fees had been paid in Sandown, Shanklin, Blackgang, and district, practically valueless; and whether he would make representations to the company concerned as to the advisability of substituting continuous-wave messages for spark signals to ships entering the Channel.

Viscount WOLMER, the Assistant Postmaster-General, said that the wireless station at Niton was a Post Office station used for communication with ships and in the interests of safety of life at sea. Although some interference with the reception of the Bournemouth broadcast programmes was unavoidable in the immediate vicinity of the Niton station, there should be no serious interference at Sandown, Shanklin, and the district when reasonably selective receiving apparatus was used. The Daventry programmes

could be received without difficulty even 200 yards only from the Niton aerial. An International Radiotelegraph Conference was to be held at Washington in the autumn of this year, at which the question of spark transmission from ships would be considered. In the meantime it was not practicable to take any steps to restrict the use of spark apparatus on ships.

The Western Union Telegraph Co. have inaugurated direct cable working in each direction between London and Boston, Mass., U.S.A., over one of the nine Atlantic cables operated by the company.

The cable steamer *Telconia* recently arrived at Valentia, Kerry, Irish Free State, where she is to undertake some repairs to the transatlantic cable.

At the end of March, 1927, the number of Post Office receiving licences current was 2,253,845, an increase of 18,845 as compared with February, 1927, and an increase of 241,845 as compared with May, 1926.

At the annual meeting of the Marconi International Marine Communication Co., Ltd., held in London, its managing director (Mr. F. G. Kelleway) announced that the authorities in this country were on the point of issuing rules governing the installation on merchant ships of the "auto alarm," actuated by a special signal which, in time of distress, would give audible warning of the need for help, and summon to the wireless apparatus on the ship where the alarm was received the telegraphist who at the time might be off duty.

GERMANY.—The reduction of 33½% in the charges for the public telephone service took effect on May 1, bringing the price down to ten pfennigs (roughly 1d.) per call. Hitherto it has been fifteen pfennigs, which odd price necessitated all users of public telephones purchasing special discs, slotted and nicked in a special way to deter "coiners," for insertion in the telephone boxes. For the lowered rates new boxes have been introduced which will take the ordinary ten-pfennig pieces.

The effect of this cheapening of the telephone upon the sister service, the telegraphs, will be watched with interest by all administrations. At the moment the telegraphs is just about holding its own.

It is reported from Hamburg that experiments are in progress with the object of connecting steamships and other vessels, when in port, with the local telephone system. This is to be done by specially arranged cables, so it is understood, but the information at present to hand is somewhat meagre.

GUATEMALA.—Reuter's Trade Service from Guatemala City says that an arrangement with the Tropical Radiotelegraph Company (a subsidiary of the United Fruit Company organised to handle the radio business of its steamships and stations in the United States) has been concluded by the Government for the connexion of the State radio station with the Fruit Company's system in Central America. The Tegucigalpa (Honduras) station has been decided upon as the connecting link with the other five States, and the Company's station in New Orleans will connect with the rest of the world and transmit Press messages at a discount of 50% on the actual rates. By special arrangement with the Minister of Promotion, messages of general interest up to 300 words from the Press of Guatemala City to that of San Salvador will be sent free of charge.

N.B.—The Minister of Promotion has nothing to do with advancement in the service!

HUNGARY.—It is understood, says the *Electrical Review*, that the Radiotelefono Hirmond Co., of Budapest, is to build a 60-kw. station similar to that at Langenberg; the scheme has the approval of the Hungarian Post Office authorities.

By a recent ordinance radio receiving apparatus may now be imported into Hungary without restriction by anyone having a licence for the "production, sale or maintenance and use" of a receiving apparatus. The importation of radio broadcasting apparatus and parts is, however, still subject to the permission of the Minister of Commerce. Consignments of apparatus will still be cleared by the Budapest Central Customs Office, and will only be delivered to the addressee if he can produce the necessary licence. The regulations also apply to the movements of apparatus within the country.

INDIA.—It was announced in the Delhi Council of State that official "beam" radio-telegraph transmission tests from the Poona station would commence in May and that the service would actually commence in June. The Indian system consists of a transmitting station situated about six miles from Poona. The site is at an elevation of about 2,200 ft. above sea level, and the area at present utilised for the buildings and aerial system does not exceed 20 acres, but considerable space has been allowed for any extensions which may be made in the future. Heavy fuel oil is used for power production. The receiving station is situated about four miles from the small town of Dhond and about 50 miles from the Poona station, and lies in open, wide country, so that there is no screening to interfere with the reception of signals. These stations will link with the Grimsby transmitter and Skegness receiver in England.

According to the annual report of the committee of the Bombay Radio Club for the year 1926, the number of members increased during the year to 585. The Club had broadcast upwards of 300 concerts, and the programmes were received in places many hundreds of miles distant. It is intended by the Technical Committee to install in the current year small transmitters, of both long and short waves, for communication with other amateur stations in India and to start a class in Morse receiving and dispatching, if sufficient members accord their support. It is expected that the Indian Broadcasting Co. will commence its regular broadcasting services from Bombay and Calcutta in August next. Mr. Page, director of the Bombay station, and Mr. Wallace, director of the Calcutta station, have both arrived in India.

The transmitting station of the company will be 120 times as powerful as the present Bombay station (2FV).

IRISH FREE STATE.—The new State broadcasting station at Cork, which is intended to serve the south and west of the country, was officially inaugurated on April 25 by Mr. J. J. Walsh, Minister for Posts and Telegraphs. Equipped with "Standard" plant, the Geneva rating of the station is 1.5 kw., which means that 4-kw. "peak" power can be handled without distortion. It will operate on a wavelength of 400 metres and its call sign is 6CK.

In Dail Eireann, the Minister for Finance, said that the yield from the duty on wireless-telegraphy apparatus in the Irish Free State from April 22, 1926, the date of the imposition of the duty, up to and including March 31, 1927, was £19,008. The total amount received from licences on wireless receiving sets for the first three months of the present year was £8,315, viz., for January last, £2,432; for February, £4,527; and for March, £1,356. The number of receiving licences issued in the Free State during the financial year ended March 31, 1927, was 21,795. The figure for Northern Ireland was 28,455 up to Feb. 28, 1927.

The *Cork Examiner* considers that the fact that in January, February and March, 1927, the authorities collected £8,315 in licence fees alone is sufficient evidence in itself that radio broadcasting in Ireland "is an extremely businesslike proposition."

ITALY.—From Milan through Reuter's Trade Service we learn that the publication is expected of a decree-law instituting a new company to take over the wireless telephony services, and appointing a supervisory committee. The decree will fix the composition of the board of the company and the staff of artists, which is to be predominantly Italian, and require the execution of the following technical plan: the replacement of the present station at Milan by another of 7 kw.; the erection at Genoa of a 11.5 kw. station; at Rome, one of 25 kw.; at Florence, Turin, Naples, and Bari stations of 3 kw., and at Palermo one of 7 kw.

To this information the London *Financial Times* adds that the new transmitter at Milan, which will deliver 7 kw. to the aerial, is nearing completion.

The Italian Government Commission examining broadcasting finance has adopted a resolution recommending the Government to impose a small tax. All Italians are instinctively against the suggestion of a licence tax.

From a Consular report received by the U.S.A. Government it is gathered that a good market existed for crystal sets immediately after the opening of the Milan broadcasting station in 1925, but the demand fell to inconsiderable proportions. The erection of the new station near Milan is expected to open up a new and larger market. A great deal of interest has been shown in valve sets; the cheapest are of Italian make, but German, British, French and American sets are available.

Reuter's Rome correspondent cables that Signor Majorana, Professor of Physics at the University of Bologna, has written to the Reale Accademia dei Lincei at Rome, claiming to have discovered a system of wireless telephony in which ultra-violet rays are employed. In experiments made between Bologna and a place 16 kilometres distant conversations were, it is said, carried on with great clearness and in secrecy.

JAPAN.—The Minister of Communications announces the return to Tokio of Monsieur Koichi Miyake, delegate of the Japanese Administration to the meetings of the International Consultative Committee on Telegraph Communications in November last.

JUGO-SLAVIA.—*World Radio* informs us that a company has definitely obtained a licence for the erection of a transmitter of 6 kw. The company began its activities with a capital of 2,500,000 dinars. The station will be installed on the top of the Académie des Sciences at Belgrade. One dinar equals 9.513 pence.

LITHUANIA.—The Lithuanian Parliament (Seimas) has adopted a new radio tariff which is already being provisionally put into operation by the institutions concerned. According to *World Radio* the monthly charge for a receiving set installed in private dwellings, State and Municipal institutions, by cultural and charitable organisations and in newspaper offices, if special taxes are already being levied, is as follows:—In towns: (a) crystal detector, tenpence; (b) valve receiver, 2s. 1d. In villages and other localities: (a) crystal set, fivepence; (b) valve set, 1s. 3d. For a receiving set in restaurants, clubs, shops, cinemas, and similar public places, the monthly fee is to be: (1) in Kaunas and Klaipeda, one pound sterling; (2) in district towns, 4s. 6d.; and in other places, 4s.

Reuter's Trade Service gives the following further interesting information regarding radio matters in Lithuania:—The first sitting of the Exploitation Commission of the Kaunas wireless station was held recently to examine the activities of the station. Owing to lack of resources it has not hitherto been possible to develop; the number of registered subscribers in Lithuania at present is 1,500, of whom 1,000 are in Kaunas. Notwithstanding the regulations regarding the registration of apparatus, there are still many unregistered sets, it being estimated that the total number is 10,000. On the basis of the recent Cabinet decision, 75% of the receipts is assigned to programmes; the Commission therefore intends to introduce measures for the registration of all radio apparatus. Strict control will be enforced, and those who fail to register in time will be fined. Moreover, in shops dealing in wireless accessories, all apparatus and parts sold will be registered. It is proposed periodically to relay from the Kaunas station the more interesting programmes of the principal European stations.

NEW ZEALAND.—*World Radio* records that Wellington is shortly to possess a 5-kw. station and that in both Auckland and Christchurch there are good stations, but so far Wellington and Dunedin have each had only a very small one. The number of licensed listeners in New Zealand is at present 13,000.

POLAND.—The *Electrical Review* states that the Polish Broadcasting Co. (Poleskie Radio) has just placed a contract for a 10-kw. station to be erected at Katowice. The equipment will be manufactured in London at the works of Standard Telephones and Cables, Limited. This order follows on the recent successes of this company in obtaining contracts in face of foreign competition for broadcasting equipments for the Irish Free State, Denmark, Japan, and New Zealand.

PORTUGAL.—An extension of wireless telegraph facilities took place on April 30 with the inauguration of services between Lisbon and the Portuguese colonies of Cape Verde, Angola, and Mozambique. The opening of these services completes the network of wireless communication which Marconi's Wireless Telegraph Co., Ltd., undertook to construct for the Portuguese Marconi Co. in accordance with the concession obtained from the Portuguese Government in November, 1922, says the *Electrical Review*. Direct wireless communication is now established between Lisbon and all the principal Portuguese colonies, which also have a complete system of wireless communication with one another. Services to the Portuguese Islands of Madeira and Azores were opened on Dec. 15 last. Direct services between Lisbon and London, Paris, and Berlin have also been opened during the last few months, and a direct service with Rio de Janeiro is expected to be opened almost immediately. The English group of stations with which the Portuguese stations at Lisbon communicate are the Marconi stations at Ongar and Brentwood, in Essex. The transmitters for communication between Portugal and South America, Mozambique, Cape Verde and Angola are operated on the short-wave "beam" system.

RHODESIA.—The London *Times* announces that a broadcasting station is to be established in Southern Rhodesia within the next ten months to operate in conjunction with the Johannesburg station, and will relay the evening programmes transmitted therefrom. The African Broadcasting Co. is applying to the Southern Rhodesian Government for a licence, and is asking for alterations in the existing regulations in order that "pirates" may be dealt with.

RUSSIA.—The *Electrical Review* writes as follows regarding the new "Great Komintern" radio broadcasting station in Moscow:—

"This station, for the construction of which Professor Bonch Brouevitch was responsible, was recently opened. The plant is claimed to have a capacity of 40 kw. . . . An unusual type of aerial mast has been adopted."

This our worthy contemporary illustrates by a photograph, and from this the writer can best describe the aerial as presenting the appearance of a number of huge tapering lobster-pots placed end to end stretching skyward!

SANTO DOMINGO.—Reuter's Trade Service states that the Minister of Promotion and Communications has ordered new equipment for the radio station at Santo Domingo, South America (the international call letters assigned to the Republic being HIA-HIZ), to provide direct communication with New York, 1,225 miles distant, and other stations within a radius of 1,500 miles. The old equipment will be utilised at a radio station to be erected at Puerto Plata, the principal seaport on the north coast of the island, and it is also proposed to install a low-power station at Sanchez, on the Bay of Samaná.

SAN MARINO.—From Rome, through the same service, we learn that a convention has been signed by representatives of Italy and the Republic of San Marino for the construction of a wireless station at San Marino.

SWEDEN.—The new Motala station, which has been testing for some time, was to begin regular operation before Easter.

SWITZERLAND.—The Bureau International de Télégraphie reports that during 1926 new submarine telegraph cables were laid between Bay Roberts (Newfoundland) and Plymouth (England); between Borkum (Germany) and the Azores; in the Pacific Ocean between Bamfield (British Columbia) and the Fiji Islands, and between the Cocos Isles and Australia.

Not a bad record for a dying industry!

TURKEY.—It is very satisfactory to be able to state that a convention was signed on May 1 with the Eastern Telegraph Co. organising the opening of the Company's stations at Constantinople and Smyrna for a period of 30 years. To which we would wish to add our respectful felicitations to our friends of the Eastern Telegraph Company.

UNITED STATES.—*World Radio* announces that a plan for the reduction of the number of broadcasting stations in the United States from 733 to 364 has been submitted by the American Engineering Council to the Federal Radio Commission. Under the scheme there would be 64 national stations and 300 local stations; the former would operate in the band between 550 and 1,250 kilocycles, that is to say, from 240 metres to 545 metres; the local stations would be confined to the range of from 1,250 to 1,500 kilocycles, or from 240 down to 200 metres. The proposal has the support of many radio engineers and was worked out by the Radio Broadcasting Committee of the Engineering Council.

The following from the *T. and T. Age*, though doubtless well known to our highly skilled technicians, may not be exactly belated information to our many amateur readers:—

"The high-powered transmitter of WGY, at Schenectady, N.Y., has for some time been using a 100-k.w. vacuum power tube, which takes the place of eight 20-kw. tubes. It is a development of the General Electric Co., and engineers are now securing data on its performance; with its water jacket, the tube stands 7½ ft. high and weighs 100 lb., or 1 lb. per kilowatt, and it is used as a radio amplifier, fulfilling a function comparable with the radio-frequency stages in receivers. Outside its water jacket the tube is 5 ft. high, and two-thirds of this height consists of the copper envelope, 4 in. in diameter; the upper third is made of glass through which the filament leads and the grid lead find insulated entrance. The glass bulb is 22 in. long and 4 in. in diameter, and it is sealed to the spun-out end of the anode cylinder, or copper envelope, by a machine process in such a way as to make the junction of glass and copper mechanically strong and vacuum tight. Two copper cables capable of carrying several hundred amperes are connected to tungsten rods which, in turn, pass through a pinch seal terminating at the filament ends; three lengths of tungsten wire, each 16 in. long, connect to each of the inner leads, forming six parallel filament spans, which pass within the grid and meet at a common point at the filament spring suspension in the lower end of the tube. The grid, within the copper envelope, is cylindrical and has an over-all length of 3 ft. 5 in. The grid frame is a most ingenious structure of molybdenum and tungsten; bracing, such as is common in steel bridges and tower construction, provides strength with a minimum of metal; rigidity is necessary to prevent short-circuiting from swaying or sagging, and minimum metal in the grid structure facilitates exhaust and minimises the possibilities of gas evolution. The grid connexion is brought out through an arm part way up the high-voltage glass bushing to a flexible outside grid terminal. To guard against failure due to pressure increase in the tube, an ionisation gauge is used which takes the form of a special three-element vacuum tube, in appearance much like an ordinary receiving tube; it is sealed to the large tube, connexions to filament, grid and plate are made from the pressure-indicating device at the operating panel, and the gauge operates on the principle of the ratio of ionisation by collision with electrons to the pressure, or amount of gas present."

My attention has been directed to a paragraph which appeared in the April "Memorabilia" under "Voice-Frequency Telegraphy," in which it is alleged that certain remarks therein conveyed some disparagement of officers employed at wireless repeater stations.

It would hardly appear necessary to emphasise the fact that nothing was farther from my thoughts than the disparagement of any class or individual, and this *amende honorable* would have been made earlier had my attention been directed to the possible viewpoint of the phrasing prior to the issue of the May number.

Congratulations are proffered to Messrs. C. W. Sparkes and C. G. Jones upon their promotion to the rank of Superintendent Lower Grade *vice* Messrs. R. E. V. May and G. J. Manners.

To these congratulations must be added the very sincerest regret that the health of the esteemed Mr. Sparkes is at present in some doubt, and that the realisation of the promotion in his case is contingent on an early resumption of duty of our C.T.O. colleague.

It is understood that the provisional appointments accorded to Messrs. F. S. Gullan and A. R. Clark, of the Cable Room, respectively to Assist. Superintendent and Overseer respectively have now been confirmed and both officers are to be congratulated on the more satisfactory situation.

News travels in a roundabout manner at times—even in matters telegraphic—as was noticed recently when a South African periodical came to hand which contained an interesting report on "Women in the New Zealand Post and Telegraph Service." The report was signed by an officer of the Secretary's Office, Wellington, N.Z., but had first been translated into Esperanto and had appeared in *La Interligilo de P.P.T.T.*, published at St. Cyr l'Ecole, Seine et Oise France, only to be "re-done into English" at the Cape!

Writing on South African matters one cannot refrain from reproducing a portion of the Report of the Controller and Auditor-General for the last financial year, which, as will be recognised, bears a distinctly personal touch throughout, at least in the paragraph now to be quoted, which is headed:—

"THEFTS FROM AND FRAUDS IN RELATION TO TELEPHONE CALL BOXES." Writes the Auditor-General: "Apparently when some youths in Johannesburg or Cape Town want to put up a wireless installation, they raid the nearest telephone call box for the microphones and other appropriate parts, and if they are short of cash, they pry out and smash the coin box in the Call Office holding the tickets and steal the contents. In the year under review there were 173 cases of theft from telephone call boxes; in 140 cases apparatus alone was stolen while in 33 cases the coin containers were burgled. Johannesburg and the Reef were responsible for 97 cases in 140 cases apparatus alone was stolen while in 33 cases out of the total, involving the Department in a loss of £94 2s. 10d., representing the cost of replacement, and Cape Town and the Cape Peninsula for 50 cases, costing £63 0s. 5d. There were £9 19s. 3d. in the coin boxes burgled. The call office at the Crown Mines Recreation Hall, Mayfair, Johannesburg, was burgled six times in one month. During the year the Department was also defrauded by bad and mutilated coins and pieces deposited in the box for telephone calls received, to the extent of £116 15s. 9d., representing 9,343 separate acts of fraud. Johannesburg and the Rand head the list with 3,908 cases and even the rest of the Transvaal with 1,955 cases approximates to the 2,082 cases for the whole of the Cape Province, including Cape Town. I viewed the six years' collection of bad and spurious coin passed off on the

Postmaster-General in this way for good telephone calls. It weighed 73 lb. While the major portion consists of mutilated threepenny pieces, there are numbers of small Canadian, Indian, Portuguese, Dutch, German and other coins. The collection also includes a large assortment of flattened buttons, brass tokens, lead and tin discs (in many cases obviously prepared for the fraud), the tops of drawing pins and small medallions, including *inter alia*, a Church Medal!"

Those specially interested in the forthcoming International Wireless Conference to be held in Washington next Autumn should not fail to read three articles on "Wireless Telegraph Communication" which appeared in the respective issues of the *Electrical Review* of April 22, 29 and May 6, and are from the pen of Lt.-Col. Chetwode Crawley, M.I.E.E.

The articles well meet the claim made for them by the writer, who simply describes them as "a review of the present position of maritime safety devices, commercial communications, and point-to-point telegraphy in view of the proposed modified requirements and regulations to be discussed at the coming conference."

The 1926 report of the Indo-European Telegraph Company is a record of successful working, and having become acquainted first-hand with the nature of some of the reconstruction difficulties encountered by the energetic and resourceful officers of this company, those of Captain A. L. Cook, for example, one may say that never was a successful post-war working better deserved than that of this indomitable company.

In presenting the report for 1926 H. L. M. Tritton (chairman), after referring to the successful working during the year, dealt with the question of radio-telegraphy. He said that, although remarkable use had been made of the discoveries in radio transmission, he was convinced that as the telegraphing habit grew, there would still be room for both wired and wireless communication, and, in his opinion, the cable and land-line companies would continue to hold their own. The company had introduced a number of special services which were much appreciated by the public. The difficulties attending the reopening of the Black Sea cable had not yet been overcome, although no stone had been left unturned to restore direct communication between Odessa and Constantinople. (Regarding Constantinople, *see also* note above under Turkey.) Negotiations had been proceeding with the Turkish authorities, but had not yet reached finality; it was feared, also, that difficulty would be experienced in repairing the fault in the cable. In December last he (the chairman) paid a visit to Moscow, and interviewed the heads of the Russian Government telegraph and telephone services; he was courteously received, and hoped that his visit would prove of mutual benefit. He also went to the company's Odessa headquarters and met members of the British and Russian staffs. The chairman then reviewed the financial results, which were as follows:—

Only two serious interruptions, caused by severe weather, occurred during the year, apart from a stoppage due to a strike of Russian employees. The revenue from all sources increased from £310,345 to £314,007. The profit, after meeting income tax, was £103,125, and a net balance of £16,288 brought forward makes available £119,413. £45,000 is devoted to writing down expenditure upon line reconstruction in Russia and Poland, and £5,244 in writing down the cost of the Persian section, and £15,000 is handed over to the retirement trust fund. A final dividend of £1 2s. 6d. per share is to be paid (making 7% for the year), together with a bonus of 15s. per share, all free of tax, leaving a balance of £11,669 to be carried forward.

The following excerpt from a recent financial article in the *Electrical Review* is submitted without comment, and simply to place on record all views regarding telegraph matters:—

"Reference was made here [in the financial column of the *E.R.*], three weeks ago to the statement on the subject of Beam developments by the president of the important American concern known as Mackay Companies. In that statement, naturally, not wholly unbiased, he defined the Beam radio as a system using low power and short waves which, by means of suitable reflectors, are more or less concentrated into a converging beam directed towards the receiving apparatus. The older trans-ocean wireless systems use high power and long waves which are much less susceptible to efficient directional sending. The superiority of short waves over long waves, he declared, remains to be proved, and he quoted Dr. W. H. Eccles, president of the Institution of Electrical Engineers, as saying that a commercial (radio) firm competing with cables would find long waves generally more trustworthy. The development of the high inductance, or so-called "loaded" cable, is a long forward step; general progress and improvement in recent years have been marked and important, even if lacking in spectacular appeal. A good deal is made, of course, of the ease with which "beam" radio can be picked up by anyone possessing the necessary equipment.

Technical testimony to the composure with which radio and wireless achievements can be regarded by holders of cable securities is of solid value. A dozen times during the past 25 years scares of greater or of less intensity have disturbed the cable companies' proprietors. Yet, in spite of the wonderful advance made by the newer systems, and the marvels which these can now accomplish, nothing has so far arisen to shake the so oft-repeated conviction that there is plenty of room for them all; that one is complementary, rather than antagonistic to the other, and that the Senior Service keeps abreast of modern requirements by linking wireless interests to those of the submarine cable."

A much-condensed report of the Mackay group for 1926, but giving all essential features is that 1926 records income and profits from investments

of \$4,922,811. Operating expenses absorbed \$296,640, leaving \$4,626,171, to which is added a surplus brought in, making \$6,771,513. The dividends required \$4,611,111, leaving a surplus of \$2,160,402. It is stated that during the past 20 years all extensions have been made from reserves and earnings, and in the last six years no less than \$25,000,000 has been spent on capital assets, including Atlantic cables. The Atlantic business continues to expand satisfactorily, but the net profit rises at a lower rate owing to the extended use of the low-rate services. The report shows that the group places great hope in the development of loaded cables.

Mr. John B. Kramer, of the General Electric Co., Ltd., who has been investigating phenomena associated with radio-active energy, described some of the interesting results he has achieved in a lecture on "Radiation" before the Birmingham Electric Club recently. He showed how it is possible to harness, in a small way, the energy of certain radio-active materials, which exist in quantities in various parts of the world. Mr. Kramer had used monazite sand from India as a source of radiation at an earlier stage in his experiments, and batteries were made by placing the sand between plates of carbon and zinc; the sand remained radio-active for years, but it was eventually found to be unsuitable owing to changes in the atmosphere setting up an electrolytic action. Other materials, notably thorium, had since been used. Mr. Kramer demonstrated various experiments, and claimed that they had brought him nearer to the practical utilisation of the energy stored in radio-active minerals. He showed a method of using radiation energy to work a small electronic balance, and also an electronic cell; the radio-active substance was placed upon a carbon plate, above which, with an air space between, was a zinc plate. He was engaged in examining such cells with a view to developing a battery which would produce sufficient energy for useful work, even if only in a small way for a start. The lecturer also pointed out that, up to a certain point, the determination of the air gap in an electronic cell, a very important matter, was contrary to Ohm's law, in that the charge increased as the gap was made larger; this was probably explained by the fact that a certain volume of air was required for maximum ionisation.

The Royal Meteorological Society recently issued a report on an attempt to ascertain the range of atmospherics; that is, how far away are the storms that produce the X's which interfere with reception in England. The Society, with the co-operation of the B.B.C., appointed observers in various parts of Europe, equipped with broadcast receivers and advance copies of certain talks transmitted simultaneously by B.B.C. stations, to which they listened. Whenever they heard a strong atmospheric they put a mark on the manuscript through the syllable on which it occurred. At the same time automatic direction finders in Aberdeen, London and Egypt, recorded the directions of atmospherics which occurred when the talks were taking place. When the papers were gathered and compared with the records made by the direction finders, the results were remarkable, says the *Evening News*, which explains that in several cases atmospherics were observed at identically the same moment by listeners in Madeira, Ireland, Germany and Norway, and the direction finders showed that the thunderstorm responsible at the moment was situated somewhere in the West Atlantic. The results show that atmospherics may be due to storms taking place perhaps 4,000 to 5,000 miles away. Instructive observations of a similar nature are contained in I.E.E. papers, says the *Electrical Review* (Vol. 63, No. 346, and Vol. 64, No. 353), by Capt. H. J. Round and Mr. R. A. Watson Watt, respectively.

The proceedings of the Institute of Railway Signalling Engineers for 1926-27 are now on sale and included in the contents are: "A Comparative Survey of American and British Signalling," by J. Parsons; "Fundamentals of Automatic Telephone Switching," by our much-respected H. H. Harrison; "Electrical Power for Railway Signalling Communications," by M. G. Tweedie; and "Railway Signalling in Germany," by T. S. Lascelles.

The annual reports of the following three important long-distance cable companies continue to show little perturbation regarding wireless at present:—

A larger outlay on maintenance of cables and stations caused expenditure of the Eastern Telegraph Company to rise from £2,151,921 in 1925 to £2,338,729 in 1926. Gross revenue in 1926 was within £37,000 of the 1925 figure, but profit fell from £1,114,399 to £920,909. The dividend, however, is maintained at 10%, but the allocation to reserve is reduced from £500,000 to £400,000, and the sum carried forward is £50,000 lower at £506,625. The reserves are £3,229,000.

The Eastern Extension Australasia and China Telegraph Company reports more favourable results for 1926 than for 1925. Gross receipts rose from £1,953,927 to £2,047,033, while expenditure fell from £947,517 to £931,058, leaving a net revenue of £951,996, against £854,294 in 1925. Reserve receives £550,000, as compared with £450,000, the dividend being maintained at 10%. The company possesses reserves amounting to £4,406,000.

The report of the Great Northern Telegraph Co., Ltd., of Denmark, proves particularly interesting, not only from its continued good financial condition but from the various peeps gained into Eastern and Far Eastern conditions at the present time, thus:—

The directors state that in 1926, owing to the closing of the Harbin station, the lines between Leningrad, Irkutsk, and Vladivostok, had to carry the whole of the company's Far East traffic during the latter part of the year. Negotiations with the Russian Administration for the exclusive use of another wire between Irkutsk and Vladivostok have not yet reached a settlement. The company's activities in Russia, in so far as the transmission of Russian terminal telegrams exchanged with Western Europe and America is concerned, are not remunerative owing to salary increases, loss of traffic, &c. In spite

of the unsettled conditions in China, the traffic exchanged with that country has not decreased; there is even a slight improvement in the Far East traffic. No result has been arrived at in the negotiations between the Chinese Telegraph Administration, the Eastern Extension Co., and the Great Northern Co. The company's offices at Mariehamn and Stockholm have been closed. The coal dispute caused a decline in British traffic and that of most other European countries shows a decrease. Although there is now radio competition in the Far East traffic, the company feels confident of the superiority of its service. There was a fall of £220,000 in the year's revenue and one of £240,000 in the expenditure. As previously reported, the directors propose to pay 30s. per £10 share less tax, making a total dividend and bonus of 20% for the year.

The cause of the fall in both revenue and expenditure is not stated.

The *London Times* in the *British Empire Products* number of its *Imperial and Foreign Trade Supplement* throws a happy side-light on the use of the Telegraph Cables in connexion with the Indian Sugar markets, when it records that

"The Sugar Cable Service, started by the Sugar Bureau in 1922, is now run successfully on a self-supporting basis. The telegrams and weekly reviews supplied by the Bureau keep the merchants in India fully posted with the world's sugar market conditions and fluctuations in prices. The importance of this service may be judged from the fact that the Cuban Government is considering the formation of a similar organisation at an early date."

It is no mean tribute to the new wireless Beam service between this country and Canada to be able to state that the one two-way service between London and Montreal has been able to carry with ease and time to spare practically all the Anglo-Canadian traffic normally carried by the two two-way cables during the total interruption of these latter.

Time.—Time! the corrector where our judgments err,
The test of Truth.—Byron.

J. J. T.

OBITUARY.

THE LATE MR. H. HARTNELL.

ON May 3 last there passed away at Wellington, Somerset, at the ripe old age of 81 years, the much respected Henry Hartnell, A.M.I.E.E., one time a Staff Engineer of the General Post Office. An old telegraphist, he was transferred from the Nottingham Post Office to the Engineer-in-Chief's Office at headquarters under Sir W. Preece.

He was for some time a technological examiner and possessed a special knowledge of electric cable matters, including loaded submarine and underground cables, and his committee work included duties as a member of the Committee on Copper Conductors, and as a member of the Engineering Standards Sub-Committee on Telegraphs and Telephones. For some years he was joint editor of the *Journal* of the Institution of Post Office Electrical Engineers, and he was also an accomplished translator of technical and scientific matter from many languages. He had, indeed, a considerable knowledge of languages, both ancient and modern.

The writer's recollection of this really remarkable man was that of an earnest thorough worker in all that he did, unassuming, and modest withal, even with his best results never leaving the impression that anything out of the ordinary had been achieved. A lovable character.

J. J. T.

PROMOTION OF MR. J. LAW, CANTERBURY.

AN interesting gathering was held on the evening of the 13th inst. at "Stanmore," the District Office of the Canterbury Post Office Telephone Department. Mr. J. Law, who had for over 20 years held the post of Chief Clerk for the Canterbury District, was leaving to take up an appointment at Glasgow as Staff Officer. Mr. W. Thyne, the District Manager of the Canterbury District, congratulated Mr. Law in the name of the Staff on his promotion, and also expressed the regret that every member felt on the separation. Mr. Thyne stated that he had heard of Mr. Law's good qualities before coming to Canterbury in February last, and after two months' experience, he could fully confirm the previous good reports. The Staff were anxious to shew their appreciation of Mr. Law by presenting him with a small token of their esteem, which took the form of a gold watch and Albert.

LONDON TELEPHONE SERVICE NOTES.

The Journal.

REGULAR readers of these notes will be interested to learn that the articles on Automatic Telephony, by Mr. C. W. Brown, which commenced in the April issue, have created nearly 300 new readers of the *T. & T. Journal*. It is to be hoped that those who thus became acquainted with the *Journal* will read it from cover to cover and will find other features which will cause them to become regular subscribers. In most issues they will find something of particular interest to them individually, and every issue is indispensable to those who wish to be kept generally informed regarding all the aspects of their calling. Should anyone have difficulty in obtaining copies, communication with T. A. Beck, G.P.O. (South), will remove it.

* * * * *
Accounts Branch.

It is regretted that owing to the indisposition of the Branch correspondent the notes are omitted this month, but it is hoped that they will appear in the next issue.

* * * * *
Contract Branch Notes.

Obituary.—The Branch was shocked to hear of the death of one of its members, Mr. E. E. Beeston, from broncho-pneumonia, following influenza, on April 13, at the early age of 56, after an illness lasting only 5 days.

Mr. Beeston entered the service of the National Telephone Company as a Contract Officer in December, 1909, and was employed on development study work in 1912 and 1913. He was attached to the West District Office during the greater part of his service but was transferred to the North-West Office about sixteen months ago. His genial presence and kindly disposition will be missed by his colleagues, especially those at the North-West and West Offices.

The following figures show the volume of work dealt with by the Contract Branch during April:—

						<i>Stations.</i>
New business obtained	...	...	...	...	...	7,003
Ceasements	...	...	...	...	...	2,741
						4,262

Although the Easter holidays interfered with the flow of new orders the net gain was only 66 below the figure for March and it was nearly 400 above the figure for the corresponding month last year.

We have been accustomed for so long to the hard words of the London daily press that we had quite a shock a week or two ago when one of the morning papers actually said that the Post Office does not sufficiently advertise either the *advantages* or the *cheapness* of the telephone service. The context of this statement dubbed Manchester as a telephone-shy city, because only 79,000 out of the 1,400,000 people in the area are subscribers.† The newspaper went on to say that three-quarters of the 79,000 were business firms, so that there are only 20,000 private subscribers, or 1 to 70 of the total population. The statement given above, that made us open our eyes and stare at it, was followed, however, by some good advice to make a serious attempt to popularise the telephone and to increase the number of subscribers so as to enable the charges to be reduced!!

Cricket.—The Contract Branch Cricket Club, "the Com-Con," has now practically arranged its fixture list, and a number of highly interesting games are promised.

The majority of the matches this year will be played in connexion with the newly-formed L.T.S. Cricket League on the new ground at Chiswick. The formation of this League incidentally marks a further stage in the development of cricket enthusiasm in the L.T.S. The Contract Branch team claims to be the pioneer of post-war cricket in the Department, and will make every effort to secure the first place in the league this year.

The first match of the season is expected to take place at Battersea Park on May 24 and will be a trial game between two Contract Branch teams, one drawn from the Headquarters and District Offices and the other from the Development Section.

The staff of the Contract Branch were gratified to learn that Mr. G. W. Livermore, District Contract Manager, Western District, conducted a ladies' choir in the accompanied part-song, "The Sea hath its Pearls," at the Festival of Song held under the auspices of the London Municipal Society (Women's Section) at the Caxton Hall, from April 25 to 30 and secured the 3rd place out of an entry of 30 choirs.

* * * * *
Sport.

Last month saw the formation of the L.T.S. Bowling Club. It is fitting that Mr. P. J. Mantle, of the Traffic Branch, should have been elected Captain since he was largely instrumental in launching the new club. Mr. W. A. Valentine and Mr. W. N. U. Napier have shown their interest by accepting nominations to be President and Vice-President respectively. The Hon.

† This area includes many towns besides Manchester. Vide p. 176.—(Ed. *T. & T. J.*)

Sec. is anxious to enrol all bowlers and would-be bowlers, and anyone interested should apply to Mr. J. E. Collins, 14, Gilpin Avenue, East Sheen, S.W.14, of telephone him at Avenue 0101. That the club has serious intentions is proved by its entry for the Bumbury Cup Competition. It is hoped that the matches in this competition will be played in the excellent rink on the Civil Service Sports Ground at Chiswick. The Hon. Sec. wishes it to be known that although the game of bowls is ancient it is not necessarily confined to the ancients.

PERSONALIA.

LONDON TELEPHONE SERVICE.

The Secretary has approved the following appointments:—

- Mr. G. H. TREE, Executive Officer to Acting Staff Officer.
- Mr. A. E. HUTCHISON, Clerical Officer to Acting Executive Officer.
- Mr. W. S. GREIG, Clerical Officer to Acting Executive Officer.
- Mr. T. J. BEDFORD, Clerical Officer to Acting Executive Officer.
- Mr. H. A. BAKER, Clerical Officer to Acting Executive Officer.
- Miss E. M. WALSH to Toll as Assistant Supervisor, Class II.
- Miss O. W. NEWPORT to North as Assistant Supervisor, Class II.
- Miss W. M. BROWNE to Hampstead as Assistant Supervisor, Class II.
- Miss K. A. M. BEDFORD to Wembley as Assistant Supervisor, Class II.
- Miss F. A. G. SCHOFIELD to Erith as Assistant Supervisor, Class II.
- Miss E. S. BOTT to Putney as Assistant Supervisor, Class II.
- Miss K. H. BURNETT to Finchley as Assistant Supervisor, Class II.
- Miss G. E. CHURCH to Regent as Assistant Supervisor, Class II.
- Miss E. M. SHAPCOTT to Langham as Assistant Supervisor, Class II.
- Miss D. HALL to Hampstead as Assistant Supervisor, Class II.
- Miss I. M. YELLAND to Trunk as Assistant Supervisor, Class II.
- Miss J. M. SHAPCOTT to Riverside as Assistant Supervisor, Class II.
- Miss L. E. MASON to Chiswick as Assistant Supervisor, Class II.

Resignations on account of Marriage, Telephonists:—

- Miss D. W. SLOPER, Trunk Exchange.
- Miss R. SHAW, Trunk Exchange.
- Miss M. E. VERNEY, Trunk Exchange.
- Miss Z. THIRLWALL, London Wall.
- Miss J. BROWN, Victoria Exchange.
- Miss I. STONE, Victoria Exchange.
- Miss D. WOODFORD, Victoria Exchange.
- Miss W. J. BAKER, Mountview Exchange.
- Miss E. I. JAMES, Mountview Exchange.
- Miss F. E. EVERED, Park Exchange.
- Miss E. V. WRIGHTON, Finchley Exchange.
- Miss I. GIBBS, Paddington Exchange.

WHERE TO STAY.

The attention of our Readers is directed to the following list of Boarding and Apartment Houses.

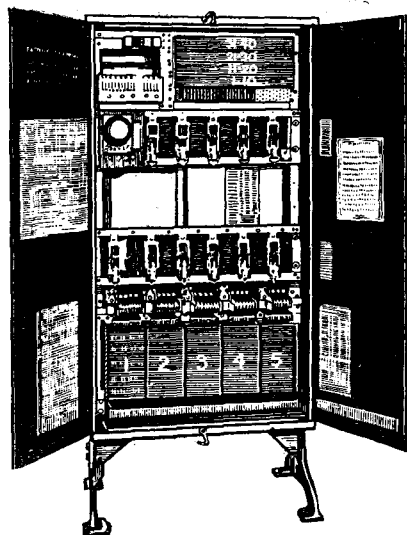
DEAN FOREST.—SEVERN-WYE VALLEYS. Beautiful Holiday Home (600 ft. up). 70 rooms, extensive grounds, motors, golf, billiards, tennis, bowls, croquet, dancing. Electric light. Boarders 50s. to 67s. 6d.—Prospectus: Littledean House, Littledean, Glos.

LAKE DISTRICT.—Beautiful Buttermere. Near Honister Pass, Crummock Water and many easy climbs. Photographers' paradise. Victoria Family Hotel (R.A.C. & A.A.). £4 4s. (reductions up to 25% at quiet times). Taxi from Cockermouth. "A day on a hilltop is worth a week by the sea."—*Ruskin*.

SANDOWN.—"Seacroft," Private Hotel. Comfortable Boarding. Residence on cliff facing sea. Large grounds, Croquet, Putting free. Electric Light, Separate Tables.—L. & E. Woodford.

SHANKLIN.—Glenavon Private Hotel. Comfortable Brd.-res. Electric light and gas fires all bedrooms. Free billiards, splendid cuisine (separate tables). Highest recommendations.—T. Geere. Phone 37.

A COMPLETE SET (Vol. 1 to 1926) of "The Telephone and Telegraph Journal" required. State price, etc., Foyles, 121, Charing Cross Road, London, W.C.2.



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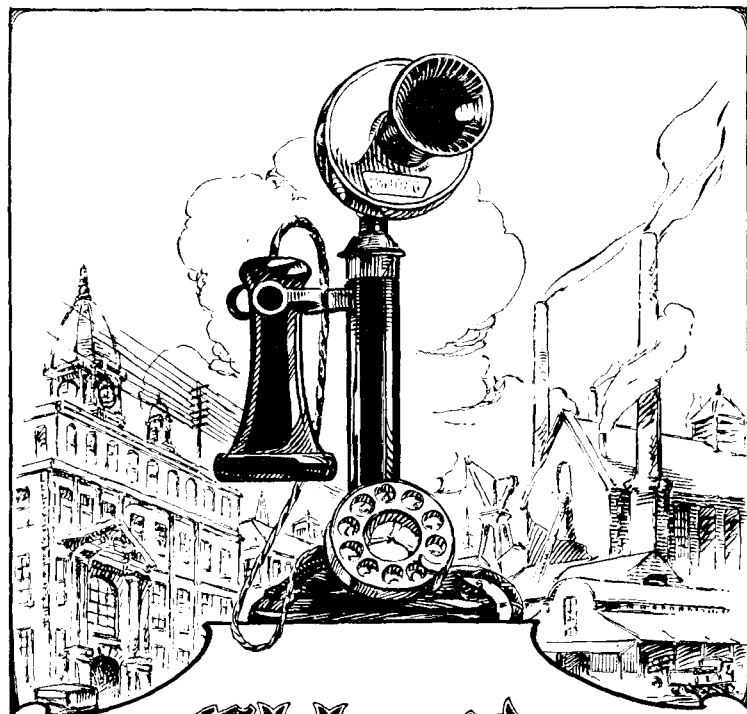
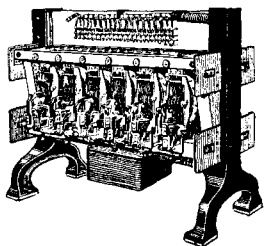
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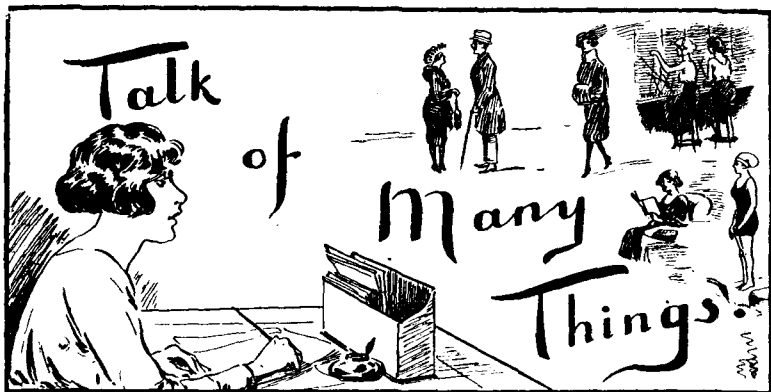
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Bank Holiday Duty.

If there is one thing that we owe to banks more than our overdraft it is the excellent institution known as Bank Holiday. Had there been no banks there could have been no bank holidays. On the other hand, if all banking accounts were like mine all days could be bank holidays—for the banks, at least. It is a pity, however, that some spirit of emulation or rivalry could not be aroused in other public bodies to enable us to set aside other days as holidays, because the excellence of bank holidays in general is marred by their infrequency. How delightful it would be to know that in addition to four bank holidays we could also look forward each year to four Post Office holidays and four Shipping holidays, and four Insurance holidays. Some will urge, of course, that our appreciation of bank holidays is due to their rarity and this, strangely enough, is exactly my view of working days.

I doubt, however, whether we could stand the bodily and mental strain of as many as twelve bank and other holidays in a year. It has been calculated that if the energy dissipated on bank holidays were applied to everyday tasks, one year's work could be completed in six months. The calculation, it should be said, was made at headquarters on a slide-rule. It must, therefore, be right, but I feel that there is a catch in it somewhere.

Then again, think of the strain imposed by the serious business of seeking enjoyment—at no time so much in evidence as on a bank holiday. We rise much earlier than usual, scramble over a heavy breakfast, pack vast quantities of sandwiches, cake, and oranges, rush violently for a train, squeeze frantically into crowded carriages, spill perspiring and crushed on to the platform at our destination and crawl and jostle laboriously through the barriers out into the street. Once there our ears are deafened with the noise of traffic, our eyes are filled with dust and our nostrils are assailed with the smell of cockles, pineapple, and petrol. Gradually we emerge from the mass of people, like flies from treacle, and make our way to field or beach with thoughts of lunch. The selection of a suitable site inevitably gives rise to a great deal of argument, but we might as well have saved our breath, for the wasps or flies find us anyhow, and sand has ever formed part of any sandwich. Then we seek enjoyment variously in walks, roundabouts, swings, donkey rides, cocoanut shies or in madly chasing a ball. Respite comes with tea accompanied by shrimps or watercress and rendered indigestible by noise, bustle and confusion. After a long, long wait we are served with someone else's order, and then we race against time to catch the return train. Finally, laden with sticks of rock or bunches of wilted flowers, we crowd into a train filled with other tired, happy people and their howling, sticky children. But, we have enjoyed ourselves, in witness whereof and in accordance with time-honoured custom we sing loudly and slowly all the sad songs we know.

Behind us the trees sway wearily, the violet nestles cosily, the daisy and the buttercup close drowsily, the twitter of the birds fades into silence and the waves gently caress the shore. One by one the stars gleam out and the gentle evening breeze, sighing sadly over the grass, proceeds to sweep up the litter of paper that we have left. No! perhaps four Bank Holidays are sufficient.

PERCY FLAGE.

(Apropos of our correspondent's conclusion, is he the author of the following verses—exhibited in many places on Oxshott Heath:—

“THANK YOU!

“Ye who visit Oxshott Heath,
I would fain remind you,
Orange Peel and Paper must
Not be left behind you.
As we range these beauty spots,
Nothing's more unsightly,
Than the litter careless folks
Strew about so lightly.
Whosoever sins in this,
Heedless of these verses,
Surely brings upon himself
Many bitter curses!”

Yes; four are sufficient.)

The Travelling Supervisor.

The life of a Travelling Supervisor covering the smaller exchanges in an industrial area, where it is possible, by the aid of train, tram or bus, to move speedily from place to place and to arrive home at a definite time each evening, is vastly different from that led by the Travelling Supervisor who is in charge of exchanges in a widely scattered rural area, maybe a hundred or more miles away from her district office. Her lot, like that of Gilbert's policeman, will not be a happy one unless she is physically strong, blessed with an abundant sense of humour to enable her to see the funny side of life, and having, in addition, the Mark Tapleyan spirit of “coming out strong under difficulties.” Consider for a moment her position. She may have assigned to her as headquarters a town or village situated roughly in the centre of the territory she has to cover, and the principal reason for the choice of such a place will not be its social amenities, but the fact that it is a more or less convenient railway centre. Located as she is, so far from the Traffic Headquarters, it is not possible for the Travelling Supervisor to refer telephonically to Cæsar for a decision on points of doubt or difficulty uncovered by the rules and regulations, and she is bound, therefore, to rely more on her own judgment than is her colleague in the urban areas, who has ready access to the district office. A large portion of her scheduled hours of duty, and of hours that are not scheduled, is spent in railway travelling, and happy is she, when books and magazines pall and fail to satisfy, if she can extract enjoyment from contemplation of her fellow-travellers. According to Pope, “the proper study of mankind is man,” and the Travelling Supervisor whom we are portraying has ample opportunities of indulging in such study. And it is really remarkable, in view of our national reputation of being a reserved, undemonstrative people, how very garrulous and communicative railway travellers can be, provided they are given the least encouragement. Many are the confidences almost forced upon the Travelling Supervisor in the course of conversations casually started to beguile a journey, and were she so gifted, many are the dramas and the comedies which could be written up from the stories told to her. Although, as previously stated, she may have her headquarters in the centre of her district, the area to be covered, and the very limited train services in these country places, often necessitate her absence from headquarters for several nights each week, possibly occupying a different bed each night, and this is one of the reasons why the position of Travelling Supervisor, enviable as it may seem in some respects, is not fitted for any but the healthy and robust, and even for such it has its perils. To leave home shortly after 7 o'clock on a winter's morning, and board a train which has evidently stood in the siding all night, and is consequently a few degrees colder than a refrigerator, is no uncommon experience. To those who say, “but why so early?” it has to be pointed out that this is the only train going that day to Plumpton-on-the-Plump, which has a rural exchange of eight subscribers and a call office, and is due for a visit from the Travelling Supervisor. Having arrived there, watched the busy hour traffic, consisting of two calls, one in and one out, she gives any necessary instructions to the exchange attendant, keeping in mind all the time that the only train out of the place leaves at 3 p.m. and that, if she misses it, there is not another until the Monday but one following. Should she become so obsessed with her duty as to allow the worst to happen, there is the possibility that she may be able to charter from the village smithy what must really be the first car turned out by Henry Ford, and assuming that the car and herself survive the journey, may reach the next place at which she intends to spend the night. Many of the sub-Postmasters and Sub-Postmistresses, acting also as Exchange Attendants, have no great love for this part of their business, and in her dealings with them the Travelling Supervisor has to be most tactful. If she is wise she duly admires the latest baby, asks after the health of Grandad or Grandma who occupies the rocking-chair in the corner, and if the attendant should happen to have a hobby she will discreetly introduce the subject during her visit. Nor need there be any suggestion of insincerity or hypocrisy in so doing. Rather should we call it an exercise in the gentle art of diplomacy. The Travelling Supervisor is out to gain the confidence of the people whom she has to instruct and supervise, and if she is fortunate enough to do so she is rewarded by seeing the smile of welcome which greets her on her unheralded visit, and hearing the chaffing remark that they wondered what they had done to offend her, seeing she had been so long away.

In her zeal for improving the service the Travelling Supervisor may occasionally have to risk incurring the displeasure of the local engineering staff. Faults not serious enough to cause a stoppage, but sufficient to interfere with the service, have been repeatedly reported to the lineman, who is always just about to clear them, but is always prevented from doing so. Along comes the Travelling Supervisor, who notes the defects, reports them to the docket centre, and the lineman proceeds to “get busy,” but whether he loves the Travelling Supervisor or not for having disturbed the even tenor of his way is, as Kipling would say, another story.

The life certainly has its compensations. There is the constant change of scene, the many pleasant tramps in the spring and summer time along sweet-smelling country roads, the intimate talks with, and the assured friendship of many of the people on whom the Travelling Supervisor has to call; but there are also the long, dreary nights in winter, spent often in unfamiliar places where, if she be fortunate, she may have for diversion in the local cinema the picture she saw two summers ago whilst on her holidays, or, what is more likely, she may retire early to the privacy of her hotel bedroom, there to write up her journal for the day, in preference to spending the evening in company with a crowd of commercial travellers in the lounge downstairs.

Often must the Travelling Supervisor sigh for “the bright lights of the city,” and the more settled daily routine of other Supervisors in the service who are not called upon to travel, and it is well for the Department that her

enthusiasm for the work is such as to enable her to conquer the homesickness and the loneliness by a feeling of pride that she has been chosen to perform pioneer work on the outposts of telephone civilisation.

G. W. B.

The Mosquito.

When roaming in the sylvan glades,
Aglow with nature's beauty ;
A gnat will jab you with his sting,
And think he's done his duty.

By sea or country in the Spring,
The midge will purr with glee :
His victims number hundreds,
Beneath each shady tree.

Mosquitoes, too, will get you soon,
Unless you all take care ;
And bring their aunts and cousins,
So maidens all ! beware ! !

Now take precautions one and all.
Don't visit the M.O.
A bottle of Ammonia
Please take where'er you go.

Some soda and some oil of cloves,
They will not come amiss,
If, maidens all, you would evade
The cruel mosquito's kiss.

D. D.

The Wreck of the Whitewash Brush.

("Owed" to a Supervisor when spring-cleaning.)

Toll for the brush !
Its bristles are no more !
All plastered on the ceiling
Are quite two hundred score !

Eight hundred of the hairs—
Beyond endurance tried—
Left home with one accord,
And Daphne they defied !

The brush was Woolworth's best,
And guaranteed to last—
But she forgot to steep it,
So the bristles left it fast.

Her foot was on the step,
Her mother cried, "Say when !"
And she lost a batch of bristles
Like four hundred gallant men !

With whitewash in her eyes,
And plaster in her hair,
She stood upon the step,
A statue of despair !

Then she said some naughty words,
(A practice we deplore !)
But she and her eight hundred,
Will whitewash there no more.

ELIZABETH DRIPPING.

Presentations.

The recent transfer of Mr. E. B. Boucher from Victoria to the Controller's Office, Traffic Branch, with the consequent transfer of Mr. T. M. Oldham from Western to Victoria was marked by the presentation to Mr. Boucher by the Staffs of Victoria, Sloane, and the District office, of an oak clock ; and of a gold watch to Mr. Oldham by the Staffs of Western, Kensington, Kelvin, and the District office ; as tokens of the esteem in which each was held by his brother (and sister) officers.

Mr. Oldham's friends conceived the happy idea of making the presentation at a farewell social held in his honour. A very happy time was spent by all concerned ; marred only by the shadow of the impending removal of a popular colleague.

P.D'A.

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.

RETIREMENT OF MR. HENRY ELLIOTT.

MR. HENRY ELLIOTT, Contract Manager, Manchester, having reached the allotted span as laid down by the Department, retired from official life on May 6.

He was the first and only Contract Manager Manchester has had, having been appointed firstly as Contract Agent in July, 1905, which title was subsequently altered to Contract Manager. Mr. Elliott was a Manchester man and joined the National Telephone Service as a Way Leave Officer in November, 1891. He was transferred to Oldham as Clerk and Draughtsman in 1892 under the late Mr. A. L. E. Drummond.

In 1894 he was appointed to the Company's Travelling Audit Staff, on which he served until 1901, when he was appointed Chief Clerk at Dublin under Mr. J. Ashton (now retired).



MR. HENRY ELLIOTT.

On the formation of Contract Sections throughout the country Mr. Elliott was selected for the Manchester post when the telephone stations in the Manchester district were approximately 18,000 ; under his administration this number has grown to practically 80,000.

At a farewell gathering in the District Office, Mr. Elliott was presented by the District Manager (Mr. J. T. Whitelaw) with a gold cigarette case, suitably inscribed.

Mr. Godfrey, Staff Officer, Mr. Clough, Contract Officer Class I, Mr. Fletcher and Mr. White, of the Engineering Department, spoke a few words as to Mr. Elliott's long association with telephone matters, and wished him a long and happy life in his retirement.

Mr. Elliott, in his reply, regretted the necessity that compelled him to give up active participation in the business which had meant so much to him, and thanked the various heads of Departments for their help and co-operation, and who worked so amicably with him.

Mr. E. S. Cooper, Contract Manager, Glasgow, has been appointed Contract Manager (Manchester) in Mr. Elliott's place.

PRESENTATION TO MR. W. J. SAWYER.

On leaving Nottingham for Liverpool to take up the position of Staff Officer in the Liverpool Telephone District, Mr. W. J. Sawyer was the recipient of a handsome electric lamp stand, the gift of the staff.

Mr. Sawyer carries with him in his new sphere the good wishes of the District Manager and the staff of the North Midland Telephone District.

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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XLII.—

MISS JESSIE LIDDIARD.

MISS LIDDIARD has been at the head of the women's clerical establishment in the London Telephone Service practically from the inauguration of a London service by the Post Office.

She obtained her early experience in that pioneer Department of women's clerical work—the Savings Bank, came over to Telephones in 1904, when she was the first woman on the L.T.S. clerical establishment in which she is now Superintendent, and there is an authorised women's clerical force of some 580.

The growth of the service in the intervening years has been considerable, and amongst those who have shared in the work of building up and adapt-



[Photograph by Elliott & Fry.]

ing the organisation to fit the increased load, the changes in tariffs, and alterations in accounting procedure, Miss Liddiard has borne a leading part.

Her knowledge and experience of telephone accounting work are of real value, and even more so are her interest in and knowledge of women's needs. This latter quality is not confined to her own staff, although they naturally have first place, but Miss Liddiard has always kept in unobtrusive touch with national and other efforts outside for the training and fitting of women to take positions in professional and commercial life.

Miss Liddiard brings a liberal culture and broad outlook to lighten her official load, and in her private hours gives to music and church life some share of that energy and devotion which have marked her Post Office career.

TELEPHONY FROM VARIOUS VIEWPOINTS*

By AGNES E. COX, LONDON TELEPHONE SERVICE.

(Continued from page 159.)

SO FAR, I have discussed telephony as a career for women from the point of view of their employment in the Exchanges only; there is another avenue in which it offers employment—that is at subscribers' private branch exchanges, and it seems possible that with the coming of Automatics, this avenue will widen. One traffic officer, I don't know whether he should be considered optimistic or pessimistic, recently gave it as his opinion that the majority of subscribers would not then be bothered to obtain their numbers personally, but would rent extension instruments and employ telephonists to do the dialling.

There is a prospect, too, foreshadowed by an advertisement of the Automatic Telephone Co. in a recent issue of the *Telegraph and Telephone Journal*, where the test clerk pictured is unmistakably a woman, that the coming of automatics may open up a new field of work for women in the Engineer-in-Chief's Department.

We might broaden our view still further, and take into consideration the thousands, perhaps tens of thousands of women, employed in the manufacture of telephones and telephone apparatus—almost all the lighter machine manipulations and the assembling of the different parts are done by women—but that is rather beyond the scope of this paper.

Our next viewpoint takes us to the School at Clerkenwell, at which telephony is taught. This school, opened in March, 1923, replaced two smaller schools, one in London Wall, taken over with the National Telephone Co., and the original Post Office School at Carter Lane. I am indebted to Miss Webb, who was in charge of the school at the time of its opening, for the following description which is taken from a paper which was broadcast by Miss Webb from the London station:—

"The School comprises Lecture, Study and Examination rooms, as well as a spacious switchroom, which is modelled on the plan of an up-to-date telephone exchange. The time-table is arranged so that the learners spend a certain amount of time every day in the various class-rooms.

"The curriculum combines both theoretical and practical tuition. A course of 20 lectures is given—each lecture being confined to a particular section of the world. The lecturers, who are trained for teaching, are experts in exchange operating.

"A small switchboard by means of which the teacher is able to demonstrate the correct method of handling the different types of calls, is fitted in the principal lecture room. There are also charts with which she can illustrate special features of the work.

"Very few beginners are accustomed to using a telephone, and one of the first in the series of lectures is on the subject of clear enunciation and voice expression. The speech and hearing of every student is carefully tested and it is scarcely necessary to dwell upon the fact that in view of the nature of the work for which they are being trained, the greatest importance is attached to this part of the curriculum. The tendency of every novice is either to shout or speak in a whisper. Happily for the telephone public, and incidentally for the staff of teachers, a well-modulated tone is acquired by the majority of the students after a short training.

"A second lecture room is fitted with an amplifier and sets of headgear which enable students to listen to a skilled telephonist actually working in an exchange. It is, in effect, a system of "broadcasting" with the object of training by example. This arrangement also enables learners to become accustomed to different types of subscribers' voices and accents, which is one of the difficulties every telephonist has to contend with.

"In the switchroom are a number of switchboards, similar to those in use at many of the London Exchanges, which are fitted with all the equipment necessary for answering calls and effecting connexions—these are operated by the students. Special apparatus is provided for the use of the teachers by means of which they can continually pass calls to the learners. The teachers act the part of subscribers. They are extremely versatile, and many are the ways and means employed by them for training new staff to handle all kinds of calls with accuracy and speed. In this connexion it can be truly said that "one teacher in a day plays many parts" for she represents all types of callers, from the man who has not used a telephone before to one who imagines he knows—well—a great deal more about the telephone system than the Controller of the London Telephone Service.

"Every learner must attain a high standard before she passes out of the school. Report forms showing the progress of each student are filled in week by week. At the end of four weeks, if the reports are satisfactory, the learner is drafted to one of 12 exchanges which are regarded as training centres and at each of which a supervising officer is specially appointed to continue the training of learners under actual working conditions. The average time taken to gain an efficiency certificate is 8 weeks.

*Paper read before the Post Office Telephone and Telegraph Society of London, Feb. 21, 1927.

"From the day of her entrance, and throughout the whole of her service, a telephonist is taught to appreciate the difficulties that the telephone subscribers experience; in effect, mentally to put herself in the subscriber's place. She is taught to exercise courtesy, self-control, and a wide tolerance—even in the most trying circumstances. No day passes in a telephonist's official life without blame being cast upon her for something for which she is not personally responsible. It is a natural impulse to defend one's self when wrongly accused or unjustly criticised! A telephonist must, however, restrain that impulse, and she must therefore cultivate patience and an exceedingly good temper very early in her career."

Before leaving the training aspect mention should perhaps be made of the assistance which has been given to other countries in this respect. When Miss Minter left the Post Office Service in London in April, 1913, to take up pioneer work in connexion with the setting up of the first telephone system in Turkey, it was to the London School that she, with the permission of the Secretary to the Post Office, sent her original staff, eight in number, to be trained; and it was to London that in the early days of telephones in South Africa and Ceylon the respective governments of these countries turned for women to train and organize the operating staffs.

In enumerating the duties which cannot be transferred to automatics, mention was made of the Street Index Section and Directory Centres, and I should like to review the work at these points briefly.

The Street Index System is, as its name implies, an index in street order of all the telephone subscribers in London. It is kept on the "loose leaf" system, the particulars regarding the name, number and address of each subscriber being recorded on a separate leaf which can be corrected or removed as required.

Reference to this index to obtain a subscriber's number is restricted to those cases in which the address but not the name is known. It is somewhat surprising, therefore, to find that the last record taken shows that in one day the number of cases referred was 979, of which 133 occurred in the busy hour—I understand that this record is found very useful officially in tracing the names of subscribers whose writing is so bad that their signatures cannot be read.

The directory centres at present number five. Their function is to deal with enquiries regarding the numbers of subscribers which have been added to the list or altered between the half-yearly issue of the directories.

The approximate number of alterations and additions between the issue of the last two directories was 45,000. A list of alterations and additions is circulated to each centre daily, and the clerical work of keeping up-to-date the card index at 5 points in order that this information may be readily available to answer subscribers is very heavy. We are therefore looking forward hopefully to the time when our promised Central Bureau for this work shall materialize.

It will then be possible by means of a looseleaf filing system to have a complete record of all subscribers in exact alphabetical order, including the day-to-day additions and alterations. This will considerably facilitate matters as at present despite enquirers' assurances to the contrary in a certain number of cases the particulars required are eventually found to be in the current directory and not on the supplementary cards.

Approximately 5,000 enquiries are dealt with daily, in two-thirds of the cases the required number being traced. Some subscribers take a very broad view of the information they are entitled to ask for at this point. One recently stated that he wanted a new lock for his door and asked the telephonist to suggest a suitable number that he might ring up; another said that he had been asked by his wife to ring up a certain draper in Oxford Street but had forgotten the name, would the telephonist please suggest a few names. He had a vague idea it had something to do with a bird and was satisfied with Swan & Edgars.

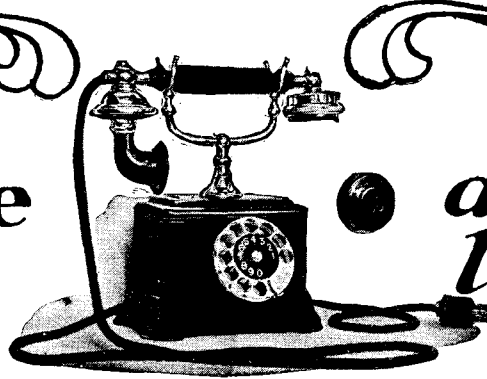
Let us next review what I will call for want of a better term the language aspect of telephony.

It would be interesting to know how many additional words the introduction and spread of telephony has given to our language, I understand that they are so numerous (especially on the technical side) that it has recently been necessary to issue a standardised list, and I assume that there must be somewhat similar additions to the languages of other countries. Earlier in this paper I touched on the language difficulties which have been experienced already in connexion with Continental work, and it seems quite possible that with the rapid spread of communications to other European and Asiatic countries, it may be necessary to evolve a universal language—a sort of Esperanto—which will at least cover the phrases usually required for operating calls. These might be prepared somewhat on the lines of the operating expressions at present authorised for use for Inland working, expressions which have grown out of the requirements of the service. In the very early days the operator passed her calls and operated them in the words and phrases which pleased her best, but the necessity for using words which were phonetically most suitable, and phrases which exactly described the situation at the moment without unduly wasting time, very soon became apparent.

The necessity for avoiding waste of time is clear when it is appreciated that an additional second on the operating time of the calls at present handled in London would be equal to the time of 58 additional 48-hour telephonists.

Our mispronouncement of some of the numerals, for instance:—foer for 4 and fife for 5, and the substitution of O for nought, in order to avoid phonetic confusion with 2, 5 and 9, roused a good deal of adverse comment

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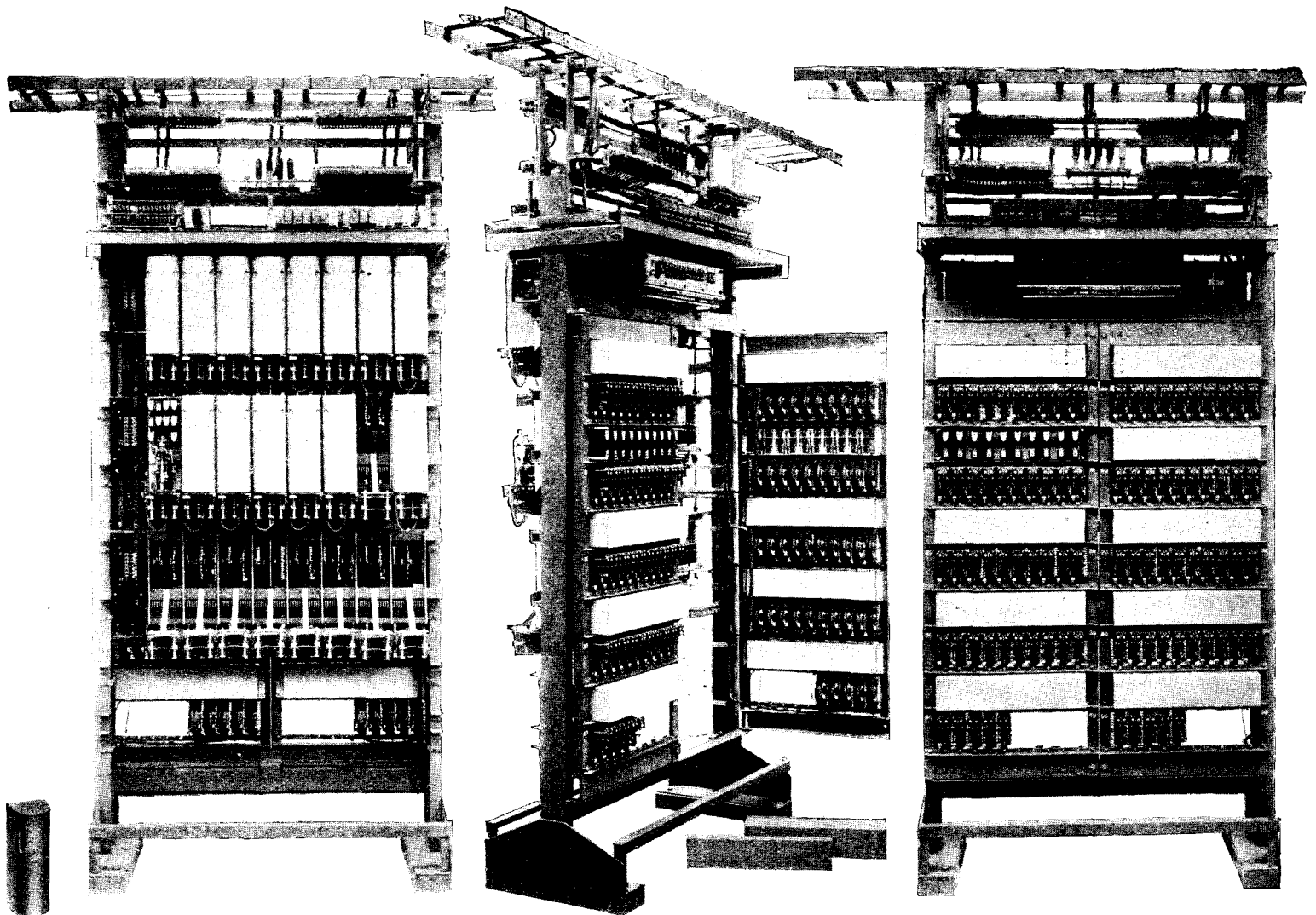
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London Office:
MAGNET HOUSE, KINGSWAY, W.C.2.

Telephone: Coventry 4111 (6 Exchange Lines).
Telegrams: "Springjack, Coventry."

Telephone: Regent 7050 (61 Exchange Lines).
Telegrams: "Peelcontel, Westcent, London."

when it was first introduced, but to a considerable extent, we have now obtained the co-operation of the public on this matter, as we have on the stile-strip system, which requires a pause between the hundreds and the tens. This system was introduced as it was found easier to remember four numerals in two groups of two, than in a single group, and also because the multiple being divided into hundred blocks, the telephonist having selected the block—during the pause—has then only to find the particular jack required in that block.

There is one other language aspect on which I should like to comment and that is spelling by analogy—necessary chiefly in phonogram work and to a lesser extent in telephone operating.

The necessity for its use is obvious when one considers how easily such words as bare, care, dare may be confused, and how similar in sound are the differentiating letters B, C, D.

I remember on one occasion when it was the practice to pass the code-time on all calls (before the introduction of analogy) hearing a telephonist try to pass the code for 7-35 G.G. The distant operator interpreted it in every conceivable way except the correct one, G.B. G.C., G.D., G.E., until in desperation she provoked the retort "Oh, can't you understand G.G.—a little horse."

This illustrates the reason for a standard analogy. It must be suitable and dignified.

Let us now turn for a minute or two to review the buildings now in use as telephone exchanges. The difficulties in obtaining suitable sites at or near the centre of each area was exhaustively dealt with in a paper read before this Society in October, 1924, by Mr. Kidner. I think the present policy of the Department to build new, rather than to adapt existing premises is a wise one. It certainly results in greater comfort for the staff both in their switchrooms and in their domestic accommodation. The plans of two exchanges recently erected, Bishopsgate and Sloane, prepared by Mr. John A. Markham, an Office of Works Architect, had the distinction of being exhibited in the Royal Academy. The 112 exchanges at present working in London are accommodated in 102 buildings. Forty-two of these buildings were erected specially to accommodate exchanges, fourteen are shared jointly with the London Postal Service and six are adapted Army huts, in which exchanges are accommodated temporarily. The remainder were built originally for some other purpose and have been adapted for our use.

The most notable adaptation probably is that of G.P.O. South, which has the unique distinction of having housed in succession three of the principal P.O. Departments in London, the Savings Bank, the M.O.D., and the London Telephone Service, and which is now the home of three exchanges, Trunks, Central, and City.

An adaptation of special interest to telephone folk is that which gave us our present North Exchange. This building was originally a Chapel, and a brass plate on its wall bears the following inscription:—

"Erected by the staff of the National Telephone Company, Limited, to commemorate the fact that Michael Faraday used to worship here from 1862 till the date of his death in 1867. From 1862 to 1899, this building was the meeting house of the Sandemanians, of which body Michael Faraday was an elder. This plate marks the position which he usually occupied on the platform. The position of his pew is indicated by a plate on the floor."

The plate on the floor simply bears his initials "M.F."

Other unusual adaptations are those of a Church, complete with a spire and stained-glass windows to give us Primrose Hill, and a Fire Station to give us Maida Vale.

AUTOMATIC TELEPHONY.

BY C. W. BROWN.

(Continued from page 175.)

IV.

As it is proposed to explain the circuit operation of the line switch, group and final selectors already discussed, some remarks of a general character on diagrams and the scheme of tracing circuits will be useful in assisting the reader in his task.

The writer has had some experience in the Engineer-in-Chief's training school with students of automatic telephony and, with others, has dealt with the problem of simplifying diagrams for study

purposes. After trials with several schemes, a system of "detached contacts" with standardised symbols and conventions has been found to have many advantages.

With the system of detached contacts, the circuits, both primary and subsidiary, are drawn as "elements" of the complete circuit; contacts of relays are placed in the portion of the circuit with which they are immediately associated. Identification between a relay coil and its contacts (which are dissociated from the coil) is provided, by assigning a letter to each relay and placing below the letter the number of contacts concerned, thus $\frac{1}{5}$ signifies relay J which has 5 contacts; the relay contacts are marked with the relay letter, followed by the contact number, thus J4 signifies number 4 contact of relay J. (The contact number does not in all cases indicate the proximity of the contact to the relay armature, i.e., in the case of the relay mentioned, number 1 contact may not be the first nor number 5 the last.)

An example is given in Fig. 1. Here a simple impinging circuit has been drawn in the usually accepted "attached" method and also in the "detached" method.

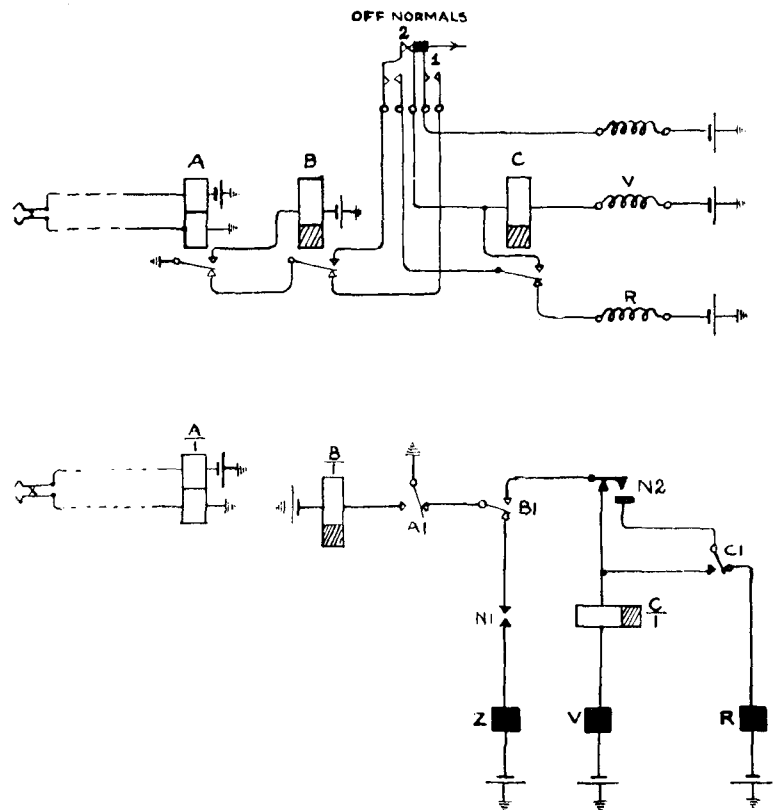
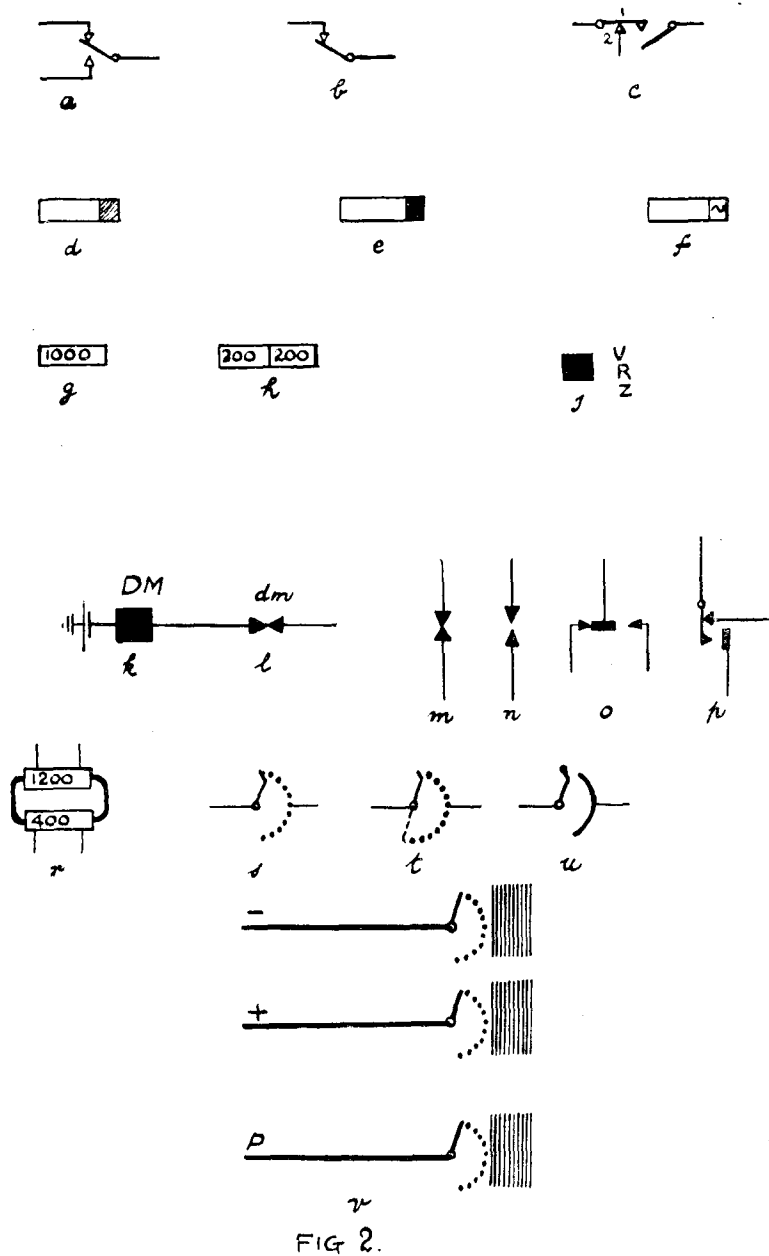


FIG 1

The "detached" contact system has several advantages, the separate circuits are drawn as they occur in the building-up of the whole circuit, crossing of lines is avoided, short lines only are necessary in most cases, and the addition of facilities, &c. to a diagram is simplified.

Fig. 2 shows some of the symbols and conventions now standardised by the Post Office and used on all study diagrams relating to automatic circuits. The significance of the symbols is as follows:—

- (a) *Change over contact*.—When the relay is energised, the contact represented by the sloping line is assumed to move forward, disconnecting the contact against which it normally rests and connecting the contact towards which it moves.
- (b) *Break contact*.—The sloping spring moves forward and disconnects the contact.



- (c) *Make before break contact.*—The sloping spring moves upward and disconnects 1 from 2. The new connexion between the sloping spring and 1 is established before 1 and 2 are disconnected.
- (d) *Relay with a "slow to release" feature only.*
- (e) *Relay with "slow to operate" and "slow to release" features.*
- (f) *Relay used on circuits carrying alternating current.*
- (g) Indicates the method of showing the resistance of relay coils. (Neither the ohm sign nor the word "ohms" are used.)
- (h) Shows a two-coil relay, i.e., two separate windings on the same core.
- (i) *Magnet (two-motion switch).*—The letters V.R.Z. indicate respectively vertical, rotary, and release.
- (k) *Magnet and magnet contacts used on line switches of the reverse action (self drive) type.* The contacts dm, are normally making, and upon full energisation of DM, the contacts break, thus disconnecting DM which de-energises (the wipers are stepped when the magnet de-energises).

- (l) *The dm contacts referred to under (k).*
 - (m) *Mechanically operated contacts which break when the mechanical action is applied, e.g., off normal contacts of selectors.*
 - (n) *Mechanically operated contacts which make.*
 - (o) *Mechanically operated change over contacts.*
 - (p) *Mechanically operated make before break contacts.*
- NOTE.—The off-normal contacts of, and the cam springs associated with selectors, are examples of mechanically operated contacts. In diagrams the contact points of mechanically operated springs are filled in, while relay contacts are not. Contacts operated by vertical movements of selector shafts are marked N and cam springs S. There are no relays bearing these letters.
- (r) *Shunt field relay.*
 - (s) *Standard line switch.*
 - (t) *Line switch having 50 contacts in the associated bank.*
 - (u) *Homing arc of line switch.*
 - (v) *Wipers and bank of two-motion switch.*—The 10 vertical lines signify 10 levels. Private (P) Levels of group selectors have 11 contacts and Final selectors 10.

An understanding of the facilities provided by the separate pieces of apparatus is useful when dealing with the circuit operations, and before taking the reader through a circuit, its functions will be tabulated. It is necessary to state a fundamental principle here; in order to engage a circuit an earth is connected to the relative P bank contact by the operation of relays, so that circuits in that condition will test busy to hunting switches.

Commencing with the line switch used in provincial areas, the following facilities are provided:—

1. The wipers hunt from the home position and extend the caller to the first free outlet, when the receiver is lifted.
2. Guards the calling line from intrusion by connecting an earth on the private (P) bank contact at the final selector (multiple).
3. Guards the circuit seized by the wipers from intrusion by other hunting line switches having access to the same outlets.
4. Maintains the guarding conditions until alternative conditions are provided by the selector to which the caller has been extended.
5. Prepares the calling subscriber's meter for the registration of the call.
6. If all outlets are engaged, the wipers hunt continuously until an outlet becomes free (or the caller replaces the receiver).
7. Upon release conditions being applied to the connexion, the wipers return to the "home" position.

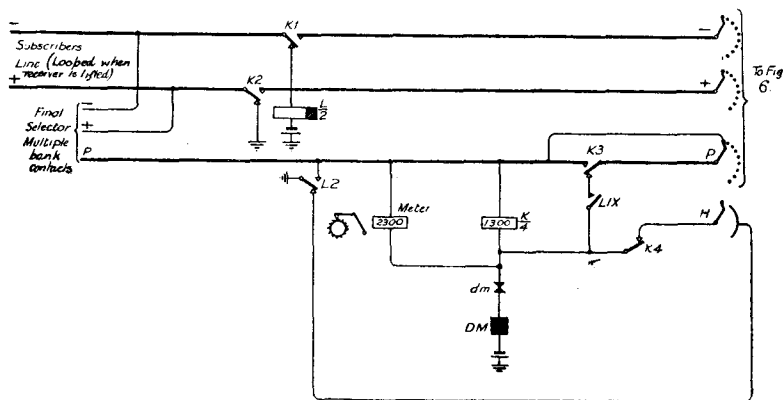


Fig. 3 is a diagram of the circuit, the operation being as follows. (It should be noted that contacts are always shown in the unoperated position) :—

Relay L energises over the path—Negative, relay L, K1,—line, subs. loop, + line, K2, positive (earth).

Relay L has two contacts. (L1 closes slightly in advance of L2, the fact being signified by placing the letter X against it.)

L1 and L2 complete the following circuit : Negative, DM, dm, L1 operated, K3, P wiper standing on the home position, L2, positive (earth).

L1 also short circuits relay K to secure the immunity of that relay for the present.

L2 also connects an earth to the P bank contact of the subscribers' circuit at the final selector thus rendering it engaged to incoming calls.

The drive magnet DM is therefore energised and when fully saturated the dm contacts open, hence DM is de-energised and the wipers step to the first contact in the bank.

If this circuit is engaged, DM will again energise over the path—Negative, DM, dm, L1 operated, K3, P wiper, positive (earth) on the bank contact.

Another step will therefore be taken by the wipers. It will be observed that as the — and + wipers are disconnected at K1 and K2, no interference is caused to subscribers on the circuits over which the wipers pass.

While hunting is in progress, relay K remains short-circuited due to an earth on one side via L2, and on the other side via L1, P wiper and the earth on the bank contacts.

The wipers step on until a circuit is encountered that is free of earth. There is then no longer a path for DM, and as an earth is removed from one side of relay K, the relay is no longer short-circuited and a path for its operation is provided as follows :—

Negative, DM, dm, Relay K, L2 operated, positive (earth). Relay K is thus placed in series with DM. The current available is sufficient to operate relay K, but is insufficient for energising DM; the wipers therefore come to rest on the contacts and relay K operates. The reason for a "bridging" P wiper can now be seen. If, when the wiper is passing from an engaged contact to an engaged contact, a break in the continuity were permitted, when the wiper is between the contacts, the path for K already traced, would be available, the relay would operate prematurely and put the caller through to an engaged circuit. The bridging wiper maintains the short circuit across relay K. Relay K has four contacts.

K1 and K2 extend the calling subscribers loop to the — and + lines of the selector associated with the bank contacts on which the wipers have come to rest, and remove relay L from the circuit (relay L does not de-energise immediately, owing to its slow-to-release feature). K3 extends the private wire to the selector, from which an earth will be returned, thus replacing the earth supplied by contact L2, which restores due to the fact that relay L is disconnected from the circuit by the operation of K1 and K2.

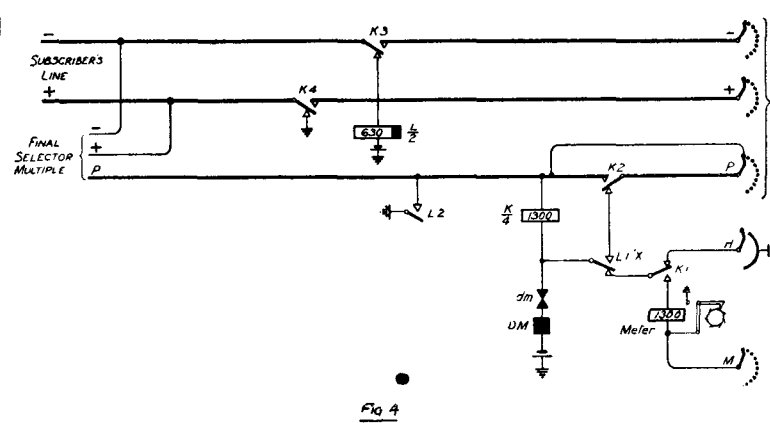
K4 opens the homing circuit of the line switch, to prevent homing when L2 resumes its normal position, due to the earth connected to the homing segment.

The meter is joined in parallel with relay K, now extended to the selector. The meter is specially designed not to operate with the normal current flowing in the circuit, and consequently is unaffected at present.

If all outlets from the line switch bank are engaged, the circuit of DM is maintained until the caller replaces the receiver thus disconnecting the circuit for relay L, when the DM circuit is also disconnected due to L1 resuming its normal position.

Homing the wipers.

Upon the receiver being replaced, the de-energisation of relays in the final selector results in the removal of the earth from the private wire, hence relay K is de-energised.



K4 completes a path for DM from : Negative, DM, dm, K4, H wiper in contact with the continuous segment, L2, positive (earth); this path is available until the wiper reaches the home position where it is broken.

While the wipers are returning to the home position, the callers' line is unguarded because an earth is not connected to the P bank contact at the final selector, but the chance of a call being received for the subscriber while the wipers are returning to the home position is an extremely small one. A circuit is given later that provides for guarding until the wipers reach the home position.

Incoming Calls to a Subscriber.

The operation of the final selector connects an earth (positive), to the P bank contact, thus operating relay K in series with DM to negative. DM does not operate. The line relay L is disconnected by the operation of K1 and K2, hence the completion of the circuit for DM is prevented because L1 cannot operate. As the wipers of the line switch are not standing upon a selector circuit, the question of extending to a selector does not arise, and the call passes out to the subscriber via the line, as explained later in connexion with the operation of the final selector circuit.

Fig. 4 is a diagram of the line switch circuit used in metropolitan areas. In this case, as already explained, a separate meter bank is provided, marked M in the diagram.

The circuit differs only with regard to the arrangement of the contacts of relay K and the homing and metering circuits. As will be seen, the operation of relay K in the manner already described results in the following :—

K1 completes the preparatory circuit of the meter over the path : Negative, DM, dm, L1 at normal because relay K has operated, K1 operated, meter, M wiper, selector. When the call matures a positive (earth) is connected to the meter wire from the selector and the meter operates and locks up over the path : Negative, DM, dm, L1, K1 operated, meter, local contact of meter, positive (earth).

K2 extends the private wire to the selector at which an earth is connected to replace the earth provided at L2.

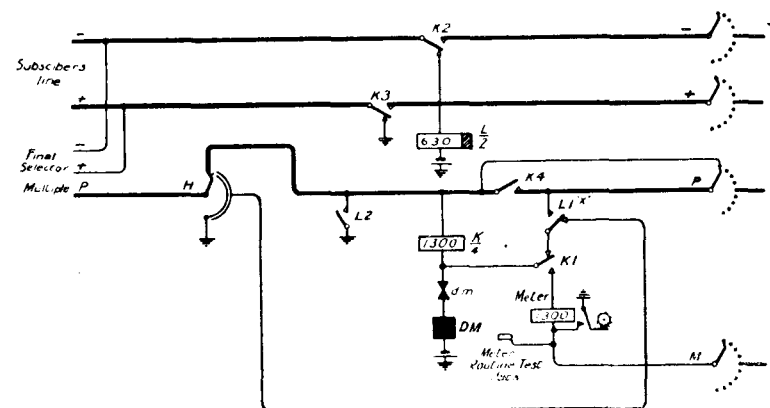


FIG. 5.

K3 and K4 extend the callers' loop to the selector for the next stage of operation.

Fig. 5 is a diagram of the line switch circuit arranged for maintaining an earth on the calling subscribers final selector (P) bank contact until the wipers return to the home position. In this case, the homing (H) level consists of two separate segments which are "bridged" by the H wiper, so that there is an earth connected to the final selector bank (P) contact while the wiper is off the home position. Otherwise the circuit is substantially the same as that described in connexion with metropolitan areas.

It remains to indicate the reason for the slow-to-release feature of relay L. When the caller is switched through to a selector by the operation of relay K, a period of time elapses before the selector relays complete their train of operation. Unless the earth is retained on the private wire until an alternative is returned from the selector, the connexion will break down because relay K will release. Relay L is therefore sluggish and its contact will retain the earth connexion because it does not release until the selector circuit is fully established; actually an overlap occurs.

9. Provides a signal to indicate when the selector has been taken into use but not operated by impulses (faults may be responsible for such a condition).

10. Releases when the caller replaces the receiver.

11. Provides an alarm signal if the shaft fails to restore when release conditions are applied.

The circuit operation is as follows (the connexions at the points marked X and numbered in Fig. 6 will be seen in detail in Fig. 7):—

The caller is extended from the line switch (Fig. 3).

The loop is extended to relay A which operates the path—Negative, A 200, H2, — line, loop, + line, H3, A 200, S1, positive (earth) via tone transformer (point 7).

Relay A has one contact.

A1 completes a circuit for relay B and the PL (permanent loop) lamp from negative (point 8), B 700 and PL in parallel, A1 operated, H1, positive (earth). Relay B therefore operates and the lamp glows.

Relay B has two contacts.

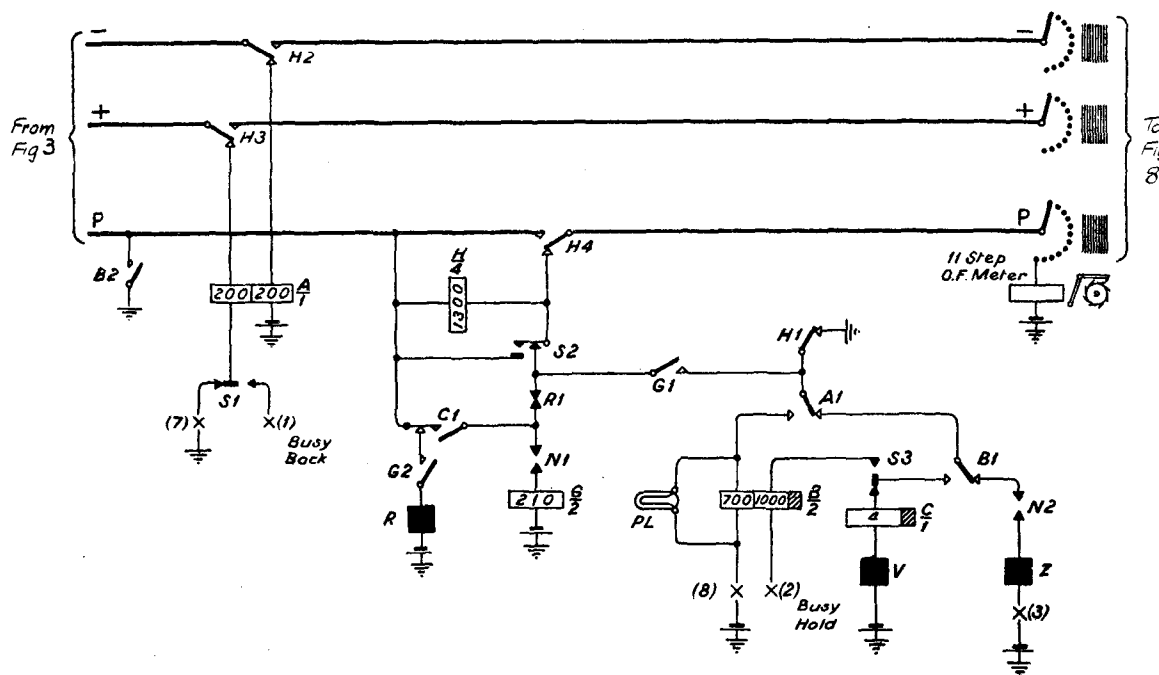


FIG 6

The selector circuit to which the caller is extended is given in Fig. 6, and the facilities afforded by the circuit are as follows:—

1. Transmits dialling signal to the caller. (This facility is only required on first group selectors.)
2. Returns an earth over the P wire to the preceding switch.
3. The wipers step vertically under the control of impulses transmitted over the lines.
4. The wipers automatically enter the level reached and if the first outlet is engaged:—
5. The wipers hunt to the first free outlet and extend the call for the next stage of operation.
6. Guards the circuit taken into use from intrusion by other selectors hunting in the same level.
7. Maintains the guarding condition until an alternative is returned from the selector to which the call has been extended.
8. If all outlets from the level are engaged, the wipers step to the 11th position and transmit to the caller (a) busy tone, (b) lamp flash for standard requirements when the call is from a manual position, also an overflow meter associated with the level is operated.

B1 prepares the V magnet circuit, which, however, is disconnected at A1; B2 connects earth to the P wire, thus meeting the condition required by the line switch, the control of which is now transferred to the selector. If impulses are not now received, the relay connected with point 8 will have operated and an audible signal given.

The caller dials the first digit.

The circuit of magnet V is established over the path—Negative, V, relay C, S3, B1 operated, A1 making and breaking due to impulses, H1, positive (earth). As relay B is slow to release, it is not de-energised while A1 is impulsing.

With the break period of the first impulse relay C becomes energised and being slow to release remains energised during the receipt of the whole of the impulses of the digit. Also, with the first step of the shaft, the mechanically operated contacts N1 and N2 close.

Relay C has one contact.

C1, in conjunction with N1, completes a path for relay G over the following: Negative, relay G, N1 operated, C1 operated, P wire, B2 operated, positive (earth). Relay G thus operates.

N2 prepares the Z magnet circuit, but B1 being operated, the circuit is not completed, and is not yet required.

Relay G has two contacts.

G1 completes an alternative path for holding relay G operated as follows: Negative, relay G, N1 operated, R1 (these contacts are associated with the R magnet and open only when the magnet is fully energised), G1, H1, positive (earth). Relay G will therefore remain operated independently of C1.

G2 prepares the circuit of magnet R which is disconnected because C1 is operated. The magnet circuit is thus ready and is awaiting the release of relay C.

At the end of the train of impulses, the pause that occurs before the next digit is dialled is longer than the sustaining period of relay C hence the relay restores—the reader will remember that the pause between the transmission of separate trains of impulses is, the lost motion period due to the slipping cam of the dial plus the personal pause of the person dialling, plus the time taken to pull the dial round to the finger stop.

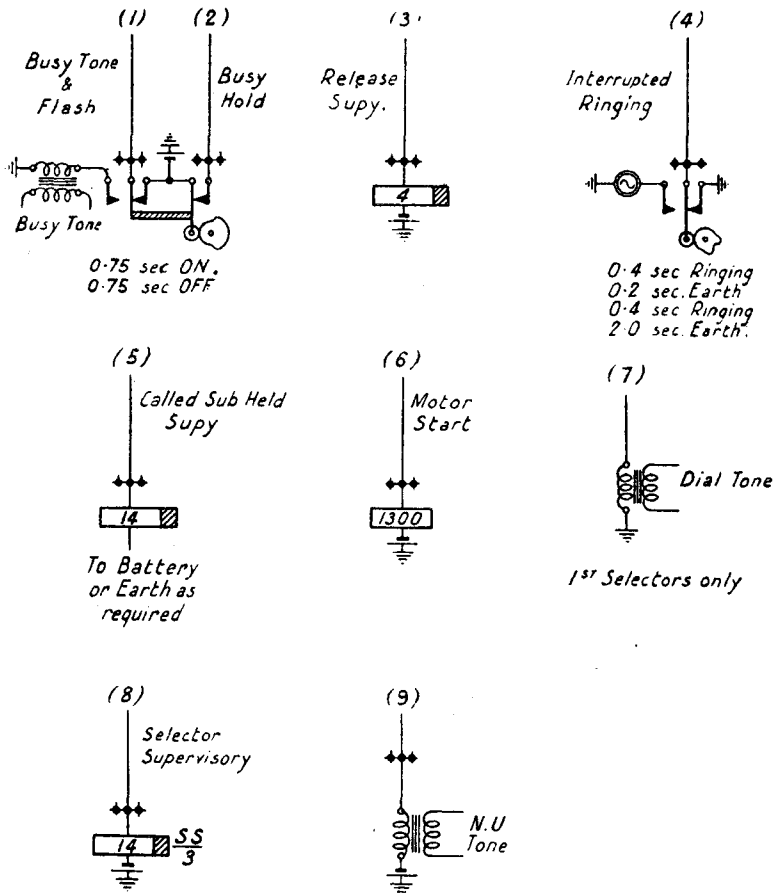


Fig. 7.

C1 upon restoring completes the circuit of magnet R and the wipers step into the level and rest upon the first contact, when the wipers are centred on the contact, R1 contacts are open, hence relay G releases because its circuit is disconnected at R1, the wipers thus halt.

If the circuit associated with the first contact is engaged an earth will be encountered on the P bank contact and a circuit for relay G is again established from negative, relay G, N1 operated, R1, S2, H4, P wiper, bank contact, positive (earth).

G1 again holds relay G independently.

G2 once more establishes the R magnet circuit from Negative, G2 operated, C1, B2, positive (earth).

The wipers move to the next contact, the process being repeated until a disengaged outlet is reached.

While hunting is taking place relay H is short circuited due to an earth on one side from B2 and on the other side from the engaged P contacts via H4.

When a disengaged outlet is reached, the earth necessary for the operation of relay G is absent, hence the R magnet circuit is disconnected at G2 and the wipers remain on the contacts. The short circuit is also removed from relay H, which now operates as follows: Negative, relay G, N1 operated, R1, S2, relay H, B2 operated, positive (earth). Although relays H and G are thus connected in series, the current available is only sufficient to energise relay H.

Relay H has four contacts.

H1 disconnects the positive (earth) connection that is required for the establishment of the Z magnet circuit, this circuit not being required yet. H2 and H3 extend the calling subscriber to the selector associated with the bank contacts and remove relay A from the circuit.

H4 extends the private wire to the selector over which an earth will be returned to replace the earth provided by B2. Relays A and B restore and lamp PL is extinguished. Relay B being slow to release, the earth at B2 remains until the selector ahead is fully operated.

The calling subscriber is now extended to another selector and the control of the line switch and the first selector is transferred to that selector.

If all outlets from the level are engaged the cam springs already described and marked S1, S2 and S3 in the diagram, are operated.

S1 transfers the — line from dialling signal to busy signal (point 1), the tone is thus transmitted round the calling loop.

S2 completes a circuit for the O.F. (overflow) meter from: Negative, meter, 11th P bank contact, H4, S2 operated, private wire, B2, positive (earth).

S2 also short circuits relay H to prevent its operation.

S3 disconnects the V magnet circuit and provides a circuit to hold relay B operated during the 0.75 secs. silent period of the busy signal, as follows: Negative, interrupter springs and busy hold wire (see point 2, Fig. 7), B1,000, S3 operated, B1 operated, A1 released during the silent period, H1, positive (earth).

It is necessary to explain at this stage, that during the tone period of the busy signal, relay A is energised because point No. 7 is connected to positive (earth) and point No. 2 is disconnected. After a lapse of 0.75 second (750 milliseconds) point No. 1 is connected to negative to provide the necessary condition for operating the cord circuit relay if a call from a manual position is concerned. During this period therefore, each winding of relay A has the same potential across it, and the relay will release. During the same period, however, point No. 2 is connected to negative, thus a circuit for holding relay B is provided. It must be remembered that 750 milliseconds is too long for relay B, the release period of which is about 300 milliseconds.

Release of the selector.

Upon the replacement of the calling subscriber's receiver, the earth from the final selector is withdrawn from the private wire and relay H releases.

H1 completes a circuit for magnet Z over the path: Negative, Z, N2 operated, B1, A1, H1, positive (earth). The release magnet armature knocks out the holding dog, the shaft spring asserts itself and the wipers and shaft return to normal.

If the call is extended to a 2nd group, 3rd group, &c., selector, the circuits concerned are identical with the 1st group selector with the exception that dialling signal and the PL lamp are not required. On such selectors point No. 7 is connected to positive (earth) and the PL lamp is not provided.

(To be continued.)

TELEGRAPHIC MEMORABILIA.

AUSTRIA.—After months of experiment and tests, the Innsbruck broadcasting station was officially inaugurated last month. Normally it will relay the Vienna programmes.

BELGIUM.—According to the *Financial News* there is a proposal to form a national broadcasting company in Belgium, with a capital of three million francs, to continue for ten years, with the right to extension for a further five years. The present company's equipment and clientele would be taken over, and the State would be interested to the extent of 60% of the receipts. The board of directors is to consist of 11 members, of whom the Minister of Posts and Telegraphs will appoint the chairman and five other members, and the rest will be appointed by the general meeting. The State will reserve the right to use all the company's equipment for communications of public interest.

BULGARIA.—The *Evening Standard*, London, states that: "Marconi's Wireless Telegraph Company, Limited, has secured a contract for the supply of wireless telegraph transmitting and receiving stations to the Bulgarian Government, for the purpose of placing Bulgaria in direct wireless telegraphic communication with England, Austria, and other European countries."

To this Reuter's Sofia agency adds: "the price to be paid is 33 million leva, or about £50,000, the Minister of Posts and Telegraphs having confirmed the decision of the two German firms and Commission appointed to examine the tenders for the construction of the wireless stations."

In this connexion the *Electrical Review* provides the following additional information:—

"Among the apparatus to be installed at the stations, which will be at Sofia, will be a high-speed transmitter with anode power of 10 k.w. and a wavelength range between 36 and 72 metres. It will be used for communication with stations which are operated in England by Marconi's Wireless Telegraph Co., and through which Sofia will be in touch with the principal cities of the world. The Sofia stations will also contain a high-speed long-wave combined telegraph and telephone transmitter for communication with Vienna, with a wave range of from 2,000 to 4,000 metres; and all the necessary electricity supply equipment and reserve generating plant will be installed under the contract. For the receiving station a set of high-speed commercial receivers with a combined overall wave range of from 1,200 to 25,000 metres, and one short-wave non-radiating receiver with a wave range of from 15 to 100 metres, are to be supplied, and one complete set of apparatus for the Central Telegraph Office control of the transmitters and receivers which will be operated by the Postal and Telegraph Administration.

CANADA.—A Reuter message from Victoria, B.C., states that the cable ship "Restorer" sailed on June 10 with 70 miles of cable to complete the link of the second cable connecting Canada with the Antipodes. The Canadian Pacific telegraphs will link up the cable with the newly-completed copper line between Vancouver and Halifax, Nova Scotia, approximately 3,400 miles in length, thus completing duplicate cable communication between Australia and England.

The following three items are communicated by Reuter's:—

It is reported that the Ontario Government will shortly undertake the erection of a 1,000-watt broadcasting station near Toronto to be used by the Department of Agriculture for broadcasting lectures, weather reports, and possibly general entertainment.

Wireless receiving licence revenue in Canada during the 11 months ended February last totalled 207,328 dollars at one dollar each, an increase of 77,462 dollars over the revenue during the corresponding 11 months of the previous fiscal year. Ontario led the provinces in the number of licences issued with 97,851.

The Winnipeg Grain Exchange will this summer operate a 500-watt broadcasting station, to be erected at a cost of 25,000 dollars; its call letters will be "CJCW."

World Radio informs us that one of the most powerful stations in Canada is to be erected in Red Deer, Alberta, by the Alberta Pacific Grain Co. Studios will be operated in both Calgary and Edmonton by remote control from the main station. It is also announced by the *Electrical Review* that Alberta is to have a permanent radio inspector to serve the entire province, whose headquarters will be at Calgary.

COLOMBIA.—According to Reuter's Trade Service (Bogotá) the Government has concluded a contract with a foreign corporation for the installation of a complete broadcasting station, with a range of 300 km., at Bogotá. The international call letters assigned are HJH-HKZ. The recently completed stations at Caracas (Venezuela) and Balóba (Panama) are expected to make the development of radio easier for Colombia. A wireless telegraphic station will also be installed, establishing communication with the remotest provinces.

It will be recalled that in our last issue it was mentioned that the President of Colombia had announced the decision to immediately provide an improved broadcasting service, and apparently no time has been lost in completing arrangements.

GREAT BRITAIN.—Lord Gainford, vice-chairman of the British Broadcasting Corporation, speaking at Truro, Cornwall, recently, is reported to have said that it was impossible to increase the size of the broadcast

wave-band in view of the just requirements of the Army, War Office, Air, and commercial and marine services. The only alternative was to reduce the number of stations in Europe from 170 to 100. He hoped such a change would be adopted in the near future. There were 19 stations in Britain working on the broadcast wave-band, excluding Daventry. Their proposals were to decrease the number of British transmitters using the broadcast wave-band, for which exclusive wavelengths would be granted to Britain, in an equitable international agreement. The objective was to bring to every listener the choice of a minimum of two contrasted programmes capable of reception on the cheapest and simplest apparatus. In addition, there would be the long-wave station at Daventry, giving a total of ten transmitters altogether. Lord Gainford was referring to the regional scheme under which the whole country will ultimately be served by five, six, or seven high-power stations using ten or more wave-lengths, so that it will be possible for each to send out two programmes on different wavelengths.

During two recent week-ends 24-hour broadcasting tests were carried out by the two short-wave "annexes" to the American station at Schenectady (WGY) uninterruptedly: 2XAF used 32.77 metres and 2XAD 26.8 metres in order to enable distant reception effects to be observed. According to the wireless correspondent of the London *Evening News*, the charts drawn by B.B.C. engineers to illustrate the reception in England of those test transmissions are not encouraging to those who believe in the immediate establishment of world-wide relaying of programmes. Throughout the whole 48 hours of the tests engineers were listening at the B.B.C.'s listening-post at Keston, using special short-wave super-heterodyne sets, and from about 10 p.m. till 4 a.m. the signals were at their best, strong and clear enough to be successfully relayed, there being during this period practically no difference between the 32-metre, 26-metre, and 22-metre wavelengths. At other times, except for short "freak patches," signals were weak, badly distorted and subject to violent fading.

The Eclipse.—The British Broadcasting Corporation's stations at London, Daventry, Manchester, Birmingham, and Newcastle-upon-Tyne assisted observers of the sun during its eclipse on the morning of June 29. They transmitted a programme of time signals in accordance with the suggestions of the Astronomer-Royal. Mr. F. Hope-Jones is the B.B.C.'s time expert. They also radiated for the benefit of observers who attempted to ascertain the effect of the eclipse on radio transmission itself a continuous wave, unmodulated, but swinging continually over a wave-band 10 metres broad, 5 metres on each side of the station's normal wavelength, not merely on June 29, but in the early mornings of June 27, 28 and 30. This wave was only interrupted by the time signals. As for short-wave tests during the eclipse, transmissions were arranged by the Radio Research Board in conjunction with the Radio Society of Great Britain on 90 metres, 45 metres and 22 metres.

The British Broadcasting Corporation proposes to adopt forthwith the principle of stating the kilocycle figure instead of the wavelength for all stations. This means that the measurements will be stated in terms of frequency. Support for this step is furnished by the fact that the Union Internationale de Radiophonie, Geneva, has throughout based its system of measurement on frequencies and not on wavelengths.

The fact that the *T. and T. Journal* is only published monthly sometimes has the effect of apparently offering belated information, and this is the case when mention is made of the annual general meeting of the Institute of Wireless Technology which was held at the end of May, after our own publication had gone to press. For the information of our many colonial and foreign readers it may still be interesting to learn that the progress of the Institute during the past year has been very satisfactory.

Ordinary meetings have been held monthly at the Engineers' Club, where papers have been read and discussed. A first number of the *Journal* has also been published, and an enlarged and improved number is now in the press. The Institute is receiving a good measure of support, and the membership is steadily increasing. The next session of ordinary meetings will open in October, and it is anticipated that sufficient support will be forthcoming to hold informal meetings monthly for discussions on problems of special interest. Those desiring further particulars of the activities of the Institute are invited to address themselves to the hon. secretary at 71 Kingsway, London, W.C.2.

The London *Daily Telegraph* recently made the following interesting statement and published the following equally interesting opinion of the headmaster of an elementary school on "Teaching by Wireless":—

Teaching by Wireless.—That 372 new schools had come on the British Broadcasting Corporation's register this term, and that there were 3,000 schools now in wireless communication with London and Daventry, was the statement made by Mr. J. C. Stobart (B.B.C. Director of Education) at a distribution of prizes at the B.B.C. Studio, Savoy Hill, to 19 children successful in examinations dictated by wireless. Captain Ian Fraser, M.P., made the distribution, and said that though, perhaps, the schools would not be superseded in the future, there could be no doubt that teaching by wireless would be of great value to education. The service had gone beyond the experimental stage. Captain Revel, the headmaster of an elementary school, said Captain Fraser had been instrumental in providing more than 3,000 free licences for blind hearers. [The exact number of free licences at the end of May was 7,158.—*Ed., T. & T. J.*]

Dr. H. R. Wright, managing director of Siemens Bros. and Co., Ltd., London, has joined the board of the British Columbia Telephone & Telegraph Co. (a Delaware (U.S.A.) Corporation with offices in Chicago), in which Siemens Bros. & Co., Ltd., hold a substantial financial interest. The British Columbia Telephone & Telegraph Co. owns a controlling interest in the British Columbia

Telephone Co., Ltd., which operates nearly 100,000 telephones in British Columbia, with headquarters at Vancouver.

The following details of exports of radio apparatus from Great Britain are supplied by the *Wireless Trader*: "The total value (excluding re-exports) £109,092, includes valves valued at £21,746. Our principal customer was Australia, whose share is given as £27,230 (valves £8,397); this figure represents a substantial increase. The share of New Zealand—£12,444 (valves £2,087)—was more than double that of the preceding month. The chief foreign customer was Holland, which took goods to the value of £6,503 (valves £89). Although Japan remained in the second place with a total of £4,452 (valves £105) the share of the latter country diminished considerably.

Parliamentary Questions.—On May 26, Viscount Wolmer informed Capt. Fraser that the beam stations for communication with South Africa were expected to be ready for the official tests in the course of the next few weeks. If the tests were successful, the stations would be taken over by the Post Office and a wireless telegraph service with South Africa would be opened. It was impossible at that stage to say whether the stations would be full occupied with telegraph traffic, but it seemed doubtful whether a directional station was likely to be as suitable for purposes of Imperial broadcasting as a station capable of transmitting in all directions.

On the same date, Capt. Fraser asked if the Government would make a grant to the British Broadcasting Corporation to enable it to establish and maintain a short-wave wireless transmitter to relay existing programmes to the Empire or parts of the Empire in order that such a project might be proceeded with immediately without hindering the development of the Corporation's new British scheme.

Viscount Wolmer, Assistant Postmaster-General, said that the British Broadcasting Corporation had been given authority to conduct experiments in short-wave transmission, and he understood that it was its intention to carry out those experiments before putting forward any proposals for a service to distant countries. The incidence of the cost of such a service, if it should be found to be practicable, would be a matter for settlement between the Corporation and the Dominions and Colonies concerned.

GREECE.—The *Times* (London) *Engineering Supplement* states that: "His British Majesty's Consul-General at Salonica reports that the Wireless Telegraphy Board in Athens has now decided to allow the use of radio receiving sets in Salonica and Cavalla. The necessary licence for the installation of wireless receivers must be obtained from the Wireless Department of the Post Office in Athens. For the time being permission will only be granted to Greek subjects, but it is thought that the privilege will shortly be extended also to foreigners. Macedonia is a virgin market for the sale of wireless apparatus. British manufacturers wishing to do business there should therefore communicate at once with local dealers and agents, quoting prices and sending illustrated catalogues in French, if possible, as well as English. The names of the principal dealers in electrical goods, also small dealers in wireless apparatus, can be furnished on application to the Department of Overseas Trade, London, S.W."

INDIA.—It is proposed to introduce in Calcutta as an experimental measure a system which will provide facilities for telephone subscribers to send and receive telegrams in plain English by telephone. The subscriber will be required to pay an additional charge of two annas only per telegram transmitted, while received telegrams will be transmitted free of charge.

The Viceroy will visit Bombay on July 23 and will open the Indian Broadcasting Company's station, which is now practically complete.

India has kept well ahead in radio-telegraph development, says the annual report of the Indian Posts and Telegraphs Department for 1925-26. She has now an efficient system of stations to meet immediate requirements and an organisation which will enable full advantage to be taken of future developments. The wireless stations in Burma and the Andaman Islands, which were erected in 1905, were among the earliest in the world for maintaining communication between fixed points on land. Coast stations for communicating with ships were erected a few years later at the principal ports and were followed by a chain of inland stations linking up the most important towns. Progress has called for a complete revision of regulations since the war; during the last five years a series of licences to suit various purposes has been brought into existence, and arrangements have been made for the issue of broadcast receiver licences on an extensive scale, broadcasting on a temporary basis being carried out by several radio clubs, which are allotted a share of the fees derived from licences. As regards new construction, only one large modern high-speed duplex wireless service between Madras and Rangoon has been inaugurated. A temporary direction-finding station was also erected at Karachi, and the results were of great value to shipping. Schemes have been approved for completely remodelling the coast stations at Karachi and Bombay and constructing permanent direction-finding stations to assist ships and aircraft, which work was in progress at the end of 1925-26, and arrangements have also been made for a temporary direction-finding station at the mouth of the Hooghly River to assist ships bound for the port of Calcutta.

SCOTLAND.—The *Electrical Review* states that it was reported at a meeting of the Clyde Lighthouses Trust that wireless telephonic communication between Cumbræ and Toward was now in working order. The licence of the Postmaster-General was limited to sending and receiving messages on the private business of the Lighthouses Trust, but the clerk was instructed to communicate with the Postmaster-General with a view to having the licence extended to include helping both shipowners and mariners in reporting the arrival of vessels, and also in communicating with steamers during fog, and giving them directions. It was stated that, owing to an invention by

Mr. D. Alan Stevenson with synchronised clocks, the installation would be under the estimated cost of £700.

SOUTH AFRICA.—It is stated that Marconi's Wireless Telegraph Co., Ltd., has completed preliminary tests with South Africa with the "beam" wireless stations which it is erecting at Bodmin and Bridgwater for the General Post Office. Further tests by the company under ordinary traffic conditions will commence immediately; should they prove satisfactory, the stations will be handed over to the General Post Office for the official seven days' trial. During the tests so far made by the Marconi Company, speeds of between 200 and 250 words per minute have been maintained over long periods daily. (The Post Office tests have now been successfully passed.—*Ed., T. & T. Journal.*)

SWITZERLAND.—The following items regarding wire and wireless matters are excerpted from a report on economic and financial conditions in Switzerland published by the Department of Overseas Trade, London:—

"Telegraphic traffic continues to decrease and several inland lines were put out of circuit in 1926; two new international lines were opened, however.

New broadcasting stations were opened at Berne in November, 1925, and Basle in June, 1926, thus bringing the total for Switzerland to five stations. The Lausanne station was re-equipped and improved in 1926. At the end of the year there were 51,194 licensed receiving sets; the increase since January was nearly 18,000. The stations at Berne, Basle, Geneva and Lausanne are now working together, the programme of each of these stations in turn being relayed by the others. The Swiss Marconi Company's station at Berne-Muenchenbuchsee dealt with more than 500,000 telegrams in 1926, i.e., an increase of over 100,000 since 1925. A short-wave transmitter will be added shortly to the two high-speed and one broadcasting transmitters already installed."

TURKEY.—At present, says the *Electrical Review*, there is only one wireless station in Turkey, that at Osmanié, 16 miles outside Constantinople, which has a wavelength of 1,200 metres; its call is "Radio Stamboul." On June 15, however, a new station, which has cost over £100,000, was to be opened at Angora, and, says the *Times*, will be the most powerful in the Near East. The control of wireless telegraphy in Turkey is in the hands of a limited company in which the Post Office, the official Anatolian News Agency, and the Banque d'Affaires are interested. Any one can purchase a licence by paying £T14 (30s.), and a heavy fine is imposed on persons who listen without possessing a licence."

We are unable to say whether the words *italicised* by our own printer are to be taken literally, and that the head of a household has to provide a licence for each member of his family!

U.S.A.—The American news is particularly lengthy this month, but is also particularly interesting as will, no doubt, be admitted by many of our regular radio readers, witness the following on the "New Radiogram Relay Station," for which once more we are indebted to our contemporary, the *Electrical Review*:—

That history repeats itself is once again emphasised by the fact that two decades ago Marconi chose the Newfoundland coast as the best site for the reception of signals originating in England; more recently, transoceanic traffic has been handled from the north shore of Long Island, far to the south. Hence the Belfast, Maine, receiving station of the Radio Corporation of America marks the return of transoceanic radio reception to the north-eastern coast of America. It appears that extensive tests proved that the reception of European signals was much better at Belfast than at Riverhead, on Long Island, where the main receiving station is located. A survey of thunderstorms during the past decade by the United States Weather Bureau indicates that there are twice as many thunderstorms at Riverhead as at Belfast, and so the reception at the former point is more affected; also, while Belfast is nearly north of Riverhead, it lies almost directly on the great circle route from Riverhead to Europe, and is 300 miles nearer the distant transmitters than is Riverhead; for this reason the European radio signals are at least 30% stronger at Belfast. The new station at present houses 12 complete long-wave receiving sets, operating on wavelengths from 8,000 to 23,000 metres, in addition to battery and motor-generator equipment, oil heating and steam plant, and has its own water supply. The function of the new station is to pick up radio-telegraph signals from European stations on a uni-directional triple antenna, consisting of three antennas, each nine miles long and spaced six miles apart throughout their parallel spans. It is highly directional, covering only a small angle and capable of receiving signals from Norway to the north and sweeping down to Italy on the south. It is the invention of Mr. H. H. Beverage, and is only 20 feet high itself, strung along on poles very much after the fashion of a rural telephone line. A multiplicity of receiving sets are worked on one Beverage wave antenna, each set being provided with a wave trap and filters so that signals from the desired transmitter are taken off the antenna and then built up by radio-frequency amplification for subsequent detection and amplification, and are automatically relayed over leased telegraph lines to the central office in New York City, where they are automatically recorded on high-speed recorders, while the inked paper tape with its wave-line passes by the operator seated before a typewriter on which the dots and dashes are transcribed into complete radiograms."

The *T. and T. Age* says that photographs sent by radio can now be enlarged to nine times their original size by means of certain new receiving apparatus tested out successfully by the Radio Corporation of America.

Our American contemporary explains that the paper used for receiving the pictures was made especially for the purpose. The actual enlarging is

done by a small asbestos device attached to a rubber tube, through which hot air is constantly blown; a tiny opening at the end of the tube lets hot air blow on the paper, making a black mark. The pictures are made, however, by a second tube conveying cold air, the passage of which to the paper is controlled by radio signals; if the cold air passes in front of the current of hot air, it prevents the hot current from making a mark on the paper. Thus there is obtained the succession of black dots and lines and white spaces, which when seen together, make the picture. The receiving marker moves across three times as far and up and down three times as far as in the original photograph.

The same journalistic authority says that: "Short-wave transmitters are being used by the U.S. Army Signal Corps to circumvent static in the transmission of official messages over the Army radio net which connects the War Department with the Corps' area headquarters and Army posts throughout the country. During the severe static months at least 75% of the Army telegraph business, both day and night, from Washington was transmitted by ten of the new sets that were installed, and they worked so well that more sets have been ordered. The sets are crystal controlled and designed to operate in two frequency bands, one of approximately 4,000 to 4,500, the other of 8,000 to 9,100 kilocycles.

Through the medium of Reuter's Trade Service, Washington, we also learn that developments in broadcast transmission are announced by the Westinghouse Electric Company, which claims that a system developed at KDKA eliminates three-quarters of the transmitting valves, permits of the broadcasting of a radio wave many times sharper than has heretofore been possible, and provides the same range and quality of transmission with less than half the usually required power input. The new system is regarded as important in offering solutions to many problems, including the possibility of a reduction of station interference and an opportunity to overcome static and local interference in receiver design, whilst an immediate effect noted by operators of receivers in the vicinity of KDKA is a lifting of the blanketing effect that usually surrounds high-power stations, due to the sharpness of the radiated wave. The new system is defined as "frequency modulation," instead of the present method of "power modulation"; heretofore the frequency band required for station operation has been 10 kilocycles, but in the new system the band has been cut to one-half kilocycle. It is explained that the 10-kilocycle separation between stations will still be required with present-type radio receivers, but the new system requires such sharp tuning as to eliminate the annoying interference set up by powerful stations operating on adjacent wave bands; also in transmission, instead of varying the amplitude or strength of the signal, as is present practice, Westinghouse engineers are maintaining constant strength of signal and are varying the frequency of the transmission by an amount usually not more than from 500 to 800 cycles, which they refer to as "frequency modulation." There has been a great reduction of the number of valves and power required; all modulator valves are eliminated, which (at KDKA) means 12 of the 10-kilowatt water-cooled type. In present-day methods of broadcasting, half the total energy supplied to the transmitter is absorbed and dissipated as heat, amounting to 80,000 watts; this energy is now saved and can be made available to increase the power of the transmitter if desired. So radical is the departure from the present practice that engineers hesitate to forecast the improvements likely to result from the general application of the new system."

According to Reuter's Agency, successful experiments indicate that approximately 1,900 stations can operate in exclusive channels at one time without sharing waves or "splitting" time, and the Company claims that the system will solve the congestion problem which the Radio Commission is now attempting to deal with, and will permit the operation of 300 applicants for licences in addition to the 680 stations already licensed.

A very friendly reception, says the same agency, was given by members of the Federal Radio Commission to a suggestion of the National Association of Broadcasters that radio stations be named instead of merely listed by call letters. At the same time, members suggested that such a movement might come from the broadcasters and need not alter the present plan of classifying stations for licensing and regulation. A commissioner, Mr. Caldwell, said that there was a good deal of protest against the constant repetition of a combination of letters. He saw no objection to the use of a name by a station, though of course the licence would have to contain some method of registration by letter, or number. Radio inspectors were at present continuously testing the ability of each station to stay in its assigned radio channel and the announcement of the letters helped them to keep this check, but when the reassignment of broadcasting channels had been made and radio transmission had settled down thoroughly the call letters might be dropped almost completely and the lawfully operating station use its name.

The Federal Radio Commission has, however, directed all stations to announce their call letters and location once every 15 minutes at least. It has also ordered that all stations must not deviate more than half a kilocycle from the wavelengths assigned to them. Owing to constant complaints of interference caused by broadcasting stations using too much power within residential sections of Chicago, three of them have been directed to reduce their maximum power output to 500 watts, effective at once, and to use no more until further notice.

World Radio states that the United States Department of Commerce has estimated unofficially that the total investment in radio in the United States was, on Jan. 1, 1927, approximately \$750,000,000, which figure is the estimated aggregate of the current value of the 6,500,000 receiving sets in use, and of the investment represented by the 700 or more broadcasting stations, the 2,550 manufacturing plants, and the 30,000 dealers.

Although the annual meetings of the Eastern and the Eastern Extension Telegraph Companies were briefly noticed in last month's Memorabilia, justice would not be done to the fascinating speeches made by the Chairman, Sir John Denison-Pender, on these two occasions, were room not to be found in these columns for at least an abridged report of each of the two statements.

Speaking at the meeting of the Eastern Telegraph Company, Sir John said: "We have received a contribution from one of our subsidiary companies of £206,500, and had thus been able to write off entirely the remaining balance of £493,000 in respect of expenditure on new cables and cable renewals. Nearly four and a half million pounds had been charged against the reserve fund since the Armistice in respect of new cables and cable renewals, and since the company was formed approximately twelve million pounds had been so charged. Their negotiations with the British and French administrations with regard to the direct line between Paris and London had been successfully concluded, and the new direct route was opened for service on Mar. 1 last. Negotiations had practically been completed both with the Palestine and Egyptian administrations for the laying of a new cable between Egypt and Palestine. The negotiations with the Greek Government had been brought to a satisfactory conclusion, and they had been granted a concession for 50 years. It had been decided to lay further submarine cables between Alexandria and Port Said and underground lines between Port Said and Suez. The improved means of communication would enable them to install their direct regenerator system between London and India, with substantial benefits to the service. Thirty-one cables of the associated companies were now being operated by the regenerator system: this gave considerable increase in capacity with resultant gain in transmission times. Having carefully watched the development of wireless during the past 30 years, he (the chairman) had no cause to alter the opinion formed and expressed over that period that the cables would remain more reliable than the wireless service. The prospect of the return to normal trade conditions would counterbalance to a very large extent the present-day competition with which they were faced, but the obvious solution, in the interests of the public and others, was co-operation in some form or another which would eliminate wasteful and unremunerative expenditure and, at the same time, provide a dual and alternative means of communication. Given a fair field for the unrestricted development of the cable industry, it would continue to prove itself the best and most reliable means of telegraphic communication.

Speaking two days later to the shareholders of the Eastern Extension, Australasia & China Telegraph Co., Sir John reported that the actual traffic receipts showed a decrease of £35,115, but in view of the disorganised trade conditions, the result could not be considered as unsatisfactory. In conformity with the action taken by the cable system worked by the Pacific Cable Board their tariff had been reduced. That reduction of tariff and the competitive "beam" service must naturally result in a certain loss of revenue. Their thanks were due to the Commonwealth Postal Department for the speedy construction of the new land-line between Adelaide and Perth. Worked in conjunction with the duplicate Perth-Cocos cable, it had already proved itself a valuable adjunct to the system.

With the state of affairs at present ruling in China, it had been found impossible for the Great Northern Telegraph Company and themselves to continue negotiations with the Chinese Telegraph Administration, and these had been postponed until a more opportune time. China failed to pay the instalment of a loan which fell due on June 30, 1922, and after extending every possible consideration and realising that affairs in China were not tending to become stabilised, but rather the reverse, the companies decided to exercise their lien, whereby amounts falling due to the Chinese Administration as its share of the revenue derived under the joint purse agreement had, since January, 1927, been retained by the companies and placed towards the liquidation of outstanding instalments. Interruptions of their cables had been few in number, and owing to duplication throughout the system, quite immaterial.

The *Westminster Gazette's* New York correspondent, *a propos* of the transatlantic flight by Lindbergh, makes the following statement: "Experts here (New York) analysing Lindbergh's trip claim that he followed the lines of the Western Union Telegraph Company's northern cable, and conclude that cables may serve as guides for seagoing airplanes."

There are one or two questions one would wish to ask before accepting this pretty little theory and the first would be: "Who were the experts, and in what science were they expert?"

Among the Birthday Honours there can be nothing but intense satisfaction at the O.B.E. conferred upon Lt.-Col. A. G. Lee, M.C., M.I.E.E., while the Cable Room C.T.O. will doubtless acclaim the decoration of Major J. J. Munro, Deputy Inspector-General of Telegraphs Egyptian Government, as yet another tribute to the high capacity and worthiness of their former colleague-telegraphist.

It is also noted that Mr. H. M. Johnson, Asst. Telegraph Engineer, Sudan Telegraphs, and Mr. R. Moffat, Asst. Engineer, Posts and Telegraphs Department Palestine, have also been duly honoured for good work done.

Last, but not least comes another telegraphist, namely, the much respected Mr. H. Sparkes, O.B.E., Controller of Stores, who has been promoted by the King to C.B.E., yet another piece of reflected glory for the C.T.O., where he was also at one time a telegraphist.

FIFTY YEARS OF BAUDOT.—In July, 1877, the first practical communication by means of the telegraph apparatus, now known the world over by the name of its inventor, M. Emile Baudot, was instituted in the country of his birth. The system constituted a revolution in telegraphy and has had many imitators.

Baudotists in the C.T.O., Paris, says *L'Interligilo*, are desirous of celebrating the 50th anniversary of this historic invention and to honour the memory of its inventor. A committee has been appointed with M. Delatête, Minister of State and General Secretary of the P.T.T., as president.

A national subscription has also been opened in P.T.T. circles, with the object of erecting a bust of M. Emile Baudot.

With No. 2,587, the issue of June 24, our much-admired and respected contemporary the *Electrical Review*, completed its one-hundredth volume. It may not be generally known among the younger generation of our readers that this now well-recognised authority on every phase of matters electrical started its career on Nov. 15, 1872, as the *Telegraphic Journal*, and added "Electrical Review" as a sub-title the following year, the present format being adopted in 1882, when a wider field presented itself. Our respectful and sincere congratulations!

In a little book on Television recently published by Sir Isaac Pitman & Sons, Ltd., by A Dinsdale, A.M.I.R.E., the author appears to have very considerable faith in the ultimate success of Mr. Baird's experiments although the writer of the interesting brochure admits that "the transmitter has not yet left the laboratory."

According to the *Electrical Review*, at the annual meeting of the *Union Internationale de Radiophonie*, which was recently held in Lausanne, agreement was arrived at on certain questions, with regard to which experience has shown the need of international collaboration, which are to be discussed at the coming international conferences at Washington and Rome. The adjustment of some of the wavelengths allocated in the Geneva plan was also discussed, but the suggested modifications have yet to be approved by the respective Governments. It was decided, among other things, to establish a permanent central post where a check will be kept by nightly observations on the stability of wavelengths from the technical point of view.

The following broadcasters have been elected members of the Union: Polskie Radjo (Poland), Radiogenossenschaft Basel (Switzerland) and Nederlandsche Draadloze Omroep, the Dutch organisation which will shortly work the Huizen station. Extra-European associate members have been elected as follows: National Broadcasting Co. (U.S.A.), Nihon Hoso Hyokai (Nagoya, Japan), Indian Broadcasting, Ltd., Amalgamated Wireless (Australasia), Ltd., Cuban Telephone Co., the Peruvian Broadcasting Organisation, and General Broadcasters, Ltd. (Australia). The European broadcasting organisations which are members of the Union now direct 113 transmitting stations serving approximately 7,000,000 receiving sets.

Vice-Admiral Cappendale (Great Britain) was re-elected president of the Union; Messrs. H. Giesecke (Germany) and R. Tabouis (France) vice-presidents; and M. M. Rambert, delegate of the Council.

W. T. Henley's Telegraph Works are one of a small group of cable makers which for years have enjoyed considerable prosperity. The trading profit last year was nearly up to the previous year's level at £306,984.

In connexion with the recent Colonial Conference in London the *Electrical Review* states that when wireless problems were discussed before it, "the opinion was expressed that progress in the application of wireless-telegraphy was so rapid that the formulation of a definite general scheme for the Colonies would be premature. It was pointed out that the amount of work in the Colonies and Protectorates had not been very extensive. During the past 15 years about 30 small stations had been erected, and were utilised for local requirements and communication with shipping, but they were regarded as the preliminary links in a chain of inter-Imperial communication which might ultimately be established. The adoption of a short-wave service between Singapore, Penang and neighbouring States is contemplated by the Straits Settlements Government, and Kenya looks forward to being in a position to pick up short-wave transmissions from this country."

For nearly two years the British Broadcasting Corporation (*née* Company) has expressed its willingness to co-operate in any practical scheme having for its aim the interchange of programmes between the many parts of the British Empire, but was obviously hampered by restricted financial resources. The Corporation has actually, however, received permission to construct the necessary experimental apparatus, but the question is a huge, not to say also a complicated, one, as was apparently recognised by the meeting of the Conference in London on May 20 when, according to our contemporary, "the delegates are reported to have expressed a desire for the formulation of a policy of broadcasting as a channel of communication and a means of entertainment, but stated that prolonged experiments would have to be made before a scheme of distribution throughout the Empire could be regarded as technically practicable in all respects. Ceylon took the lead in establishing a broadcasting service in 1924, and Hong Kong, Palestine, the Gold Coast, Cyprus, and Zanzibar have been considering the possibilities of setting up broadcasting services."

It is of interest to remind our readers that the Sydney (Australia) broadcasting station (2BL) successfully relayed the (5 to 8 p.m., May 20) programme of the British Broadcasting Corporation's London station (2LO) between 3 and 6 a.m. on May 21. The relay took place via the B.B.C.'s Daventry station (5XX, 1,600 m.) and the short-wave station of Messrs. Philips in Holland; it was relayed again by Broadcasters, Ltd., from Sydney to New Zealand, and in South Africa also from the Cape Town, Johannesburg, and Durban stations, while the programme was heard at Rangoon in India as well.

This feat of PCJJ, the Philips experimental station at Eindhoven, Holland, which broadcasts on a wavelength of 30.2 metres, merits attention, and its success has been mentioned on more than one occasion in these columns.

It is not inappropriate at this point to mention that the Australian Beam created a record for the Derby result that it will be very difficult to beat. It is even stated by some that the actual limit of physical possibility was reached.

The wisdom of working cables and wireless communications between any two cities, under the same roof and indeed in close physical contact, was also very clearly demonstrated during the May interruption of the Imperial cables, if such policy ever needed demonstration to experienced telegraph traffic experts.

Despite the special pressure upon space in the present number, the cause of which will be readily appreciated, and the justification for which no one will question, it would be ungracious to omit from the present number a few words of appreciation of Mr. J. D. Laxton, Superintendent, C.T.O. (Inland), who reached the age-limit a month ago. Mr. Laxton leaves behind him a host of friends and quits the service he has served so well in an atmosphere of affection which many of us might well envy.

Congratulations to Mr. G. E. Taylor who, it is understood, succeeds to the vacancy thus created.

A much respected reader and correspondent of the *T and T. Journal* forwards me the following probably unique record of two C.T.O. telegraphists:—

In April of this year there passed away Mrs. E. E. Lemon, relict of Mr. Charles Lemon, both of the old Electric Telegraph Company and of T.S. Mrs. Lemon entered the Company's service in 1865 and married twelve years later, surviving her husband by four years. Her will has just been proved for over £70,000!

Literary Ethics.—We assume that all thought is already long ago adequately set down in books—all imagination in poems. . . . A very shallow assumption. Say rather, all literature is yet to be written. Poetry has scarce chanted its first song. The perpetual admonition of Nature to us is "The world is new, untried."—Emerson, in *The Conduct of Life*.

J. J. T.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations working at April 30, 1927, was 1,517,842. New stations during April numbered 22,100 and ceased stations 13,044, resulting in a net increase of 9,056, on the total at the end of March.

The growth for the month is summarised below:—

Telephone Stations—	London.	Provinces.
Total at April 30	535,654	982,188
Net increase for month	3,588	5,468
Residence Rate Installations—		
Total	116,654	189,548
Net increase	1,376	1,765
Call Office Stations—		
Total	4,758	17,335
Net increase	34	125
Kiosks—		
Total	478	2,670
Net increase	13	84
Rural Party Line Stations—		
Total	—	9,987
Net increase	—	—
Rural Railway Stations connected with Exchange System—		
Total	—	758
Net increase	—	13

A brief review of the trunk statistics for the year 1926/27 is as follows:—

The total number of inland trunk calls dealt with was 94,661,136, an increase of roughly 8½ millions, or 10.0% over the figure for the previous year.

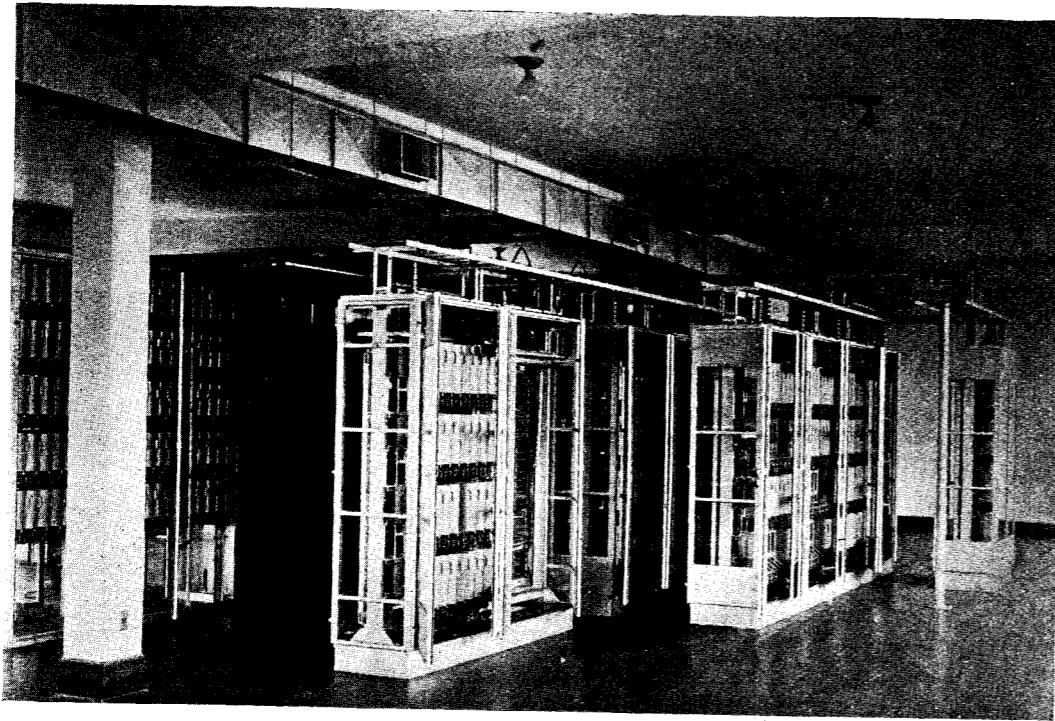
A comparison of the inland trunk statistics for the two past financial years is below:—

	1925-26.	1926-27.	Increase.	100%
No. of Trunk calls	86,001,248	94,661,136	8,659,888	10%
No. of Exchange Lines (mean for year)	838,813	920,207	81,394	10%
Average No. of Trunk Calls made per Exchange Line	103	103	—	—
No. of Trunk Circuits at end of year	13,075	13,955	880	7%
Average No. of Trunk Calls made per working day	278,321	306,347	28,026	10%

During the year 1926/27 283,121 calls were made to the Continent, representing an increase of 58,934, or 26%, over the total for the previous year.

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TELEPHONE EQUIPMENT

The Telegraph and Telephone Journal.

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

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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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No. 148.

JOHN LEE.

MR. JOHN LEE, C.B.E., who retired from the Service on June 16, having then attained the age of sixty, entered the Post Office at Liverpool as a Second-Class Telegraphist in January, 1883; reached the grade of Assistant Superintendent in May, 1901; was transferred to Headquarters as Assistant Traffic Manager for telephone purposes in October, 1907; rose by successive promotions to be Deputy Chief Inspector of Telegraph and Telephone Traffic in April, 1916; was appointed Postmaster of Belfast in July, 1917; and returned to London in July, 1919, as Controller of the Central Telegraph Office, which post he occupied till his retirement.

Thus far (though in slightly fuller detail, and with even greater economy of words) the Establishment Book of the Post Office. Let us not despise this bald chronicle of official facts, in which we may trace the stages of Mr. Lee's ascent from almost the lowest rung of the telegraph ladder to its summit. But let us not look to it for any revelation of that which is our concern here—of the essential John Lee: as well might we expect Bradshaw to convey a sense of the glory of motion. Nor, again, shall we find much help in the chronicle—sufficiently impressive in itself—of his principal achievements during his long term of service. We merely record, in passing, that he reorganised the Indian Railway telegraph system in 1909-10; that he was in 1916 a member of the Committee on

High-Speed Telegraphy, which inaugurated a far-reaching departure in Post Office telegraph practice; that in 1917 he did important work in France in connection with the employment of women as telegraphists and telephonists behind the lines; that in 1920 he was a member of the Post Office delegation to a European conference held at Paris, under the auspices of the Transport Committee of the League of Nations, for the restoration of European communications; that in 1925, again at Paris, he played a brilliantly successful part, as leader of the British Delegation, in the International Telegraph Conference; that, finally, he was a member of the International Committee which met last year at Cortina to study the question of code language in telegrams. These are, after all, but lifeless facts: and our concern is with a living fact, which belongs to a different order of things.

We may get somewhat nearer to the essential John Lee by turning from dry facts to characteristics and qualities. An Establishment Book which dealt with these more important matters (if such a wild flight of imagination may be permitted) would have much to record, in its laconic style, under the heading of John Lee. As thus: open and attractive manner; humour; generosity and warmth of heart; a genius for friendship; a rare gift of words (the compiler-in-chief would probably cut out his subordinate's audacious reference to the Blarney stone); dynamic energy; rapidity of thought and action; breadth of outlook; idealism combined with shrewd practical sense; an invincible optimism. And so forth. All very well, no doubt, in its way—yet still quite inadequate. For by no summary, whether of facts or of characteristics, can we arrive at that *je ne sais quoi* which is the all-important thing. We seek in vain to catch and fix in words the personality, the ultimate differentia, the unique John-Lee-ness of John Lee—that indefinable something which has made him a singularly vivid and arresting figure among the actors on our Post Office stage, and one destined, after his exit, long to be held in the affectionate recollection of those of us whose parts are not yet finished.

Mr. Lee's official duties, though never very light and not seldom highly exacting, have not absorbed more than a part of his abundant store of energy: indeed, the over-spill has been little short of phenomenal in its magnitude and the variety of its directions. His work for this Journal—his editorial contributions to which were anonymous merely in the formal sense of being unsigned—lay within the sphere of the quasi-official. In the Institute of Public Administration, of which he was one of the founders and moving spirits (he served both as Chairman of its Council and as Editor of its Journal), he had a field of work which, while it reached beyond the limits of the Post Office, was yet in the main an affair of Civil Servants. But these more or less intramural activities are but a fraction of the whole. Mr. Lee has been able to double—or rather treble—the part of Civil Servant with those of student and teacher. He has taken degrees at two universities, and has made himself an authority in the field of economics, in which his literary output is both considerable in quantity and distinctive in quality. The fact that he has been chosen to edit the Dictionary of Industrial Administration, about to be published by Messrs. Pitman, is sufficient

indication of the position attained by this amazing amateur in what we are apt to regard as a close preserve of the professionals : so also his chairmanship on no less than five occasions of Industrial Conferences at Oxford and Cambridge. That position he owes not only to his books, but also to his ceaseless activity as a lecturer on economic and industrial questions. The dominant note of his work in this field has always been an insistence on the subordination of the mechanical to the human element in industrial relations, and a steady warfare against the tendency of the machine—be it the physical or the administrative machine—to cramp and fetter the human soul.

Mr. Lee has, unfortunately, had to pay the penalty of his devouring energy and his versatile genius. At the beginning of this year his health broke down, and he was forced to give up both official and non-official work some months before the date of his retirement. That he was unable to resume his official duties, even for a short time, is a matter of the keenest disappointment to all of us, as it must have been to himself. We console ourselves with the hope that a period of complete rest will restore him to health and vigour, and that, freed from official trammels, he will yet be able for many years to carry on the good fight for the humanisation of industry.

L. S.

TRUTH AND FICTION.

ATTACKS on the British telephone system are usually bolstered up by extravagant statistics. Why, we do not know, for it is common knowledge that America is far ahead of Europe in telephone development, and we should have imagined that accurate figures would sufficiently demonstrate the shortcomings of the Old World. But, somehow, our critics do not think so. Last month the *Daily Express*, with the familiar concomitants of fat headlines, comic pictures and articles by "experts," in criticising "out of date Post Office methods" stated that in "the whole of the Kingdom there are fewer telephones than are at work in many a single town in America." The truth is that in Great Britain and Northern Ireland at the beginning of this year there were 1,510,755 telephones, particulars of which we gave in our February issue. In New York at the same date there were 1,502,376 telephones. Thus, not many, but not any cities in the United States have more telephones than Great Britain. According to the latest figures (those for Jan. 1, 1927) the following were the cities of the world with the largest number of telephones :—

New York	...	...	1,502,376
Chicago	...	...	848,017
London	...	...	519,969
Berlin	...	...	427,070

It will be seen that not only in America but in the world, only two cities have more telephones than London. Only two countries have more telephones than Great Britain, viz., the United States with 17,746,152 and Germany with 2,688,495.

RETIREMENT OF MR. JOHN LEE.

JOHN LEE FROM A STAFF SIDE POINT OF VIEW.

BY A. C. WINYARD.

THURSDAY, June 16, 1927, saw the last General Order issued to the staff of the Central Telegraph Office by Mr. John Lee. In a few brief and characteristic sentences he announced his retirement and conveyed his farewell to the staff of the largest telegraph office in the world, which he had governed as Controller for so long. In this quiet fashion—so typical of the man—did the greatest Controller in the history of the C.T.O. pass away from the scene of his activities to a retirement which, however well-earned, is, one ventures to suspect, not altogether welcome.



MR. JOHN LEE.

The first chapter in the post-war history of the C.T.O. has thus closed ; a chapter distinguished for all time by the initiation of a regime of efficiency running concurrently with that humanitarian attitude which has always typified the administration of Mr. Lee wherever he has been.

Reflections on the past inevitably follow an event of this character, and memories of Trenam, Newlands, and Eames pass naturally through the chambers of one's mind.

In their own way all those mentioned were vivid and dominant personalities, though combining in more than one instance a rigidity of outlook with stressful and successful ideas which have been inscribed so deeply in the office annals. Not one, however, belonged to the same school as Mr. Lee, and somehow one fears that the majority of bygone Controllers would have been sadly out of tune with the spirit prevailing in these days of Whitleyism.

It was, perhaps, just as well for the peace of mind of the C.T.O. Staff, not to mention that of the Secretariat, that the advent of Mr. Lee to office coincided with the new outlook on staff matters.

It is not necessary to draw invidious comparisons, but the younger men now at the C.T.O. can scarcely believe that a time existed when for many men and women the daily travel to the office was a journey to an eight-hour sojourn in purgatory. The older men and women will remember it well enough. No man or woman can now say that the C.T.O. is other than a pleasant place in which to work, provided he or she performs the appropriate side of the bargain.

Concurrently, efficiency has been increased to a marked degree, a supreme achievement indeed when one remembers the difficulties of administration following the war period.

Mr. Lee can justifiably be proud of the part he has played in this respect, and in later years the Central Telegraph Office will recall with grateful pleasure the historical position he has secured for it in public estimation.

During an earlier period of his career, while stationed at Belfast, he had voluntarily introduced a system of staff consultation on the Whitley model, and it was fitting, therefore, that the official adoption of the Whitley system throughout the Civil Service should coincide with his appointment as Controller in London. Automatically he took the Chair on the introduction of the system in the C.T.O., and he has filled the position ever since. By a coincidence the Staff Side of the Committee has also honoured me by election to the Vice-Chair throughout the whole of the period so that unusual opportunities have fallen to my share over a period of years to learn something of Mr. Lee's methods, and observe the play of his temperament.

It would simply be stating the obvious if one said that in the handling of the many intricate problems which have confronted a man in his position he has used infinite patience and tact. This has been patent to all observers.

What has definitely struck me has been his consummate ability in overcoming difficult situations by securing in subtle manner that breathing time which is so necessary for reconsideration of a question if successive crises are to be avoided. His innate quickness of mind naturally did not render the task of the Vice-Chair an easy one, but that is all in the day's march.

His dexterous handling of difficult problems on which the Staff Side view differed from his own, was always a matter for admiration, though his almost uncanny command of language often rendered a counter speech a necessity. Discussions have nearly always been exceedingly keen, but he was always most courteous in debate and no hint of "scenes" ever marked the proceedings.

He can rest assured that in his retirement he carries the unanimous esteem of the staff and perhaps the greatest tribute that can be paid is that from every point of view he has left the C.T.O. a better place than he found it.

It is reassuring in the hour of his departure to know that his successor, Mr. Stuart Jones, will carry on by high endeavour and frank forthrightness the high standard so worthily established.

SOME APPRECIATIONS BY FOREIGN AND COLONIAL COLLEAGUES.

BY MONSIEUR E. BROIN, VICE-PRÉSIDENT DE LA CONFÉRENCE
TÉLÉGRAPHIQUE INTERNATIONALE DE PARIS.

L'ORGANISATION et la mise en œuvre des moyens d'action de plus en plus puissants que nécessite la correspondance électrique internationale exigent, on le comprend, une collaboration directe

et amicale et de tous les moments de la part des chefs d'exploitation de chaque pays intéressé. On doit reconnaître que, s'exerçant en ce qui concerne les relations entre la GRANDE-BRETAGNE et la FRANCE, cette nécessaire collaboration a, au cours des dernières années, donné les plus heureux résultats. Il m'est agréable de dire ici que, du côté français, on en attribue tout le mérite à M. JOHN LEE, Controller of the Central Telegraph Office, à son initiative prévoyante toujours en éveil, à ses dispositions conciliantes dans les études poursuivies en commun à ce propos.

Mais c'est surtout dans la discussion des intérêts généraux de l'Union télégraphique universelle, lors de la Conférence de PARIS en 1925, que se sont affirmées aux yeux des représentants de toutes les Administrations assemblées la hauteur de vues, la maîtrise supérieure de M. JOHN LEE, alliées à la droiture et à la fermeté du caractère.

Appelé par acclamation à présider les travaux de la grande commission qui devait reviser les règles de service de l'Union, règles alors vieilles de quinze années, M. JOHN LEE a su mener à bonne fin et à la satisfaction de tous cette tâche entre toutes difficile. Sans abandonner jamais la manière courtoise et souriante qui est le secret d'une autorité personnelle à laquelle chacun se plaît à rendre hommage, il a su constamment tenir les discussions à un niveau élevé, obligeant toutes les opinions, et même les intérêts, à céder sur les considérations de détail, à compter avec les nécessités d'ensemble du présent et à préparer l'avenir merveilleux qui attend la correspondance télégraphique mondiale.

Lorsque la délicate question des tarifs se présenta devant la Conférence, la même largeur d'idées, le même souci des intérêts économiques généraux inspirèrent les interventions de M. JOHN LEE, vigoureusement soutenues en toutes circonstances par le très distingué M. F. W. PHILLIPS, secrétaire adjoint au Général Post Office. La plupart des délégations réclamaient avec insistance le relèvement des parts unitaires qui rémunèrent la participation des Offices au trafic télégraphique international. A l'encontre de ces exigences, M. JOHN LEE fit valoir le danger qu'elles comportaient pour le commerce et l'industrie considérés dans leur activité mondiale. Or, cette activité a le plus grand besoin d'être facilitée et encouragée, dans le moment où toutes les nations s'efforcent à reconstituer leur condition économique bouleversée par la guerre. Il fit valoir aussi que l'opportunité manquait pour augmenter les taxes demandées au public, alors que l'utilisation plus étendue des moyens nouveaux que permet la T.S.F. devrait plutôt en commander la réduction. L'argumentation de M. LEE, si puissamment servie par sa connaissance approfondie des questions d'économie politique et sociale, ne manqua pas de faire impression sur la Conférence, qui, finalement, limita à des chiffres raisonnables les majorations demandées dans un souci uniquement fiscal.

C'est avec la même volonté de faciliter toujours davantage le développement de la télégraphie mondiale, que M. JOHN LEE participa aux travaux du Comité international constitué par la Conférence de PARIS pour rechercher les bases d'une tarification nouvelle applicable au langage télégraphique convenu. Je me garderai bien, la question restant ouverte, de formuler aucune appréciation sur la valeur des opinions qui se sont confrontées devant ce Comité. En tout cas, je puis dire que l'action prudente de M. LEE en cette circonstance a été fort remarquée. Elle a encore augmenté la très haute considération dont il jouit dans l'Union télégraphique et elle a donné à celle-ci de nouveaux motifs de placer M. JOHN LEE au premier rang des hommes éminents de qui les avis sont le plus profitables à l'Union et qui lui font le plus grand honneur.

E. BROIN.

[The organisation and operation of more and more powerful means of action necessitated by international electric communication require, it will be understood, direct and amicable collaboration at all times on the part of the chiefs of the service of the countries concerned. It should be recognised that this necessary collaboration, exercised in the relations between Great Britain and France in the course of late years, has given the happiest results. It is pleasant to me to say here that, on the French side, all the merit for this is attributed to Mr. John Lee, Controller of the Central Telegraph Office, to his watchful foresight and initiative and to his conciliatory disposition in the common studies pursued for this purpose.]

But above all it is in the discussion of the general interests of the International Telegraph Union at the Conference at Paris in 1925, that the loftiness of Mr. John Lee's views, and his mastery, his uprightness and firmness of character have been confirmed in the eyes of the representatives of all the assembled administrations.

Called upon, with acclamation, to preside over the labours of the *grande commission* to revise the service regulations of the Union—rules then 15 years old—Mr. John Lee knew how to bring this difficult business to a happy conclusion to the satisfaction of all. Without ever abandoning that courteous and smiling manner which is the secret of a personal authority to which all are pleased to render homage, he knew how to keep the discussions on a high plane, obliging all opinions and even interests to yield upon considerations of detail, to take into account the present necessities of the whole, and to prepare for the marvellous future which awaits world-telegraphy.

When the delicate question of tariffs came up before the Conference, the same breadth of ideas, the same care for general economic interests inspired Mr. Lee's interventions, vigorously sustained in all circumstances by the distinguished Mr. F. W. Phillips, assistant-secretary at the General Post Office. The majority of the delegates called insistently for the raising of the unit charges for international telegraph traffic. In view of these exigencies, Mr. Lee made them appreciate the danger they threatened to commerce and industry in their world-wide activity. Now this activity has the greatest need of being facilitated and encouraged at a moment when all nations are obliged to reconstitute economic conditions upset by the war. He also made it appreciated that it was no opportunity for increasing public charges at a time when extended use of the means offered by wireless rather suggested a reduction. Mr. Lee's arguments, powerfully supported by his profound knowledge of questions of political and social economy, did not fail to impress the Conference, which at last limited to reasonable figures the increases demanded to purely for fiscal reasons.

It was with the same will ever to facilitate further the development of world-telegraphy, that Mr. Lee took part in the labours of the International Committee constituted by the Paris Conference to find bases for a new tariff applicable to code-language telegrams. I forbear, the question being open, from formulating any appreciation of the value of the opinions placed before this committee. In any case I can say that Mr. Lee's prudent action on this occasion was much remarked on. It has increased still more the high consideration which he enjoys in the Telegraphic Union, to which it gives new motives for placing Mr. John Lee in the front rank of the eminent men whose opinions are most valuable to the Union and do it the greatest honour.]

BY MINISTERIALRAT OTTO ARENDT, BERLIN.

JOHN LEE will Feierabend machen. Er räumt die Arbeitsstätte auf und legt besinnlich das Werkzeug zusammen. Wir nehmen regen Anteil an allem was in diesen Tagen sein Herz bewegt, wo er eine Arbeit beschliesst, die bis dahin sein Leben ausgefüllt hat, wo er zurückblickt auf Mühen und Erfolge. Wir alle grüssen ihn heute, die wir ihn kennen, und das sind nicht wenige. Wenn man auch zu jeder Zeit vom Londoner Telegraphenamnt und von seiner Bedeutung gewusst hat, so war doch die Person seines Leiters dem internationalen Kollegenkreise nicht immer so vertraut und so beliebt wie JOHN LEE.

Sein Amt war ihm keine Bürde; man las es aus seinen Augen, dass es ihm Freude und Befriedigung schuf in seinem Reich zu wirken. In froher Harmonie schloss sich ein weiter Kreis von Mitarbeitern um ihn und gern kehre ich in der Erinnerung zu der Stunde zurück, wo ich bei einem Besuch in London in diesen Kreis eintreten durfte, begrüsst von JOHN LEE, aus dessen heiterem Gesicht eine Freude lachte, die von innerem Gleichgewicht getragen wird. Wir kannten uns seit langen Jahren. Er hatte uns mit seiner Gattin in Berlin besucht, um die deutschen Einrichtungen zu studieren und wir haben uns nicht nur über Sicherheit und Schnelligkeit von internationalen Telegrammen, nicht nur über die Wirtschaftlichkeit unseres Dienstes unterhalten, sondern von Allem, was des Menschen Herz in seinem Werden und Streben bewegt. John Lee wusste überall Bescheid und entpuppte sich als ein geschickter und liebenswürdiger Schriftsteller und Redner.

Als nach dem grossen Weltkrieg die Länder Europas sich in Paris zusammenfanden um sich darüber auszusprechen, wie die alten Verkehrslinien möglichst schnell wieder in Gang zu bringen wären, da bekannte JOHN LEE durch einen warmen Händedruck, dass das Wort von der grossen Familie der Telegraphisten für ihn nicht leeres Wort, sondern aufrichtige Wirklichkeit war.

Bei einem Besuch in London traf ich ihn im Fahrstuhl und erlebte die ersten Stunden seines Dienstes mit ihm. Wie dankbar ein freundlicher Gruss, eine kurze teilnehmende Frage nach persönlichen Verhältnissen von dem ihm unterstellten Personal anerkannt wurden, offenbarte sich schon auf unserem kurzen Wege über den Korridor. Der Schreibtisch in seinem Zimmer ist leer, denn der Leiter eines Betriebes in dem so intensive, so schnelle und so genaue Arbeit zu leisten ist, wie in einem grossen Telegraphenamnt, befasst sich nicht viel mit Feder und Papier sondern steht mitten drin im Getriebe seiner Räder, und hört und sieht und konzentriert alle seine Sinne darauf, dass die Zusammenarbeit all der vielen einzelnen Teile eine möglichst hohe Gesamtleistung ergebe. Einige Briefe, an den Leiter des Amtes persönlich gerichtet, waren schnell gelesen und ebenso schnell war die Antwort diktiert; es schien mir, als wenn diese Antworten darauf angelegt wären, ein besonders freundliches persönliches Verhältnis mit dem Briefschreiber herzustellen. Und dann war die Bahn frei für den täglichen Gang durch alle Dienststellen des weitverzweigten Amtes und für die Besprechungen mit den Mitarbeitern.

Im Herbst 1925 sahen wir JOHN LEE in Paris als den Führer der britischen Delegation zum Welt-Telegraphen-Kongress. Die Versammlung wählte ihn zum Vorsitzenden für den Ausschuss zur Beratung der Betriebsvorschriften. Sie ist mit ihm wahrlich nicht schlecht gefahren. Den Betrieb kannte JOHN LEE, und wer den Stoff beherrscht, der kann Verhandlungen so führen, dass erspriessliche Arbeit geleistet wird. Meinungsverschiedenheiten lassen sich durch logische Beweisführung ja nicht immer aus der Welt schaffen, aber JOHN LEE wusste sie durch das Berühren einer menschlichen Saite immer freundlich zu überbrücken. Unter seinem Vorsitz zu arbeiten war ein Vergnügen, und keine Sitzung schloss ohne eine erheiternde Anregung unseres Vorsitzenden, die zuweilen vielleicht auch unfreiwillig herauskam, wenn ihm die verflixte Ähnlichkeit der französischen Sprache mit seiner Muttersprache ein Schnippchen schlug. Warm und herzlich war der Dank der Versammlung am Schluss der Kommissionssitzung, und wir werden nicht vergessen wie unser Vorsitzender sein Streben, die gemeinsame Arbeit zu fördern, kennzeichnete, durch eine Anspielung an die im Englischen übliche Beteuerung "your obedient servant."

Wieder trafen wir ihn im Sommer 1926 in Cortina, wo er an der Seite seines Freundes PHILLIPS im Comité d'Etude mit uns über die Vorschriften für die Abfassung der Telegramme in Code-Sprache zu beraten hatte. Der Beratungstoff, so wichtig er für unser Handwerk ist, war trocken und stachlig. Die herrliche Landschaft gab uns wahrlich tiefere Anregungen zum Austausch freundlicher Gedanken. Sollte nun, da JOHN LEE aus unserem dienstlichen Gesichtskreis ausscheiden wird, dieses das letzte persönliche Zusammentreffen gewesen sein, so wird die Erinnerung daran erheitert durch den warmen Schein der Dolomitensonne,—just der rechte Rahmen für das freundliche Bild unseres lieben Freundes.

Ich bin aber der Zustimmung vieler unserer Kollegen im internationalen Dienst sicher wenn ich sage, wir wünschen uns ein frohes Wiedersehen mit JOHN LEE, und wir wünschen ihm noch viele Jahre heiteren Zusammenlebens mit seiner verehrten Gattin und seinen Kindern.
OTTO ARENDT, Berlin.

[John Lee is taking a holiday. He is clearing up his workshop and wistfully putting away his tools. We take a lively interest in all that stirs his heart at this time when he concludes a labour which has hitherto filled his life, and when he looks back on his struggles and successes. All we who know him greet him to-day—and we are not few! Whoever at any time has known the London Telegraph Office and its significance, knows that none of its chiefs was ever so trusted and beloved in the circle of his international colleagues as John Lee.

His office was no burden to him; one read in his eyes that it was a joy and satisfaction to him to work in his metier. In happy harmony he united a wide circle of co-workers round him, and I turn gladly to the memory of that hour when, on a visit to London, I entered this circle, greeted by John Lee, on whose smiling face shone the gladness of an equable disposition. We knew each other for many years. He and his wife had visited us in Berlin to study German installations, and we talked not only of speed and reliability

in international telegrams, not only of the economics of our service, but of all that moves the heart of man in its being and striving. John Lee had knowledge of everything and developed into a clever and kindly writer and speaker.

When after the Great War European countries found themselves together in Paris to consider how the old means of communication were to be set going again as speedily as possible, John Lee signified by a warm pressure of the hand that the word of the great family of telegraphists was for him no empty word but a downright actuality.

On a visit to London, I found him in his chair, and spent the first hours of his duty with him. How thankfully a friendly greeting, a short intimate question on personal affairs, was received by the staff under him, was soon manifested during our short walk through the corridors. The desk in his room is empty, for the chief of a service in which such intensive, rapid and close work is conducted, as in a great telegraph office, does not deal much in pen and paper, but standing at the very centre of the machine hears, sees and concentrates all his thoughts upon obtaining by co-operation of all the many single parts the maximum of service possible. Some letters, addressed personally to the chief, were quickly read and the answer dictated just as quickly: it seemed to me as though those answers were designed to establish a specially friendly connexion with the writer of the letter. Then the way was free for the daily visit to the many branches of the office and for conversations with his colleagues.

In the autumn of 1925 we saw John Lee in Paris as leader of the British delegation to the World-Telegraph Congress. The assembly chose him as president of the Commission du Règlement.

Truly they did not fare ill with him. John Lee knew the service, and whose is master of his material can so guide meetings that profitable work is performed. Differences of opinion do not always yield to logic, but John Lee always knew how, by touching a human chord, to bridge them over in a friendly manner. To work under his guidance was a pleasure, and no meeting closed without a humorous remark from our president. Warm and hearty were the thanks of the Committee at the conclusion of the sittings, and we shall never forget how our president signalled his efforts to further our common labours by a playful reference to the expression, usual in English correspondence, "Your obedient Servant."

We met him again in the summer of 1926 at Cortina, where he, in company with his friend Phillips, had to consider with us in the Comité d'Etude the question of telegrams in code-language. The material for consideration, though important for our service, was dry and thorny. The splendid landscape, however, gave us a deeper stimulus for the exchange of friendly thoughts. If this, now that John Lee has departed from our official circle, should have been our last personal meeting, the memory of it will be enlivened by the warm glow of the Dolomites—just the right frame for the friendly picture of our dear friend.

I am assured of the concurrence of many of our colleagues in the international service when I say that we hope for a joyful reunion with John Lee, and we wish him still many years of happy life with his wife and children.]

BY SIGNOR GNEME, MINISTRY OF COMMUNICATIONS, ROME.

Ho avuto l'onore ed il piacere di conoscere il Sig. LEE nella breve Conferenza delle Comunicazioni Elettriche, tenutasi a Parigi nel Luglio del 1920.

La Conferenza telegrafica internazionale di Parigi del 1925 mi ha permesso di annodare più strette relazioni personali col Sig. LEE, di cui ho avuto agio, durante i lunghi lavori della Conferenza medesima, di ammirare l'alta coltura scientifica ed economica, la solida competenza in tutti i rami dei servizi telegrafici e telefonici, l'abilità nel dirigere le discussioni della Commissione del Regolamento di cui era ben qualificato Presidente, l'amabilità mai smentita anche nei momenti più difficili delle vive discussioni fra tanti Delegati di opinioni divergenti, ed il fine umorismo che gli permetteva con una battuta felice di metter fine ad una pesante seduta, rallegrando il severo ambiente della sala del Consiglio dei Professori della Sorbona—sede delle adunanze della Conferenza.

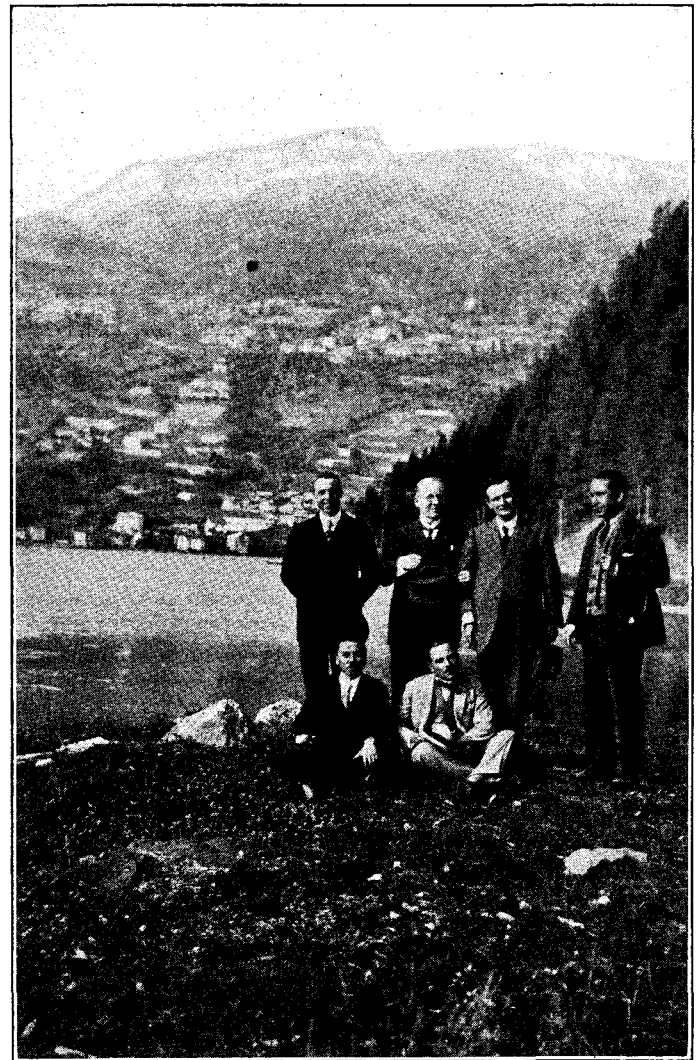
Nell'ambiente luminoso di Cortina, ove è stato tenuto nello scorso agosto il Comitato internazionale di studio del linguaggio convenuto, che ho avuto l'onore di presiedere, la vita comune in albergo e nelle gite fra le bellezze incantatrici di quelle maestose e sempre varie montagne, mi hanno consentito di apprezzare ancor di più le alte doti del Sig. LEE e di stringere seco lui rapporti di cordiale amicizia.

Nel momento in cui il Sig. LEE lascia l'Amministrazione a cui ha dedicato tutta la sua grande capacità ed esemplare attività

gli giungano i miei più vivi auguri di vita longeva, fra la pace della famiglia e le soddisfazioni che certamente gli procureranno gli studi economici di cui è sì alto cultore. GNEME.

[I had the honour and pleasure of knowing Mr. Lee at the short Conference on Electrical Communications held at Paris in the July of 1920.

The International Telegraph Conference of Paris in 1925 permitted me to strengthen my personal relations with Mr. Lee, in whom, during the long labours of this Conference, I had occasion to admire the high economic and scientific culture, the solid competence in all branches of the telegraph and telephone services; the ability in directing the discussions of the Commission de Règlement (of which he was the well-qualified president); the imperturbable



Standing: Mr. PHILLIPS, Sig. GNEME, Mr. LEE.

CORTINA.]

amiability in the more difficult moments of a lively discussion between so many delegates of diverse opinions; and the fine humour which enabled him by a happy stroke to put an end to a heavy session and lighten the severe atmosphere of the Conference Hall of the Professors of the Sorbonne—the seat of the Conference above mentioned.

In the bright atmosphere of Cortina, where was held last August an International Committee on the study of code-language, over which I had the honour to preside, our common life in the hotel and in journeys amidst the enchanting beauty of majestic and ever-changing mountain scenery made me appreciate still more Mr. Lee's great gifts and bound faster the relations of a cordial friendship.

At this time, when Mr. Lee is leaving the Administration to which he has dedicated his great capacity and exemplary activity, I extend the heartiest wishes for his long life amidst family happiness and in the satisfaction which he will certainly derive from those economic studies in which he is so deeply versed.]

BY MR. H. P. BROWN, M.B.E., SECRETARY OF THE POST OFFICE OF THE AUSTRALIAN COMMONWEALTH.

Although my official connexion with the British Post Office was severed some three years or so ago, I reflect with not a little sadness that the time has arrived when one of the most versatile and picturesque personalities amongst my late colleagues is to relinquish his position from that great service.

There is some subtle quality which grants the licence to speak of certain men in terms which would ordinarily be regarded as unduly familiar in other cases. The question of disrespect does not arise. The informal reference does not rob the personality of dignity, but it does certainly convey a sense of affection. Consequently I feel quite free to write of my subject as JOHN LEE. I should certainly be slow to associate the man with any other form of address. I am not one of those who readily adopts the informality, being, perhaps, unduly English, but the question never arises in my mind in thinking of this particular man, who possesses those subtle inherent qualities which make him different from most of us.

To know JOHN LEE has been my privilege for many years. I have never seen him moody or dull, I have never been in his company without being conscious of a new interest and stimulation. There is always a problem to consider, always something to elucidate, invariably a new train of thought opened up, and always a point of view to develop.

The influence of such a mind may not be realised as it should but if one ponders a moment on the outcome of associations of this character, there will be an appreciation of the fact that much enjoyment has resulted, mental activity has been stimulated, and from that fertility of thought undoubted benefits have followed. To make a man think is a great virtue, to do the imaginative work needed to stir another mind, to develop a useful process of thought is a quality of no mean order.

I should imagine that one of the prominent achievements of JOHN LEE's administration has been the degree of co-operation invariably secured in all the many important tasks with which he has been associated.

If a man has the knowledge and competence to guide, and the faculty to command co-operation without demanding it from his colleagues the success of his endeavours is assured. Without any one of these qualities he will fail as a leader of men; his administration may carry on, but there will be no evidence of landmarks on which its history may be written.

There are numerous phases of telegraph and telephone development in the British Post Office with which JOHN LEE's name must always be associated, and in his retirement he can with justifiable pride meditate on the progress and improvements which he has been so largely instrumental in securing. There have been names to conjure with in the Controllers of the Central Telegraph Office, but without fear of challenge I will say none will stand out more prominently than that of JOHN LEE.

It cannot be doubted that much of the success so justly deserved, much of the affection so lavishly bestowed arises from the fact that JOHN LEE is one of the most human of men, unselfish, devoted to the interests of others, zealous to a degree for the advancement of the business for which he is responsible, and consequently jealous for the prestige of the department to which his life's work has been devoted. These qualities are contagious and irresistible, and exercise an enormous influence for good in whatever sphere they are found.

JOHN LEE simply radiates good cheer. His conversation and nimble wit informs and delights, and his mode of expression fascinates. His life has influenced many, and I acknowledge to be one amongst the number. His long years of service have been spent to some purpose, and the impress which he has made will persist long after he has bade St. Martin Le Grand's an official farewell.

It would be in his nature to lay down one task only to pursue another, and I do not doubt that his self-imposed burden will be a continuance of service to others. He knows the secret of Life's happiness.
H. P. BROWN.

BY MR. J. McMILLAN, GENERAL MANAGER OF TELEGRAPHS, CANADIAN PACIFIC RAILWAY, MONTREAL.

IT has been my privilege to have known Mr. JOHN LEE for some years. He has supervised and controlled a national service and has applied his talents and experience to making as near perfect as possible the wonderful telegraph system, the details of which it has been my pleasure to discuss with him. Mr. LEE is as enthusiastic at the time of his retirement as a beginner entering the service.

After many years' experience he is retiring from very heavy responsibility, and notwithstanding the pressure of official duties and the multiplicity of services, he has retained in a wonderful measure the respect of all with whom he came in contact.

Visiting Mr. LEE, discussing and comparing London service with Canadian service has been very interesting indeed, the Central Telegraph Office in London being the greatest telegraph plant in the world, having every known type of telegraph service and connecting direct with almost all points in Europe, with Canada and other Colonial possessions. The building-up of the Central Telegraph Service has been a great achievement; a step by step process, the additions and improvements requiring constant supervision for which Mr. LEE has been at all times practically responsible. The success of the service to-day is a monument to the enthusiasm with which his administration has been so marked.

When men retire there is a certain element of regret, and while no one begrudges Mr. JOHN LEE the period of rest and relaxation which comes as a result of long and efficient service, we are sorry, indeed, to see him sever his direct connexion with the British Telegraphs, and take this opportunity of extending to him our appreciation and wish him many years of good health and enjoyment away from the stress of business.

When I visit London I shall miss Mr. LEE very much. He has at all times shown a sympathetic interest in all that pertains to the service. May he have many happy days and health and strength in such measure as will permit him to enjoy for many years his well earned retirement.

BY COL. H. E. SHREEVE, TECHNICAL REPRESENTATIVE IN EUROPE, AMERICAN TELEPHONE AND TELEGRAPH COMPANY.

To those who have known John Lee over a term of years, the announcement of his approaching retirement from active service with the Post Office comes as a great surprise and something of a shock, for his maturity of judgment, breadth of vision and ripeness of scholarship have never subdued the energy or stifled the driving force of the abundant youth that has ever been his.

His friends in the American Telephone and Telegraph Company remember with pleasure his all too infrequent visits to the United States. We have always profited by his keen analysis of the points of difference in the technical practices of England and America and we have ever been deeply conscious of the whole-hearted friendliness of his comments. It is unthinkable to us that his activities and sphere of influence will decrease. Rather do we picture him as pushing on with renewed vigour in those fields to which his official duties have heretofore permitted him only intermittent access. We heartily congratulate him on the brilliant record of achievement which he is about to complete and on the opportunity for continued intensive devotion to what were formerly his avocations.

May his years be many in continued service toward the goal to which his ideals shall point the way!

REVIEWS.

"*The Post Office.*" By Sir Evelyn Murray, Secretary to the Post Office since 1914. (*The Whitehall Series.*) (Messrs. G. P. Putnam's Sons, Ltd. 7s. 6d. net.)

Sir Evelyn Murray has succeeded, within the modest scope of some 200 pages, in giving a brief history of the Post Office, a review of its finance, an account of the main branches of its activity, and a record of its general organisation and staffing, together with a short chapter on what the Post Office did in the Great War, and a generally prophetic epilogue. So ambitious a task demands a nice sense of proportion and a rigid conciseness; not only does this work display both qualities, but it avoids the dullness which so compressed a treatment frequently entails, without recourse to anecdotal "frills."

The telegraph and telephone services are treated comprehensively, and the main objects of Post Office policy are frankly discussed. In the treatment of inland telegraphs, the explanation of the deficit appears by implication to lay rather too much emphasis on rates of wages as distinct from staff costs; one could have desired a comparison with the telephone service, in which the financial effect of a probably greater increase of wages has been offset by other factors. Under foreign telegraphs we are given the full story of the Wembley telegram which travelled round the world in 80 seconds; but records become out of date very quickly, and the transmission of the Derby result to Melbourne in three seconds by the Australian Beam puts all previous achievements in the shade. Of the Beam system Sir Evelyn writes with optimism; he frankly admits that its intermittence stands in the way of its complete efficiency, considers that if this handicap could be removed, "wireless would be in almost impregnable position," and later in the book expresses confidence that the advance of science will render the handicap practically negligible. In connexion with telephones, Sir Evelyn traces back the difficulties of the present to the errors of the past; but he shows also that the retarded development before 1912 was due not so much to the errors of the National Telephone Company but to the well-intentioned, yet profoundly mistaken, policy pursued by successive Governments.

We could have wished that space had permitted a fuller account of the staffing and organisation of the Post Office; the local organization of a post office is hardly mentioned, and the account of the organisation of Headquarters is perhaps too compressed for the inexpert reader. We are assured, for instance, that "the administration of the Post Office entails an immense amount of clerical labour, ranging from large blocks of purely routine work, such as the keeping of savings bank and other accounts, to highly responsible and difficult duties." It is not quite clear what duties are referred to in the latter category, but the absence of specific mention of any of the other "Treasury classes" suggests that the word "clerical" is used to comprise duties which would not normally be so described. The rôle of the Comptroller and Accountant General is admirably described as a combination of vigilant criticism with "a temperate enthusiasm for the Post Office and its manifold operations."

The book is written mainly for the general reader, and may be specially commended to those who accuse Government Departments of a cautious timidity. Members of the Post Office staff will not find technical exposition; but they will probably be refreshed by the direct vigour of the style and the almost complete absence of that official jargon which is our daily fare. (We note as a minor example the rarity of initial capitals, in contrast to the excessive indulgence in their use which characterises most official publications). The Post Office servant, after reading this book, feels like a dweller in a small suburb of a great city who is taken up in an aeroplane, surveys the whole perspective, and knows himself to be a citizen of no mean city.

HIC ET UBIQUE.

WE heartily congratulate our colleague, Mr. J. STUART JONES, on his appointment to the Controllership of the Central Telegraph Office, in succession to Mr. John Lee. It is an excellent principle to have one of the seats on our Committee filled by the Telegraph Controller and we could not wish for a more acceptable representative than Mr. Stuart Jones.

Towards the end of last month, telephone service was established between London and Stockholm by means of a through circuit between those cities. The charge for a 3 minutes' call between 8 a.m. and 9 p.m. is £1 1s. 6d., and between 9 p.m. and 8 a.m. 12s. 11d. On the 27th communication was established between Great Britain and the Free City of Danzig. The charge for a day call between London and Danzig is 19s.

At the beginning of 1926 direct telephonic communication was available between Great Britain and France, Belgium and Holland only, whilst Switzerland could be reached somewhat uncertainly, owing to the busy state of the Anglo-French lines, via Paris. Through circuits now exist between this country and France, Belgium, Holland, Germany, Switzerland and Sweden, Danzig can be reached via Berlin, and furthermore, with the aid of wireless, the United States and Cuba are also obtainable by telephone. This represents quite a notable progress.

Somebody, says the *Daily News*, should draw up a list of popular fallacies on the lines of those which Lamb prepared a century ago.

Here is one modern fallacy I should like to contribute to the list: "That the Post Office is always slow."

The explanation is that I am glowing with a reflected enthusiasm.

The man next door has had a telephone installed within a week of asking, and he is chanting the efficiency of the State service to every rabid individualist on the morning train.

There is no doubt, however, that the telephone service has vastly improved in recent months. Yet it has become such a consecrated subject of musical comedy jests, that few people ever think of saying a good word for it.

Very true. But if one abolished those consecrated jests where would our comic papers be? *Punch*, for instance, which has the "wrong number" complex, would lose a paragraph a week if debarred from jests on that favourite theme.

According to the American papers, a striking object lesson in the complete dependence of the commercial world on the telephone service has just been afforded in New York.

Following a fire which destroyed the telephone connexions for the Eighth Avenue area, 15,000 instruments were silent for three days and the entire district was in effect wiped off the business map of the city. Worst of all was the plight of those whose businesses were carried on high up in the skyscraper buildings. The fire had destroyed also the electric cables that supply the power to the lifts. "We could do just as much business on a desert island," said a manager ruefully.

Many offices closed for the time being. Some took temporary accommodation in other sections of the city where the telephone service was not impaired; others struggled along by using messengers.

As the *New York Times* said: "The telephone is one of those great conveniences or blessings of which we think little until we are deprived of them. It has become second nature to believe that we have only to take down the receiver in order to be brought into instant touch with whom we wish to speak on business, social or personal affairs. It is a striking tribute to the excellence of the service that people feel so lost and bewildered when it is broken off."

"A generation has grown up to whom the telephone appears indispensable. That we should not have it instantly at command

has come to seem incredible. It is accepted almost as if it were a gift of nature. Only when something goes wrong with it do we stop to realise that it is the result of inventive skill and the application of vast capital. Without it our complicated civilisation could not now go on."

It may not be generally known that one of the sportswomen who competed recently in the German Olympic Games, to uphold Britain's prestige in Berlin, is Miss D. Uglow, a telephonist of Putney Exchange. She finished second in the hundred metre race, won her heat in the relay race, and is now the possessor of two artistic medals.

On Saturday, June 18, 1927, she also won the 220 yards race at the Inter-Club Sports at Stamford Bridge. Our correspondent in the Putney Exchange adds: "We are all following her sports career now with great interest."

THE LONDON POSTAL SERVICE.*

BY LT.-COL. W. T. BRAIN.

(Continued from page 182.)

The Staff and Establishment Branch deals with those matters which are common to such branches throughout the service, viz. :-

Recruitment,	Leave,
Appointments,	Accidents,
Promotions,	Pensions,
Discipline,	&., &c.

One important item has been added recently, viz.: Promotion Boards Procedure.

This is perhaps the appropriate moment to say that in the Controller's Office there is a Senior Promotion Board dealing with higher promotions; an L.P.S. Promotion Board dealing with all other promotions, and the Assistant Controllers in charge of the E.C. and Foreign Sections, and the Inland and Parcel Sections, as well as the District Postmasters have their own local Promotion Boards.

(d) *The Travelling Post Office.*—This Section exists for the purpose of accelerating correspondence by performing *en route*, in special carriages built expressly for the Post Office, all the processes of sorting usually performed in a stationary office. Obviously, if quantities of work can be sorted on the railway journey, a later time of accepting it can be given to the public. By means of special apparatus fixed to the side of the specially constructed carriage a Travelling Post Office is able to collect and despatch bags of correspondence whilst travelling at a high rate, thus obviating the necessity for stopping the train for mail purposes.

The story of the Travelling Post Office is a fit subject for a lecture in itself, and time will not permit me to do more than touch on some of its fascinating features.

In early railway days it was customary to attach mail coaches to trains; the horses were taken out and the mail coach placed on a flat platform-truck at the end of the train.

Later mail coaches were attached to first-class passenger trains. In those days (1837) the carriages for first-class passengers were closed, whilst second-class passengers rode in open trucks.

Even in the days of mail coaches the practice of delivering the mail without stopping obtained, and undoubtedly this suggested the apparatus system introduced in 1838.

"Adopt, adapt and improve"—the Prince's slogan—seems to have been that of the Post Office even in bygone days, and in very early railway days, viz., 1838, we had our own railway carriage, even though it was a converted horse box, complete with apparatus for receiving and despatching mails.

When bags are ready for despatch by apparatus they are packed into strong leather envelopes which are folded over the bags and tightly strapped. There is a thong made of compressed leather attached to the pouch with an eyelet at the end.

The despatching officer stands at the open door and draws into the carriage the "delivery arm," which moves on a swivel and is fixed to strong iron tubes containing a spiral spring. This spring keeps the arm in an upright

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

position by the door pillars when the arm is not in use. Each arm has a pin forming part of its head which is protected by a spring cover, and on this pin the eyelet on the thong of the pouch is fitted.

On reaching the appropriate point in the journey, which has to be determined in the darkness largely by the sounds made by the train passing through tunnels, cuttings, &c., the arm with the pouch attached is swung out of the carriage, and lowered gently into a slot of a semicircular iron rest called a "Sweep" and is thus brought to a level at right angles to the train. The arm is held in the slot of the "Sweep" by the weight of the pouch until it is released by the "detaching line" of the wayside net striking the leather thong and knocking the pouch off at the rail side. The arm then automatically springs back against the door pillar of the carriage.

The operation of despatching from the wayside to the carriage, which I will explain in some detail.

It should be remembered that the Post Office runs four trains entirely composed of Post Office carriages each night, viz., between Euston and Aberdeen and between Paddington and Penzance in each direction. The P.O. carriages are joined up by gangways, and it was this system which suggested "corridor" trains. Reference should also be made to the fact that the personnel for T.P.O.'s and sorting carriages is drawn from provincial towns as well as from London.

A branch of the T.P.O. Section deals entirely with Apparatus working and is responsible not only for the maintenance of all Mail Bag Apparatus, whether attached to carriages or at the wayside, but for the proper instruction of all officers dealing with apparatus work.

In all these Headquarter Branches the personnel consists of—Higher Executive (or Staff) Officers, Executive and Clerical, with Assistants on writing work selected from the manipulative classes.

Passing from the purely administrative realm of the Controller's office (from which is excepted the T.P.O. Section), we come now to the large executive sections which are in charge of Assistant Controllers.

The front block of King Edward Building contains, besides the Controller's office, the office of the Assistant Controller, E.C., and Foreign Section, and on the ground floor the Chief Office counter. This is a handsome office, 152 ft. by 52 ft.—the largest in the country—built throughout with Irish and Italian marble, the pillars having bronze bases and capitals, the counter grille and electric fittings being of the same metal. In addition to the Chief Office counter the Assistant Controller, E.C., has under his charge all the Branch Offices (except Threadneedle Street) and the Town Sub-offices, in the City area. He is virtually the Postmaster of the City of London.

The variety of the work dealt with at Branch Offices, &c., has, as you are all aware, increased with the advent of social services organised by the Governments of the last few years.

LETTER FITTING PRIMARY DISTRICT SORTING ALPHABET

HATTON GARDEN	HOLBORN	CHAPSIDE	WOOD STREET	FENCHURCH STREET	LEADENHALL STREET	FLEET STREET	KING WILLIAM STREET
N. SUB. DIST. 7-22	E. SUB. DIST. 2-15	S.E. SUB. DIST. 2-27	S.W. SUB. DIST. 2-10	BATT. SUB. DIST. 11-20	PADD. SUB. DIST. 3-14	N.W. SUB. DIST. 2-11	BLIND
N.1	E.1	SE.1	SW.1	W.1	PADD. W.2	N.W.1	UNPAID & LETTERS MARKED T.
1ST DIVISION	2ND DIVISION	3RD DIVISION	4TH DIVISION	W.C.1	W.C.2	FOREIGN	INLAND

FIG. 3.

Behind the front block and connected with a bridge from the second floor of King Edward Building, is the "Sorting Office Block," occupied by the E.C. District Sorting Office on the ground floor (picture), and by the Foreign Section on the first floor. Beneath both these blocks is a basement measuring 446 ft. east and west, and 210 ft. north and south. There is also a sub-ground floor of slightly less extent.

The E.C. Sorting Office deals entirely with London work. It is not only a delivery office for E.C. (i.e. City) work, but it has direct connexion with all the District Offices and makes despatches to the 104 Sub-District Offices to connect with each delivery, throughout the day. Over 5,600,000 letters, &c. (excluding registered letters) are collected weekly from City posting boxes, of which just over 1,000,000 are for abroad, the rest being for London.

London work is brought in in separate bags collected from town boxes for disposal in the E.C. Section but Country work is also collected and sent for treatment to Inland Section at Mount Pleasant, a mile away. Even from Chief Office posting room this country work is simply bagged off

and sent by an underfloor conveyor to the platform on the other side of the building and despatched by van to Inland Section. Be careful, therefore, to post your letters in the proper boxes, or you run the risk of their being delayed. We are taking special steps to impress this upon the public just now in an endeavour to reduce the number so misposted to something less than a million a week. Letters brought in to E.C. by van collections and on foot then go through the processes of "Facing."

The "Facing" tables where the letters are gathered up and arranged with the postage labels in the right-hand top corner, are fitted with two running bands or small conveyors. On one band are placed the letters to be stamped, and these are conveyed to one end of the table, where they are put through electric stamping machines (picture), whilst on the other band are placed thick letters (unsuitable for machine stamping) and packets. These are conveyed to the other end of the table, whence they are collected for hand stamping at another part of the office. Having been stamped the letters are placed on the "Primary" sorting tables for the initial sortation. (See Fig. 3—Primary District Sorting.)

LETTER FITTING. PRIMARY WALK SORTING ALPHABET.

BLIND & UNPAID	CALIEKS	STATES	ALDESGATE STREET.	BARBICAN	BARTHOLOMEW SQ.	BURHILL ROW	CENTRAL STREET
CHARTER-HOUSE	CHISWELL STREET	CITY ROAD	CLERKENWELL GN.	CLERKENWELL RD.	FARRINGDON RD.	GOSWELL ROAD	HATTON GARDEN
HOLBORN	JEWIN STREET	LEATHER LANE	MYDDELTON SQ.	NEWGATE STREET	NORTHAMP TON SQ.	OLD STREET	RED LION STREET
ROSEBERY AVENUE	ST JOHNS SQUARE	WEST SMITHFIELD	WHITECROSS STREET	TRUDEN TIAL	2ND DIVISION	3RD DIVISION	4TH DIVISION

FIRST DIVISION.

FIG. 4.

"Primary" sorting in the E.C. Section consists in dividing letters for all the Head Districts in London, for groups of Sub-Districts, for the geographical Divisions of the City, 1, 2, 3 and 4, and for a few well-known streets, as shown on this plan. Each of the E.C. Divisions is made up of a number of "Walks," varying from 16 to 25. There are 81 Walks in all at present. The practice of making a first sortation to Divisions in the City is a survival of an old practice of splitting up the whole of postal London into Divisions. (In 1796 when London clung more or less to the river, there were 12 of these Divisions, extending from Westminster to Wapping, and from Lambeth in the south to Aldersgate Street and Goswell Road in the north.)

Letters for the City are next taken to the appropriate Division for "Walk" sorting, and a plan of the first Division (Fig. 4) is shown as an example. Those for other parts of London are conveyed to another portion of the office, where they go through a process of sub-division according to the numerical indicator of the District or Sub-District. They are then bagged off, dropped through an opening in the floor on to a conveyor which takes them to the platform for despatch.

After being "Walk Sorted," letters for the City are taken to special tables set aside for "Walks," and are there prepared by the postmen for delivery. Similar processes of "Walk Sorting" and preparation for delivery have, of course, to be gone through when the letters despatched to Head District and Sub-District offices reach their delivery points.

Bags which are received from the provinces, &c., containing bundles and packets for London generally, are opened at a different point, on a table also fitted with conveyor bands. The bundles are placed on one band for transfer to a Bundle sorting table, whilst the packets flow on another band into a basket at the opposite end of the table.

The number of items delivered weekly in the City is approximately 9,500,000. Of these, over 6,000,000 weekly fall into the first delivery, and there are 6 deliveries a day. In other Town Districts there are usually seven deliveries, and in Sub-Districts four.

In the E.C. Section alone the force numbers more than 3,600—Postmen 2,041, and Sorters 886, being the largest classes. The most interesting time to see the E.C. Office is between 5.30 and 7 p.m., or between 7 and 8 a.m.

Foreign Section.—The first floor of the Sorting Office block of King Edward Building is the main despatching office in London for mails for abroad.

The system of sorting is similar, *mutatis mutandis*, to that in the E.C. That is to say, there is a "Primary" in which countries or groups of countries form the Divisions, after which there is a further sub-division. The sub-division stage is necessarily more difficult than the first.

The work for abroad increased so rapidly that a few years ago it became necessary to set up other despatching points throughout the country so that large provincial centres such as Liverpool, Manchester, Birmingham, Bristol, Glasgow, Edinburgh, &c., &c., now make up complete mails for places abroad.

This system of decentralisation has also been carried out in London, and the District Offices now make up and despatch mails for many places overseas.

All the sorting work in the Foreign Section is performed by Sorters, of whom there are approximately 700. There are no Postmen in the Section. Most of the letter sorting is done on the standard box fittings and drop bag frames for news and packet sorting are also used. Mechanical aids are utilised as in the E.C. Section, and there is a long Conveyor which runs nearly the whole length of the Colonial side of the Foreign Section, on which full bags are placed. This Conveyor takes the bags to the west end of the building and automatically deposits them into a spiral chute down which they pass to the platform, whence they are despatched by motor to a railway station or direct to the docks.

The mail to the Far East is the largest weekly despatch, the bags disposed of numbering on an average 7,500.

(To be continued.)

LONDON TELEPHONE SERVICE NOTES.

Accounts Branch.

The number of accounts for the June quarter showed the usual increase over the number for the preceding quarter, 265,387 being despatched between April 7 and 29, or nearly 6,000 more than the number sent out in January. In addition, there were several hundreds which could not be despatched during this period for various reasons, such as removals or transfers in course of completion, and, of course, there are the new lines which arrive daily and mean the despatch of first accounts throughout the quarter to the number of about 400 per week.

A large proportion of the subscribers seemed to consider the first week in May the most suitable time for settling accounts, as in the five days from May 2 to 6 inclusive £397,955 passed through the hands of the Cashiers. This represented 29,182 cheques and postal orders sent direct to the Controller's Office and 29,177 accounts paid at Post Offices. Each of the former involved the writing of at least on receipt, so that the officers responsible for this part of the work had a busy time.

The last Directory is already three months old and work is now in full swing for the next issue. Needless to say, it will be bigger than ever and at the present rate of progress it looks as if, in a few years' time, we shall have to send it out in volumes like an encyclopaedia, with a suitable artistic book case to hold it!

* * * *

Cricket.

The Accounts Branch Cricket Club is going strong, like Johnny Walker. On June 1 a match was played with the London Engineering District, when after a most interesting game, the Accounts won by 13 runs. On June 3 they met an eleven from the Secretary's Office, but were not so successful, as the visitors carried all before them. However, matters were kept even by the League match against the Contract Branch on June 7, which ended in a draw, the Accounts being all out for 110 while the Contract had 91 for 9 wickets.

An interesting event in connexion with the Accounts Branch Cricket Club was the match *versus* the Ladies of the Branch at Mottingham on May 25. The ladies displayed such skill at the game that one is tempted to describe it as a "Gentlemen v. Players" match.

The Gentlemen gallantly elected to place themselves at a disadvantage by batting and bowling left-handed, with the exception of one or two players who were accustomed to play in that manner. The Ladies batted first and succeeded in knocking up 37 runs, 17 of which were scored by Miss Locke. The Gentlemen followed on and although they obtained 46 runs it was no easy task. Some of the overarm bowling of the Ladies was quite good and there was keenness in the fielding. Lbw. is often a questionable decision, and this match was no exception.

The Club were pleased to see quite a number of spectators, amongst them being the President, Mr. Stirling, and the Vice-President, Mr. Bold. We hope to see them all again at future matches, together with many other members of the staff, particularly at the Chiswick events, where provision for the general comfort of players and supporters is so excellent.

Contract Branch.

The volume of new business obtained by the Contract Branch during May was as follows:—

	<i>Stations.</i>
New business obtained	7,415
Ceasements	3,322
Net gain	<u>4,093</u>

The witness to a telephone agreement recently gave his description as "Male, 5 ft. 9 in., tall, medium complexion." The name indicated that he was a foreigner so he may be more accustomed to passports than telephone agreements.

The streets of the City of London have recently been brightened by the appearance of several kiosks painted the well-known pillar-box red. Particularly conspicuous are those behind the Royal Exchange, outside the *Times* Office in Queen Victoria Street and that by the Secretary's Office in King Edward Street. Members of the staff of the late N.T.C. who were acquainted with the Company's Headquarters will be interested to know that two kiosks have been installed in the garden of Telephone House facing the Embankment.

The recent attempts of a certain morning paper to belittle the Post Office generally and the Telephone Service in particular are certainly interesting for the number of inaccuracies the articles contain and the remarkable feebleness of the expert who is quoted from time to time. The whole thing would be laughable if it were not for the fact that the public are apt to believe every word they see printed in their favourite paper.

Among other things, the Telephone Service is blamed for the inadequate telephone installations in Hotels! But the doorsteps of hotels in this country have been worn down by the feet of generations of Contract Officers who have been endeavouring to persuade the "business" men who run them that telephones are essential to the comfort and welfare of their guests. Progress is slow but that is not the fault of the Post Office, and the newspaper in question should look elsewhere for the culprits and with the clue given above their discovery should not be difficult.

Cricket.

Exceptional interest is being taken this year in the affairs of the cricket team, mainly due to the introduction of triangular games between the Accounts, Contract and Traffic Branches, and the Branch is grateful to the L.T.S. Sports Council for the assistance they have given in connexion with the season's arrangements. There is much speculation already as to who will be the winners of the initial tournament.

So far the Contracts have played two matches, which have resulted as follows:—

Versus Traffic—

Contracts 122 for 8 wickets. Innings declared closed.
Traffic 49 for 2 wickets. Match drawn.

Versus Accounts—

Accounts 110.
Contracts 91 for 9 wickets. Match drawn.

The game against the Accounts Branch provided a most exciting contest. The Accounts batted first and made a total of 110, which was incidentally assisted by unfortunate lapses in the field. Left with 1½ hours to obtain the necessary runs and batting in a very bad light the Contracts were soon fighting to stem the tide of several early disasters but a splendid stand half-way through the innings suggested the possibility of a win being forced. However, the game veered round again and for the last four minutes the last wicket had to withstand a desperate attempt to dislodge it. The atmosphere was so tense that one of the umpires forgot to call "over" when time was up, but everybody else had carefully counted those last six balls and so the game ended.

* * * *

P.O. Sanatorium Society.

Eight delegates from the L.T.S. attended the Tenth Conference of the Society which was held in Birmingham on May 26.

The delegates were accorded a civic welcome and were addressed by the Lord Mayor, the Medical Officer for Health, Col. H. V. Prynne and Mr. Garland, founder of the Society.

Miss M. M. Worth of the Hop Exchange was re-elected to the Board of Management, gaining a high place in the ballot.

Our delegates were especially gratified by the Secretary's special commendation of the work done in the L.T.S. in contributing towards the increase of 951 in the membership during the preceding six months.

* * * *

Sports Association.

The representative of the L.T.S. Sports Council who attended a meeting of the Development and Publicity Committee of the Civil Service Sports Council on May 24, reports that reference was made at that meeting to the need for further support of the *Civil Service Sports Journal*.

The number of copies circulating to the various Departments was quoted and the L.T.S. figured very low in the schedule with a circulation of 36 copies. Seeing that the L.T.S. membership of the Civil Service Sports Society is now 1,000, our representative suggested that the publication may not be known to the majority of the staff. The Journal is the official organ of the Society and contains much useful and interesting information with regard to C.S. sports and the doings of the Council. The subscription is 1d per month. Agents are required in the various branches and exchanges, and will any of the staff who are prepared to assist in the circulation please communicate with Mr. Hugh Williams, Private Wire Section, Cornwall House.

Mr. Williams hopes to be able to report at the next General Council Meeting that every L.T.S. member of the Society is now a subscriber to the *Civil Service Sports Journal*.

* * * *

Cricket Scores.

The first of a series of matches in connexion with the newly-formed L.T.S. Cricket League was played at the Civil Service Ground, Chiswick, on May 31, between the Contracts and Traffic Branches.

The game resulted in a draw, the scores being as under:—

<i>Contracts.</i>		<i>Traffic.</i>	
Staples, b. Berry	6	Adams, c. Wilson, b. Canham	2
Hodgkiss, b. Berry	38	Thompson, not out	26
Oliver, b. Crossley	30	Crossley, c. Griffiths, b. Cowdrey	6
Dickinson, run out	19	Holdstock, not out	14
Canham, b. Berry	10	Extras	1
Mitchell, c. Adams, b. Berry ...	0		
Cowdrey, c. Adams, b. Holdstock	10	Total (2 wkts.)	49
Wilson, run out	0		
Griffiths, not out	1		
Extras	8		
Total (8 wkts. dec.)	<u>122</u>		

Frankenstein and Harris did not bat. Grove, Shepherd, Berry, Dodson, Gregory, Webb and Evans did not bat.

* * * *

Cricket Fixtures for July.

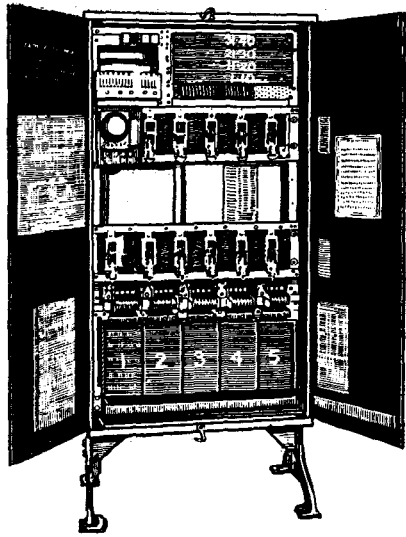
- July 5.—Accounts Branch v. Traffic Branch (L.T.S. League).
 - " 12.—Traffic Branch v. Contracts Branch (L.T.S. League).
 - " 20.—A.G.D. v. L.T.S.
 - " 26.—L.T.S. League Champions v. The Rest.
- All matches will be played at the Civil Service Sports Ground, Chiswick.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Promotions to Assistant Supervisorships, Class II:—

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- Miss W. M. PRESTON, at Hop Exchange.
- Miss E. A. HARVEY, at Streatham Exchange.
- Miss L. H. EVANS, at Gerrard Exchange.
- Miss E. M. BATH, at Regent Exchange.
- Miss EDITH M. WEBB, at Trunk Exchange.
- Miss E. M. BREEZE, at Sloane Exchange.
- Miss C. S. LONTIT, at Trunk Exchange.
- Miss G. L. COOPER, at Paddington Exchange.
- Miss H. J. CAMPBELL, at Kensington Exchange.
- Miss F. L. DANIELS, at Central Exchange.
- Miss D. J. ENGLISH, at Clerkenwell Exchange.
- Miss L. A. GRAY, at Museum Exchange.
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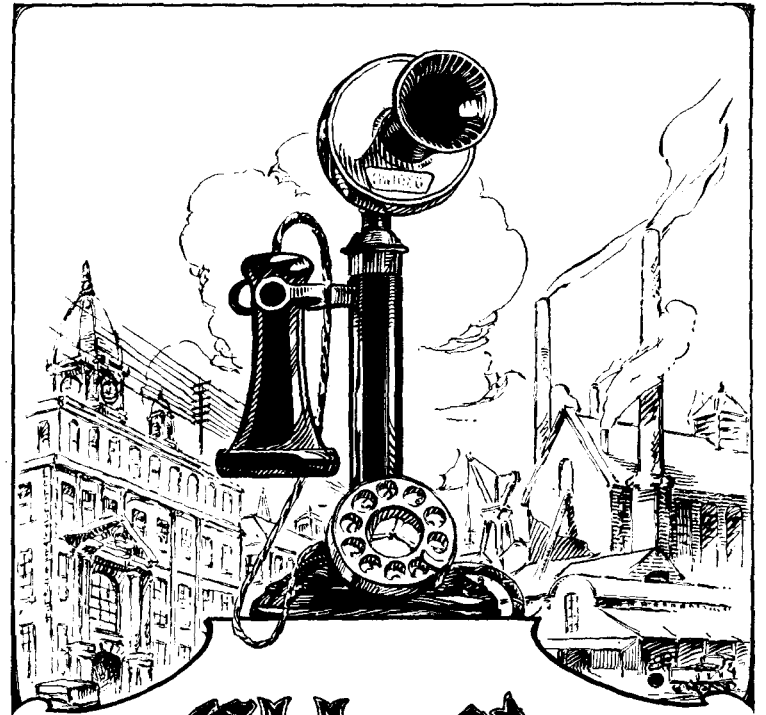
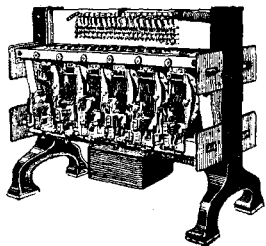
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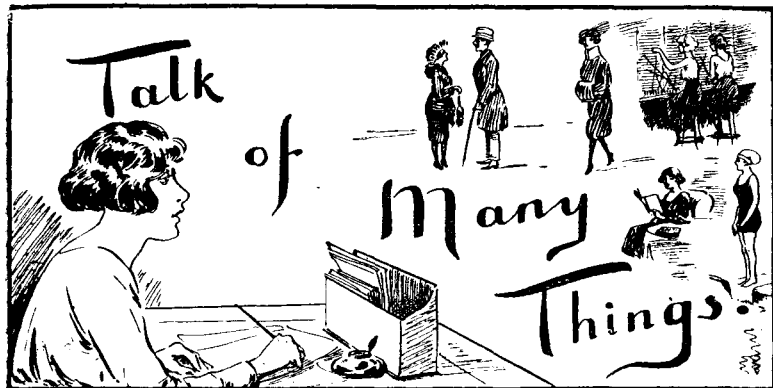
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Leaves of Grass.

I HAVE a friend whom I will call Hezekiah. That's not his real name, I am glad to say, because I could not bear to know a man with such a heathenish Christian name. I will call him that to conceal his identity. Although you may never have met him you will, doubtless, be familiar with his type. He is frightfully learned and is a man of wide interests. He wears longish hair, a shabby suit, a soft collar and an enormous bow of arresting colour. He is the sort of man whom you can take around with you as an exhibit and thereby gain no small amount of respect for yourself. He is, of course, dreamy and highly unpractical but he has intervals of sly practicality which deceive the most wary. I met him in one of these moods one day which, perhaps, explains how I came to mow his lawn. I say "mow" advisedly, because the grass was knee-deep. I found him standing in it dreamily and in his eye was a look of poetic and contemplative abstraction. I have since learned that at such times he is most dangerous. I greeted him, and his gaze gradually turned upon me and the abstract look slowly dissolved in recognition. "Oh, hullo," said he. I remarked that the grass was long, that it needed cutting and that his lawn would be spoiled. "Yes," he said, "it is, it does, it will; I thought of a sheep." "Stupid," I said. "They are," he went on, "or a mower." "Too long," I said; "or a scythe, perhaps," he added. "Look here," I said, "scythes are dangerous to the user and the public in the vicinity. Your first sweep would probably convert your Alsatian into a Dachshund. What you want is shears." "Sheer nonsense," he said. "I don't, but you . . .," and then I fell to his dreamy fascination and I set to work. I felt like one of those explorers one reads of who cut their way through virgin forest, scarce seeing daylight and pursued by hosts of insects with no tails and sharp teeth. Intent on my work I heard a sudden yell followed by unpoetical expressions. I looked up and found that I had sheared Hezekiah's white shoes and had, moreover, bitten well and truly. "Pardon me," I said, as politely and pleasantly as possible, "if in my zeal I have exceeded my duty in cutting your grass and have cut your corn." I reminded him of the saying of Asparagus (57 B.C. or thereabouts) that a corn in the ear is worth two on the feet. But he merely snorted and disappeared profanely into the house. In the fulness of time I completed shearing and mowing and I stacked the cut grass in a neat rick at the end of the garden. Then I brought him forth to show him the shingled landscape. He was profuse in his thanks; he complimented my skill, my expedition, my courage and my extreme friendliness. He slaked my thirst and grasped me by the hand. "What will you do with the grass?" I asked. "I really don't know," he replied. "What does one usually do with it?" It pained his nature-loving heart to think of burning it, so I suggested that he might give it to a horse or, perhaps, a donkey. "Excellent," said he eagerly, "take it, my friend." "But," I began. "No, no," said he, "I'll take no refusal, and besides"—this sternly—"it is ungracious to refuse a gift." Then he re-entered the house rapidly, rubbing his hands gleefully, and murmuring delightedly, "excellent, excellent." So here am I with a haystack on my hands and with a profound suspicion in my heart that I am the donkey.

PERCY FLAGE.

Switzerland.

Our holidays draw near. Soon we shall bid a short farewell to the office and hasten to the land of exquisite beauty—Switzerland. What an experience it is to travel abroad! Pack up your summer dresses and a warm coat: it is very hot in the valleys but chilly in the high Alps.

The joy of the Lugano I am not yet acquainted with, but I guarantee that you will be delighted with Brunnen. It lies on Lake Lucerne and looks out on to range after range of mountain peaks.

We will saunter through the famous Axenstrasse with our cameras, and take some fine snaps.

I think we ought to join an excursion from Lucerne to Altdorf; there are so many objects of interest round the Lake and in the little town.

The romantic story of William Tell will be related to us whilst we are on the steamer; we shall see the wonderful pictures in his chapel, and hear of the events which led to the freedom of the Swiss people from the tyranny of the Austrians. A monument to Schiller stands on the lake—it was Schiller who inspired the great musician, Rossini, to write the opera "William Tell."

The village town of Altdorf is the capital of the Four Forest Cantons. It possesses its own Parliament, a Court of Justice, a fine memorial to William Tell, and a theatre entirely devoted to his opera.

The Parliament in Altdorf is the smallest in the world, it consists of one large well-appointed room; but the Court of Justice is even more quaint. It is a room no larger than our locker room! William Tell's theatre has a most wonderful stage. Last year we stood in the middle of it while the scenic effects were displayed. First, stars shone above us in a clear sky, then came a mighty storm, a noise as of angry waves dashing upon the shore, the howling of the wind in a tempest, vivid flashes of lightning, and peal upon peal of terrific thunder.

We must take a trip to lovely Lucerne to obtain the best view of Mount Pilatus. There is a curious legend concerning this mountain, which is supposed to have derived its name from Pontius Pilate. According to the legend, Pilate became in disfavour with the Roman Emperor after the death of Christ, and fled to Switzerland to escape execution. He lived for a time on Mount Pilatus, but the part he played in the Crucifixion so preyed upon his mind that he eventually committed suicide by throwing himself from the summit of the mountain into Lake Lucerne. Severe thunderstorms immediately broke over the town which threatened to destroy the lives of the inhabitants. The superstitious peasants of that time thought that the ghost of Pilate haunted the Lake, and until his body was recovered and sent to Rome for burial, there would be no peace. Many patriots went to the Lake to lay the ghost, but all returned declaring that they had seen Pontius Pilate sitting on a throne in the middle of the Lake. The uneasiness became so acute that the Lake was searched. Whether the body was found is not known, but the thunderstorms ceased and Pilate troubled the people no more.

We must climb the Rigi! There is the mountain railway when we get too tired to continue walking. The scene from Rigi-Kulm surpasses all description. Wooden crosses up the mountainside mark the places where mountaineers have perished, but you need have no fear! The Great Architect who planned the Land of Beauty has ordained that man, in this generation, shall have domination over the works of His hands.

G. M. T.
Sydenham Exchange.

New Versions of Old Songs.

NO. 1.—I SEE YOU CALLING ME.

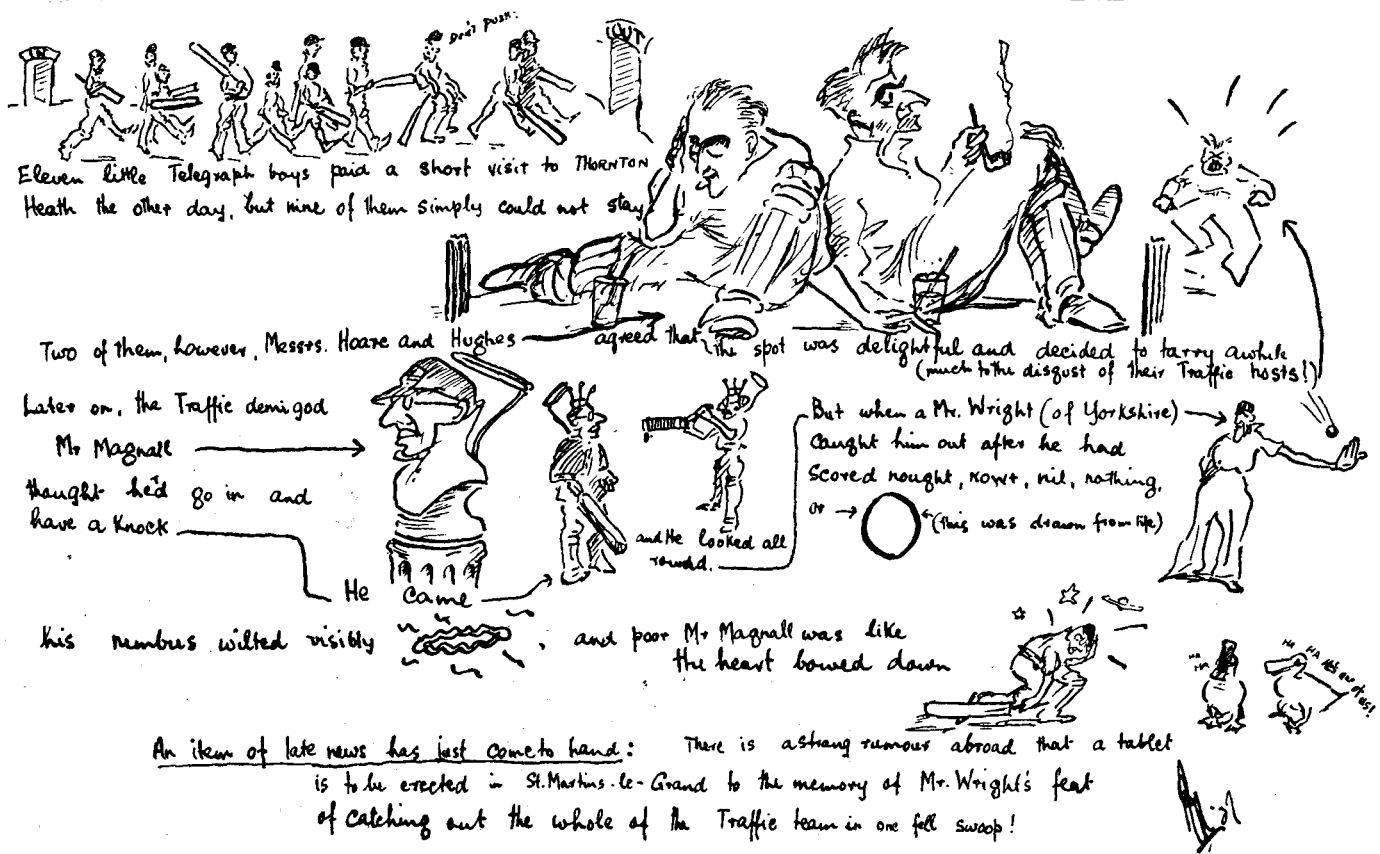
I see you calling me!
You called me when your line was T.O.S.
For re-connexion you began to press,
You cleared—do you remember, when you heard
That you would have to pay five bob excess!

I see you calling me!
And oh! the flood of language you released!
I tried to soothe you, but your wrath increased,
Because, do you remember, your best girl
Had just been misinformed your line was ceased.

I see you calling me!
Though vast positions stretch their weary length between.
You still are answered from the multiple, I ween,
You flash—and I behold you, slogging here,
But oh! I have a buzzer stuck, old Bean!
I see you calling me!

C. A. S.

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.



SECRETARY'S OFFICE CRICKET CLUB.

INTER-BRANCH COMPETITION.

Building and Supplies and Establishment Branches v. Registry.

B. & S.B.		Registry.	
C. G. Bray, b. Asplin ...	30	R. Douch, b. Hambridge ...	0
F. E. Waters, b. Devenport ...	1	C. W. Devenport, b. Hambridge ...	0
G. H. Banton, c. Cove, b. Reussiet ...	18	G. Asplin, b. Newman ...	1
C. J. Newman, lbw., b. Asplin ...	6	R. S. Hardie, c. Lester, b. Appleby ...	5
A. J. Garrett, c. Walton, b. Asplin ...	8	C. A. W. Plouviez, b. Appleby ...	22
J. W. Bambridge, b. Cove ...	12	D. W. L. Hughes, b. Appleby ...	3
J. Scholes, not out ...	10	R. J. Border, run out ...	5
G. W. Colyer, c. Douch, b. Asplin ...	2	J. C. Mathieson, b. Appleby ...	0
F. J. Pearce, not out ...	5	G. H. Hunter, run out ...	6
Extras ...	8	J. Cramp, not out ...	2
		T. E. Spiller, b. Appleby ...	0
		Extras ...	10
Total, 7 wickets, declared	100	Total ...	73

Asplin took 4 wickets for 21 Hambridge 7 for 2.
Newman 3 for 0.

Mails Branch v. Staff and Investigation Branches.

Mails.		Staff and Investigation.	
D. Lester, c. Masters, b. Plouviez ...	13	C. W. Whitehurst, c. Wyles, b. Appleby ...	1
N. Abramovitch, lbw., b. Plouviez ...	17	L. F. Masters, b. Abramovitch ...	18
W. Appleby, run out ...	24	F. Kemp, b. Appleby ...	1
F. W. Viney, b. Cramp ...	0	R. S. Hardie, c. Lester, b. Appleby ...	5
E. J. Joyce, b. Hardie ...	9	C. A. W. Plouviez, b. Appleby ...	22
F. H. Brooks, c. Plouviez, b. Border ...	8	D. W. L. Hughes, b. Appleby ...	3
R. Oakshott, b. Plouviez ...	22	R. J. Border, run out ...	5
W. H. Wyles, c. & b. Cramp ...	0	J. C. Mathieson, b. Appleby ...	0
E. A. Figures, b. Cramp ...	6	G. H. Hunter, run out ...	6
W. Sellars, c. Whitehurst, b. Cramp ...	10	J. Cramp, not out ...	2
Cramp ...	10	T. E. Spiller, b. Appleby ...	0
G. O. Wood, not out ...	5	Extras ...	10
Extras ...	10	Total ...	73
Total ...	124		

Plouviez 3 for 38. Appleby 7 for 37.
Cramp 4 for 29.

Telegraph Branch v. Telegraph and Telephone Traffic Section.

Telegraph Branch.		Traffic Section.	
A. H. Read, b. Findley ...	5	J. Magnall, c. Wright, b. Moore ...	0
F. G. Birkett, b. Magnall ...	1	C. Leaver, run out ...	2
A. C. Belgrave, c. Whiffen, b. Findley ...	1	J. Lennox, b. Moore ...	0
Findley ...	1	C. Earle, c. Crowe, b. Moore ...	2
A. W. B. Price, c. Key, b. Findley ...	0	F. J. Key, c. Price, b. Moore ...	10
S. Moore, b. Findley ...	1	J. A. Beaver, run out ...	2
F. S. Hoare, c. Earle, b. Magnall ...	57	G. F. Findley, c. Birkett, b. Moore ...	14
R. E. Hughes, c. Leaver, b. Magnall ...	50	H. J. Still, c. Price, b. Hoare ...	9
R. J. Crowe, b. Findley ...	0	J. Whiffen, b. Moore ...	1
G. L. Mallett, c. Magnall, b. Findley ...	1	G. Pybus, b. Price ...	16
Findley ...	1	Higham, not out ...	0
A. J. Hill, c. Beaver, b. Findley ...	1	Extras ...	1
S. P. Wright, not out ...	4		
Extras ...	6		
Total ...	127	Total ...	57

Findley took 7 wickets for 47. Moore took 6 wickets for 24.

WEDDING PRESENTATION—ABERDEEN.

A LARGE and representative gathering of the Telephone House staff met on Friday, June 10, in the District Manager's Room. The occasion was the presentation of a wedding gift to Mr. David Smith, Traffic Branch.

Mr. A. Clow, Chief Clerk, who officiated as chairman in place of Mr. Edmond—absent on leave—congratulated our much-esteemed colleague on the step he was about to take.

Mr. Forrester, Traffic Supt., made the presentation—a handsome mahogany clock with Westminster chimes—and in happy vein referred to Mr. Smith's popularity.

This was demonstrated in further speeches by Mr. Webb, Asst. Traffic Supt., on behalf of the Traffic and Operating staff; Mr. Coulsell, Contract manager; and Mr. Scott, Overseer, on behalf of the Accounting staff.

Mr. Smith expressed his warm thanks for the gift and good wishes in an excellent reply, and an altogether pleasant function closed with votes of thanks by Mr. Kay, Asst. Traffic Supt.

THE Telegraph and Telephone Journal.

Vol. XIII.

AUGUST, 1927.

No. 149.

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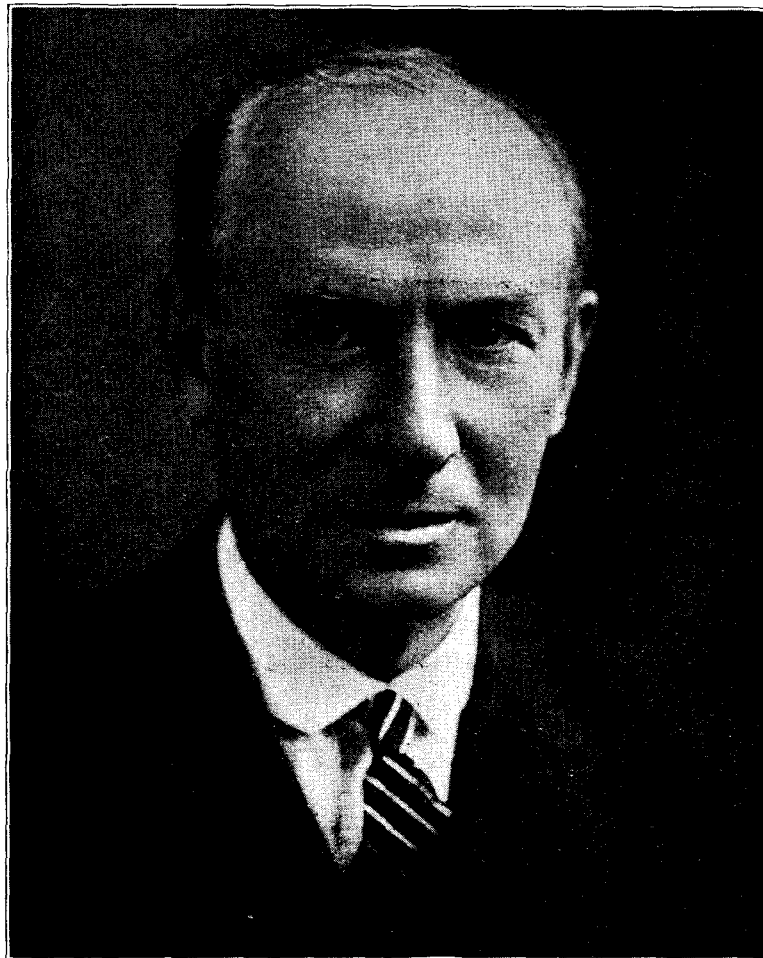
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XLIII.—

JAMES STUART JONES,
M.B.E.

JAMES STUART JONES, who has just succeeded John Lee as controller of the Central Telegraph Office, was born on Aug. 31, 1872. He began his Post Office career in May, 1892, as a Second Division Clerk in the Savings Bank Department, and was appointed to the Supplementary Establishment of the Secretary's Office in April, 1895, just before the acquisition of the Telephone Trunk wires by the State. He was selected, with John Lee, as an Assistant Traffic Manager at Headquarters in October, 1907, and by successive steps attained the rank of Deputy Chief Inspector of Telegraph and Telephone Traffic in July, 1924. His translation to the C.T.O. as Deputy Controller followed the retirement of A. W. Edwards in July, 1926.

Stuart Jones, as he is known over the length and breadth of the country, is a synonym for sterling worth. In the mid-nineties he was mentioned as "writing a good letter." As Assistant Traffic Manager, he and his colleague



[Photograph by Elliott & Fry, Ltd.]

secured many improvements in trunk telephone working, and steered the ship through the difficult "call wire" waters; and it is on record that they, with great tact, ensured loyal co-operation in the changes by creating the impression that the Superintendents, and not the Assistant Traffic Managers, were responsible for the innovations.

Stuart Jones, Lee, Purves and the late A. W. Martin visited the United States in 1911, and their combined reports on practical automatic working form the keystone of the automatic systems in this country.

Stuart Jones was the living force behind the working of the Air Raid Warning Scheme during the Great War, and, incidentally, enjoyed—or rather endured—the somewhat unique experience of lecturing the assembled chief constables in the Conference Room at the Home Office. For the service—and not the lecture—he received the M.B.E.

His abilities and solid qualities make him a worthy follower of his brilliant and mercurial predecessor—John Lee—although there is a distinct contrast in temperaments.

GERMANY'S TRAIN TELEGRAPHS AND TELEPHONES.

It has long been an established fact that wireless programmes can be received on moving trains, and that telegraph and telephone services could be provided on trains if required by means of wireless links. The tests to establish that fact have generally been made direct by wireless between the fixed stations and the moving trains, and the only real difficulty arose from the fading effects which were experienced in tunnels and under bridges in consequence of the absorption of the wireless signals. There are grave doubts whether there is any real demand for ordinary telegraphic and telephonic facilities on trains, and capitalists generally seem somewhat shy at incurring the heavy expenditure involved on the somewhat uncertain possibility of its being practicable to create such a demand.

In Germany, however, the circumstances are somewhat different. The railway, telegraph, telephone and broadcasting services are the property of the State, and the main lines of telegraphs follow and are often on the railway routes. It is therefore possible, by using the parallel wires to reduce the gap to be bridged by wireless to a few yards, and to overcome the fading effects in tunnels. The demand for the telegraph services is, however, small, though possibly influential; and the State has therefore wisely decided that, as the business is of a speculative nature, the risks should be undertaken by the private interests concerned. A private company has therefore been formed, under licence from the State, and have provided installations which are at present working only on the Berlin-Hamburg line of railway. They afford the following services:—

- (i) telegraph service to and from any destination;
- (ii) telephonic intercommunication with subscribers in Berlin, Hamburg and Wittenberge only; and
- (iii) telephonic reception of broadcast programmes of entertainment, commercial and press matter, &c.

The distance between Berlin and Hamburg is approximately 187 miles and the travelling time of an express train is between 3½ and four hours. Three fixed wireless communicating stations have been provided—one at Spandau, one at Bergedorf, and one at Wittenberge, and these are provided with facilities for transmission of high frequency currents from wires running parallel with the railway track throughout the whole distance, to the receiving apparatus on the moving train, the gap being bridged by wireless. Similar transmissions from the train are received by the parallel wires and conveyed to the fixed stations. The Spandau and Bergedorf stations are connected by wire with the Berlin and Hamburg telegraph and telephone offices respectively, whilst the station in the middle of the route, that at Wittenberge, is connected with both Berlin and Hamburg, and can work on both channels simultaneously. It is understood that technical considerations prevent telephonic conversations over a more extended area; but the German technical staff consider that these difficulties will soon be overcome and they are at present contemplating the provision of a similar restricted service on the Berlin-Munich main railway route.

The wavelengths assigned for the four traffic channels between train and train exchanges are as follows:—

	3,820 metres.
Transmission by train exchanges and	5,710 ..
reception by trains	4,580 ..
	3,270 ..
	2,140 metres.
Transmission from trains and recep-	2,015 ..
tion at train exchanges	1,750 ..
	1,830 ..

and the power used is apparently only 20 watts, which is presumably sufficient to bridge the short gap between train and parallel wires.

On the train itself one corridor coach is allotted to the concessionaire solely as accommodation for apparatus, operators, silent compartments &c. The concessionaire is licensed to equip the special corridor coaches, to erect fixed stations on Government land (or to rent space accommodation in Government buildings), to erect connecting wires on railway property, and to share the use of the railway and telegraph wires for high frequency transmission; but he must pay all costs involved and provide and pay the working staff—which must be solely of German nationality. All communications are subject to a special train charge in addition to full charges at the current tariff for the telegraph or telephone service concerned. This train charge is fixed by the concessionaire, subject to veto if the State regards the amount as too much, and less 20% is retained by him as a return on his outlay. The 20% deduction with a minimum payment as for two train charges in respect of each train journey is payable to the State as royalty. The post office charges collected by the concessionaire for that part of the service from the train exchanges onwards to destination are payable in full to the post office, which in the case of foreign telegrams passes on the appropriate portion of the fees to the other administration or administrations concerned.

The licence contains, in addition, a large number of precautionary clauses and reservations such as are to be commonly found in most legal documents.

In conclusion, it may be stated that the details of the arrangements have been worked out with characteristic thoroughness by the German engineers and that full publicity is given to the arrangements by attractive pamphlets, the illustrations in which are unfortunately not suitable for reproduction in the pages of this *Journal*.

TELEGRAPHIC MEMORABILIA.

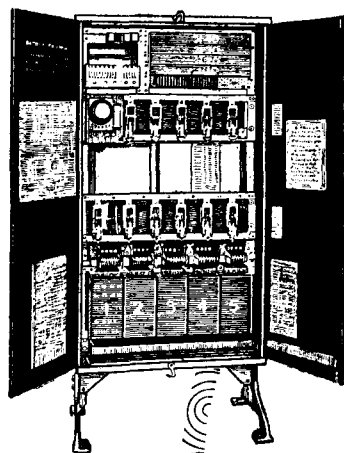
ARGENTINA.—The Sociedad Radio Argentina recently secured a concession from the Spanish Government for the establishment of a wireless-telegraph service between Spain and Argentina.

The *Financial Times* says that the primary object of the Executive Power during the past year has been to obtain the perfect operation of the postal and telegraph services. This important public service has been carried on regularly notwithstanding its extraordinary growth and the shortage of *personnel*, each day more apparent. On July 12 last was inaugurated the Library and Museum of Posts and Telegraphs, as also the Philatelic Section as a part of the same. An arrangement made with the Union Telephone Company, in the Federal Capital, and the Telephone Company in Tucumán, has enabled the Executive Power to endow both localities with the service known as "telephone-grams." During the year 1926 there was a great increase in the movement of internal postal and telegraphic drafts amounting to 2,176,499 items for a total of \$78,601,612.63 m.n. and in that of telegraphic orders 137,944 items for a sum of \$9,026,132.43 m.n. The total of declared values received was 413,844 items for a sum of \$57,958,382.06 m.n., the dispatches being 472,193 for \$64,974,290.49 m.n. The telegraph lines on Dec. 31 last amounted to 44,248 kilometres in extent and to 114,318 kilometres of development.

AUSTRALIA.—Reuter's Trade Service informs us that some time ago a sub-committee was appointed by the New South Wales Cabinet to inquire into a proposal for the erection of a Government super-power wireless station near Sydney and six relay broadcasting stations in country areas. It is said that the sub-committee's report is favourable to the scheme, which is receiving Cabinet consideration.

According to the *Electrical Engineer of Australia and New Zealand*, the total number of wireless receiving licences in force throughout the Commonwealth at the end of April was 206,534, of which 108,732 were held in Victoria, 54,581 in New South Wales, 21,335 in Queensland, 15,738 in South Australia, 3,890 in Western Australia, and 2,259 in Tasmania. During the month 2,317 licences were cancelled in Victoria, but 4,968 new ones were issued.

CANADA.—The production of all radio apparatus and accessories in Canada during 1926, says Reuter's Trade Service in Ottawa, was valued at



For Service & Speed

STANDARD Automatic Telephone Systems are simple to install, inexpensive to maintain and speedy to operate. They are ready for use day and night—an important factor in large offices, and have been proved to economise time and save labour. Designed and manufactured by one of the largest electrical undertakings in the world, they are positively the most efficient system in existence. Write for our illustrated booklets. They are free upon request.

Standard Automatic Telephone System

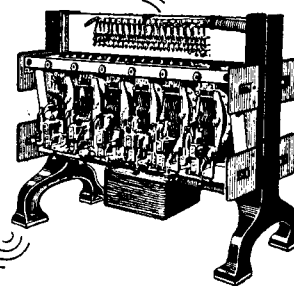
Standard Telephones and Cables Limited

CONNAUGHT HOUSE, ALDWYCH, W.C.2

Central 7345 (10 lines).

Works: HENDON, NORTH WOOLWICH, SOUTHGATE.

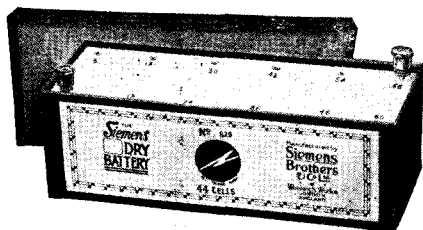
Branches: Birmingham, Leeds, Manchester, Glasgow, Liverpool & Dublin.



SIEMENS

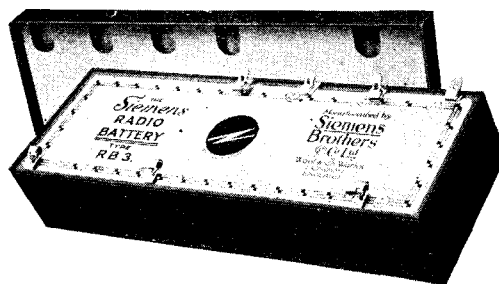
RADIO BATTERIES

for *STEADY,*
PERSISTENT
SERVICE.



H.T. DRY BATTERY. 60 VOLTS.
—small capacity type.

Dimensions $9\frac{3}{16} \times 3\frac{3}{8} \times 3$ ins.
Weight 4 lbs. 12 ozs. Price 12/6.



H.T. DRY BATTERY. 72 VOLTS.
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Dimensions $16\frac{7}{8} \times 5\frac{1}{4} \times 3\frac{3}{4}$ ins.
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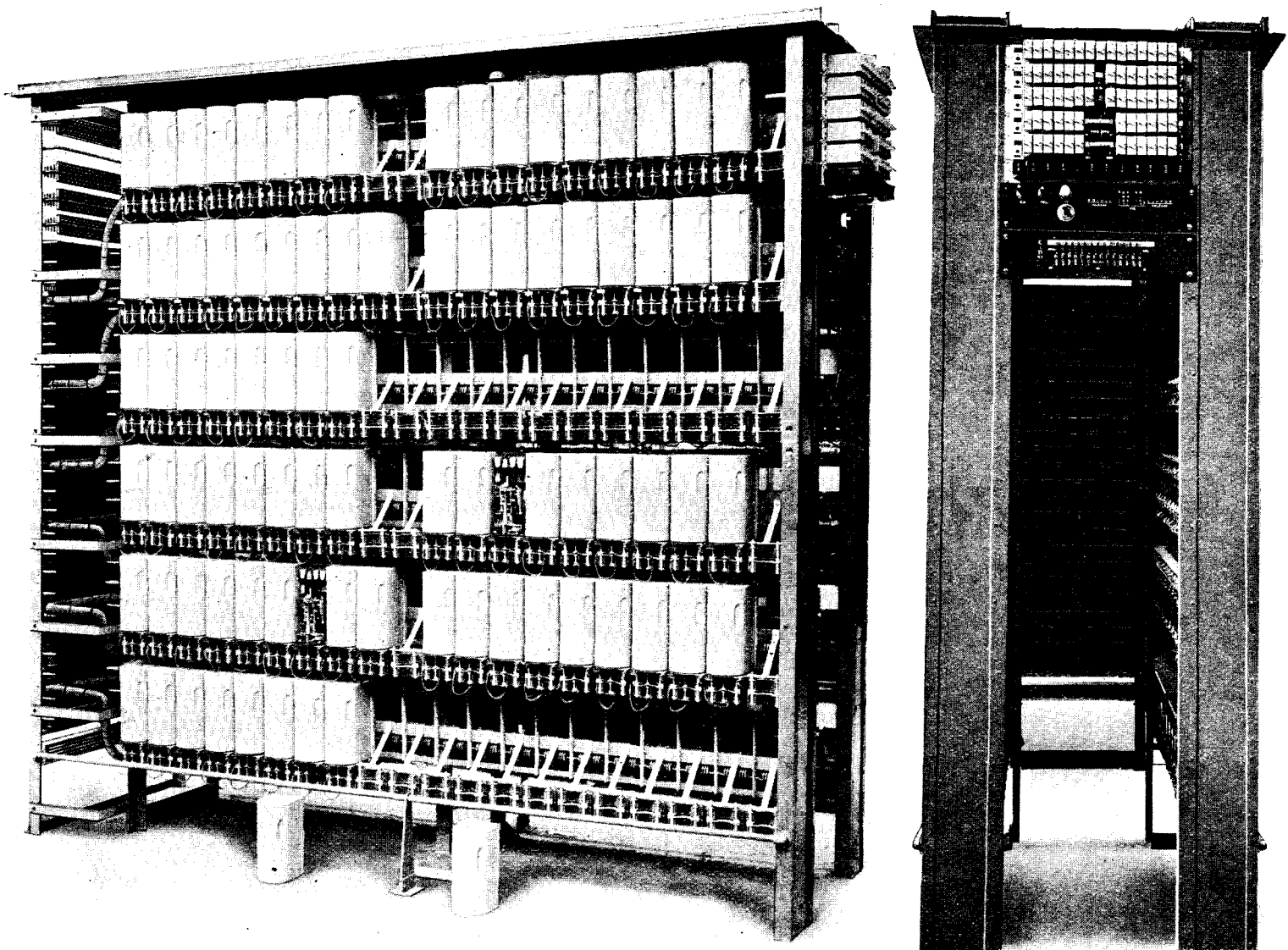
SUPER RADIO H.T. DRY BATTERY.
—extra large capacity type.

Dimensions $8\frac{3}{4} \times 5\frac{3}{8} \times 9\frac{1}{2}$ ins. high.
Weight 20 lbs. Price 25/-.

ALSO MANUFACTURERS OF

- L.T. Dry Cells and Batteries.
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- Inert H.T. Batteries.
- Negative Grid Bias Batteries.

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AUTOMATIC GROUP SELECTOR UNIT

(Switch Capacity—240)

As used on automatic equipments supplied to
the British Post Office, Colonial Administrations
and Foreign Governments, by:—

PEEL-CONNER TELEPHONE WORKS

(PROPRIETORS THE GENERAL ELECTRIC CO. LTD.)

Head Office and Works:
STOKE, COVENTRY.

London Office:
MAGNET HOUSE, KINGSWAY, W.C.2.

Telephone: Coventry 4111 (6 Exchange Lines).
Telegrams: "Springjack, Coventry."

Telephone: Regent 7050 (61 Exchange Lines).
Telegrams: "Peelcontel, Westcent, London."

\$6,277,544, f.o.b. factory, in addition to which furniture manufacturers sold wireless cabinets to the value of \$708,658. The details of the production were:—

	1926.	1925.
	\$	\$
Batteries	2,276,747	2,238,169
Condensers	13,281	41,626
Panels, dials and switches ...	29,895	88,103
Microphones, loudspeakers	146,074	412,556
Transformers	26,855	36,816
Valves	1,261,803	1,299,684
Complete sets	2,253,098	2,667,999
Miscellaneous	269,791	325,675
Total	\$6,277,544	\$7,110,628

Wireless receiving licences issued during 1926 numbered 207,328, compared with 134,486 in 1925, and broadcasting licences issued rose from 55 to 96. Imports of wireless apparatus from the United States amounted in value to \$2,872,991.

CHILE.—It was announced from Santiago a week or two ago that the sole ownership of the Chile Telephone Company had been acquired by the American International Telephone and Telegraph Corporation as the result of negotiations in London. The American International Telephone and Telegraph Corporation is a keen buyer of telephone companies throughout South America, and not long ago acquired control of the Montevideo company.

CZECHO-SLOVAKIA.—Reuter's Agency, Prague, states that the balance sheet of the Czecho-Slovakia broadcasting organisation, which had 215,000 subscribers in 1926, shows receipts amounting to 7½ million crowns (£46,000) and an expenditure of 5½ millions (£33,500).

FARSAN ISLANDS.—As may not generally be known, the Farsan Islands is a lonely group of islands in the Red Sea and the Oil prospectors at present living on this group of islets are the latest of the world's isolated communities to adopt wireless as a means of communication. These islands, in the Farsan group, are being prospected by the Red Sea Petroleum Company, and are about 400 miles north of Aden and the same distance south-east of Port Sudan, these being the nearest British territories, while the Italian port of Massaua in Erythrea is across the Red Sea about 200 miles away. Through these ports and the large number of ships passing up and down the Red Sea within wireless range, the prospectors will be able to communicate with their headquarters and to link up with main telegraph circuits. The installation will consist of a standard Marconi 1½-kilowatt quenched-spark transmitter, together with emergency gear and receiving apparatus, as used on board ship.

FRANCE.—The French telegraph service has decided to inaugurate a system by which urgent telegrams may be sent to passengers travelling by certain express trains on the P.L.M., Paris-Orleans, and Est railways.

The *Compagnie Générale de Télégraphie sans Fil* has paid a dividend of 50 fr. per share out of net profits of 8,507,000 fr. in 1926.

The *Compagnie Française des Câbles Télégraphiques* reports gross profits of 7,382,000 fr. for 1926, as against 5,338,000 fr. in 1925. It is proposed to increase the dividend on the ordinary shares from 30.05 fr. to 35 fr.

GREAT BRITAIN.—The *Electrical Review* states that "it is understood that Mr. G. Marcuse has offered to carry out preliminary Empire broadcasting experiments from his well-known station (2NM) at Caterham. The Postmaster-General has provisionally approved of the scheme, which will be purely experimental, with a view to determining whether or not a regular broadcast service to the Dominions can be maintained regularly and efficiently. The wavelengths to be used will be 23 and 33 metres, and the transmitter itself has recently been rebuilt, a new power supply system having been installed. Marconi rectifying and transmitting valves will be used. It is probable that the experiments will commence on or about Aug. 15." (The scheme is subject to the approval of the P.M.G.—ED., T. & T. J.)

The Board of Trade, after consultation with the Postmaster-General, has made new rules relating to wireless telegraphy on ships, mainly in view of the probable early approval of automatic alarm apparatus designed to receive a distress call, and the need for regulating the use of such apparatus. The new rules define the "alarm signal" which is to be used to operate the automatic apparatus, and prescribe the conditions to be complied with by such apparatus. They require class 2 ships, after a certain delay, to fit such apparatus in lieu of carrying "watchers," and give certain relief to other ships fitted with the apparatus. All ships are required to have a clock in the wireless room with a seconds hand, to enable the operator to send the "alarm signal" correctly. The new rules come into force on Oct. 1 next; they are to be provisional to the extent that they may require amendment as the result of decisions at the Washington Radio-telegraph Conference, or at a subsequent conference on safety of life at sea.

Parliamentary Questions, &c.—On June 21, Mr. Hore-Belisha asked the Postmaster-General whether it was the intention of his department to issue instructions that, wherever possible, telephone wires should not be run across, either above or below, wireless receiving aerials.

Sir W. Mitchell-Thomson said there was already a standing instruction which provided for the alteration of telephone wires on private property which interfered with wireless reception, and he did not consider that further instructions were necessary. If the hon. member would furnish him with particulars of any cases in which reception was hampered, he would see whether steps could be taken to remedy matters without incurring undue expense.

On the same occasion it was also announced by Sir W. Mitchell-Thomson that the total number of telephone calls since the opening of the Transatlantic Radio-telephone Service that had passed from Great Britain to the United States was 485, a daily average of three. The total number of calls from the United States was 612, a daily average of 4. The number of calls originating from London was 435, and the number from the provinces 47. The question of charges would undoubtedly receive consideration in the future, but some of the calls were of considerable duration—a quarter of an hour or more. The service covered working expenses.

On June 28, Mr. Grotrian asked the Postmaster-General whether, in view of the great advantage to the fishing fleet, it was permissible for private individuals to establish a wireless telephone service with the trawlers and other vessels with which they were connected.

Sir W. Mitchell-Thomson said that in view of the risk of interference it was not practicable to permit the establishment of private wireless stations for communication with ships at sea. Vessels fitted with wireless-telegraph apparatus could send and receive messages through any of the Post Office coast stations; and in order to meet the needs of a number of trawlers which had recently been fitted with wireless telephone apparatus, arrangements were being made to equip the new coast station now in course of construction at Mablethorpe with suitable apparatus for the exchange of messages with those vessels by wireless telephony.

Under the title of Community Radio, Ltd., a company, the first of its kind in the country, is to supply wireless to houses in Lytham St. Anne's in a similar manner to water and gas services. The fee of 2s. a week covers everything, and programme items are to be available every day from noon to midnight.

According to *The Times*, the company, which already has 40 subscribers, spread over a wide area at St. Annes, has had inquiries from other towns, including Blackpool and Lytham St. Anne's. Mr. H. Holmes originated the idea of a subscribers' service, on payment of 2s. a week, with the licence included. For this sum, a wire will be run from the central receiving station to the house, and a loudspeaker will be provided for reproducing the Daventry programme. The subscriber will merely switch on or off in the same way as he does the electric light. Plans have been prepared for a bigger receiving station in the open country, and lines will be run into the town. The service will be opened wherever it is demanded, and there will soon be a dual service with the choice of two programmes. From the public press it is understood that the company was registered on June 29 last. The nominal capital is £2,000 in £1 shares.

According to the *Western Mail*, Newport Mon.'s newest suburb at Malpas is to be an up-to-date electrical one, for "wireless masts, aerials, leads and even earthing switches are 'fixtures' of every one of the 300 houses which have been erected by subsidised private enterprise in Newport's newest suburb at a rent of 16s. 6d. per week, inclusive of rates. The building company which owns the estate has provided the masts and aerials in order that they shall be erected in a uniform manner."

GREECE.—His Majesty's Consul-General at Salonica (Mr. F. E. Crow) reports that the Wireless Telegraphy Board in Athens has decided to allow the use of radio-receiving sets in Salonica and Cavalla. The necessary licences for the installation of receivers must be obtained from the Wireless Department of the Post Office in Athens. For the time being permission will only be granted to Greek subjects, but it is thought that the privilege will shortly be extended also to foreigners. Macedonia is a virgin market for the sale of wireless apparatus. British manufacturers wishing to do business there should therefore communicate at once with local dealers and agents, quoting prices and sending illustrated catalogues in French, if possible, as well as English. The names of the principal dealers in electrical goods, also those of small dealers in wireless apparatus, can be furnished on application to the Department of Overseas Trade, Whitehall, London, S.W.

INDIA.—As has already been announced, the Bombay station of the Indian Broadcasting Co. is to be inaugurated at 5 p.m. on July 23 by Lord Irwin, the Viceroy. According to *World Radio*, the stations have been allotted call signs and wavelengths as follows:—Bombay, 7BY, 357.1 metres; Calcutta, 7CA, 370.4 metres; other stations are to be established later.

The correspondent of the *Electrical Review* in India reports that the imports of wireless apparatus into India in 1926-27 amounted in value to Rs. 5 lakhs, as against Rs. 6 lakhs in the previous year. The imports came principally from the United Kingdom.

MALAYA.—The *Straits Times* announces that a company is being formed in Ipoh, Perak, for the purpose of broadcasting from Kuala Lumpur. Its capital is to be \$4,000,000 (£46,660), and it is estimated that the most modern equipment will cost \$135,000 (£15,750). The site at Kuala Lumpur has already been applied for, and the intention is to have daily programmes, so that a considerable income from advertising is anticipated. The upkeep has been estimated at approximately \$150,000 (£17,600) per annum. Mr. Leslie Cant is the promoter.

PORTUGUESE EAST AFRICA.—A Department of Overseas Trade report on the economic and financial condition of Mozambique is an interesting document. It reminds us that the province forms part of the South African Postal Union and communication is regular. In the district of Lourenço Marques there are over 600 telephones; telephones also exist at Beira and most of the coast towns, as well as on the estates of the large agricultural companies and the railways. Telegraph lines belong to the State, the chartered companies, the cable companies, and private concessionaires: 14,000 miles of line exist, of which about 7,500 miles belong to the State and 3,750 miles to British enterprises: over 1,000 miles are within the territory of the Mozambique Company, and nearly 250 miles belong to the Niassa Company. Wireless stations exist at Lourenço Marques, Inhambane, Beira, Quelimane, and Mossuril, near the Island of Mozambique: they are equipped with plant used during the war, either by the Portuguese forces or seized on German ships, and are used for the provincial service and for communication with shipping (official and private). In addition, a standard 6-kw. Marconi station has been completed at Lourenço Marques, and a 1.5-kw. station at Beira; they are being used for communication with the other provincial stations and similar stations are to be erected at Tete and Mozambique, to be followed later by subsidiaries at Chai-Chai, Porto Amelia and other points of importance. Marconi's Company has erected at Lourenço Marques, for the Companhia Portuguesa Radio-Marconi, a "beam" station for communicating with Lisbon and the other colonies. The concession of the Portuguese company is for forty years, and similar stations are planned for Madeira, the Azores, Cape Verde and Angola.

SOUTH AFRICA.—The seven-days' official test by the General Post Office of the "beam" wireless service with South Africa commenced on Friday morning, June 17, and was completed at 10 o'clock on June 24, as was mentioned in the July number of the *T. and T. Journal*. The results proved satisfactory—"eminently satisfactory" might be added, judging by subsequent experience with actual traffic.

The first experimental tests, says the *Electrical Review*, showed that communication between England and South Africa could be maintained for a longer period than the 11 hours required under the conditions of the Marconi guarantee to the Post Office, but it became clear that the wavelength originally selected was too long to give the maximum of communication during daylight hours, and the change of wavelength necessitated certain modifications not only in the transmitter itself, but also in the aerial and feeder systems. The stations use two wavelengths, one for daylight and the other for night communication. The standard time of the Union of South Africa is only two hours fast of Greenwich mean time, and sunrise and sunset in both countries therefore occur at nearly the same time; thus the signals in the path of the beam between the two countries travel almost completely in darkness or in daylight.

The intention of the Minister of Posts and Telegraphs to reduce "piracy" is crystallised into a very important amendment to the Radio Act now before the Union House of Assembly for consideration. According to *World Radio*, it reads: "Any person who sells, gives, or in any manner whatever supplies any valve, loudspeaker, or telephone receiver for radio to any person who is not a licensed listener shall within seven days after such supply notify the Postmaster-General thereof by written notice, setting out the name and address of the person so supplied. Failure to comply with the provisions of this sub-section shall constitute an offence." Objection is expected to this provision, and it is probable that wireless dealers will be registered, and they will have to record their sales of valves, telephones and loudspeakers.

The *Electrical Review* states that the recently-formed South African Broadcasting Co., after having taken over and resuscitated the Johannesburg station, has since also purchased the Cape Town station and entered into an agreement with the Durban Town Council to take over its station, which is unique in South Africa in being owned by the municipality, and the transfer takes place on July 1 next. With all the South African broadcasting stations now under one management, it is intended to interconnect them all with land lines and take full advantage of relaying, and it is hoped, by establishing further relay stations, to enable the small crystal user to benefit in various parts of the country. The new company, being also interested in the African Theatres Trust, intends to transmit items from various theatres with greater variety of artistes than is possible under present arrangements.

TURKEY.—An agreement with the Eastern Telegraph Company has now been ratified by the Turkish Parliament, says the *London Daily Telegraph*, under which the company has been granted a cable concession for a period of 30 years.

Turkey will once more be placed in direct communication with the rest of Europe and the world.

A cable ship is now actually engaged in restoring the Odessa-Constantinople cable.

This agreement, or convention, it will be recalled by readers of the *T. and T. Journal*, was actually signed on May 1 of this year.

U.S.A.—The United States Trade Commissioner at Ottawa has reported to the Dominion Bureau of Statistics that the exports to Canada of radio sets and parts from the United States during the calendar year 1926 amounted in value to £2,872,991, and included the following items: 32,768 receiving sets, worth £1,238,680; 96,059 valves, valued at £113,837; and £1,520,474 worth of parts and accessories.

Radiophone communication between the engineer in the locomotive cab and a brakeman in the "caboose" of a freight train a mile and a quarter long has been demonstrated satisfactorily by the American General Electric Company. The locomotive and "caboose" had identical equipment, consisting of two antennæ, one for transmitting and the other for receiving, a transmitter operating on a short wave so as not to interfere with regular broadcasting, and a receiving set.—*Reuter's Trade Service* (Schenectady).

The departure of Mr. John Lee from the C.T.O. was adequately and uniquely dealt with in the excellent international symposium of the July number of the *T. & T. J.*, and it is only referred to again in these columns in order to quote the following from *Supervising* regarding the successors to the respective posts of Controller and Deputy Controller of the C.T.O.: "We welcomed Mr. Stuart Jones to the C.T.O. almost twelve months ago, and the favourable impression then gained has been enhanced by association and observation. Mr. Stuart Jones has become 'one of us' and he can rest assured that he leads and controls a fully co-operating Supervising staff. Mr. D. M. Ford, on mounting a step higher in the ranks of the office within whose walls his official life has been spent, does not need any assurances of loyalty from a staff which 'knows him so well'."

The flight of time has indeed recently been particularly marked in the C.T.O. by the lengthy list of retirements and the sequential steppings-up. Thus, while congratulating Mr. W. E. Jones upon safely and happily reaching the retiring age in the capacity of Superintendent and passing out of the Service with the best of wishes behind him of a host of friends and colleagues who appreciate the straightforwardness of his character and the cheerfulness of his sunny temperament, congratulations are proffered to Mr. H. A. Bolton a most worthy successor to the vacancy.

The well-known Mr. C. E. Daggett, overseer, of musical fame, replaces Mr. J. W. Charter, Assistant Superintendent, already referred to in these columns, while the following Overseers, Messrs. E. Veale, C. Heywood and R. Suters, replace respectively Messrs. A. F. Bullard, A. F. Simmons and F. J. Palmer (retired), Mr. G. H. Major replacing Mr. C. W. Sparkes, some time since promoted to Superintendent. The following eight Telegraphists are likewise promoted to the Overseer class, consequent upon the above or other retirements, among which latter is noted with deep regret that of Mr. C. Pond, due to ill-health. The promotees are: Messrs. A. C. Bull, E. J. Willis, H. H. Carpenter, A. W. Randall, S. Parker, A. J. Medland, F. H. Brown and A. B. Hulls, to whom the usual felicitations.

The above refers especially to the Inland portion of the C.T.O. To these names must, however, be added those of Mr. F. S. Gullan and A. R. Clark, of the Foreign Cables and Wireless Department, to whom reference was duly made in our June issue. Their respective appointments are to the posts of Assistant Superintendent and Overseer, Cable Room Establishment, are additional, and are due to the expansion of the Cable and Wireless activities centred in the C.T.O.

A propos of this particular department it is gratifying to note that despite the abnormal pressure, "The Room" has so far given a particularly good account of itself in the Cricket contests this season.

Although the Editor has warned me to "cut down" this month, space must be found to note that the Second Exhibition of the C.T.O. Art Society was as successful as the preceding one. Yet again Sir William Orpen honoured the exhibition by his attendance and by giving his services as adjudicator. Sir William's prize of five guineas for competition in the Art Section was awarded to Mr. Ginger for a study of "Tulips."

Mr. F. C. Osborne dominated the Black and White Section, and drew appreciative notice from the Judge.

Much more could be written, but the editor is adamant!

At the Annual Inspection of the National Physical Laboratory by the General Board at the end of June among the many interesting exhibits which comprised such items as the analysis of various gases, sound-pulse photography, high-frequency furnaces, X-ray spectrography, &c., one singles out in the Wireless Division of the Electricity Department, and as specially appropriate to mention in these columns, (a) apparatus for the transmission and reception of waves as short as two metres, (b) an audio-frequency amplifier to demonstrate the insensitivity of the human ear to changes of sound intensity, and (c) apparatus for studying the behaviour of aerials in transmission and reception. From the observations on this latter apparatus, made by an electrical expert, it appears that "the difficulty of this work is that the only way to measure the current at different points in an aerial without changing the behaviour of the aerial is to put the measuring instruments actually *inside* the aerial wire. In the field outside the wireless hut is a special experimental tubular aerial built to enable this to be done, and the instruments are read with a telescope from the foot of the aerial."

Heredity.—"Heredity is far too serious a matter to lose importance through the futile things that are currently said of it. . . . It is taken for granted that women derive exclusively from their mothers and grandmothers, and men from their fathers and grandfathers. . . . A man to-day, we are told, is a little balder than his father, who was a little balder than his grandfather. The hair of his mother and his grandmother does not affect him—we may suppose—because it is all used up in supplying the heritage of his sister!—"Daughters of Men," by Alice Meynell.

AUTOMATIC TELEPHONY.

BY C. W. BROWN.

(IV—Continued from page 197.)

The caller is extended to a final selector, the facilities afforded by which are:—

1. The wipers are stepped vertically by the tens digit impulses and in a rotary direction by the units digit impulses.
2. Returns an earth over the P wire to hold the preceding switches.

The circuit of the final selector using booster metering is given in Fig. 1, the full operation being as follows:—

Caller extended from a group selector. Relay A is energised round the calling loop from: Negative, A200, D4, — line, calling loop, + line, D5, A200, G3, positive (earth).

Relay A has one contact.

A1 completes a circuit for relay B from: Negative, B700, A1 operated, positive (earth). Relay B thus operates.

Relay B has five contacts.

B1 prepares the V magnet circuit in preparation for the receipt of the tens digit.

B2 earths the P wire from the preceding switches from earth, D3, B2 operated, private wire.

B3 connects positive (earth) to the private wire of the P wiper for use when the call matures and to hold the switching relays or busy relays when operated.

B4 completes a circuit for relay J from: Negative, relay J, F5, B4, positive (earth).

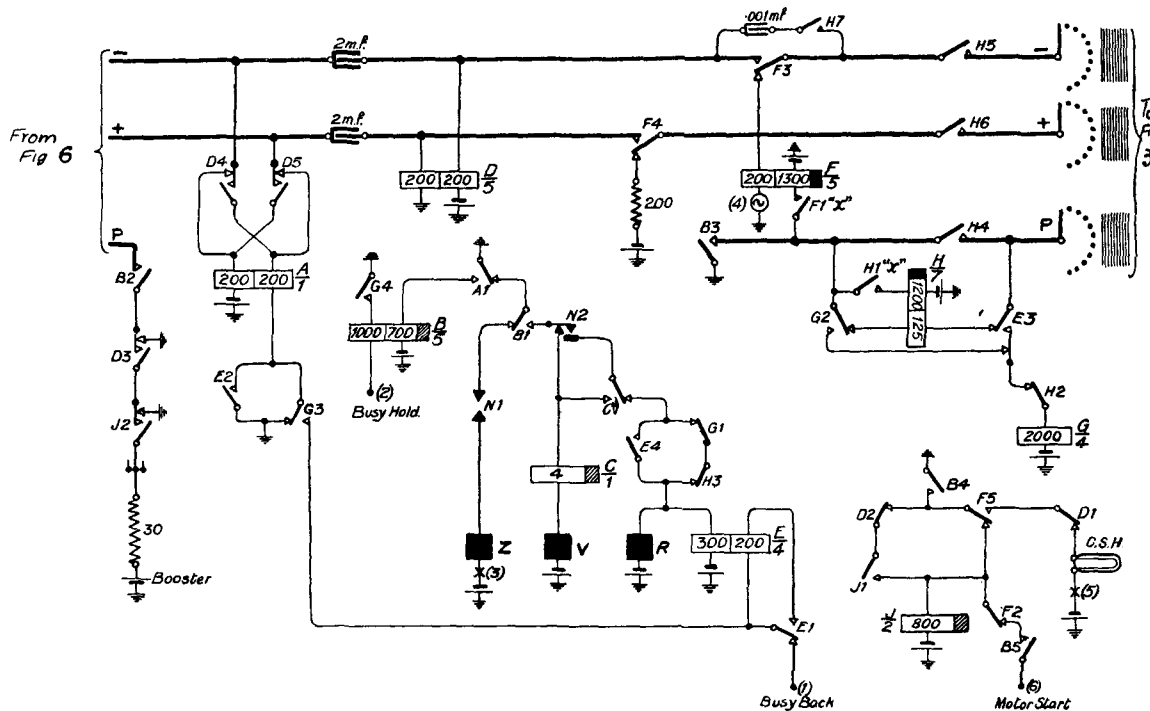


FIG. 1.

3. If required starts up the ringing motor.
4. Tests the called subscribers' line; if engaged transmits a busy signal and busy flash. If disengaged, transmits ringing current to the called line and ringing signal to the calling line.
5. Disconnects the ringing motor (if required) when the called subscriber lifts the receiver.
6. Provides talking current for both calling and called subscribers.
7. Connects the metering condition to the calling subscribers' meter.
8. Provides switchhook supervision to an operator on calls from manual positions.
9. Provides a visual and audible signal should the called line be held after the receiver has been replaced.
10. Releases itself and all preceding switches when the calling subscriber replaces the receiver.
11. Provides a signal if the shaft fails to restore.

B5 connects positive to the motor start wire (point 6).

Relay J consequently operates and the ringer is started up.

Relay J has two contacts.

J1 provides an alternative circuit for holding the relay operated via D2 and B4, thus relay J will be controlled by relay D.

J2 connects the booster voltage—50—to contact D3 so that when relay D is energised (upon the removal of the called subscriber's receiver—see later—) this voltage is connected to the private wire from the line switch.

Tens digit dialled.

The impulses are directed to magnet V over the circuit already prepared, but with the first impulse of the train, relay C energises, and remains operated while the whole of the tens train is passing. Also with the first upward step of the shaft, the mechanically operated contacts N1 and N2 change over.

N1 prepares the Z magnet circuit in readiness for release conditions.

N2 prepares the circuit for the reception of the units train of impulses.

The vertical impulsing circuit can now be traced as follows:—

The first impulse: Negative, magnet V, relay C, N2, B1 operated, A1 impulsing, positive (earth).

The remainder of the impulses: Negative, magnet V, relay C, C1 operated, N2 operated, B1 operated, A1 impulsing, positive (earth).

The wipers are therefore raised to the level in which the required line is located.

Relay C restores because of the comparatively long pause that occurs between the dialling of digits. The relay cannot again be operated for the call prevailing, because the circuit is broken at N2 operated.

Units digit dialled.

These impulses are received by magnet R over the following circuit: Negative, magnet R, H3, G1, C1, N2 operated, B1 operated, A1 impulsing, positive (earth).

Relay E being connected in parallel with magnet R will be energised while impulses are passing. The relay is rendered slow to release by placing a short circuit across one of its windings, so that the relay remains energised while impulses are passing and remains operated for a short period *after* the last impulse is received.

Relay E has four contacts.

E1 short circuits one of the relay windings for the reason already indicated. E2 provides an alternative path for the positive (earth) connexion of relay A, in event of relay G operating while the wipers are moving to the desired contact—this happens when engaged lines are passed by the wipers and also if the required line is engaged.

E3 connects relay G to the private wiper of the switch in readiness for testing the called subscriber's line.

E4 provides an alternative path for magnet R in event of relay G operating while the wipers are moving to the required contact, thus ensuring the continuity of the rotary impulsing circuit under such condition.

The wipers reach the bank contacts of the required line and

Assuming that the line is engaged, an earth will be encountered on the private bank contact, as relay E does not restore immediately, relay G is energised over the path: Negative, H2, E3, P wiper and bank contact, positive (earth).

Relay G has four contacts.

G1 opens the circuit of magnet R, to prevent any further movement of the shaft should the caller dial or in event of the switchhook being agitated.

G2 holds relay G operated over the path: Negative, relay G, H2, E3 (this contact is now at normal because the relay—E—has by this time de-energised), G2 operated, B3 operated, positive (earth).

G3 connects the busy tone to the calling loop.

G4 holds relay B during the busy flash period as explained for the group selector.

The circuit remains in this condition until the caller replaces the receiver.

Assuming that the called line is disengaged, there is no earth on the private bank contact, hence relay G does not operate, and upon the restoration of relay E, a circuit is established as follows:—

Negative, DM, dm, relay K, private wire and bank contact of subscriber's line (*see* Fig. 3 of last instalment for this portion of the circuit), P wiper, E3, relay H 125, G2, B3, positive (earth).

Relay K of line switch operates and removes relay L of line switch from the circuit.

Relay H only operates partially, as the current value is too small to fully energise it. Contact H1 only operates at this stage, the fact being indicated in Fig. 1 by the letter X against the

contact. The contact establishes a local circuit for the other winding of relay H, thus the relay now becomes fully energised. The relay is rendered slow to operate by fixing a copper slug at the armature end, so that a margin of time occurs between the full operation of relay K (Fig. 3 of last instalment), and the full operation of relay H. This is to ensure that relay L is removed from the circuit before the ringing current is passed out, otherwise would be removed prematurely.

Relay H has seven contacts.

H1 has been explained above.

H2 disconnects relay G to prevent that relay remaining energised via G2 should it become operated from any cause after the called line has been tested and found to be disengaged the irregular application of Busy signal is thus guarded against.

H3 disconnects the circuit of magnet R to prevent any further movement of the shaft, due to the calling subscriber's dial operations or any movement of the switchhook.

H4 connects a full earth to the private wiper and consequently to the private bank contact of the called line to satisfy the normal busy condition.

H5 and H6 complete the ringing circuit as follows: Positive, ringing alternations, relay F200, F3, H5 operated,—line, condenser and bell of called line, + line, H6 operated, F4, 200 ohms, negative.

Relay F does not operate under this condition as the amount of current is small and the relay is designed not to operate with the passage of alternating current of the ringing frequency.

H7 completes the circuit for ringing signal to the calling line over the path: — ringing lead, F2, H7 operated, .001 m.f. condenser, 2 m.f. condenser in the negative line, calling loop, + line, D5, A200, G3, positive. As the ringing lead has a tone of 133 periods per second superposed, a tone interrupted at the same frequency as the ringing current, is heard by the calling subscriber, only when the ringing condition has actually been set up.

The called subscriber lifts the receiver. When this occurs, the resistance of the called line is reduced by cutting out the condenser and bell, thus relay F will energise. Actually the relay "trips."

Relay has five contacts.

F1 closes first (contact marked X) and holds the relay from: Negative, relay F1,300, F1 operated, B3, positive (earth).

F2 opens the circuit of the ringing motor, which therefore stops.

F3 and F4 extend the called line to the transmission bridge—relay D—.

F5 disconnects the original circuit of relay J, which however is still held via D2.

The called line having been extended to relay D, that relay operates over the path: Negative, D200, F3 operated, H5 operated,—line, called subscriber's loop, + line, H6 operated, F4 operated, D200, positive (earth).

Relay D has five contacts.

D1 disconnects the "called subscriber held" lamp as this is not required.

D2 releases relay J which does not immediately restore.

D3 extends the booster voltage to the private wire towards the line switch, so that the meter of the calling line operates, but as relay J is releasing, the booster voltage is only connected to the meter until relay J restores to normal (approximately 300 milliseconds after it is disconnected by the action of D2), after which it is replaced by an earth at J2. The booster current is fed through a heat coil—shown as 30 ohms in the fig.—this provides a protection against the abnormal application of the extra current, as the heat coil will "blow" if the application of the current is abnormally prolonged.

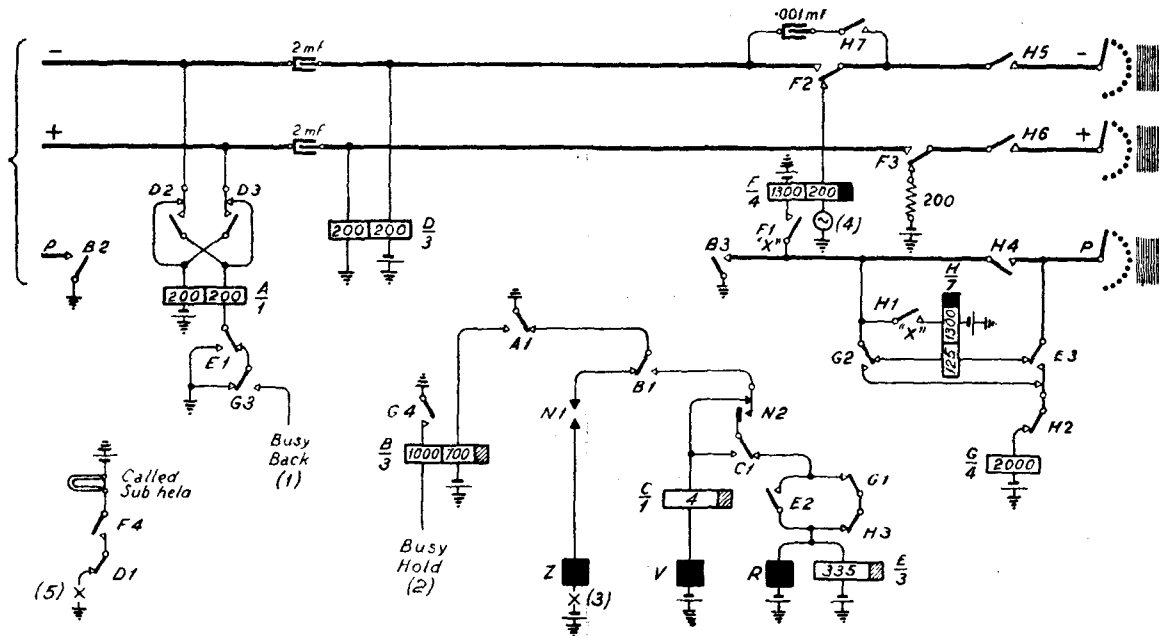
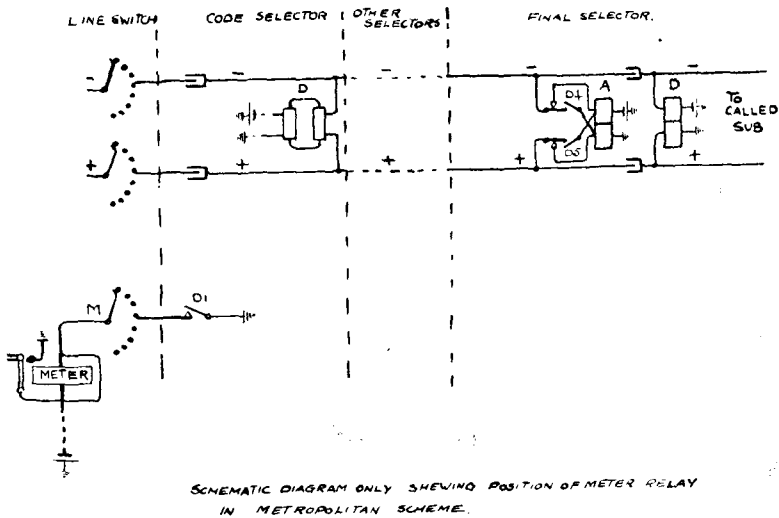


FIG. 2.

D4 and D5 reverse the potential towards the calling line, thus, if the call has originated from a manual position, the cord circuit supervisory conditions are satisfied.

Talking conditions are now set up. The potential for the transmitter of the calling subscriber is derived via relay A and for the called subscriber from relay D, the two 2-m.f. condensers in the - and + lines providing the link between the subscribers.



SCHEMATIC DIAGRAM ONLY SHOWING POSITION OF METER RELAY IN METROPOLITAN SCHEME.

FIG. 3.

The calling subscriber replaces the receiver.

Relay A is released.

A1 disconnects the circuit of relay B, which releases.

B1 completes the circuit of magnet Z from : Negative (point 3), N1 operated (until the shaft reaches the normal position), B1, A1, positive (earth). The switch is therefore released.

B2 disconnects the P wire towards the calling line, hence the H relays of group selectors (see Fig. 6 of last instalment) and the K relay of the line switch (see Fig. 3 of last instalment) are disconnected and the whole connexion is restored.

B3 having restored, relays H and F are released.

If the called replaces the receiver first—

Relay D only will be released and a circuit will be established over the path : Negative (point 5), C.S.H. (called subscriber held) lamp, D1, F5 operated, B4 operated, positive (earth).

A signal is therefore given to indicate the existence of the abnormal condition and as previously mentioned, the attendant releases the connexion by hand.

Fig. 2 is the final selector circuit used in metropolitan areas, the essential differences between Figs. 1 and 2 being the absence, in the latter case, of relay J and the relative booster voltage. Otherwise, the circuits are similar.

The reversal of potential that occurs when the called subscriber lifts the receiver (operation of relay D) in Fig 2 changes the direction of current flowing through the metering relay located in the special selector (code selector) from which the call has been routed. The operation of this relay places a positive (earth) on the meter wire, thence over the M wiper to the meter (Fig. 4 of last instalment).

Fig. 3 is a schematic diagram showing the link.

V.

It has been assumed that the subscribers concerned in the switching scheme already discussed have but a single line. It is necessary now to indicate the manner in which the requirements of subscribers having more than one line are catered for under automatic conditions.

A reference to the manual method of dealing with such cases will be useful at this stage. Generally the lines to the subscribers' premises are terminated on a switchboard known as a P.B.X. (Private Branch Exchange). Although not entirely necessary, it is desirable that the exchange numbers allocated to the subscriber should be consecutive, to permit the use of consecutive multiple jacks at the exchange and thus to facilitate the handling of incoming traffic.

As a rule, one number only is advertised in the telephone directory, the multiple jacks of all the lines being suitably marked to indicate the commencement and the end of the group of lines. The directory number is the first of the jacks, so that a coloured line may be painted along the jacks for the purpose of the identification

mentioned. Calls for the required subscriber will therefore mature if a free line exists, busy conditions only being given when all lines have been tested and found to be engaged.

In the case of very large groups of lines requiring several strips of multiple jacks, a "group busy" scheme may be necessary to reduce the number of tests to be made when a free line is being sought.

As P.B.X. lines are invariably required for bothway traffic, calling equipment is provided in the normal manner.

Under automatic conditions the intelligent anticipation available under manual conditions is absent, but the facilities provided and afforded to subscribers must not suffer, hence it is necessary to modify, without substantially altering, the switching arrangements for dealing with the P.B.X. subscriber.

Many different schemes exist for dealing with the problem; to discuss and of necessity explain them is not the intention of the writer now, but rather to concentrate upon the schemes that are used by the Post Office.

At the moment three schemes have been tentatively standardised, they are:—

- Scheme 1. For subscribers with fewer than 11 lines.
- Scheme 2. For subscribers with fewer than 21 lines.
- Scheme 3. For subscribers with more than 20 lines.

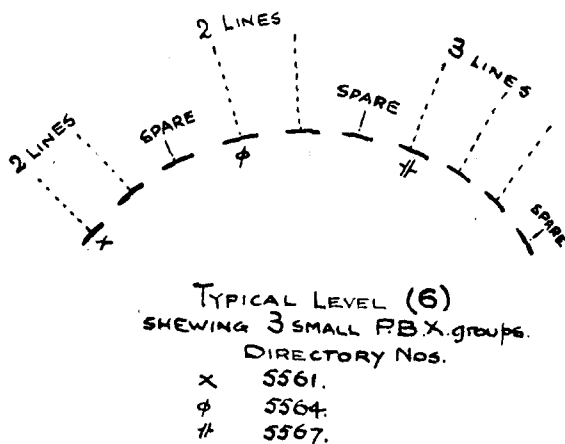
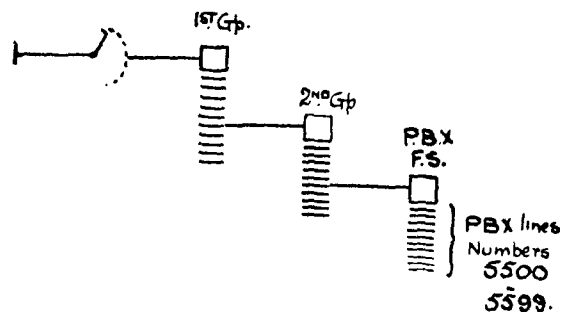


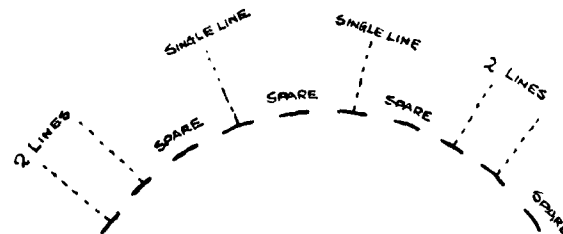
FIG. 4.

The schemes differ in the type of final selector used because (a) incoming traffic only is involved and (b) because the final selector used for subscribers having a single line, requires dialled impulses to direct the wipers to each of the contacts in the bank, also the number of lines in the levels is limited to 10.

As the result of the use of special final selectors, separate blocks of numbers are allocated for each of the schemes, but in order to prevent congestion of traffic in particular channels, the numbers

are spread over the exchange. The predominant type of P.B.X. is that having fewer than 11 lines, the number having over 20 lines being small.

In reviewing the facilities afforded by each of the schemes mentioned it will be appreciated that as one number only is advertised in the telephone directory, the switches (final selectors) concerned must be capable of testing the whole of the lines when the number is dialled, and that a busy signal must not be transmitted



ALLOCATION OF NUMBERS OF P.B.X. SWITCH (LEVEL 6) SHEWING SINGLE LINES AND P.B.X. GROUPS

NUMBERS AVAILABLE:—

2261, 2, 3, 4, 5, 6, 7, 8, 9, 0.

P.B.X. LINES.	2261	DIRECTORY.
	2262	
	2263	SPARE FOR GROWTH.
	2264	DIRECTORY.
	2265	
	2266	SPARE FOR GROWTH.
	2267	
SINGLE LINES.	2264	DIRECTORY
	2265	SPARE
	2266	DIRECTORY
	2267	SPARE.

FIG. 5.

to a caller until all the lines have been tested and found to be engaged. Thus there is the proviso that in each of the schemes the lines to the P.B.X. must be consecutive. This proviso enables much simplification in circuit design, a commendable feature. In order to meet reasonable development, it is desirable that spare positions should be left at the end of each group of lines, otherwise if growth occurs, the subscribers' number must be changed. The forecasting for this type of subscriber must be carried out with great care, for not only are number changes irritating to subscribers, but the Post Office is involved in intercepting the old number, which cannot be used until a subsequent issue of the telephone directory, thus temporarily reducing the exchange capacity and involving additional expense for operating staff.

It will be convenient to take each of the schemes *seriatim*. The figs. given as illustrations refer to a 4-digit (10,000-line) system.

Scheme 1.

In this case, several small P.B.X. groups may be accommodated in one level, provided that the total number of lines does not exceed 10. Fig. 4 shows such an arrangement. The dialling of the directory number directs the wipers to the requisite contact, if the line be engaged the wipers step automatically to the next contact, this process is repeated if necessary until the last line is reached, and if this is engaged, the wipers halt on the contact and the standard busy signal is transmitted to the caller. Thus the final selector is arranged for both dial control and hunting, but hunting conditions are only set up if the first line is dialled and found to be engaged. Therefore, if a number other than the first (the directory number) is dialled, the automatic hunting condition is not introduced; the final selector then functions as an ordinary dial controlled switch and consequently subscribers' having single lines may also be

accommodated in a level as indicated in Fig. 5. This is a useful feature that enables potential P.B.X. subscribers to be given a number that will not require altering when the additional line or lines mature.

Figs. 4 and 5 show only one level of a P.B.X. final selector, but of course the same conditions apply to the remaining levels. It will be observed that directory numbers which finish with 0 cannot be used with this scheme.

The question of special night service is an important one, particularly to the subscriber with a few lines; the single line feature mentioned is extremely useful for meeting the need, the numbers to be dialled at night being specially advertised. The directory number cannot be used for special night service purposes, because if it were already engaged a caller upon reaching it after dialling the number would be passed on to another line (hunting is set up if the directory number is dialled and found to be engaged) and consequently to a wrong extension.

If a spare contact is not available at the end of the group, and the line connected to the directory number is required for night extension purposes, then it is necessary to "tee" it to a spare number in the regular number (non-P.B.X.) series, and the spare number advertised for night service calls. The number selected cannot be allocated for other purposes, hence the arrangement results in an encroachment upon the multiple capacity of the exchange.

If a spare contact is available at the end of the group, it may be "teed" to the line connected to the directory number, thus the night numbers will all be within the group. The scheme will be seen in Fig. 6.

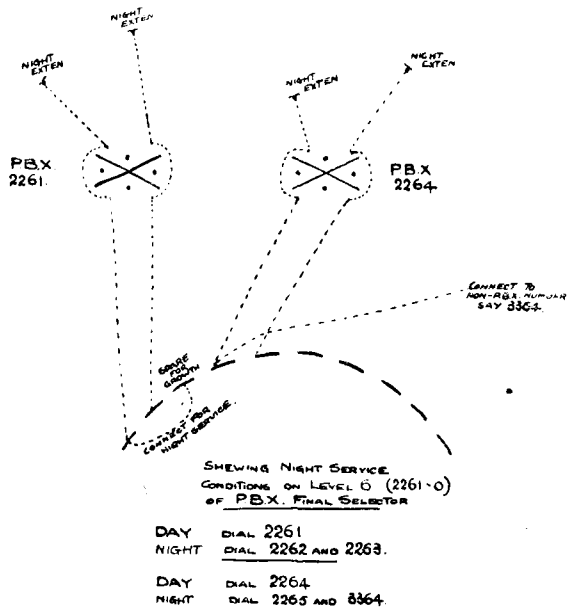


FIG. 6.

It will be clear that an increase in the number of lines in excess of 10 brings the small P.B.X. into Scheme 2 or 3. As separate numbers are involved with each scheme, the transfer from one scheme to another necessitates a number change; to avoid this, when the increase is limited to one or two lines, facilities are provided in the wiring arrangements which enable the addition of lines in excess of 10 without transferring the subscriber to another group.

The arrangement is outlined in Fig. 7. The final selector multiple is cabled to the access points (terminals) in two sections, i.e., the multiple is divided. In some literature on the subject the

arrangement is referred to as a double appearance multiple. When the P.B.X. lines do not exceed ten, the two sets of terminals are connected—connections A in the fig.—so that the ten lines are available from all the final selectors. If it be assumed that an additional line is required for a subscriber having 10 lines already, clearly a number must be given to the line for identification purposes, hence it becomes auxiliary to the normal numbers. A block of auxiliary numbers is necessary for the requirements of Schemes

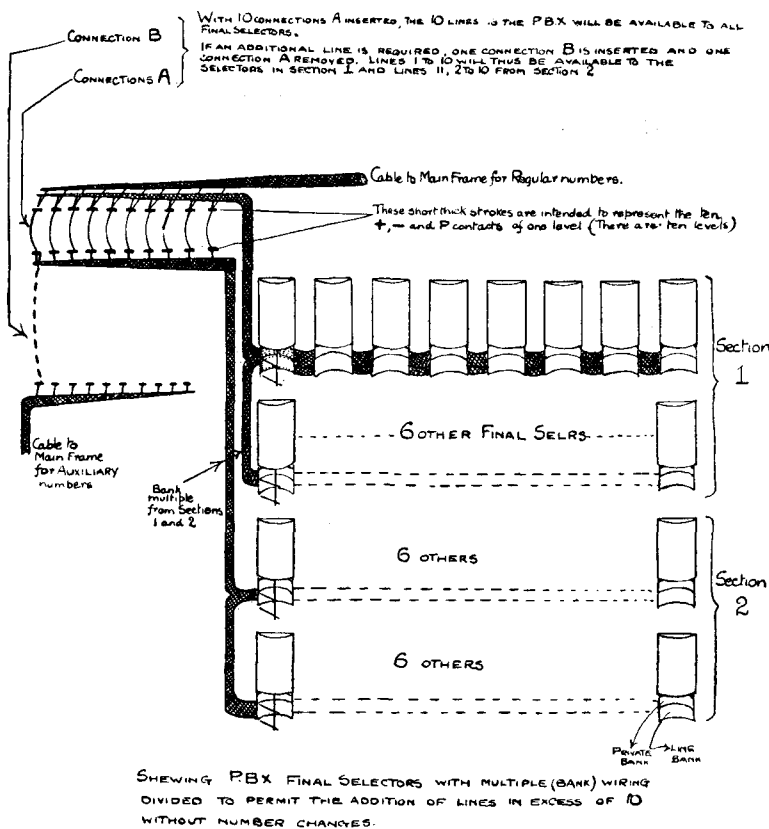


FIG. 7.

2 and 3 as will be explained, consequently, in order to accommodate the extra line, connection A of one of the existing lines is cut away and the auxiliary line joined in by means of connexion B (we may call this line No. 11 for the purpose of this explanation) so that lines 1 to 10 are available from the selectors forming Section 1 and lines 11, 2 to 10 from Section 2. Full availability is not therefore given, as only 10 lines are available from each section of the final selectors but the number of lines to the P.B.X. is 11, and busy conditions will be given when the 10 lines concerned are engaged. For this reason it has been found desirable to restrict the number of additional lines to three.

In the fig. the arrangement shown is typical only. In practice the additional circuits are not necessarily added at the commencement of the level.

(To be continued.)

PRESENTATION TO MR. J. NORWOOD.

A PLEASING ceremony took place at the Cornwallis Road Depot of the Engineering Department, London, when the Sectional Engineer, Mr. Steed, made a presentation of a Gold Watch to Mr. J. Norwood, a tradesman, upon his retirement at the age of 70, after 38 years' service. A large number of the staff witnessed the ceremony.

"WHEN WE GET TANDEM."

By J. W. SHEPHERD (*Traffic Superintendent, Tandem Exchange.*)

To all Traffic people in London, the name "Tandem" has been one to conjure with for the past two years or so. The expression chosen as the title of this article has been in as constant circulation as coin of the realm, and, so far as the writer is concerned, has been observed in far wider use than that commodity—probably by reason of greater availability of supply. Be this as it may, the fact is that, whether in Headquarters, District, Section, or Exchange, provided that "shop" was the topic of conversation, your gambler would regard it a safe wager that, sooner or later, the remark would be made "When we get Tandem." Truly it would be made with different expression and, according to the degree of optimism of the utterer, so would vary the degree of emphasis laid on the initial word.

In order to demonstrate the important changes that will occur when we get Tandem, it is necessary to consider briefly the functions of the Exchange. First and last, of course, Tandem is a junction centre. Its daily life will be spent in completing calls between Exchanges that have no direct junction communication with each other. Although at the outset Tandem will perform this office wholly for manual Exchanges, it will form an equally important and similar link as Automatic Exchanges are opened.

To get a clear conception of the functions of Tandem, it is important to realise the fundamental fact that calls can be completed to any Exchange within the London 10-mile circle, i.e. within the boundary of London's Automatic Exchange area. Indirect traffic to Exchanges beyond the London 10-mile circle, although within the London Telephone Area, will be dealt with by the Toll Exchange.

Tandem will form a link between Manual and Automatic Exchanges alike and can best be considered as having its incoming side divided into two distinct portions:—

- (1) Manual Tandem, at which calls from Manual Exchanges will be dealt with on Tandem "B" positions.
- (2) Automatic Tandem, through the apparatus of which indirect calls originating at Automatic Exchanges will pass.

Every call outgoing from Tandem will be dispatched over automatic switches and will be received automatically at the Exchange of destination. Where the distant Exchange is Automatic, the receiving switches will, of course, be installed as a part of the Exchange equipment. Where the distant Exchange is manual, apparatus in the form of Coder Call Indicator equipment must be fitted for the reception of Tandem calls. It should be mentioned in passing that this same apparatus at the Manual Exchange will be used to receive calls direct from Automatic Exchanges, so that, ultimately, a mixture of calls from Tandem and Automatic Exchanges will be received at Coder Call Indicator positions.

The Manual portion of the Tandem Exchange, which of course forms the main subject of this article, comprises 108 Key Sender "B" positions and a 10-position Information Desk. Each Tandem Key Sender "B" position is equipped for 30 incoming junctions, and is fitted with a "Key-Sender" set which is, in effect, an automatic telephone dial arranged in Key form as shown below.

Upon receiving the required Exchange name and number by order-wire from the "A" telephonist at the originating Exchange, the Tandem telephonist allots a junction and, at the same time, depresses the relative Junction Assignment Key. The depression of this Key associates the allotted incoming junction with the position Key-Sender Set, and the Tandem telephonist proceeds to set up the demand by successive depressions on the corresponding Seven Keys, i.e. the first three letters of the required Exchange name, and then the four figures of the number required. The depression of the first three keys corresponding to the code of the required Exchange results in the selection of an outgoing Tandem junction, and the preparation of a path to the receiving Coder Call Indicator apparatus at the distant Exchange. The depression of the four keys corresponding to the required number causes electrical impulses to be sent over the prepared path, and results in the display of the number on the Coder Call Indicator position at the required Exchange, where the call is completed silently in the multiple by the Coder Call Indicator telephonist. Should the Tandem telephonist mis-key, and realise her mistake before she has depressed the seventh key of the call, she can, by means of a "Cancel" key, erase what she has sent, and can re-commence without any reassignment of the junction. Should she, however, not realise an error in keying until after she has depressed the seventh key, she can obliterate everything that has been sent on the outgoing junction by operating the appropriate "Junction Disconnect" key. If she still remembers the Exchange and number demanded, she again depresses the Junction Assignment Key as before and keys up the Exchange code and number afresh. So far as the "A" telephonist at the originating Exchange is concerned, the call is completed regularly. If, however, the Tandem telephonist has forgotten the demand she should have keyed up, she obliterates the error as before by operating the "Junction Disconnect" Key and, again

depressing the "Junction Assignment" Key of the junction originally allotted, sets up the code "INF," thus transferring the call to the Tandem Information Desk. This last operation is, in fact, the means by which the Tandem telephonist can dispose of any irregular demand which she has accepted in error and which she is unable to complete, e.g., a request for a number on an Exchange beyond the London 10-mile circle. Requests for "Trunks" (Records), "Telegrams," "Directory Enquiry" and "Toll" can be complied with by keying-up "TRU," "TEL," "DIR" or "TOL" respectively. This, in brief, is the outline of procedure in operating the various types of call via Tandem.

It is not the intention here to deal at length with the operating procedure, but rather to review broadly the effect of the Tandem Exchange upon existing arrangements. It may, however, be of interest to record that all incoming order-wires to Tandem will be fitted with a "guarding tone" device. This tone is produced on the order-wire immediately the junction is allotted by the Tandem telephonist, and continues for a period of about 2.5 secs.—the length of time taken to operate the seven keys for the completion of a call on a Tandem Key Sender "B" position. Its purpose is to safeguard the Tandem telephonist from interruption on the order-wire during the process of keying-up a call.

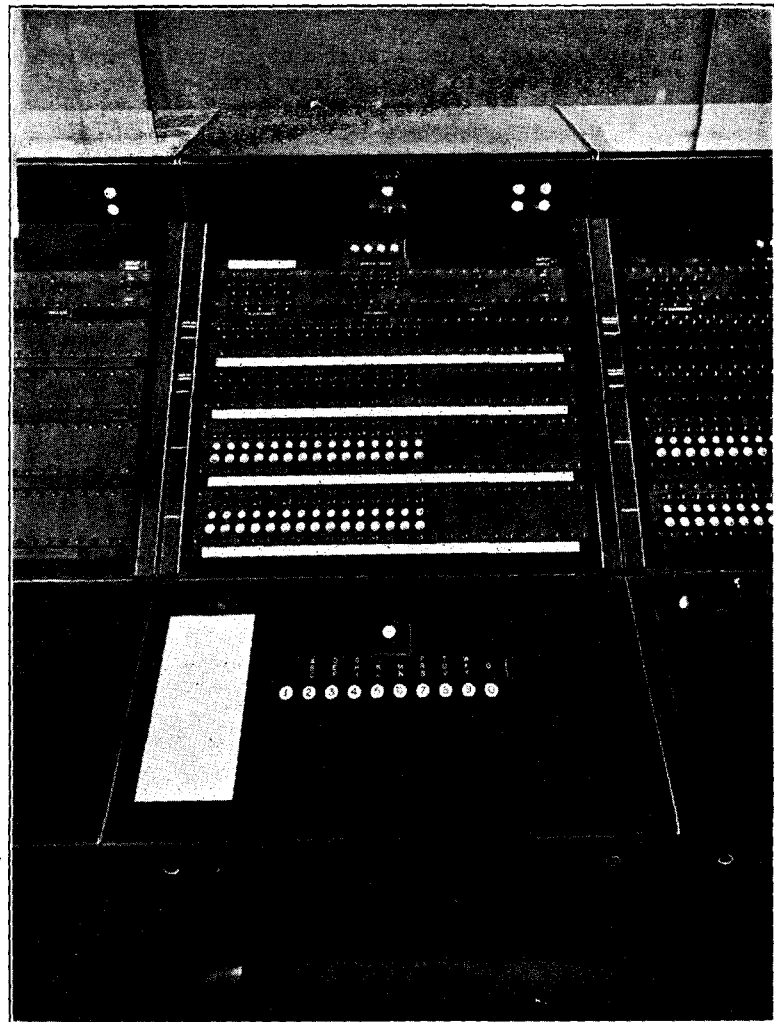


FIG. 1.

First two rows of keys: JUNCTION DISCONNECT KEYS.
Second two rows of keys: JUNCTION ASSIGNMENT LAMPS.
Below: CANCEL KEY AND KEY SENDER SET.

The most obvious achievement of Tandem will be the substitution of one order-wire working junction centre for the London 10-mile circle in place of the existing six. Whatever policy is determined as to the area to be served incoming by Tandem, every Exchange within the London 10-mile circle, at least, will have its own order-wire group to Tandem, and by means of it can obtain access to any Exchange within that area to which it has no direct junction communication. Thus all existing lending groups will be abolished and with them the often tiresome process of obtaining a junction to a distant Exchange, via a junction centre and waiting, for a variety of reasons, until the distant Exchange answers. This will be particularly evident during late evening, night, Saturday afternoon and Sunday periods.

Next in order of extinction will be the signal junctions, both plug and jack-ended. The great majority of these will disappear when Tandem becomes fully operative. The few that will remain have been retained temporarily for economic reasons, but these will be superseded as opportunity serves. How many Supervisors will view with satisfaction the passing of the jack-ended junction.

Whatever may be the many shades of opinion upon signal junction working generally, all Traffic people will agree that the service will be improved by its substitution in favour of one large order-wire junction group per Exchange, over which all demands for the "odds and ends" of traffic may be met.

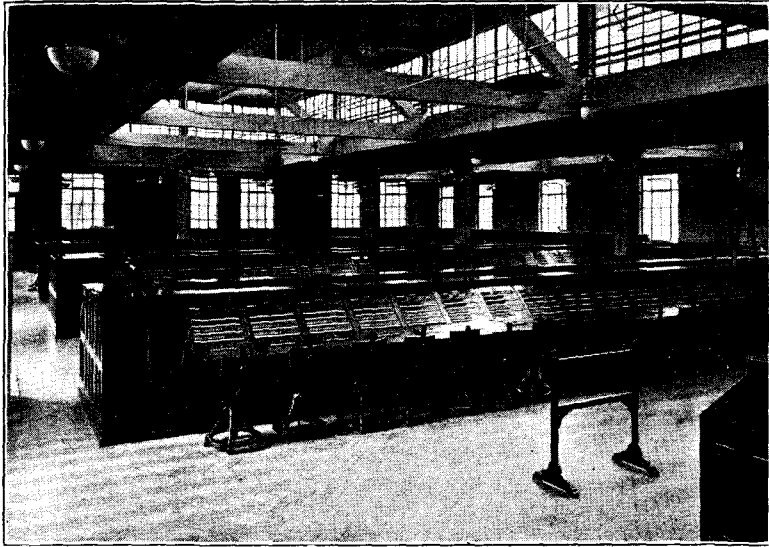


FIG. 2.

Many existing small direct order-wire groups also will be recovered in favour of Tandem working. This step may not receive universal favour at the outset, but a brief consideration of the ideal at which Tandem will aim may modify dissenting opinion. Originally, it was hoped that all groups of junctions over which less than 43 calls were passed in the busy hour could be recovered in favour of Tandem working as soon as the Exchange became fully operative. Subsequent considerations, e.g., unexpectedly high development in Exchange lines, have necessitated the lowering of that standard temporarily to a figure of approximately 25 calls. But even under these circumstances, the efficiency of Exchanges in general, and of those between the $7\frac{1}{2}$ -10 mile London circles in particular, must be increased by the improved facilities for effecting, via the Tandem order-wire, all that traffic now passed either by borrowed or direct Signal junctions or by an order-wire shared with several other Exchanges. It is interesting to note that a large proportion of order-wires to Tandem will be worked on a "straight" basis. Thus, many Exchanges that now have to depend upon their junction centres and signal junctions for a considerable portion of their junction traffic will find one Tandem position entirely at their service for traffic to any Exchange within the London 10-mile circle to which they have no direct junctions. Tandem, in fact, will trim the ragged edges of telephone operating. In these edges undoubtedly lies an appreciable amount of inefficiency, born of facilities which are below the general standard and requirements of an ever-increasing service.

The Automatic portion of Tandem, referred to earlier as a separate part of the incoming side of the Exchange, will commence to function with the opening of the first Automatic Exchange, and will become increasingly operative as the London Automatic telephone system grows. Just as Manual Exchanges cannot, for economic reasons alone, be provided with direct junctions to all other Exchanges within the London 10-mile circle, so must a certain proportion of Automatic Exchange traffic be dealt with over indirect routes. Subscribers served by Automatic Exchanges will obtain access, without verbal interception, to any other subscriber within the London 10-mile circle by dialling the first three letters of the required Exchange name, followed by the number. In the case of Exchanges (Manual or Automatic) to which direct junctions are provided, calls will take the direct path to the Coder Call Indicator apparatus or to the Subscriber respectively. But where the call is made by a subscriber on an Automatic Exchange to an Exchange (either Manual or Automatic) to which direct junction communication is not provided, that call finds its way to the distant Exchange indirectly, i.e., via the Automatic Tandem Switches.

The thought may occur to the reader that, as more and more Automatic Exchanges are opened, the Automatic side of Tandem will increase, and the Manual side decrease correspondingly. This is so, and advantage will be taken of the relief given by the Automatic to the Manual side, gradually to effect the conversion of more and more existing small direct routes to Tandem working, and so to raise the standard of direct routes accordingly—at least

to a point at which a direct junction route carrying less than 43 calls in the Exchange busy hour will be an exception.

It is not difficult to realise that the opening of Tandem involves considerable changes in the layout of Exchange "B" boards—particularly in the case of medium size and small Exchanges. Data which have been circulated to the Traffic Districts shows that a large number of existing junction groups will be recovered when Tandem is fully operative. The traffic now carried on these junctions (about 31,000 calls) will be dealt with at Tandem in its busy hour, and a large proportion of the traffic of many suburban Exchanges will then circulate via Tandem and Coder Call Indicator equipment. Some 6,000 junctions in all have been provided to and from the Tandem Exchange for the indirect traffic of Manual Exchanges within the London 10-mile circle.

Coder Call Indicator equipment will be installed at all the Manual Exchanges within the London 10-mile circle, with the exception of Hendon and Edgware.

The Traffic side commenced to co-operate with the Engineers in testing out the Tandem and Coder Call Indicator equipment some time ago; the work has been increasing in intensity, and during the period mentioned, about 1,250,000 test calls have been made. This number represents the calls sent into the Exchange. During the early stages of testing, an appreciable number of calls did not succeed in getting out again—they were lost in the maze of intricacy known as the Tandem switching equipment. Calls there were, also, that evinced a desire (sometimes with success) to reach an Exchange other than that to which they were sent, and there have even been cases in which the apparatus has sent fives for nines—a sure proof that it has absorbed the telephone environment! It is good, however, to be able to record that, at this time, a high and increasing percentage of the calls passed arrive correctly at the Exchanges to which they are sent.

At the time of writing (early July), Tandem is passing test traffic to Coder Call Indicator equipment at forty Exchanges. At three of these—Addiscombe, Croydon and Thornton Heath—a measure of public traffic is being passed experimentally throughout the day, and within a short time, a further eight Exchanges (i.e., those having East as their junction centre) also will be passing experimental public traffic in the same way.

Thus it can be said that the expression, "When we get Tandem," will soon apply only to the past. It requires little imagination on the part of the reader to realise that only the fringe of the effects of Tandem upon the routing arrangements of to-day has been touched in the foregoing. The theme is worthy of expansion by individual thought; consideration alone of the possibilities of concentration of traffic via Tandem at other than normal hours forms a subject peculiarly applicable to all local Exchange officers. It is not a fantastic supposition that the whole of the incoming traffic of many London Exchanges in the late evening, night and early morning hours could be received via Tandem, during which time the direct junction routes would be inoperative and only Coder Call Indicator positions would be staffed. Truly a fascinating subject is offered to the agile and inventive mind in the future effect of Tandem upon the telephone service of to-day. These are new lands awaiting exploration, and few better ports exist from which to embark than the Exchanges at which Coder Call Indicator equipment is installed.

Many and varied modifications will inevitably be necessary in the course of time, but, in such an entirely new departure as Tandem working in conjunction with London's Automatic System, a little foresight will be invaluable for some time to come, until experience of the new conditions has been gained. Now is the time for Exchanges to build their machinery for the transition period and to gather, from every available source, a stock of that extremely effective lubricant known as "seeing" forward."

MANCHESTER NOTES.

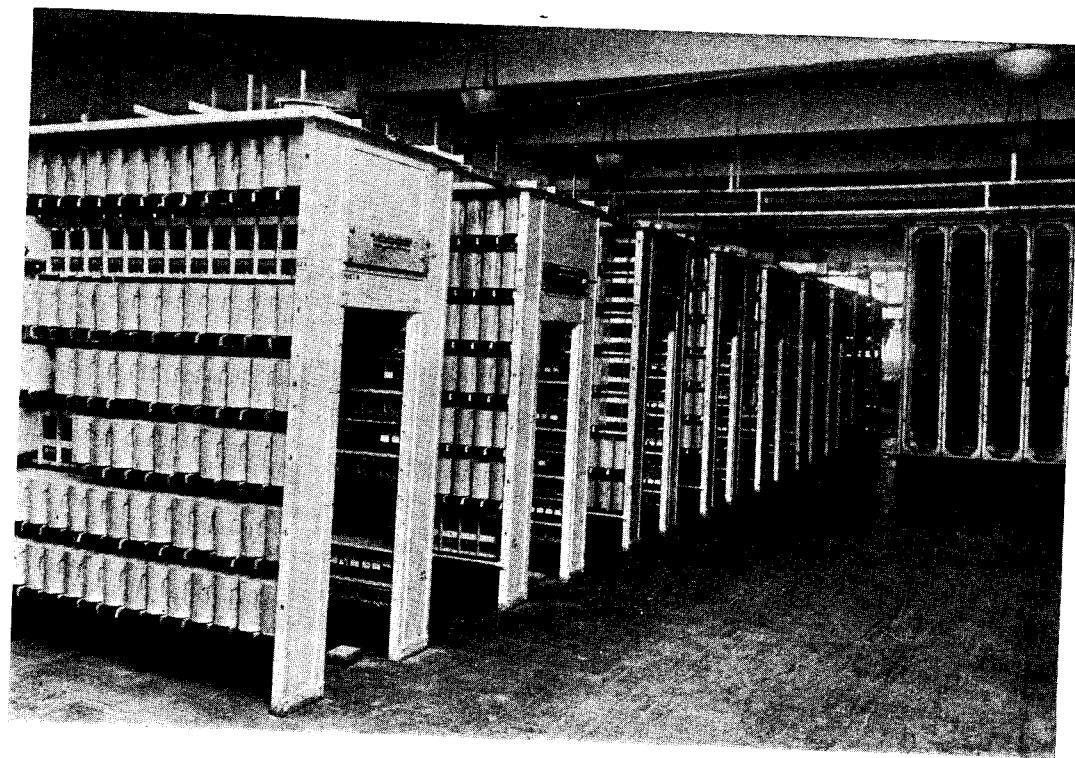
SOME few members of the District Manager's Office, Manchester, spent a very pleasant afternoon on the 2nd instant when they journeyed to Bakewell, Derbyshire, by motor coach. The party, numbering about thirty-five, were fortunate in their selection of date as the day turned out to be one of the finest experienced so far this summer.

After a splendid drive through the hills and dales of Derbyshire, high tea was served at the Wheat Sheaf Hotel; visits were paid to the points of interest (which are many, varied and historical) in the neighbourhood. The return journey through the Peak District was delightful, Manchester being reached at about 10.30.

Marriages:—Miss F. HORNE, Writing Assistant, was presented by the staff of the District Manager's Office with a case of cutlery, and a brass rose bowl by her colleagues in the Cash Office, besides many personal gifts on resignation on account of marriage; Miss M. B. HITCHEN, Writing Assistant, also received a similar gift from the District Manager's Office Staff, and a cut glass cruet from the Cash Office Staff, together with many other gifts from personal friends when she left the service to be married; Mr. J. S. MCFADDEN, Clerical Officer, Traffic Section, who is the elder son of Mr. S. McFadden, Traffic Superintendent, Class II, North Midland District, has resigned his bachelor status, and as a result was presented by his colleagues in the District Manager's Office, Manchester, with a canteen of cutlery. Mr. Parry, Traffic Superintendent, made the presentation in a happy speech and Mr. McFadden suitably responded.

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TELEPHONE EQUIPMENT

The Telegraph and Telephone Journal.

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

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		J. W. WISSENDEN.
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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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No. 149.

MR. DALZELL'S RETIREMENT.

WITH Mr. Dalzell's retirement the Post Office loses one who was in a very real sense a telephone pioneer. He joined the Globe Telephone Company so long ago as 1881—only 5 years after Graham Bell's invention of the telephone—and, even before that date, he had been studying electrical engineering and telegraphy professionally. In one of his early posts, as electrician, he was occupied in designing apparatus to meet the changing and rapidly developing systems of infantile and juvenile telephony. Later he carried out extensive trunk construction and reconstruction works. He served in four or five different telephone companies, was successively Manager of more than one provincial Telephone District, District Manager West London Area, and Assistant Superintendent for London. At the time of the transfer to the Post Office he was Superintendent of the West of England Province. In 1916 he was appointed Inspector of Telegraph & Telephone Traffic, in 1919 Chief Inspector, and in 1922 Director of Telegraphs and Telephones, thus in turn adding to the scope of his responsibilities inland telegraphs and overseas communications, both cable and wireless.

Mr. Dalzell's continuous and intimate contact with so many phases—engineering, traffic and managerial—of the developing telephone service largely explains his broad outlook, his wide and deep knowledge, and the impressive ease with which he moved

amidst the intricate details of telephone questions—an ease which was perhaps the more striking as there was no parade of knowledge, pretention or assertiveness such as too often mar the deportment of men of expert knowledge.

In 1919-20 he visited the U.S.A. to study American telegraph and telephone practice, and he was a member of the Departmental Committee entrusted with the task of revising telephone rates. He has served on important Imperial Committees in more recent times. His Committee work best known to colleagues of Company days, however, is perhaps that associated with his selection by them to give evidence on their behalf before the Select Committee on the Post Office Telephone Agreement—with good results to his constituents.

Among the more important matters which have occupied him in recent years must be recorded the widespread development of automatic telephony in the Provinces, the stupendous task of preparing for automatic working in London, Anglo-European telephony, and the enlargement of wireless telegraphic and telephonic communication to inter-Continental range. It is a personal romance as well as an index of the rapidity of scientific progress in modern times that one whose early service was concerned with overcoming the difficulties of speech between adjoining streets should, in his later official days, have a large share in making it a matter of everyday occurrence that subscribers in Great Britain should be able to hold easy conversation with their fellows on the shore of the Pacific Ocean. Mr. Dalzell is generally credited with a considerable measure of ambition. He has achieved such success as falls to the lot of few.

He is possessed of shrewdness, caution and strong common sense, and these qualities, coupled with his extensive knowledge and experience, have rendered his judgment very sound. He generally knows his own mind, and gives decisions rapidly—a most valuable attribute, for in Civil Service affairs, as in those outside, it is often at least as important to decide quickly as to come to the best decision. He displayed powers of rapid and effective assimilation, and also initiative and energy, which were the more remarkable as he has not been blessed with altogether robust health. If he sometimes appeared unconvinced of the wisdom contained in the homely adage, "Too many cooks spoil the broth," it must be admitted that he saw to it that the quality of the soup did not really suffer, while his conviction as to the soundness of the somewhat antithetical declaration, "In the multitude of counsellors there is wisdom," produced valuable results.

Interest in organisation was not, perhaps, very prominently displayed, and a preference was shown for using individuals, including himself, rather than the machine. It may be claimed that such a preference has high warrant as a theory of management and many eminent supporters in practice. Equal use of all available resources is, indeed, probably an ideal impracticable of achievement, and on the whole an efficient manager is most likely to get the best results by following his own ways. It is also probably a good thing for a large-scale service that all its leaders should not manifest entirely the same qualities and follow precisely similar methods.

Mr. Dalzell's resource, dexterity, suppleness, practical sagacity and drive enabled him to get things done. Indeed, he was something of a hustler.

To the staff he was courteous, kindly and extremely accessible.

Mr. Dalzell had a profound conviction of the importance of the part which should be played by the public in telephony, and he always showed himself sympathetic towards representations and complaints. He would much rather meet an application than refuse it. This attitude was not due solely to general ideas as to the proper methods of administration and as to the expediency and value of tact, but rather to his sincere belief in "service" to the community and to his profound sense of the importance of telephony in the domestic, social and commercial life of the nation. He ever aimed at the highest possible standard of usefulness to the public, at maximum efficiency for the service and also at making the staff feel the great importance of their share in the organisation; and he bent every effort to achieve all these objects.

Among Mr. Dalzell's recreations are gardening, golf and motoring, but his official duties have been his main interest. Indeed, his devotion to duty has been such that he could not bring himself to allow his body adequate convalescence after illness. Let those who may be disposed to question the wisdom of such absorption in official affairs reflect how great is the aggregate happiness enjoyed by one who finds true satisfaction in congenial work, and how large the increasing need of the modern world for public servants, of both high and low estate, who will devote themselves wholeheartedly to furtherance of the common weal.

F. H. S. G.

HIC ET UBIQUE.

THE *Morning Post* says: "The River Plate Telephone Company—which, thank goodness, is a British concern, connected up 158,088 telephones during the year 1926. This must cause the London Telephone authorities—also British—some uneasy qualms. Argentina's ability to set such an example may, or may not be, due to the fact that the telephones there are a private enterprise. But, in any case, how would it do to invite the gentleman responsible to pay us a visit and show us how to do it? But it would be a scurvy trick if, in return for his bringing us the business-like methods of Argentina we infected him with the British facility in finding excuses for not getting on with the job."

The 158,088 are, however, not a year's increase, but the total number of telephones on the United River Plate Co.'s system. It would seem desirable, before preaching a sermon, to verify your text.

The Arabic for devil is Iblis (pronounced Iblese, with the accent on the "blese"). Our Jerusalem correspondent sends us the following:—

"Jerusalem telephonist (politely and with rising inflection, &c.): Number, please?"

"Arab subscriber (catching only the last two syllables): Shu! Inti iblis. (What! Devil yourself!)"

Out of 7,902 girl telephone operators, according to the *Telegraph and Telephone Journal*, 350 get married every year. We can only hope that this is the right number.

Thus our contemporary, *Punch*, which in its eagerness to work in the wrong number joke once again, overlooks priceless opportunities to refer to "numbers engaged" and the giving of "rings."

From a report of the *Manitoba Government Telephone* we learn that the three outstanding events for 1926 throughout the province were: the inauguration of full automatic service in Winnipeg (Strowger system); the opening up of telephone communication to the Lake Head cities, and the erection of a direct telephone circuit between Chicago and Winnipeg.

Communication was opened up to 57 new districts.

Telephone service was opened on July 15 between Great Britain and Denmark, limited at the outset to communication between London and Copenhagen. The charge for a day call of 3 minutes is 18s. 6d., and for a night call (9 p.m. to 8 a.m.) 11s. 1d.

Our Preston correspondent sends us a copy of the following letter from the Mayor of Wigan to the District Manager of Telephones, with the remark that it may do something to correct the erroneous impression that Wigan is famed only for its "pier":—

"The duties of my office have, during the past few months, been extremely heavy. The volume of work imposed upon the Mayor of such a town as Wigan is, indeed, very great. I am writing to you to say how much I have been helped by the kindly and spontaneous co-operation of the girls in the Exchange at Wigan. My letter of thanks is very brief, but it is none the less sincere. These ladies seem almost to anticipate the Mayor's requirements and by their bright and willing service have made my task very much more easy than it otherwise would have been.

Will you please convey to these unseen workers the expression of my sincere thanks.

Yours faithfully,

ROBERT ALSTEAD,
Mayor.

THE C.T.O. PENSIONERS AT KEW.

SHOULD the reader imagine the annual gathering of the retired supervisory staff of the C.T.O. at Kew Gardens as a meeting of elderly ladies and gentlemen basking in the sun with conversation limited to the long, long past, and walking in that last stage, "leaning upon a stick," he or she would be much mistaken. True, on June 8 the weather was particularly kind, the gardens were at their best, and Tea on the Terrace, with the more or less silvery Thames flowing placidly by, would have rejuvenated a much older-hearted assembly, despite the fact that ten, fifteen and nearly twenty years of pensioned service was individually represented.

One hundred and thirty sat down to tea, and Charlie Keen and Harry Adams are to be congratulated upon the excellent organisation. A little more masculine among the rebellious clans frae th' North, and the next affair should prove perfection!

Among the new recruits, one may mention Miss Shacklock, bright and alert as ever, if not even more so, Mr. A. W. Edwards troubling no more over his O.B.E. than his elder "brother" Jim Bailey concerning his I.S.O., G. T. Bennett, W. G. Wood, C. S. Docwra, A. T. Jacobs and Jack Mansell, while of those whose experience of pensioned life has by this time become absolutely matured note may perhaps be taken of the presence of Miss Mayersbach and Messrs. Donaldson, Didden, Hilton, Peter King, Adam Gordon, Sadler MacEwan, Tinson, and last but not least, Mr. and Mrs. S. J. Treby.

Should space permit, the complete list of those present will follow. The writer of these stray lines is confident, however, that should this not prove possible in the present case it will only be so if the insertion of the full list proves to be a physical impossibility.

One charming incident was the mention of a letter received by Mr. Keen from Miss M. A. Watts, a lady of 84, whose handwriting is not only easily read but even under a strong magnifying glass shows not the slightest unsteadiness. What is the secret of this preservation of the freshness of life? The key is to be found in Mary's broad and kindly outlook. One sentence in her letter gives it. Thus: "How lovely everything is looking! Even round here (Parson's Green) the trees and flowers are a sight and the flower beds in Hyde Park are worth a journey to see."

J. J. T.

R. A. DALZELL, C.B., C.B.E.

BY JOHN SCOTT.

WHEREVER ex-National men and women foregather the talk tends to become reminiscent, and more often than not expression is given to a wistful regret that the Company ceased to exist. It may be that kindly memory in this as in other of life's experiences emphasises the pleasant things and relegates the others to a shadowy background. We had our grievances of pay, of promotion and of discipline, but in retrospect these hardly count against the stirring memories of comradeship in strenuous fights among rival companies, in competition with the Post Office and Municipal Authorities ;



MR. R. A. DALZELL.

all the time extending and improving the service and that without any compulsory wayleave powers. The consecutive changes from iron to copper and then to bronze for overhead wires, the transfer to underground, introduction of paper insulated cables and loading coils, the passing of the old Blake transmitter, the evolution of the test and switchboards to C.B. and automatics are among the things that stir the blood of those who had a part in the changes.

There are splendid friendships and loyalties in the Post Office, and incomers like ourselves would be churls not to acknowledge these gratefully. But, letting memory run away with us without let or hindrance, were there ever such loyalties and friendships as among the N.T. Company's staff? From General Manager to pot boy there was an eager enthusiasm that caught us all in its grip.

Names of chiefs and colleagues spring to the mind sufficient in number to occupy the available space, but each must recall these for himself.

At the moment the purpose of these reflections is to provide a setting for a tribute to R. A. Dalzell who in the sixty-second year of his youth and after forty-seven years Telephone service has retired from his post of Director of Telegraph and Telephone services.

His retirement is not only notable as that of a pioneer but marks the end of an epoch in Telephone Administration. His experience covered all the scientific and engineering developments of the Telephone Service as well as the administrative changes which kept pace with them, and he was the senior of the small band who carried the specialised knowledge and experience of the N.T. Company's telephone administration into the Post Office and helped to adapt it to the new conditions. Latterly, as Director since July 1, 1922, he has been the Secretary's chief adviser on Telegraph and Telephone administration.

When Mr. Dalzell entered the service there was no long-distance communication except by telegraph cable—now the trunk service throughout the country is stable and rapid, communication with the continent of Europe is good to many centres and is rapidly extending, and by means of the Transatlantic wireless service satisfactory speech is possible with San Francisco. On the Telegraph side the wireless service from Rugby covers the world and the Beam services link up the Dominions. In every stage of this development Mr. Dalzell has played his part.

Reverting to local telephone service and development, it is worthy of record that for over twenty years Mr. Dalzell's work and experience lay more on the engineering side than the administrative, although there never was so clear cut a division between the two under the Company as in the Post Office. He had all the pride of a craftsman in his engineering work, and no achievement probably gave him greater pleasure than the successful completion of what were in 1891-5 first-rate overhead trunk routes linking up Leeds and Bradford with Hull, Grimsby, York, Northallerton, Manchester and Sheffield.

The perfect alignment of poles on straight stretches of road, the proper setting of struts and stays, well fitted arms and nicely adjusted open wires have a beauty which appeals to the initiated, and give room for legitimate pride to those who are responsible for them—Mr. Dalzell has had many occasions for such pride.

The variety of his service was great and with companies whose names are now only remembered by few.

His first love, as a student, was telegraphy, and he never lost the ability to send and receive by Morse. His first job with the Globe Telephony Company was fitting up new switchboards in 1881. Three years later the Globe was taken over by its rival Company, the United. Thereafter Mr. Dalzell's service was given in the Northern District Telephone Company's area with headquarters at Newcastle. This was a first-rate training ground because it was there that, under the inspiration of Mr. Heaviside, the Post Office put up the best opposition to the Telephone Companies in these early days.

Thereafter service in Yorkshire with the National Company and in Lancashire with the Lancashire & Cheshire Company, widened his experience till in 1895 he returned to London as Manager of the Western District. In that period Mr. Dalzell submitted a scheme for the reorganisation of the London Telephone Service, on functional instead of territorial lines. The idea was adopted and in 1903 he was appointed Assistant Metropolitan Superintendent for Service and Traffic. In 1905 he became Provincial Superintendent for the Western Province, and on the transfer to the Post Office in 1912 was one of three Provincial Superintendents attached to the Secretary's Office. His two colleagues found outlets in other directions, and after a period during which he was Chief Inspector of Telephone and Telegraph Traffic, he became Director on July 1, 1922. His years of service with the Post Office, covering the transition from Company to State control, the period of the war,

the aftermath of shortage of plant, the preparation and construction of automatics, the continued growth of machine telegraphy, have been not the least strenuous in his career. His ideals for both the Telegraph and Telephone services have been high. As he himself has put it the ends he has striven to attain are "Service, sufficient and efficient, specialisation in bringing these about, co-operation between administration and staff and public."

It is not too much to claim that he has made a considerable and helpful contribution towards telephone service and development in this country and has left his mark in several important directions, and all who have been associated with him feel genuine regret at his passing from active participation in telegraph and telephone affairs.

Always a hard worker himself he appreciated that quality in others. To the numerous questions, technical and human, which were the day-by-day concern of the Provincial Superintendent and latterly of the Director, he brought his equipment of practical common sense to bear.

There was a curious shy bit in his nature which revealed itself to his colleagues occasionally.

Were this a critical essay it might be appropriate to attempt to strike a balance of Dalzell's qualities of heart and head, but when one's friend and colleague is in the eclipse of retirement it is the corona of his life which claims our attention.

The workers pass but the work goes on. Happy are they who enter into the inheritance of good pioneer work well done, and equally happy they who pass, with the assurance that their successors will carry on the good work till they in turn must rest. It is with this assurance that Mr. Dalzell bids farewell to the scene of his labours.

That he may be spared to enjoy his leisure and mayhap see some of the schemes in which he has been interested come to fruition is the sincere wish of all his friends.

THE LONDON POSTAL SERVICE.*

BY LT.-COL. W. T. BRAIN.

(Continued from page 210.)

Inland and Parcel Sections.—The Inland and Parcel Sections, under the charge of an Assistant Controller, are situated at Mount Pleasant on the site of the old Coldbath Fields Prison and the House of Detention.

The Inland Section deals entirely with provincial correspondence. Into it is collected all the "Country" work from the City and W.C. dual posting boxes. In addition, it acts as a Forwarding Office and general Clearing House for provincial work originating not only in London but anywhere. At the "Primary" sorting the letters are first split up into certain Divisions or Groups of countries. Fig. 5 shows these groupings. The Midland Division (North), for example, is comprised of the counties of Northumberland, Durham and Yorkshire, whilst the Midland Division (South) consists of Derby, Notts, Lincs, Leicestershire and Rutland.

The South-Western Division consists of Dorset, Hants and a portion of Surrey.

The numbers on the map represent the "Roads" in these Divisions.

Having been thus generally divided the letters are cleared from the Primary Sorting Tables into the appropriate Divisions for sub-division. You will see from the following plan of the South-Western Division (Fig. 6), which is typical, that a good deal has been done to make this second sorting the final one, but there are certain places for which there is not enough correspondence to justify a special "Selection" and the work for them is therefore sent to a Residue "Road" for despatch. In order to relieve the Inland Section it has been arranged that certain District Offices shall act as "Divisional" Offices and take and dispose of the Residue work for particular Divisions which is posted throughout London, excluding the E.C. and W.C. Thus, the South-Western District Office is the Divisional Office for correspondence for the S.W. Division, and Paddington D.O. for the Western Division. It should be noticed that I say "Residue" work, because in many cases a District Office has sufficient locally posted, or locally collected, correspondence to warrant making up a direct bag for some of the larger towns in a Division.

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

As may be supposed, the new Inland Section is quite up to date in labour saving mechanical aids.

The Parcel Section at Mount Pleasant is the largest Parcel Office in the country. It deals not only with parcels for London and the provinces, but also those for and from abroad. The method of sorting is somewhat similar to that for letters, except that the Inland Divisions are on a Railway basis, e.g., Euston, King's Cross, Liverpool Street, &c., to take parcels for towns served from the railways starting from these stations. As in the case of the Inland Letter Section, certain measures of decentralisation have been introduced for relief purposes. Despite the increase in postage charges the work has so rapidly grown that more space has had to be provided and the Parcel Section has now extended into the premises recently vacated by the Inland Letter Section.

A Surveyor of Customs and his staff are attached to the G.P.O. Parcel Office at Mount Pleasant.

Passing, in the general scheme of organisation, from the centrally situated offices we now come to the London district offices.

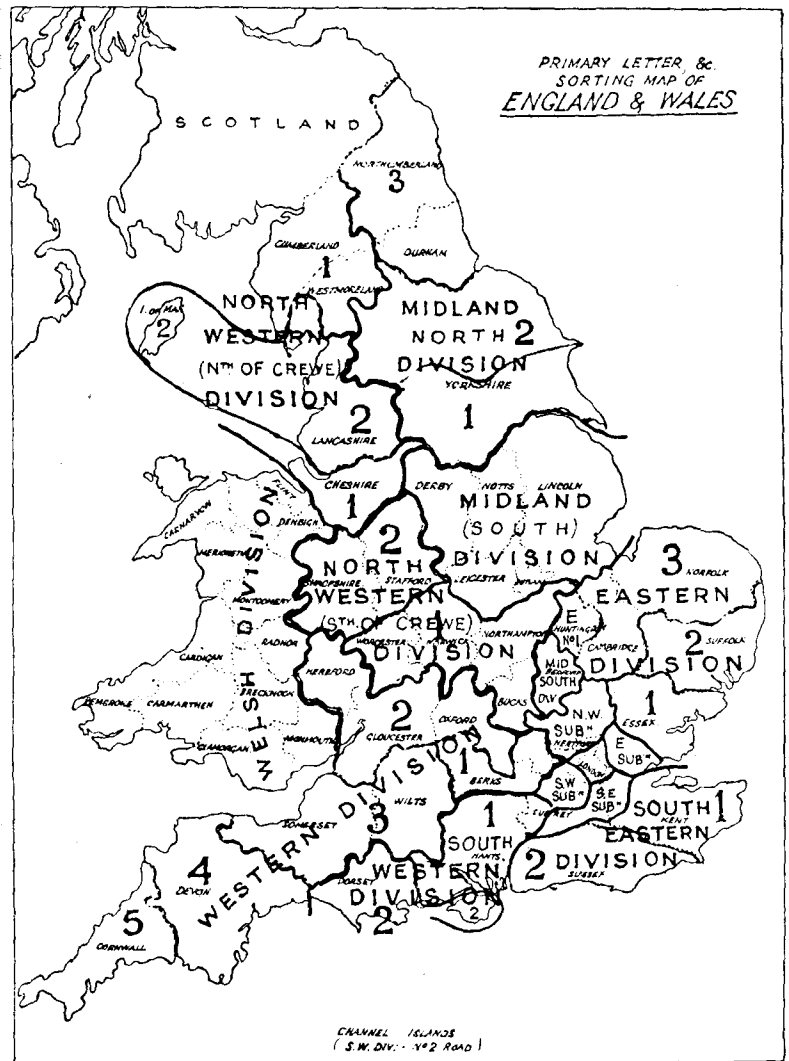


FIG. 5.

London Districts.—These are eight in number, each under the control of a Postmaster, viz.: E., N., N.W., Paddington, S.W., W., W.C., S.E.; Battersea is run practically as an independent unit, so far as control is concerned, under an Assistant Postmaster, who receives a special allowance.

Imagine a combination of the E.C. (town) and Inland (country) Sections as one office and you have an idea—on a smaller scale, of course—of just what a District Office is like.

Each one deals with Collected, Delivered and Forwarded work. Every Postmaster has an organising staff, and he exercises jurisdiction over the Sub-Districts in his area. (This does not apply to W.C. and W., where there are no Sub-Districts.)

It is very essential that there should be complete co-ordination between all Districts, and this has been a special feature of the Controller's organising staff during the last few years, a period of phenomenal development and growth. All the District Offices except N., W.C. and W. act as "Divisional" Offices, and it is highly necessary that each should be acquainted with the separation of correspondence carried on at the other offices, so that, as far

as possible, the dividing should be the same. For example, if N.W.D.O. has correspondence for the S.W. Division which has to be sent to S.W.D.O. for despatch, N.W.D.O. should know to which "Road" in the S.W. Division such Correspondence is sorted at S.W.D.O., the office of disposal. It can then be tied up in a bundle or sent in a bag and so reaches the appropriate "Road" at S.W.D.O. without further handling.

I will now say a word or two about *Mechanical Aids, &c.*, in Sorting Offices.

In large Sorting Offices efficient organisation of the work as well as staff is an essential. The "lay-out" must be planned in such a way that confusion and congestion are avoided as far as possible. Certain work has to be segregated, e.g., Long Letters and Packets have to be dealt with apart from short and ordinary-sized letters, as I have already described in connexion with the process of "Facing," and transporting can best be done by mechanical means.

SORTING ALPHABET.

INDICATING ARRANGEMENT OF SELECTIONS ON A 48
BOX FITTING FOR LETTERS

INLAND SECTION ~ S.W. DIVISION.

BRIDFORD	BROCKEN HURST	COSHAM	EASTLEIGH	EMSWORTH	HAWANT	HINDHEAD	BLIND
RINGWOOD	ROMSEY	SANDOWN	SHANKLIN	SWANAGE	VENTNOR	WAREHAM	WIMBORNE
BLANDFORD	COWES	POOLE	GODAL -MING	DORCHESTER	GOSPORT	LYMING -TON	PARKSTONE
ALTON	PETERS -FIELD	NEWPORT I.O.W.	BOURNE -MOUTH	GUILDFORD	WEY -MOUTH	WOKING	BASING -STOKE
SHERBORNE	HASLEMERE	KYDE	SOUTH -AMPTON	PORTS -MOUTH	ALDERSHOT	JERSEY	WINCHESTER
CHRIST -CHURCH	FAREHAM	ANDOVER	GUERNSEY	CAMBER -LEV	FARNHAM	No 1 ROAD	No 2 ROAD

FIG. 6.

If I describe some of the mechanical aids in the E.C. Section they may be taken as types of others. There it has been designed that Packets placed on the top band conveyor of the "Facing" Tables shall automatically drop down a chute on to another under-floor conveyor which will bring them up at a point adjacent to the table, some distance away, at which they are to be hand-stamped.

To avoid congesting the gangways by trucks with full bags, under-floor conveyors take them from the Sorting Office to the Platform for despatch, the bags being dropped on to the Conveyor through holes in the Sorting Office floor. A very complete system of Conveyors, Chutes, Lifts and Elevators is being installed in connexion with the Tube Railway and at the E.C. Office there are, or will be—

- A Bag Elevator from the railway station to Ground Floor for upward mail traffic ;
- A Double Spiral Chute from the Ground Floor to the railway—one Chute discharging on to the Westbound platform, the other on to the Eastbound platform. These chutes will take the downward mail traffic ;
- Two large Lifts (carrying capacity 25 cwt. each)—one running to the Foreign Section on the First Floor (with openings on Ground and Sub-Ground Floor also), and the other (a reserve lift) to the Sub-Ground Floor only. These will serve for conveying Staff to and from the railway, and will also act as reserve appliances for both up and down mail traffic.

These appliances will be supplemented by Conveyors, as under:—

In Tube Railway Station.—A Conveyor under each Platform (fed through openings in Platform) to deliver bags unloaded from trains on to the Bag Elevator.

In Sorting Office.—(a) An Underfloor Conveyor starting from near the discharge point of the Bag Elevator to transfer District bags discharged from the Elevator to the District Bag Opening Table on the north side of the Office.

(b) An Underfloor Conveyor from the District Despatching Roads on the north side of the Office (fed through openings at the ends of Despatching Tables) discharging into the westbound spiral Chute to the railway, to take bags made up inside the Office which are intended for onward transmission by the railway.

(c) Underfloor Conveyor from the Posting Room under the Chief Office Counter (with an opening on the East Arrival Platform) discharging into the Westbound spiral Chute to railway, to take country bags made up in the

Posting Room for transmission by railway to Mount Pleasant, and also bags arriving by road at the East Arrival Platform for transfer to the railway. This Conveyor will also be fed by a short band running from under the Parcel Despatching Room at the end of the Chief Office (public) Counter, to take the bags of parcels posted at the Chief Office Counter to the Parcel Section at Mount Pleasant, thus obviating the use of vans.

(d) A relief Conveyor to (c). This will be provided by having a diversion switch on the existing Conveyor running from the Posting Room to the West (despatching) Platform, so that this Conveyor can be diverted to discharge into the spiral Chute to the railway if and when required.

Mails arriving by the Tube Railway will be deposited through the openings in the platforms on to the Under-Platform Conveyors, which will discharge them into the buckets of the Bag Elevator that will in turn convey them to the Ground Floor. On arrival there E.C. bags will be trucked to the Opening Table near by ; District bags deposited on to a Conveyor which will take them to the Opening Table on the north side of the Office, and bags for transfer by road to other offices will be deposited on to an existing Conveyor running to the West (despatch) Platform.

Before leaving this subject, I want to draw your attention to the fact that in the E.C. section we are still using the open shelf Tables to a large extent.

I hope that in course of time the suitability of the new 48-box fitting for "setting in" of a Postman's delivery will be demonstrated. We are experimenting in this direction.

For District News Sorting and for the E.C. News we already use adapted drop-bag fittings.

Post Office (London) Railway.—The railway is 6½ miles long and runs from Paddington District Office to the Eastern District Office, with intermediate stations at Western District Parcel Office, Western District Post Office, Western Central District Office, Mount Pleasant Sorting Office, King Edward Building Post Office and Liverpool Street Station.

Each station consists of an island platform—the stations varying in size according to the importance of the office served. The largest Station is at Mount Pleasant, where the dimensions of the platforms are 315 ft. by 12 ft. Mails are received from the Sorting Offices by Chutes or Lifts, and are transferred from the railway to the Sorting Offices by Lifts or Elevators, as already stated.

The running track consists of two 2-ft. gauge running tracks, one for Eastbound traffic and the other for Westbound traffic. The tracks run side by side in one tunnel of 9 ft. diameter, except on leaving or approaching stations, where the East and Westbound tracks are contained in separate tunnels. At most stations loop-lines are provided connecting lines running on one side of the platform with lines running in the opposite direction on the other side, so that trains finishing a journey at one platform may be easily transferred to the other platform and sent in the reverse direction ; Sidings are also provided at certain Stations.

There will be no drivers, and trains will be operated by switchmen from switch cabins situated at the various stations ; the switchmen will be the counterpart of the signalmen on ordinary railways, but the operation of the levers by the switchmen on the Post Office Railway will not only work the points and thereby set up paths for the trains, but will also complete electrical circuits and thereby create a supply of energy to the motors on the trains and set them in motion. The movements of the levers are so inter-locked one with the other that it is impossible to send a train on to the Section which is already occupied, or which is about to be occupied by another train, and the passage of a train over one Section automatically renders it impossible for a train to occupy the Section in the rear.

The train service will be run to a definite Time-Table as is done on ordinary railways, and will operate throughout the 24 hours except on Sundays. The trains will consist of three cars which will have a capacity of approximately 60 letter mail bags. It will be possible to run trains over any part of the line at an interval of 1½ minutes.

The object of the tube is to accelerate the transit of bags of correspondence and parcels across London. Let me illustrate this by an example. The scheduled motor van "run" from Paddington to E.C. at present is 29 minutes, or if calls are made at W.C.D.O. and W.D.O., 35 minutes. The Tube will bring bags direct from Paddington to E.C. in 10 minutes.

There will, of course, be some reduction in street traffic by the use of the tube.

Conclusion.—In 40 years there have been many changes. Conditions—that general term which covers so many things—have undoubtedly improved ; young officers are better trained and, in the case of juvenile manipulative entrants, their education is continued after they enter the service. The relationship between the higher and the lower ranks is decidedly happier ; more attention is paid to hygiene, ventilation, sanitation, welfare and industrial psychology, all of which are now recognised as essential to efficiency. The old bureaucratic methods of government which applied to the whole Post Office service have disappeared. Even the meeting together of Post Office people to discuss their work was once forbidden ; and the sweeping away of that veto on liberty has resulted in free expression of opinion, criticism and suggestions, all of which are now met in a considerate spirit. Much has been done and is being done to encourage and cultivate a better understanding between all ranks by social intercourse and in the world of Sport. I think I may claim that the L.P.S. has always been in the forefront in bringing about this changed orientation, and it remains, as it has long been, not only an efficient machine, but a virile and definitely articulate factor in Post Office affairs.

TELEGRAPH & TELEPHONE DEVELOPMENT IN AUSTRALIA.

By H. P. BROWN

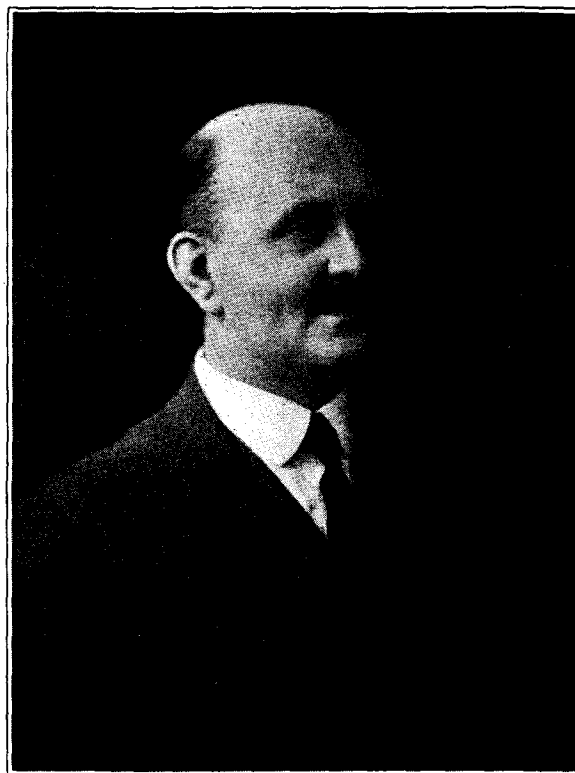
(Secretary of the Post Office of the Commonwealth of Australia).

IN common with the experience in many other countries, the communication services administered by the Post Office in the Commonwealth of Australia suffered a serious setback during the years of the war. The transference of so large a proportion of the nation's manhood to the zones of military activity necessarily gave rise to an increase in the overseas business, and, on the other hand, caused a very great diminution in the usage of the internal services. At the termination of the war, when the nation was resuming its normal activities, it at once became manifest, not only that the existing services had to be thoroughly overhauled and rehabilitated, but that a rapid expansion in the provision of plant and facilities generally would be essential to cater for the current demands. The telephone service, being a branch in such personal and intimate contact with the community, stood out most prominently in this respect, and as a consequence the greatest endeavour was put forward towards the rectification of this portion of the communication system. I think it would be a fair statement to make that only now is the Department level with public needs, and this position has been reached after a few years of really strenuous endeavour, during which period a wonderful spirit of determination has animated the whole staff of the Post Office.

The Government had determined that the telephone service should be extended in full conformity with the national needs, and it allocated annually sufficient funds to permit this policy to be developed in the most economical fashion. The problem confronting the officers of the Australian Post Office was dissimilar in many respects from that which the British Post Office was faced at the conclusion of the war. The differences will be evident from a moment's thought. Australia is a continent of 3,000,000 square miles, populated by 6,000,000 of people. In the six State Capitals there are no less than 2,757,000 people. It will be clear, therefore, that the population density is extremely small, and the distances to be covered in the provision of both trunk and local lines are greatly in excess of those which obtain in densely populated territory. Another great difference as between the Commonwealth and Great Britain is the remoteness of the former from the main sources of supply of many classes of material extensively used for telephone and telegraph purposes. There is necessarily an absence of that close consultation which is possible when the large manufacturing concerns are situated immediately within the territory for which equipment is to be installed. The whole procedure, from the preparation of specifications until the time when supplies become available, is more laborious and protracted. Requirements for every conceivable class of material need to be forecasted for abnormally long periods ahead, and if there is any hiatus during the currency of a contract it is infinitely more difficult to rectify. Some conception of the magnitude of the problem confronting the Australian Post Office will be gathered from the fact that 16,000 applications were on hand for telephone service at June 30, 1920. Large numbers of these had been outstanding for twelve months or more, and it was evident that many more applications would have been held but for the common knowledge that the Post Office was not in a position to give service. At the time in question the output of work averaged 2,500 connexions per month. At the end of December, 1926, the number of applications awaiting attention was 6,000, and the average rate of execution was 5,200 orders per month. It is of interest that for the first time in the history of the Commonwealth canvassing for orders was instituted some six or eight months ago, and that policy has since been actively pursued. The number of telephones in operation was increased by 89.5% during the six and a half years in question. During the six years ended June 30, 1926, the mileage of wire in the local

exchange system was increased by 102.8% and the mileage of wire provided for telephone trunk communications was increased by 136.5%. From the financial standpoint the comparative growth has been at a phenomenal rate. In the four years ended June 30, 1926, the expenditure on the creation of new assets exceeded that incurred during the previous twenty-one years. To-day it is believed that the rate of growth of the Commonwealth telephone service is almost the highest of all telephone administrations. It was 11.11% for the financial year ended June 30, 1926. The telephones per hundred of the population are now 6.9, which, from the latest available statistics, places the Commonwealth seventh on the list of countries arranged in their order of telephone density.

In laying its plans for affording relief in the various telephone networks one of the greatest obstacles to be overcome was presented by numerous large exchanges having reached the limit



MR. H. P. BROWN.

of their capacity. Not only was the plant incapable of extension, but buildings also had become fully occupied. To meet the revised order of things new premises had to be built and switching equipment sufficient in quantity to replace the existing working services and provide an adequate margin for current demand and future needs had to be installed. In the large networks the Department's policy has been to introduce automatic switching equipment, and it has restricted itself to the use of systems operating on the step by step principle. At the present time 25% of the total telephones of the Commonwealth are operated on an automatic basis, and in addition quite a large programme of new automatic exchanges is in course of execution.

In the country districts magneto apparatus has been used exclusively, but owing to the costs which are entailed in the provision of continuous service, the Department has been forced to make an exhaustive investigation into the feasibility of substituting automatic equipment. A number of experimental installations have now been brought into service, and it is hoped that the experience so gained will make it possible to pursue the policy on a large scale.

A brief reference has been made to the expansion in the trunk service. A further indication of what this represents will be

gleaned from figures showing the comparative extent of use: for the financial year ended June 30, 1920, the total number of trunk calls was 12,420,205, and for the year 1925-26 the paid calls totalled 26,085,231, an increase of 110%. Plans have been laid to provide for comprehensive trunk communication throughout the length and breadth of the continent. The transmission scheme adopted requires all circuits to have an efficiency not inferior to 12 T.U. between the terminal test-boxes. It will be evident that this

A great deal of attention has been given to organisation and to the routing and handling of traffic, with the result that the paid time per circuit has been greatly increased and the waiting times have been diminished. Wherever practicable short-haul service is being rendered, and through dialling to automatic networks, in some cases over considerable distances, is in operation.

The following statistical data may be of interest:—

COMMONWEALTH OF AUSTRALIA—TELEPHONE STATISTICS: *Financial Years ending 30th June, 1922 to 1926.*

PARTICULARS.	YEAR ENDING				
	30, 6, 22.	30, 6, 23.	30, 6, 24.	30, 6, 25.	30, 6, 26.
Number of Telephones	258,881	282,087	317,520	363,242	403,616
% Increase over preceding year	7.58	8.96	12.56	14.40	11.11
*Mileage of Wire in Local Exchange Systems	876,490	1,008,165	1,141,075	1,357,441	1,511,389
% Increase over preceding year	11.64	15.02	13.18	18.96	11.34
*Mileage of Wire in Telephone Trunk System	118,030	132,312	160,867	211,287	248,890
% Increase over preceding year	7.29	12.10	21.58	31.34	17.80
Number of effective Local Calls	220,636,600	233,062,600	257,232,300	273,704,900	300,354,400
% Increase over preceding year	—	5.63	10.37	6.40	9.74
Number of Trunk Calls	13,968,200	15,914,600	18,122,200	21,675,400	26,085,200
% Increase over preceding year	8.19	13.93	13.87	19.61	20.34
†Number of effective Local Calls per telephone per annum	879	863	859	799	781
% Decrease compared with preceding year	—	D 1.81	D .46	D 6.98	D 2.25
†Number of Trunk Calls per telephone per annum	56	59	60	63	68
% Change from preceding year	(I) 1.82	(I) 5.36	(I) 1.69	(I) 5.00	(I) 7.94
§Total Value of Telephone Assets (including Buildings, Sites and Furniture)	£14,403,800	£16,550,600	£20,113,700	£24,390,000	£28,936,600
% Increase over preceding year	13.48	14.90	21.53	21.26	18.64
Gross amount expended annually on Telephone Assets (including Buildings, Sites and Furniture)	£1,918,000	£2,434,000	£3,922,000	£4,695,000	£5,075,000
% Increase over preceding year	41.03	26.90	61.13	19.71	8.09
Annual Telephone Revenue per 100 Population	£50.06	£53.84	£58.29	£62.39	£68.66
% Increase over preceding year	9.18	7.55	8.27	7.03	10.05

* Single wire mileage.

† Based on the number of telephones at 31st December in each case.

§ Value of assets at prime cost, less the value of plant dismantled. (No deduction made for Depreciation.)

plan has only been capable of accomplishment by the extensive utilisation of telephone repeaters. Australia is a land of great distances, and in consequence telephone repeater equipment must be used extensively. Because of the great distances separating the State Capitals and of the community of interest between these centres, a profitable field also presents itself for the utilisation of Carrier Wave Services. Between Melbourne and Sydney, a distance of roughly 600 miles, there are two physical trunks, and on one of these a three-channel carrier telephone is superposed. Repeaters are installed on the physicals, and a high-grade service is therefore available on all channels. The carriers were installed some eighteen months ago, and since that time the revenue has increased by 150%. Steps have been taken to provide three additional carrier channels, and it is hoped these will be available within the next twelve months.

A comprehensive scheme of telephone carrier services is also being installed north of Sydney to Newcastle, Maitland, the Northern River Towns of New South Wales, and to Brisbane. In a number of instances arrangements have been made to provide single channel carrier telephone services, where the traffic is in excess of the present line provision, but where the anticipated growth is not expected to absorb more than one additional circuit during the next five years or so.

The total mileage of telephone carrier channels in use and in course of provision represents the equivalent of 10,250 circuit miles.

On the telegraph side appreciable extensions have taken place, but as far as possible the erection of additional physical circuits has been curtailed by utilising the telephone plant to the utmost extent with a view to securing composite telegraph channels. Over the long-distance routes trunk circuits have been utilised to accommodate Carrier Wave Telegraph Channels. The mileage of wire in use for telegraph purposes on June 30, 1920, was 67,345, and at the corresponding date in 1926 it had increased to 72,223. The net addition represented only 7.24%. During the same years the length of wire used for joint telephone and telegraph purposes was increased from 79,930 to 137,755 miles, the percentage addition being 72.34. Carrier Telegraph Services have been provided over the Melbourne-Sydney and the Melbourne-Adelaide routes, in which cases five duplex channels have been made available at the outset, with provision for ready extension to ten channels in each case. These services are used not only for direct communication between the terminal points, but also for providing through services where the traffic warrants such a course. A regular Carrier Service is operating between Sydney and Adelaide, a distance of some 1,100 miles.

On the equipment side there has been considerable development in multiplex working, the principal services being two quadruple duplex, Melbourne to Sydney (600 miles), two Sydney to Brisbane (650 miles), one Brisbane to Townsville (830 miles), and one triple duplex Brisbane to Rockhampton (408 miles). The total number of duplex channels in service is 23. In passing it may be of interest

to mention that quadruple duplex sets are being worked over the Carrier Wave Channels between Melbourne and Sydney.

Start-stop teletype has also been introduced to a considerable extent in the last year or two, and 36 sets of this class of apparatus have been provided. Creed apparatus is installed on certain of the long-distance routes, where benefit results from tape transmission from cables and other circuits. Seven services are being operated on this basis.

There is a marked difference between Australia and the United Kingdom in regard to reception over hand-worked circuits. In the larger offices the Australian telegraphist almost invariably uses a typewriter, and even in a considerable proportion of the country offices the same practice is in vogue. Where typewriters are not in use messages are written in ink. The operating rooms in a number of instances present anything but an attractive appearance, but fortunately it has been possible to remedy this state of affairs, and at an early date a change-over will be made in both Melbourne and Sydney to new operating rooms with an up-to-date, modern equipment and the necessary mechanical conveyors for the collection and dispatch of telegrams.

Phonogram services are also being extended, and an alteration in the regulations at present under contemplation will doubtless result in a considerable accretion to this class of business. A review has been made of the telegraph business to centres where the volume of traffic is small, and to offices situated within a short distance of the main telegraph centres. Economies have been effected by dispensing with Morse transmission and utilising the main telephone system for the dispatch of business to and from the phonogram rooms.

As in the case of the telephone branch, changes have been made in the telegraph organisation, and studies have been carried out with a view to securing the most effective routing of traffic and the improvement of circuit loading. There are 8,900 telegraph offices within the Commonwealth, and during the financial year ended June 30, 1926, 17,637,716 telegrams were handed over for transmission. The revenue received per hundred of the population was £21.53.

Wireless broadcasting claims such a degree of popularity that I may be permitted a brief reference to Australian experience. In 1923 a representative conference of wireless interests advocated the introduction of a scheme which required every licensee to utilise a receiving set manufactured so that it would be restricted to the receipt of a specified wavelength. The set was to be sealed and to be retained intact under a penalty, and the licence fee was to be paid to the particular broadcasting company operating on the relevant wavelength. It was arranged that each company could make its own charge, and the development of its business would necessarily be dependent on the nature and value of its programme, combined with the reasonableness of the fee which it imposed on its clients. Regulations on this basis were promulgated and a number of licences were issued for the establishment of broadcasting stations, but, as might be imagined, the system broke down almost before it became established. Unfortunately certain vested interests which it was impossible to ignore in the revised order of things had been created by this action. New regulations were promulgated in August, 1924, the basic principle being to circumscribe the broadcasting areas in conformity with the State boundaries. It was not easy to disregard the claims of certain companies which had secured rights under the original scheme, and as a consequence, in each of the States of New South Wales and Victoria two broadcasting stations were permitted. In the remaining four States only one station was allowed. These eight stations were to be known as A Class Stations, the significance of the classification being that the companies operating them would be permitted to receive fees collected in respect of listeners' licences.

It was provided that other stations, known as B Class Stations, might be licensed at the discretion of the Postmaster-General. The owners of the B Class Stations would derive their remuneration by indirect means, such, for instance, as advertising. The eight

stations in the main group, known as A Class Stations, were to be situated in the capital cities of the States, and because of the great distance of the remote portions of the States from their respective capitals, it was decided to introduce a zoning scheme on which the tariff would be based. Three zones were adopted, the first embracing a distance of approximately 250 miles, the second from 250 to 400 miles, and the third beyond 400 miles. The appropriate licence fees at the time of the inauguration of the service were 30s., 25s., and 20s. per annum respectively, but these have since been reduced to 27s. 6d., 22s. 6d., and 17s. 6d. All licences are issued by the Post Office, and the revenue collected in each State is allocated to the A Class broadcasting station or stations within that State. The growth of licences has been very unevenly distributed amongst the States, due to a variety of reasons, the figures up to the end of March, 1927, being as follows:—

	<i>Licences in Force.</i>	<i>Ratio to 100 of population.</i>
New South Wales	52,528	2.2
Victoria	106,081	6.2
Queensland	20,787	2.3
South Australia	15,807	2.8
West Australia	3,932	1.0
Tasmania	2,153	1.0
Commonwealth	201,288	3.3

Owing to the different density of population in the various States it seemed evident at the outset that even this scheme could only be of a tentative character, and that if equivalent treatment were to be accorded to licences, some system would need to be devised which would guarantee the utilisation of the financial resources through some centralised medium. A Royal Commission is at present considering this matter along with other phases of wireless telegraphy and telephony.

In concluding this summary of some of the activities of the Commonwealth Post Office, I should like to express indebtedness to the generosity which has been shown by many of our friends in Great Britain and in the United States in placing at our disposal the results of technical research and other studies which they have found it desirable to undertake in the interests of their respective administrations. In a country of small population, large mass-production factories, with their associated research staffs and laboratories, are impracticable. It is natural, therefore, that we in Australia should look to those more fortunately situated for enlightenment on the problems which they have been called upon to face because of the very magnitude of their undertakings. Fortunately, the personnel in the Commonwealth service stands on a very high plane of technical efficiency, and is making its own contribution to the advancement of the arts of telegraphy and telephony. A Post Office research section has been established, and twelve highly skilled engineers are applying themselves to the incorporation of modern invention into the Commonwealth services. A programme of original research has also been mapped out, and is being pursued systematically.

I have not touched on the postal side of the Department's activities, as I understood it to be outside the province of this article. It may not be out of place to mention, however, that intensive studies are being made in this sphere of Departmental activity with particular relationship to the elimination of all manual processes which can be performed by mechanical aids. In Sydney a new sorting office has been erected and a most comprehensive scheme of mechanical appliances is now in process of being installed. I feel sure that the appliances which are being incorporated in the system are of a character which would interest many of my old friends in the British service, and at a later date, when some little experience has been gained of their utility, I shall be pleased to make detailed information available.

REVIEWS.

"*Das Telephon und sein Wesen.*" By August Roth. (Berlin: Julius Springer. 148 pp. Price 4.50 marks.)

This is a very readable work on the invention of the telephone and its early developments. It goes into the history of the beginnings of electrical transmission of speed and deals at some length with the claims of Bourseul, Reis, Gray and Bell. Graham Bell's specification of 1876 is given in full in English. In the author's opinion "it is not to be doubted that, knowingly or unknowingly, Bell stood on the shoulders of Reis." Gray and Bell, he considers, were both indebted to Reis for the use of the membrane in the receiver. The claims of Hughes and Lüdtege to the invention of the microphone are also touched on, and the work of Sylvanus Thompson and Werner Siemens in the further development of the telephone are recorded. The final chapters deal with the patent disputes in which the Bell Company was involved in its early days. Interesting sketches of the early telephones of A. G. Holcomb and Phil. van der Weyde are given—indeed, the little book is well illustrated throughout by clear diagrams.

"*An Outline of Indian Currency.*" By H. B. Turle. (Thacker, Spink & Co., Calcutta. 94 pp. Paper, Rs. 2. Cloth, Rs. 3.)

This work is somewhat outside the scope of the *Journal*, and we shall touch on it but briefly. It contains some preliminary remarks on the origin and nature of currency, on the efforts of modern governments to regulate exchange, and on the difficulties created by the adoption of a gold standard. A review of Indian currency up to 1913 follows, and the work of the Herschell, Fowler and Chamberlain Commissions is described. The dislocations caused by the war created considerable difficulty in maintaining the exchange value of the rupee, which the influence of internal conditions in Mexico on the production of silver tended to aggravate. For stabilising the exchange, Commissions on Currency were held in 1919 under Sir H. Babington Smith, and in 1925 under the Right Hon. E. Hilton Young. The latter Commission recommended stabilisation of the rupee at a rate corresponding to an exchange rate of 1s. 6d. On the subject of the rate of 1s. 4d. or 1s. 6d. the author says it is impossible to say that one is right and the other wrong without coming to a definite decision on the question of the adjustment of prices. Provided the Government has sufficient resources to maintain the rupee at the selected level, the prosperity of India will, as before, depend on her natural resources and human efficiency and will only be temporarily affected if the rate chosen is either above or below the existing price level.

"*Automatic Telephony.*" By Charles W. Wilman, A.M.I.E.E. (Lecturer in Telephony at the Coventry Municipal Technical Institute). (Crosby, Lockwood & Son, 7s. 6d. net.)

This book is an elementary treatise on the principles underlying the art of automatic telephony of the standard step-by-step system, and no attempt has been made to describe in detail the system of any one particular manufacturer. There is a good chapter on Relays and their Time-Elements, and the chapters on Pre-Selectors, Group Selectors, and Final Selectors each commence with a useful enumeration of the functions of the unit.

The Director system of London and the Controller system for large areas are faithfully dealt with. We can recommend this book to readers who are commencing the study of this fascinating branch of our work.

"*Atomic Theory. An Elementary Exposition.*" By Arthur Haas, Ph.D. Translated by T. Verschoyle, M.C., Ph.D., A.R.C.S. (Published by Constable & Co., Ltd., 10-12, Orange Street, W.C.2. xiv + 222 pp. Price 10s. 6d. net.)

Among the remarkable scientific achievements of recent years, the discoveries which have been made in connexion with atomic structure are probably the most fundamental. These advances have revolutionised the views of the chemist, the physicist, the engineer and even the astronomer as to the underlying causes of the phenomena with which they deal, and have shown a uniformity in the ultimate structure of matter which, although previously suspected, had not before been demonstrated. A knowledge of these discoveries is nowadays essential to all who have to deal with physical science, using the term in its widest sense.

Unfortunately, the advance in this field has been so rapid that information on it is not yet fully available in text books and, for the greater part, has to be sought for in original papers written in various languages. This is a disadvantage for anyone who wishes to obtain a general view of the matter without going into minute details. For such, the present book will be welcome.

The author has recently published a large standard work on Theoretical Physics, noteworthy for its clearness of exposition. The subject matter of the book under review forms one of the sections of this large work. Many, especially those for whom student days are past, will not wish to purchase the complete work, and it is for the benefit of such readers that the section on Atomic Theory has been published as a separate volume.

The book is divided into five chapters. The first deals with the elementary quanta of electricity and energy. In the second chapter the theory of the construction of the hydrogen atom is discussed. The third chapter deals with Röntgen rays, and their use in sub-atomic researches. The fourth chapter is devoted to the theory of the elements, the natural sequence into which the elements can be arranged, the phenomena of radio activity, and similar matters. The final chapter deals with the general theory of spectra and atomic structure.

The book is very clearly written, the use of higher mathematics is avoided, and only an elementary knowledge of physics on the part of the reader is assumed. We can recommend it to anyone who wishes to obtain a good general and up-to-date knowledge of the matters of which it treats.

PRESENTATION TO MR. J. A. W. GREGORY.

At the North-Western District Office, Preston, on the 30th ult., Mr. J. A. W. GREGORY, Assistant Traffic Superintendent, who has been transferred to Southampton, was presented by the Traffic and Clerical Staff with a handsome Canteen of Cutlery. Mr. A. L. Barclay, Traffic Superintendent, occupied the chair, and Mr. S. O. Allen, the District Manager, made the presentation.

Eulogistic references were made to the esteem in which Mr. Gregory was held, and the happy relations which existed between him and the staff. Regret was expressed at losing Mr. Gregory, but hopes are held that his transfer to the South will speedily and completely restore him to good health.

Mr. Gregory suitably replied, acknowledging the gift and expressing his sincere thanks for the kindly expressions of good wishes towards him.

CIVIL SERVICE APPROVED SOCIETY.

As delegate of the Central Telephone group of the membership, I attended the Annual General Meeting, which was held at the Home Office on Tuesday, July 5th, 1927.

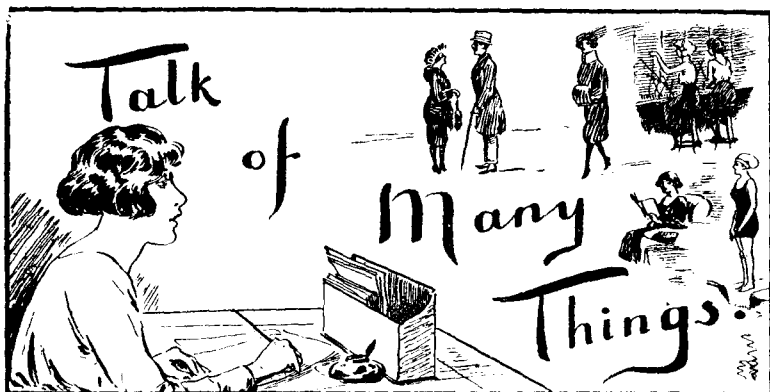
Sir John Anderson and Sir Malcolm Ramsay were elected President and Vice-President, respectively, and these two gentlemen, with Sir John Kempe, were appointed Trustees of the Society.

Mr. T. Jordan, who retires from the Registrar of Friendly Societies Office in September, was appointed full-time Secretary as from the date of his official retirement.

That the affairs of the Society are being closely watched was proved by the keenness of the discussions and by the large number of delegates from all parts of the country who attended the meeting. One delegate actually travelled specially from Northern Ireland.

H. A. BAKER, L.T.S. (K.D.3.C.)

WE TELEPHONISTS



OUR valued contributor, Mr. Flage, has, we know, a wide circle of readers, and we have much pleasure in printing a letter to the Editress of this column, inspired by him, from a correspondent in Palestine. (The verses which follow were found in the waste-paper basket):—

“General Post Office,
“Jerusalem.

“Dear Madam,

“In the first paragraph of his chat on ‘Bank Holiday Duty’ in your June number, ‘Percy Flage’ bewails the paucity of Bank Holidays in England. He should come to Palestine, where, in addition to 3 official languages, a thoughtful Government provides public holidays for each section of the community. In the course of the year there are (apart from King’s birthday) no less than 32 official holidays—8 for Christians, New Calendar; 8 for Christians, Old Calendar; 8 for Jews; and 8 for Moslems—all on different dates.

“Unfortunately for ‘Percy,’ no Government official is allowed to profess more than one religion during a single year!

Yours faithfully,
“GOLDEN CITY.”

He soliloquises (mournfully):—

When I was sent to Palestine
I kept an open mind.
No bigot I; I yearned to try
The creeds of all mankind.
In March I’d be a Moslem,
In June, I’d be a Jew;
In August and December,
A Christian, Old and New.

When I arrived in Palestine,
Life looked extremely gay;
Adjustment slight to views thought right,
Gave endless holiday.
From Jan. to March a Moslem,
April to June a Jew;
Then Christian Grace should hold first place—
Ergo—days thirty-two.

And now I’m fixed in Palestine,
Alas! Ochohe!! Eheu!!!
No more am I a Moslem,
Much less am I a Jew.
All Christian Creeds have left me,
All faith long since has fled,
(*Changing too late I lost each right!*
(It serves you right.—The Ed.)

Gardens.

July is with us, and once more the gardens and the gardeners have come into their own. Some there may be who do not love a garden, but they are not missed, for gardens have their myriads of admirers, from Kings to peasants.

This is a joy in which we may all share, and there is probably no affection so well-placed; the more care and love we lavish on our garden, the more it responds, and the sweeter it becomes. Never mind how small it may be—look after your garden, and you will be amply repaid. If you want a special little thrill, take pride in some particular kind of flower—the sweet pea, for example. It is not every soil that is suitable for growing roses—the acknowledged queen of the garden—but the sweet pea will grow in a very

ordinary soil, and, given sufficient space and sunshine, will blossom profusely. As I watch mine flowering day after day, delighting in their exquisite scent and marvellous colouring, I am reminded, as are scores of garden-lovers, I suppose, of T. E. Brown:—

“A garden is a lovesome thing, God wot!
Rose plot,
Fringed pool,
Ferned grot—
The veriest school
Of peace; and yet the fool
Contends that God is not—
Not God! in gardens! when the eye is cool?
Nay, but I have a sign;
’Tis very sure God walks in mine.”

L. R.

Hop Exchange.

On a recent Sunday members of the Hop Exchange and their friends spent a very enjoyable day on the river from Windsor to Hurley. Judging from the merriment of the party the heavy showers during the day appeared to have very little effect.

Lunch and tea were provided on the launch, and several impromptu musical items were rendered with great success by Miss N. Smith, Mrs. Knight (formerly Miss I. Dean), Mr. Kent and others, while Miss J. Buckley kindly lent a gramophone for the occasion. Our thanks are due to the organiser, Mr. Baxter, whose capable arrangements made the day such a brilliant success.

F. D. B.

Kirkdale Tennis Club.

The Tennis Club members wish to thank very heartily Miss Verbrugge and Mr. Solomon, on the occasion of their marriage, for the work they have done to make the Club a success. Miss Verbrugge has served the members well for many years, and to Mr. Solomon the Club owes much. May they enjoy happiness and prosperity in the future,

In filling the vacant place of Secretary, I trust that I may serve as faithfully and as well as Miss Verbrugge. I hear that a tournament is desired; no doubt one could be arranged. It would be interesting to divide the members into several teams, one for experienced players, one for learners, and a team for old members who are new wives; while the losers of all teams could compete for a prize between themselves.

We cannot all be victorious, but we can be good losers.

G. M. T.,
Sydenham Exchange.

New Versions of Old Songs.

NO. 2.—MY DEAR SOUL.

Hast thou heard the Busy Back
In the Busy Hour
Singing down the junction track,
Forty bagpipe power?
So it seems to waiting Subs.,
More than they can thole.
Makes them yell, words like—“Well,
’Pon my soul!”

Hast thou heard the ringing tone,
On a junction call,
With a syncopated drone
Not well-known to all?
So when Subs. would clear the line,
Then we take control.
Say it’s new—see them through,
To their goal.

Has thou heard the dreary hum
Through the telephone,
When the dialled number’s dumb,
Or the bird has flown?
Or perchance the line is “dis”
Through a broken pole.
Don’t complain, try again,
My dear Soul!

C. A. S.

Guaranteed.

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“Yeh! Who?”
“Woolworth.”

From Northern Manhattan Echo.



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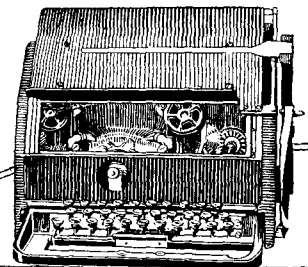
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The Transatlantic Telephone Service, Jan. 15, 1927.

American Service is now in full swing,
And fair cousins from o'er the Atlantic.
Oft when passing a call, for our Night Staff will fall,
They find them so quaint and romantic!

But the smart Wall Street Gent., on business intent,
By this holdup is rendered quite frantic—
His remarks anent queues, cause the cables to fuse,
For his language is *most* "Transatlantic."

M. C.

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.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations working at May 31, 1927, was 1,531,868. New stations during May numbered 24,473 and ceased stations 10,447, resulting in a net increase of 14,026 on the total at the end of the previous month.

The growth for the month is summarised below:—

Telephone Stations—	London.	Provinces.
Total at May 31	540,947	990,921
Net increase for month	5,293	8,733
Residence Rate Installations—		
Total	118,355	191,865
Net increase	1,701	2,317
Call Office Stations—		
Total	4,791	17,539
Net increase	33	204
Kiosks—		
Total	512	2,824
Net increase	34	154
Rural Party Line Stations—		
Total	—	10,036
Net increase	—	49
Rural Railway Stations connected with Exchange System—		
Total	—	774
Net increase	—	16

The number of inland trunk calls dealt with during April (the latest statistics available) was 8,012,729, an increase of 684,715, or 9.3% on the April, 1926, figure.

Calls made to the Continent during April last numbered 25,052 and from the Continent 27,245.

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

PROVINCES—Halifax (automatic).

And among the more important exchanges extended were:—

LONDON—Ambassador, Paddington, Popesgrove, Streatham, Tilbury, Wanstead.

PROVINCES—Ayr, Belfast, Birmingham (South), Cleethorpes, Cradley Heath, Fort William, Gateshead, Glossop, Goole, Hamilton, Henley-on-Thames, Horsham, Penzance, Plymouth, Wakefield, Wallsend.

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

Tavistock—Truro—Penzance,
Bristol—Temple Cloud,
Bridgend—Aberkenfig,
Hull—Grimsby,
Hitchin—Letchworth,

while 80 new overhead trunk circuits were completed, and 88 additional circuits were provided by means of spare wires in underground cables.

PRESENTATION TO MR. R. P. LOWE.

A PRESENTATION of a Gold Watch was made to Mr. R. P. Lowe, Contract Manager, Norwich, and a Work Basket to Mrs. R. P. Lowe, from the members of the staff, to mark the occasion of his promotion to Newcastle. The presentation was made by Mr. C. F. Ashby, District Manager, who spoke with appreciation of Mr. Lowe's long service in Norwich and his excellent work in the Contract Section, and also in connection with Civil Service social activities. Mr. R. Inglis (District Office) and Mr. C. A. Gate (Traffic Section) contributed remarks to the excellent relations that have existed between their Sections and the Contract Department.

Mr. R. P. Lowe suitably replied, thanking the members of the staff for their splendid gifts and for the pleasant remarks regarding his work.

LONDON TELEPHONE SERVICE NOTES.

Accounts Branch.

THERE is nothing of special importance to record this month. The quarterly balances are done and the dispatch of the Accounts for the current quarter is already in full swing and the regular routine of the quarter commenced once again.

The closing date for the September Directory has passed and the new issue is now in the press.

Those officers who in recent weeks have been working at top speed in order to get every alteration and addition up to the very last minute included can now think of such relaxations as annual leave before the next issue is put in hand.

Cricket.

The rainy summer has not in any way damped the enthusiasm of the Accounts Branch Cricket Club, and on the whole the fixtures have been fortunate in their weather.

A number of interesting matches have taken place since the last notes were written.

On June 15 a league match was played with the Traffic Branch, which ended in a draw. The return match was played on July 5, when the Accounts won handsomely with 110 for 3 wickets, while their opponents were all out for 60, 16 of which were scored by Grove. Good scorers on the Accounts side were: Taylor 29 not out, Mayle 28 and Moon 24. The Second League match with the Contract Branch took place on June 28, when the Accounts Branch again did well with 90 for one wicket, Young scoring 49 and Moon, not out, 24. Moon also distinguished himself by taking 6 wickets for 33 runs. The Contract Branch were all out for 89.

The return match with the London Engineering District was held on June 23, when the latter had their revenge by winning with 110 runs against 83.

A match against a team from A.N. Section was also held on July 8, and resulted in a win for the Accounts.

The Accounts Club having defeated both Traffic and Contract Branches now has to play their combined teams. A full account of this match, which is to be held on July 26, after these notes have gone to press, will appear in the next issue of the *Telegraph and Telephone Journal*.

Contract Branch.

The volume of business obtained by the Contract Branch during the first quarter of the current financial year was as follows:—

	Stations.
New business obtained	21,321
Ceasements	10,712
Net gain	10,609

The net gain represents an annual rental exclusive of call fees of over £57,000.

The new business obtained in June—and consequently the net gain—was a great disappointment. It would appear, however, from enquiries made that the absence of orders is pretty general throughout trading circles. Everything appeared to be going well until the Whitsun holidays, but it is curious that on the return to business of those who should have been our customers, they seemed to be immersed in a sort of miasma which numbed their senses, temporarily at any rate, and prevented them from using their facilities to order telephones and a hundred and one other things—hence the slackness in business generally.

Let us hope they will speedily recover.

Cricket.

The destination of the L.T.S. Championship has now been decided and the honour has fallen to the Accounts Branch, who managed to beat the Traffic and Contracts in successive matches.

The Accounts proved to be much the better eleven in the last match with the Contracts. The Contracts batted first and scored 93, Dickinson and Cowdray contributing more than half the total. The Contracts were unfortunate in having several of their best players away on annual leave, and this handicap was severely felt in bowling, and Moon and Taylor managed to hit off practically the whole of the runs required before they were separated.

The final match in the competition between the Contracts and Traffic will determine who shall hold the "wooden spoon," and ought to provide an interesting encounter.

Five of the Contracts team were selected to play in the inter-departmental match against the A.G.D., and Oliver, who has been in splendid batting form for the Contracts, had the honour of contributing the highest score.

Several matches remain to be played before the season closes, and with a view of building up a strong combination for future competitions any player in the District Offices who is prepared to play, should get in touch with the Cricket Secretary, Mr. T. Culley, of the City Contract District.

Retirement of Mr. C. F. Joyce.

Mr. Bold, the Superintendent of Accounts, on July 8 last, at Cornwall House, gracefully expressed the feelings of his colleagues to Mr. C. F. Joyce, who has retired from the London Telephone Service after nearly 40 years' service.

Mr. Joyce entered the service of the National Telephone Company in December, 1887, and in 1912 came over with that Company to the Post Office. For many years he was employed in a clerical capacity, but owing to defective eyesight was transferred to the Collecting Staff. His kindly and generous nature engendered a special affection amongst his colleagues, and Mr. Bold paid the highest tribute to the zeal which had always characterised the performance of his duties. In asking his acceptance of a silver chronometer and a cheque subscribed by his colleagues, Mr. Bold wished him better health, good luck, and many years of life yet to enjoy his well-earned retirement.

Mr. Joyce feelingly expressed his thanks and hoped that he would have many opportunities to reciprocate the friendship which had been further cemented by their action that day.

DO IT NOW!

A PERSONAL VIEW.

THIS business slogan of to-day might indeed be regarded as the inspiration of the rapid development in our electrical services and of those kindred transport services whose object is to bring peoples and places into closer communication. The many developments during the past few years have certainly done much to shorten distance even if, as some urge, they have also had a tendency to shorten life itself as a result of the nervous strain of living in a state of perpetual hustle.

History tells us that the introduction of steam as a motive power and of the electric telegraph caused a complete revolution in commerce, and that a craving has subsequently developed for speed and more speed. The telephone brought the personal touch and speedier communication, the aeroplane brought its spice of adventure and speedier transit; and wireless—that still mysterious and unplumbed science—has already brought many things with the still greater speed of light. These handmaidens of science have their legitimate uses to the community, and they bestow many advantages on business and social circles; but we venture to suggest that, in so far as they may insistently pursue the business man into the realms of rest and recreation, study and quiet thought, they also have their abuses. We would therefore regard commercial telegraph and telephone services with passengers in trains and short-distance aircraft as partaking to some extent of the nature of vindictive pursuit.

At the present time the telegraph cables and the beam and other wireless stations wreath a cobweb of communications over the whole globe. The inhabitants of the North and South Poles—if there be any—can now get instant news of heat-waves in London or New York and can enjoy whatever measure of comfort or vicarious warmth they can derive from the fact. For many years communication with ships at sea has been an everyday occurrence. The Rugby wireless station has given world-wide, one-way communication with shipping and the short-wave station at Devizes seems to promise a universal two-way service to ships in the near future. A commercial service to long-distance aircraft when in flight is, literally and metaphorically, in the air, and there seem signs that the railway passenger cannot long hope to dodge wireless programmes, the telegram and the telephone call.

When will this spirit of hustle call a halt? Shall we ultimately have each a telephone installation attached to our person or after a long period of evolution be born with one? In the early stages, presumably, this installation would form part of our hat or maybe our collar-stud. (The ladies, perchance, would be obliged to revert to earrings or lockets—incongruous accessories to an Eton crop.) Shall we be liable to telephone calls at all times, even when golfing, boating, bathing or dancing, in prayer or in meditation? Perish the thought, lest the plain man be forced to abandon business altogether. But where will it all end?

After all, perhaps there is no need to conjure up such tragic possibilities. Human laziness is a potent antidote. There is that growing habit of long week-ends and other indications that the spirit of hustle and the spirit of health are already in deadly combat; and sanity may yet prevail. As a last resource we can don a knapsack and stealthily creep away to join the army of "hoboes," those noble gentlemen "who toil not neither do they spin," and shun "glad rags."

This being holiday time, shall we add "Do it now"?

J.W.W.

THE Telegraph and Telephone Journal.

VOL. XIII.

SEPTEMBER, 1927.

No. 150.

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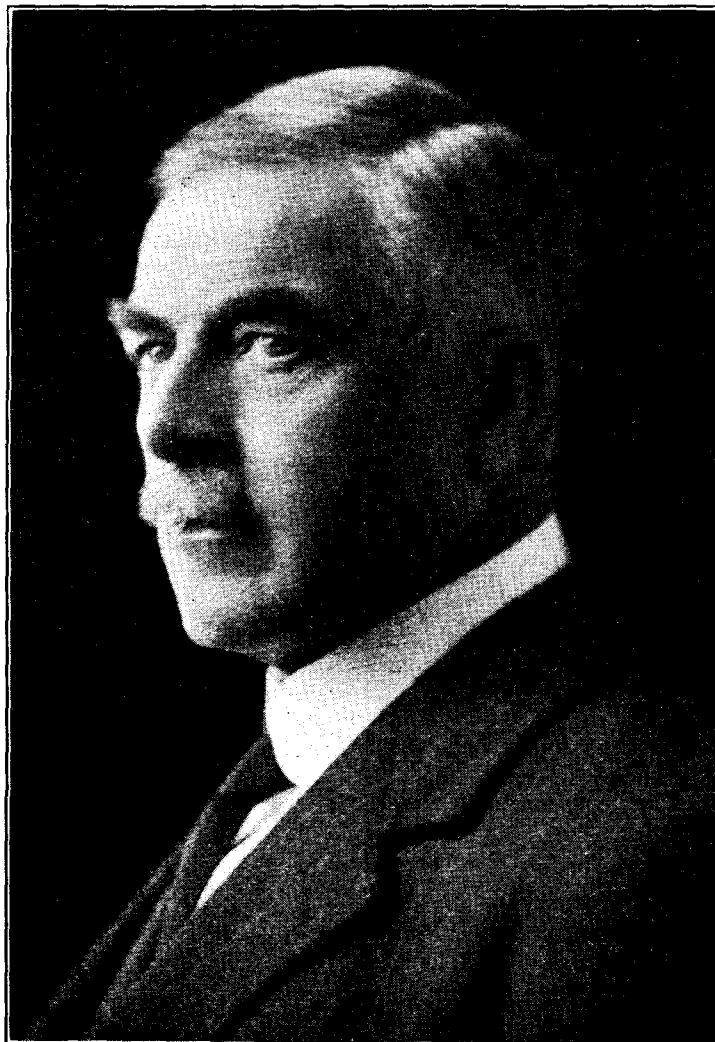
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TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XLIV.—
MR. HENRY SPARKES,
C.B.E.

LIKE many other officers who have risen to distinction in the Post Office service, Mr. Henry Sparkes, the Controller of the Post Office Stores Department, commenced his official career as a telegraphist. He began at an unusually early age, for he was not quite 15 years old when, in February, 1886, he joined the manipulative ranks in the Central Telegraph Office. He was a telegraphist for six years, and it is noteworthy that that period was the longest on which he has remained in any grade, though we hope it will be considerably exceeded in his present grade. In 1892 he applied for a clerical position and, by a stroke of luck, as he himself recounts, he was given a post in the old department of Telegraph Stores. The establishment records suggest that the year 1892



[Photo by Hana, London.

was a period of revolution in Telegraph Stores for, inside of four months, Mr. Sparkes found himself transformed from a Junior Clerk to a Second Class Clerk, and then to a Second Class Examiner, and must have been a little breathless at the end of it. He had, however, found his *métier*, and his rise was rapid. He was a Staff Officer at the time when he became a notable figure on the Post Office side in the proceedings concerning the valuation of the plant of the National Telephone Company, his services to the State on that occasion being beyond measure.

Mr. Sparkes had the honour of being made an Officer of the British Empire at the termination of the War, and was made a C.B.E. in the last Birthday Honours. In 1924 he became Controller of his Department, to the joy of his subordinates, for there never was a more popular Head of a Department.

THE TELEGRAPH SERVICE—PAST AND PRESENT.*

BY A. W. EDWARDS, O.B.E.,

Late Deputy Controller, Central Telegraph Office.

At luncheon in a little restaurant in Soho a grey-haired, benevolent, be-spatted old gentleman sat down agitatedly at a table and observed to his *vis-a-vis*, "So sorry, I've a telegram I simply must send to the North of England. I'm stuck for a shilling. Can you help me out. Here's my card." On it was printed the name of a famous club in Pall Mall. Somehow it seemed all wrong to the man appealed to and he declined to hand out the required shilling, whereupon the benevolent-looking old gentleman dashed out of the restaurant. "Same old telegram," breathed the waitress.

Ladies and Gentlemen, the same old telegram is the subject of my paper to-night. It is the same old telegram to-day as it was in 1835, when Messrs. Cooke and Wheatstone collaborated and presented to an astonished world their five-needle telegraph system, the result of which was the establishment a few years later of various telegraph companies, opening up yet another profession for the men and women of Great Britain. Telegraph clerks, as the operators were then named, as against the later title of telegraphists, together with engineers and many and various clerical officials required for accounts keeping, &c.

Under the régime of the various telegraph companies which were established the minimum charge for an inland telegram of 20 words in the text and 10 in the address ranged from 1s. to 6s., according to distance or to whether the telegram had to be handed over from one company to another, or to a railway company, the average cost of a telegram to the sender being 2s. 2d. An additional fee of 1s. was charged for telegrams sent on Sundays and for those sent to and from race meetings and other special events. In the companies' time the free delivery of a telegram extended only to a distance of half a mile, as against the present distance of 3 miles. For distances beyond and within a mile, a portage fee of 6d. was charged, with 6d. for every additional mile and with increased rates for the express delivery of telegrams. It must be assumed that in these times telegraphs were required to show a profit and that the companies paid some kind of dividend to their shareholders, for we find that in the year 1868 an Act was passed empowering Her Majesty's Postmaster-General to acquire, work and maintain electric telegraphs, and that two years later the business and interests of the several telegraph companies, viz., the Electric and International, the British, Irish and Magnetic, the United Kingdom and the London District were taken over by the State at a cost of some eleven million pounds, which sum included, I believe, the cost of numerous extensions during the first three years.

I do not propose to weary my listeners to-night with particulars of the evolution of telegraphy, because I do not doubt that the vast majority present have from time to time heard papers on this interesting subject and are *au fait* with the various phases of telegraphic instruments, from five-needle, double and single needle, to the present high-speed automatic and multiplex machine apparatus. Recently I read with some grief and a little asperity the following Press paragraph: "The Post Office Accounts for 1926 disclose the usual loss on the telegraphs. If they only cost us a million and a quarter more than they bring in every year I suppose we should think ourselves lucky. But this deficit has been going on ever since the Government entered the telegraph business and it was because the Government had entered it that it obstructed for many pertinaacious years the development of the telephone. That particular fight is now pretty well over, but it has cost the nation incalculable sums in the past.

"The relative utility of the telegraph grows less with every year. Two or three decades hence it may have become virtually obsolete. Meanwhile we shall have been mulcted in another 50 millions or so."

To telegraph men and women such Press comments do not make happy reading, particularly as apart from his satire the writer endeavours to be prophetic. It is the more unhappy to the telegraph men and women of the present decade to whom has been left the legacy of an indifferent initial bargain, and I suggest, therefore, that our time would be more usefully employed to-night in retrospection and in an endeavour to ascertain whether any errors of omission and commission in the past have aided these yearly losses of telegraph revenue and whether it is possible in the light of past experience to do anything which will serve as a guide to the future prosperity of the Telegraph Service.

At the transfer the Government, following, possibly, the example of the penny post, established a uniform rate of 1s. for 20 words in the text and a free address to any part of the British Isles, while on Oct. 1, 1885, a further reduction to a minimum charge of 6d. for 12 words, with a ½d. for each additional word, was made, the average cost to the public being about 7½d. per inland telegram, as against 2s. 2d. in the companies' time. The rates were increased during the war to 9d. instead of 6d. for 12 words, and later to 1s. for 12 words. The transfer, too, was responsible for a considerable reduction in the Press rates, 1s. being charged for every 100 words transmitted between 6 p.m. and 9 a.m., and 1s. for every 75 words between 9 a.m. and 6 p.m., with 2d. per 100 or 75 words for each additional address.

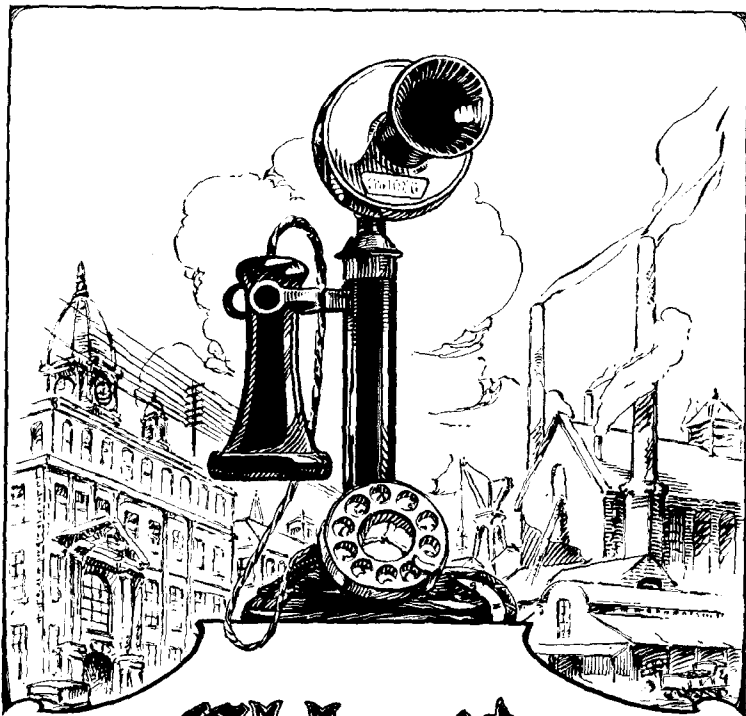
* Paper read before the Telephone and Telegraph Society of London.

There can be no doubt that these much reduced rates were directly responsible for the vast increase of telegraph traffic which year by year accrued and that as a result our telegraph service made rapid strides in this connection. But the expense incurred in the laying down of lines everywhere, consequent upon the continual extension and development of the system even to villages, together with the scrapping of apparatus as newer inventions were discovered, must have been enormous, and expense in the latter direction still continues and will continue as new methods are invented.

All this was no doubt justifiable while telegraphs had no rival in the field, but it naturally followed that with the introduction of its telephone competitor, which year by year made its influence felt, particularly upon local telegraph traffic, the uniform rate for any distance by telegraph could no longer be justified as a commercial proposition and that, in effect, the public was being subsidised to a much larger extent than ever. For it must, I think, be contended that the establishment of a uniform rate for telegrams has never been a sound commercial proposition, and that since the Government took over the business of the several telegraph companies the telegraphing public has always been to an extent subsidised in regard to its telegraph service. I may be wrong, but during the whole of my 44 years' telegraph service I do not remember telegraphs as a revenue-earning machine, and when one reads such annual deficits of 1¼ to 3½ million pounds since the year 1913 it tends to show conclusively that our charges for telegrams are not altogether sound. What would be the case of telephones to-day had the Government when taking them over introduced a cheap uniform rate of charge? Would they be in any different case to that of telegraphs? I suggest not. And yet, notwithstanding the losses shown on telegraphs, it is suggested in the Press that a cheaper and more popular service is wanted. If telegraphs cannot pay at the present rate of charge how is it possible to give a cheaper service? There is, I think, only one method of making telegraphs pay, and that is by the abolition of the present uniform rate of charge and reverting in some degree to the pre-transfer system of charging according to distance. It might then be even possible to win back some of the local traffic lost because the rates for local telegrams might, under such a scheme, be lessened. Why is it that we are to-day maintaining our telegraph traffic loads between London and the large provincial offices and losing local traffic? Simply, I think, because we are giving a splendid service between London and the Provinces and between the large provincial towns at infinitely cheaper rates than by telephone, whereas the local charges for telephones are not only infinitely cheaper than telegraphs, but in the matter of service telegraphs cannot live with telephones. It may, of course, be argued that under such a scheme we should run the risk of losing much of our provincial traffic to telephones, but I suggest that in the matter of long-distance inland telegraphy there will always be considerable business.

Recently one of our daily newspapers would appear to have suddenly discovered that our Press rates are altogether too low and that the Government was subsidising the Press in regard to its telegrams. It is certainly somewhat extraordinary that this fact has only now been discovered by this enterprising newspaper, and that it has taken some 56 years for this to be acknowledged by the Press. Press telegrams never have paid since the transfer of telegraphs to the State, and the Press of this country has been receiving a State subsidy ever since the establishment of Press rates. The low rate of 2d. per 100 or 75 words, according to whether at night or day rate, for each additional address no matter whether in the same town or to any town throughout the British Isles, killed any possible chance of making revenue out of the Press traffic for the obvious reason that while such a rate might be justified for additional addresses in the same town, it could not for one moment be justified in regard to addresses in other towns. The rate of 2d. was increased to 3d. after the war, while the number of words at day and night rate was lessened, but even this I submit is altogether insufficient. Whenever any suggestion was made for increasing the Press rates it was for one reason or another stifled at its inception, but the fact remains that there has always been a recognised heavy loss each year on Press telegrams, and that each successive Government has wittingly, if unwillingly, subsidised the British Press. If, therefore, telegrams are required to become a revenue-earning concern it behoves a careful revision of the present Press rates, a revision which I feel sure we must all agree is justified. The loss on Press telegrams has certainly lessened during the past few years, consequent upon the rental of private lines by Press agencies and newspapers, and the working of such lines by their own telegraph staffs, but on Feb. 15 last, the Postmaster-General acknowledged that the loss on Press telegrams had been between £200,000 and £250,000 a year during the last three years but that the existing rates could only be altered by legislation, which he was not prepared to introduce. I am, of course, not in a position to give reasons why such legislation should not be introduced, but it was pleasant to read, some three days later, in the leading article of the newspaper which was doubtless directly responsible for the question being raised in the House of Commons, that "no newspaper wants a secret subsidy from the Government, and that such undercharging of newspaper telegrams is in effect a subsidy of the worst kind." If the newspaper in question speaks for the remainder of the British Press, we ought not, I suggest, to be backward in taking them at their word and in putting our Press rates on a commercial basis after a period of 57 years.

The subject of my paper would not be complete without a comparison of the output or working rates of hand-worked Morse, with its attendant Wheatstone and the modern machine multiplex apparatus. Morse telegraphy with Wheatstone and Wheatstone-Creed working is still with us to a considerable extent, and cannot yet be relegated to the past; indeed, old-timers still retain a big place in their hearts for this fine old example of their craft. Modern machine telegraphy has done much to replace it, particularly



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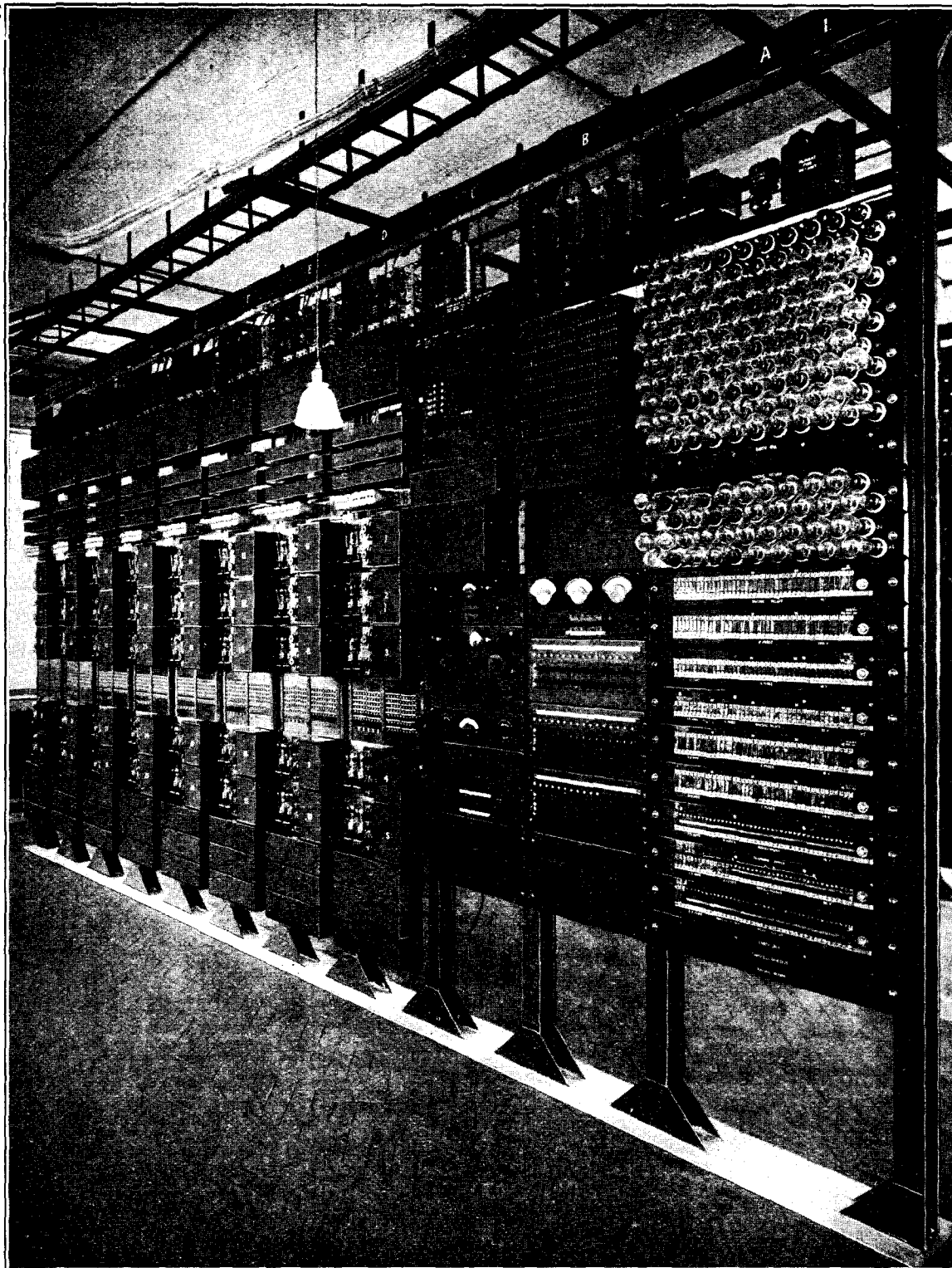
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between towns with telegraph loads sufficient to justify its installation. This class of telegraphy has enabled considerable economy in the matter of lines and their maintenance, although this saving has to some extent been off-set by the necessity for the employment of many additional mechanics for the upkeep, repair, &c., of the machines. With stable conditions it has evidenced splendid results, and notwithstanding that it requires the special services of such experts as Dirigeurs to maintain stable working conditions, whose services have to be included in operator averages, it has proved its capacity on good working days of an average output per circuit of some 40 messages an hour inwards and outwards per working day of 12 hours. To obtain this daily average it, of course, follows that a higher rate is required to be, and is, obtained during the peak hours of traffic. This, therefore, may be said to be the general average obtained by multiplex machine telegraphy on circuits working between London and the more important provincial towns and between certain provincial towns. On circuits where machine or multiplex telegraphy is not justified, Morse working in the main continues, with the exception, perhaps, to certain towns or offices to which that wonderful little machine known as the Teletype, with its typewriter keyboard and direct type printing, has been installed, a machine which will in time replace quadruplex Morse working and bids fair to compete with and supersede hand-manipulated Morse where traffic loads justify, dealing a further blow to the old-time craft of Morse telegraphy. Morse telegraphy has been the mainstay of the service for so many years that it would be deplorable if, as a craft, its supersession became necessary. Before the introduction of the more modern methods of telegraphy it was capable of and showed fine results, particularly where the traffic was within the compass of one operator, and in my young days such was the esprit de corps of a telegraphist that it was no infrequent occurrence for an operator during the peak traffic hours to transmit 50 messages an hour and even more. I do not desire to suggest that there are not as good exponents of Morse telegraphy now as in past days, but I do not think we obtain such good results by Morse as formerly. Possibly this is partly due to the more modern telegraphist being required to be expert in the other methods, such as Baudot, Western Electric, Type Keyboard, &c., and again that where the traffic of a circuit is slightly beyond the present capacity of one Morse wire, it is superseded by the newer methods. There is still much to be said for old-time Morse, and telegraphy as a craft would lose considerably were it altogether superseded. The modern methods are easier to learn, as was shown during the war, when temporary hands were engaged for Baudot and keyboard working, and if telegraphists are at all jealous of their calling it behoves them not to despise the old-time Morse sounder and its attendants.

Well, Ladies and Gentlemen, you are doubtless wondering what all this is leading up to. It is this, and it is much to do, I think, with another of the reasons why telegraphs fail to show a profit. With all our modern plant and its costly installation, are we to-day getting any better or as good a result per operator (taking the establishment of each large telegraph office as a whole) than when Morse telegraphy was supreme? As individual operating goes, possibly we may, but having regard to the fact that when Morse telegraphy prevailed almost every officer of operating rank was utilised for such work and that whatever operator average was obtained it stood as something near that figure, we have been required in more recent years to divide the operator output by two. In other words, for every telegraph operator's output he is required to carry another officer engaged in the multifarious duties of his office, and his daily average of, say, 24 messages per hour is thus reduced to 12. It is along this line that I suggest something should be done if we want to reduce the telegraph deficit. Too many duties other than operative telegraphy have crept into telegraph offices, particularly in recent years, while the more complicated machinery for the arrangement of duties, time-keeping, &c., are considerably greater than in the more simple days under Morse. Compare, too (and here I am aware that I am treading on delicate ground), the present considerable number of officers required for supervision and the many duties carrying supervising appointments with the number engaged on such duties in the 80's and 90's. In my early days the divisions of the Central Telegraph Office, then, perhaps, smaller than those of to-day, were self-contained with two Supervising Officers to cover the 12 hours, one for early and one for late duty. One telegraphist served as a Book-Clerk and performed all the staff allocation, arrangement of duties and preparation of the Time Book. These self-contained divisions were sometimes accused of being overstaffed, making for wastage of staff during certain hours, but more often than not, in times of pressure, staff was loaned from one Division to another, as happens now, and any overplus of staff in any one Division was neutralised. Then someone thought that economy would result by throwing the whole of the staff into one common pool, to be allocated to the Divisions from one common centre. Splendid in theory, maybe, but where did it lead? It certainly did not prevent wastage of force during certain hours and certain months of the year, as it is practically impossible to utilise every working hour of the day by reason of the requirement of a full staff during the pressure hours and the non-necessity for so much staff immediately following such period. And in this connexion there would be a still larger wastage but for the introduction many years ago of the system of long and short duties. It was, however, one of the largest factors to the lessening of that esprit de corps of the operator which had hitherto been so fine, as whereas a telegraphist under the old régime was posted to one particular circuit for the whole of his duty taking in his stride the peak hours of pressure with the slacker periods and having a direct and personal interest in the working of his circuit, he was under the new arrangement placed a couple of hours at one circuit, a couple of hours at another, and oftentimes was required to be at busy circuits throughout the whole of his duty. As a result dissatisfaction was engendered and working rates lowered. What

has it developed into at the present time? The services of assistant superintendents, overseers and telegraphists are utilised in the Staff Superintendents' Office for the distribution of staff hours as required, not always in whole duties but more often in hourly periods, while in addition overseers or assistant supervisors and telegraphists are required in each Division for the arrangement of the duties according to the charts and allocation of the staff odds as supplied. Again, overseers and assistant supervisors are necessary in each Division for the preparation of the time book, signing-on of staff, &c. Furthermore, there are overseers or assistant supervisors and telegraphists for other clerical work, such as that dealing with staff irregularities, preparation of returns and the many other matters of a clerical nature which seem to have grown up with the office by the introduction of the more modern system of telegraphy. For the actual supervision in the Divisions there are overseers and assistant supervisors and assistant superintendents and supervisors according to whether the Division is designated a Man or Woman's Division.

The old-time simplicity of management of a Division has departed, and although it must be admitted that with the mixed forms of apparatus now in use some disturbance of that straightforward régime under Morse only must have come about, yet I venture to assert it was never estimated that the present complicated machinery would have grown up when the self-contained smaller Divisions were departed from.

In support of my statement I venture this comparison:—

In 1884 there were 13 Superintendents and 37 Assistant Superintendents, 8 Supervisors, 14 Assistant Supervisors Higher Grade, and 14 Assistant Supervisors Lower Grade, a total of 86 Supervising Officers. This number included those employed in the old Foreign Gallery (the Cable Room had not then been instituted) and in the Controller's Office, in which the services of several Superintendents and Assistant Superintendents were utilised. The operating force was 1,696, the ratio of supervising force to operators being 19.7, or 21 if the Supervising Officers engaged on clerical duties in the Controller's Office are excluded.

To-day (excluding the Cable Room establishment and the Controller's clerical staff) there are 2 Higher Grade Superintendents, 11 Lower Grade Superintendents, 56 Assistant Superintendents, 197 Overseers, 3 Supervisors Higher Grade, 24 Supervisors and 104 Assistant Supervisors, in all 397. The number of men and women telegraphists is 2,290, to which should be added 214 telephonists and 250 girl probationers, a total of 2,754—the ratio of supervising force to rank and file being 6.7. I am, of course, quoting the Central Telegraph Office as an example in this connexion, but it is very possible that similar ratios obtain in the large provincial offices; for it usually follows that where a certain ratio of supervising appointments to rank and file is established at one large office others are not backward in their claims for similar privileges.

I am ignorant of the ratio of supervising officials to rank and file in cable companies' establishments, but I should be surprised if it is in any way comparable.

The Department itself must, I think, share responsibility for the considerable increase in the higher positions which have accrued from time to time. Whenever agitation for increased salaries and wages obtained, and throughout my service these occasions were many and periodic, the usual *via media* was adopted in the earlier days by the giving of additional supervising appointments, which only served as a partial amelioration but did not really satisfy the claim, which was for improved scales of pay to the rank and file. The Service became from time to time more or less loaded with supervising officials and the climax was reached when still another class of Supervisors was added by converting (in 1908) the class of Senior Telegraphists into Overseers. It would, I venture with all deference to suggest, have been better had the salaries, later wages, of the operators, which up to the time of the Tweedmouth Revision in 1897 (when classification was abolished) had been very poor in comparison with existing scales, been improved, thus making them more satisfied and contented with the conditions of their service and by such means have obtained from them the best possible results of their craftsmanship. For a contented rank and file should require less supervision.

(To be continued.)

OBITUARY.

WE much regret to hear of the death recently, in Berlin, at the ripe age of 71 years, of Herr BRUNO KOHLEN, the former Chief of the Telegraph and Telephone Department of the German Post Office.

Deceased was well known in this country and was recognised as no mere figure head but a sound practical administrator.

Herr Kohlen took a leading part in the development of both the Telegraph and Telephone systems of Germany, in addition to which he was instrumental in developing telegraph communication between Great Britain, the U.S.A. and other foreign countries.

J. J. T.

AUTOMATIC TELEPHONY.

BY C. W. BROWN.

(V—Continued from page 223.)

Scheme 2.

THE limitations of the level capacity are overcome in this scheme by using a selector having an additional line bank and a long shaft with an additional pair of wipers. A reference to Fig. 8 will make the arrangement clear. By this means the capacity of the final selector levels is doubled but the standard mechanical system retained. From a consideration of Fig. 9 it will be seen that for the 100 numbers allocated, 200 circuits are obtained. There will thus be 100 numbers auxiliary to the normal numbering scheme. The numbers allocated to those lines are outside the regular numbers for the exchange. Fig. 10 will probably satisfy the reader on the point, the fig. shows the disposition of a typical level of a P.B.X. group of 20 lines. This type of selector is frequently referred to as a 20-contact switch, as the number of contacts per level is 20.

It will be observed that in the example given the auxiliary numbers are in the 10,000 series, the highest regular number being 9999.

Each level of 20 lines is individual to a P.B.X., and a hunting action is given to the selector. The dialling of the tens digit causes the shaft and wipers to rise to the levels containing the P.B.X. lines, the wipers enter the levels and if necessary hunt in the level. If all lines are engaged, the shaft steps to the 11th position and busy signal is transmitted to the caller as the result of the operation of cam springs which function in the manner indicated earlier for group selectors.

The selection of a line is effected in the following manner:—When the wipers come to rest after entering the level they are standing upon two lines to the P.B.X.; the line associated with bank No. 1 is taken if both lines are free, the necessary discrimination being afforded by rendering one of two controlling relays slow to operate. Fig. 11 is an endeavour to represent the principle of such selection. If both lines are engaged, the wipers step to the next contacts and the process is repeated. If all lines to the P.B.X. are engaged the shaft steps to the 11th position and busy signal is transmitted to the caller. The bank contacts to which lines are not connected—when the full number of lines (20) is not in use—are artificially engaged, so that the wipers will pass over them.

Although when the wipers come to rest the contacts of two lines to the P.B.X. are occupied by the wipers, only the contacts of one of the lines are engaged, the wipers standing upon the contacts of the other line remain disconnected; that line is thus unaffected although wipers are standing upon its contacts.

As the rotary operation of this type of selector is not dial controlled, special night service requirements necessitate the use of non-P.B.X. numbers, to which the lines selected for night service are "teed." The special numbers are called during the time that night service conditions prevail. It will no doubt have been observed that the units digit does not play any part in the selection of a line. The digit is dialled for uniformity, but is rendered ineffective. In order to reduce operating and holding times, the units digit should preferably be a small one, but, of course, any digit may be used.

The number of P.B.X. groups actually associated with each block of 100 numbers in practice is dependent upon the traffic passing to the P.B.X.'s; it is seldom that the full number of groups (ten) is provided, owing to the large number of switches that would be necessary; but when the number of 20-line groups is limited, the remaining levels may be used for 10-line groups if it is not economical to leave the levels spare.

Scheme 3.

In this case the final selector consists of a single motion switch (rotary line switch) with an associated relay set. If the number of lines to the P.B.X. is not likely to exceed 23, a standard

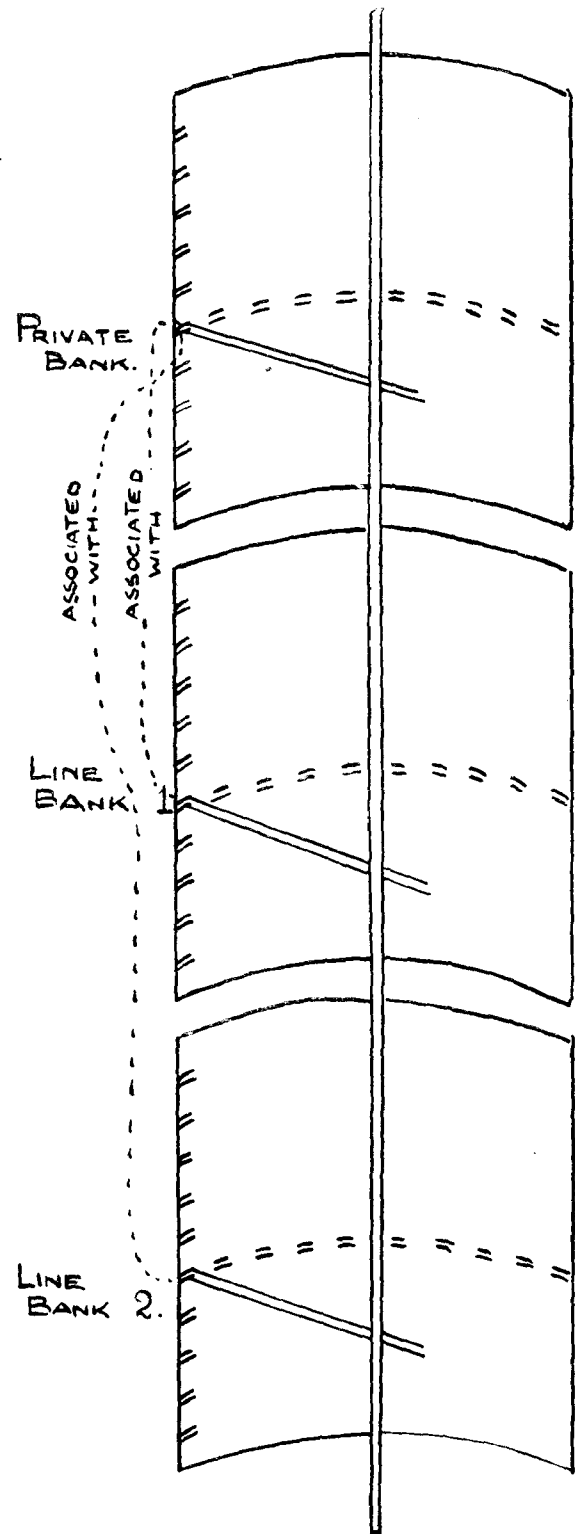


FIG. 8.

line switch may be used. When the number of lines exceeds that figure the 50-point (contact) line switch previously described meets requirements; actually 48 lines may be accommodated by such a switch, the last contact being used for group busy purposes. By joining two such switches in tandem, access is given to 96 lines.

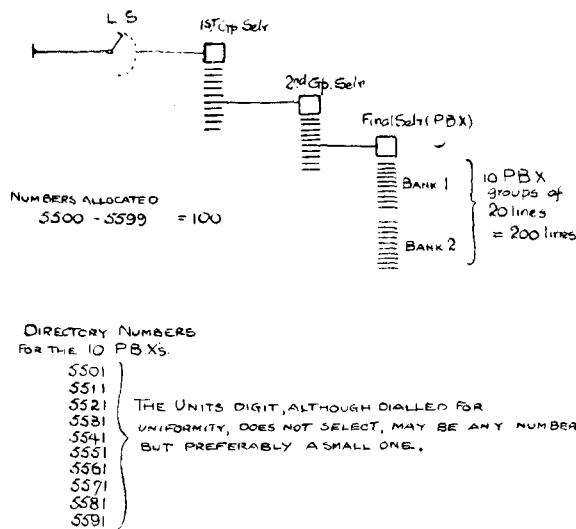


Fig. 9.

Fig. 12 shows the arrangement. The particular rank (by rank is meant 1st, 2nd, 3rd group) of selector from which the final selectors are served, will depend upon the number of P.B.X.'s concerned and the extent to which the regular numbers may be encroached upon.

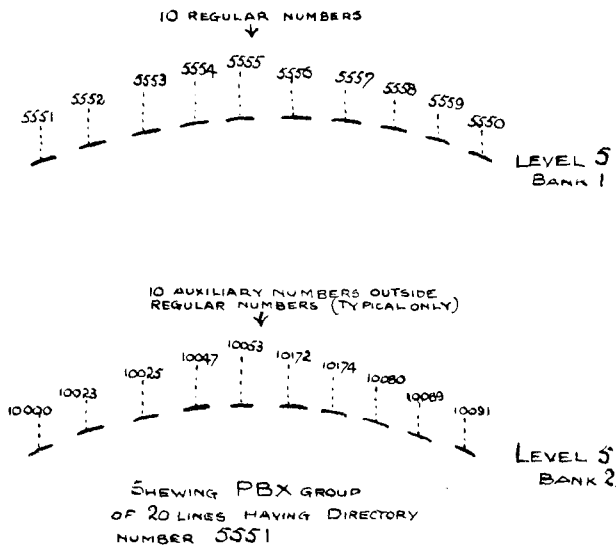


Fig. 10.

Referring to Fig. 12 it will be seen that if scheme A is adopted, 100 regular numbers are given up for each P.B.X., if the number of P.B.X.'s is small and the ultimate capacity of the exchange will not be seriously affected, the arrangement is quite satisfactory. If, however, a large number of P.B.X.'s is involved (a very unlikely event, generally), it is doubtful if the large sacrifice of numbers (100 per P.B.X.) would be economically justifiable and Scheme B would

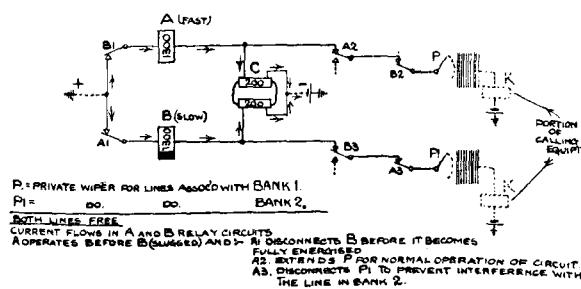


Fig. 11.

then be necessary; this gives access to 10 separate P.B.X. groups per 100 numbers, the numbers in excess of 100 being auxiliary to the normal numbers as indicated for Scheme 2, but an additional rank of selectors is necessary, the number of such switches depending upon the traffic to the P.B.X.'s and is consequently bound to be large.

The relay sets are, of course, necessary to preserve signalling, metering, &c. conditions as provided from a final selector.

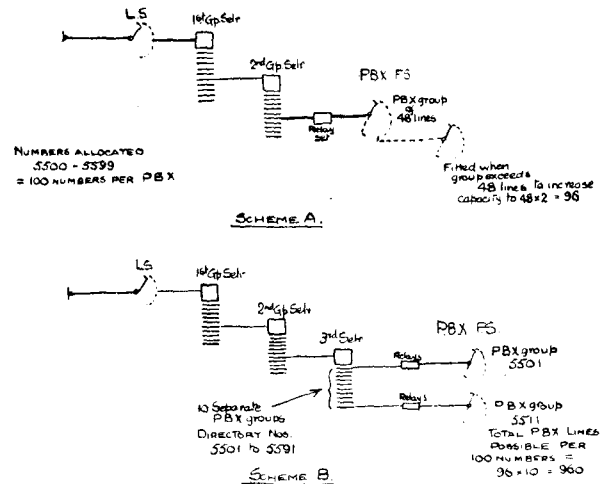


Fig. 12.

The absence of dial control over the movement of the final selector wipers makes it necessary to allot non-P.B.X. numbers for special night service lines, as explained for Scheme 2.

The selection of a line to the P.B.X. is as follows:—When the wipers of the group selector reach a free contact, the dialling of the next digit causes the wipers of the final selector (line switch) to step into the bank, and, if necessary, to hunt for a free line to the P.B.X. Actually only the first impulse of the train of

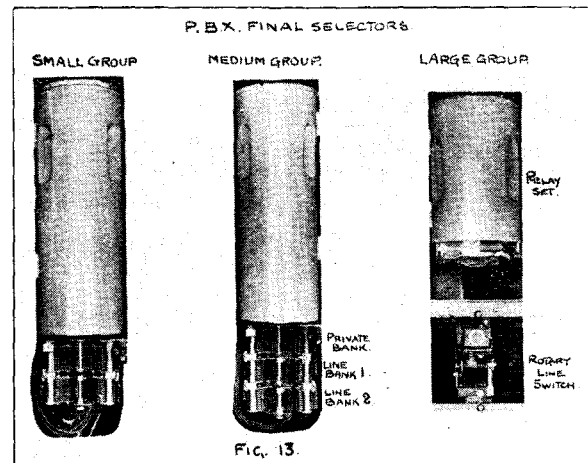


Fig. 13.

impulses representing the dialled digit is necessary for this, the rest of the train being ineffective, thus the value of a small digit is apparent.

Fig. 13 shows the three types of final selector.

VI.

It will be obvious that a scheme of switching on the lines discussed, is capable of being so arranged that subscribers located on different exchanges may intercommunicate direct.

In discussing the ways and means, it is necessary to consider a unit fee area containing a number of separate exchanges. In view

of the proviso that under automatic conditions numbers and levels of switches are associated, a common numbering scheme will be applied to the whole area, separate blocks of numbers being allocated to each of the exchanges; such an area is known as a multi-office or multi-exchange area. An alternative to the introduction of separate exchanges is, of course, the provision of one exchange, to which all subscribers in the unit fee area are connected. An arrangement such as this is clearly impracticable. Heavy gauge subscribers' lines would be required for signalling purposes and "loading" of cables would be necessary for transmission requirements to meet such a condition. As is also well known, telephone plant suffers from the economic disadvantage that it is idle for long periods, hence the plant costs must be regulated as far as possible to offset that disadvantage.

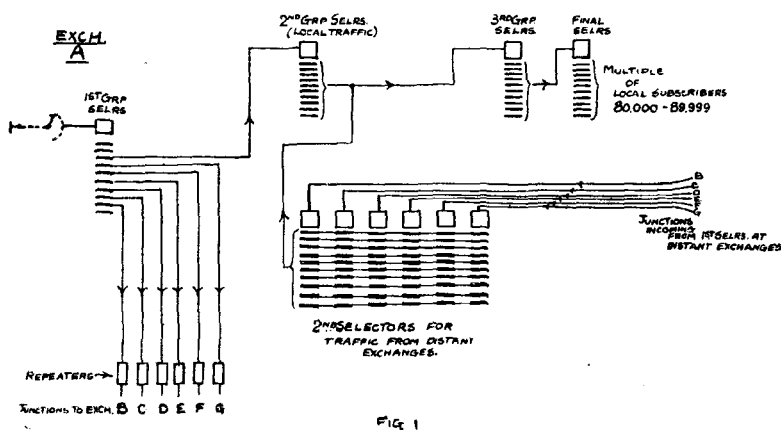


FIG 1

If it be assumed that a particular area, with which we shall concern ourselves, has been designed for an ultimate capacity of 100,000 lines, the numbering scheme will contain 5 digits and allowing for the restrictions already indicated, the practical capacity will be 70,000 lines.

Further, let it also be assumed that the area contains only large exchanges, then it can be arranged to accommodate seven 10,000 line exchanges, each of which will require the use of a complete first selector level.

Each level, other than the local level (the level via which local numbers are reached) will have junction circuits to the respective exchanges connected to the bank contacts, the junctions will terminate upon second selectors at the distant end. Fig. 1 is a schematic representation of one of the exchanges. For convenience, the separate exchanges have been referred to as A, B, C, D, E, F and G. The numbers allocated to the exchanges are :-

Exchange A	...	...	80,000 to 89,999
„ B	...	...	20,000 to 29,999
„ C	...	...	30,000 to 39,999
„ D	...	...	40,000 to 49,999
„ E	...	...	50,000 to 59,999
„ F	...	...	60,000 to 69,999
„ G	...	...	70,000 to 79,999

The figure shows the allocation of the levels in exchange A; the allocation of the levels at exchange B will be :-

Level 2.	Local second selectors in exchange B.
„ 3.	Junctions to second selectors in exchange C.
„ 4.	„ „ „ „ „ „ D.
„ 5.	„ „ „ „ „ „ E.
„ 6.	„ „ „ „ „ „ F.
„ 7.	„ „ „ „ „ „ G.
„ 8.	„ „ „ „ „ „ A.

The reader will probably find it interesting to construct for himself the level allocation in exchanges C, D, E, F and G.

Levels 9 and 10 (0) of first selectors at each exchange will be connected to circuits to manual positions, either centralised or local, for the special services provided via those levels.

Traffic from manual boards to the automatic exchanges is routed over junction circuits from the jack field to selectors in the auto-exchanges. It is usual for these circuits to terminate upon selectors in the penultimate rank; in the case referred to, on third selectors. A calling device is necessary on the manual positions concerned, from which the required digits are dialled.

Fig. 2 shows a typical distribution, from which the services mentioned will be seen.

The rigid association of numbering and routing is clearly exemplified in the foregoing. It follows that each subscriber in the area has a different number and the generally accepted significance of exchange names disappears. It is also clear that in the event of the replacement of a manual system by an automatic system, changing of subscribers' numbers is unavoidable.

Having established that in a 100,000 line area, each first selector level gives access to 10,000 lines, the manipulation of numbers and exchanges does not present difficulty. For example, Fig. 3 shows that ten different 1,000-line exchanges can be reached from a first selector level, the second level has been chosen, thus the numbers available are 20,000 to 29,999. The bank contacts of the level are connected to a separate group of second selectors, from the levels of which junctions to the ten exchanges are connected. The junctions terminate at the distant exchanges on third selectors. It will be clear that by interposing a third selector between the second selector levels and the junctions, one hundred 100-line exchanges can be reached from the first selector level, in which case the junctions will terminate on final selectors at the distant exchange, but in order to provide full intercommunication with such an arrangement, direct junctions between, and 1st, 2nd and 3rd selectors at, each exchange will be necessary.

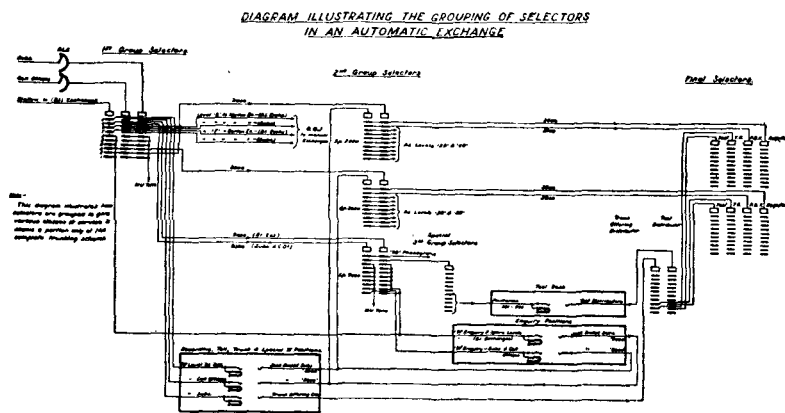


FIG 2.

It is at once obvious that such a scheme is impracticable and would not be tolerated. Before passing to the practical methods adopted, attention is again directed to Fig. 1 and Fig. 3 from which it will be seen that "repeaters" are associated with junction circuits connected to bank contacts. It will be recalled that in the switching scheme standardised by the Post Office, the private wire of switch circuits is extended at each switching point in the connecting chain and the control of all switches is finally vested in the final selector, which passes back the necessary earth (positive) connexion. This feature is frequently referred to as "forward holding." The expression "repeaters" will probably be replaced by "junction relay set."

When the chain of switches is completed via a junction, different conditions prevail, because the private wire is not extended when the

junction is reached, as the junction consists of two wires only, hence the switches preceding the junction must be "held" by special means provided in the "repeater." Other facilities normally provided from the final selector must also be given from the repeater such as:— preservation of signalling conditions (lamp flash, metering, &c.) and the provision of a transmission bridge (talking current) for the calling party; in addition the repetition of impulses over the junction takes place at the repeater.

In the development of a multi-exchange area, the question of the economic provision of small exchanges on an automatic basis is of the first importance.

Under practical conditions, the small exchange is made dependent upon a larger exchange for routing of calls, thus making unnecessary, direct junctions to the remainder of the exchanges in the fee area (it is extremely unlikely that direct junctions would be justifiable on the score of traffic). A reduction in the number of ranks of selectors is possible, while full intercommunication is given in the standard manner. An exchange that is dependent upon a dominating exchange becomes a satellite*, and it will depend in the main, upon the ratio of local to junction traffic as to the particular scheme of grouping that is applied.

Fig. 4 shows two schemes of satellite working. In the simple case, the satellite forms part of a four digit area, but only line switches (marked JF—junction finder) and final selectors are necessary. Junctions from the banks of the line switch are terminated on first selectors in the main exchange, (the main exchange is often referred to as the "parent") junctions incoming to the satellite exchange are associated with second selector levels at the main exchange and terminate on final selectors at the satellite, repeaters will be necessary in both outgoing and incoming junctions for the reasons already given. With this scheme, local calls on the satellite exchange require the use of two junctions, but other calls are routed via the main exchange and thus make use of the junction circuits provided for the main exchange. Therefore as an offset to the saving of 1st and 2nd selectors at the satellite, there is the use of two junctions for every local conversation. If the number of local calls is few, the arrangement is quite satisfactory and provided the conditions are not likely to alter, the scheme is a sound practical solution.

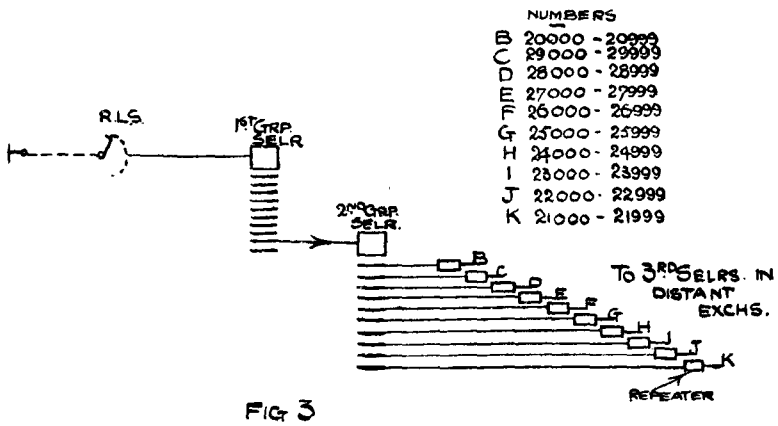


FIG 3

If, on the other hand, the number of local calls is such to prevent the economic application of the foregoing arrangement, a modification is introduced at the satellite exchange. A special type of selector is fitted, known as a switching selector repeater; this apparatus functions either as a selector or a repeater dependent upon the destination of a call. If a call is local, the repeater function is dispensed with early in the setting up of the call. If a junction

* The B.E.S.A. definition of a satellite exchange is "An automatic exchange where the lifting of the receiver by a subscriber takes possession of an outgoing junction to another automatic exchange. The incoming traffic may be received from one or more exchanges."

call is involved, the selector function is dispensed with at an early stage. Thus discrimination between two classes of call is made possible. In one well-known system the same features are provided by means of two separate units—a repeater and a selector—which may be combined or separated according to the destination of the call, and in a later scheme suggested as a standard, features of both are incorporated. In each case, however, the principle of discrimination is substantially the same.

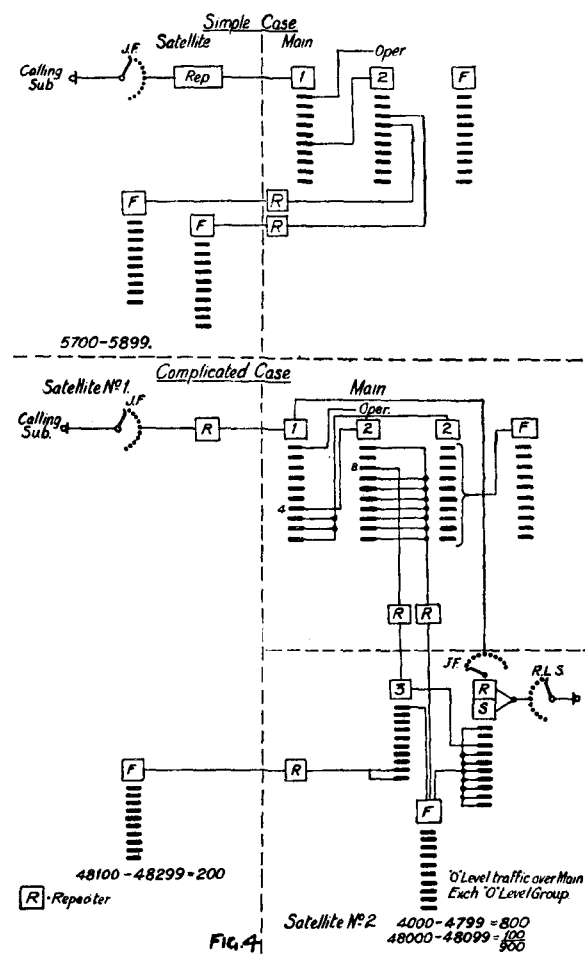


FIG. 4

The application of the discriminating scheme may be seen from Fig. 4 which shows two satellite exchanges and a main exchange. Traffic from satellite No. 1 is routed via the main exchange direct and local calls pass through satellite No. 2 to final selectors in satellite No. 1. Although the main numbering scheme is on a four figure basis, the numbers allocated to satellite No. 1 are on a five figure basis, thus 3rd selectors are necessary at satellite No. 2. As, however, satellite No. 1 is a very small exchange, the amount of local traffic will not be large, and consequently a few 3rd selectors only will be required, with the result that the use of four digit numbers is not restricted and may be fully used where the traffic is heaviest. In the scheme shown, three junctions are involved per local call on satellite No. 1. Satellite No. 2 is a comparatively large exchange, and in order to cater for ultimate requirements 100 of the numbers are on a five figure basis, but as 3rd selectors are required for the purpose already mentioned, special rack provision is unnecessary. Switching selector repeaters are provided at satellite No. 2, and the digit individual to both satellite exchanges is 4. This digit is thus the discriminating digit. The general operating scheme is as follows:—

Assume that a local call on satellite exchange No. 2 is concerned, the calling subscriber upon removing the receiver will seize both a switching selector repeater and a junction (via the junction finder

JF) to the main exchange, the junction terminates on a first selector. Dialling the digit 4 will cause *both* switches to respond and the wipers will rise to the 4th level in each case. The switching selector repeater releases but is still held, the main exchange selector extends to a second selector. The switching selector repeater has therefore functioned as a first selector, and as discrimination is arranged on the 4th level, the circuit has been prepared so that the switch will function as a second selector with the dialling of the next digit. Thus when the next digit is dialled, the wipers of the switching selector repeater again rise. Also the wipers of the second selector in the main exchange rise, but immediately the wipers of the switching selector repeater enter the level and extend either to a 3rd selector or final selector, the junction to and the switches in the main exchange are released, having been held only for the short period of time up to the dialling of the second digit. If the second digit is 8, the call will be extended to a 3rd selector, the third digit will then determine the destination of the call, i.e. third digit 0 the call will be routed to final selectors in satellite exchange No. 2, third digit 1 or 2, the call will be routed to final selectors in satellite exchange No. 1. If the second digit be 0, 1, 2, 3, 4, 5, 6, or 7, the call will be extended to final selectors in satellite exchange No. 2.

In the event of the first digit being other than 4, the switching selector repeater and the main exchange first selector both respond to the digit dialled, the switching selector repeater releases, and as discrimination is not arranged on the level reached, the circuit is prepared for extension to the main exchange, and when the second digit is dialled, the switching selector repeater again responds, but the wipers remain disconnected and the apparatus functions as a repeater only.

If the transmission standard of the junctions to the main exchange is unsuitable for outer area and toll traffic and cannot therefore be extended to the main exchange 0 level circuits, junctions of the required standard are accommodated on the 0 level of the local switching selector repeaters and terminate direct on the manual board. In such cases, the use of 0 as the second digit for subscribers' numbers is precluded.

The routing of local calls on satellite exchange No. 1 will be clear from the fig., also calls from satellite No. 1 to satellite No. 2.

Calls from satellite No. 2 to satellite No. 1 will be routed in the manner indicated previously.

(To be continued).

REVIEWS.

"*Navigational Wireless.*" By S. H. Long, D.Sc., M.I.E.E. (Published by Chapman & Hall, Ltd., 11, Henrietta Street, W.C.2. xi + 164 pp. Price 12s. 6d. net.)

The application of the directive properties of certain aerial systems to navigation is, in its practicable form, one of the latest developments of wireless telegraphy, but it is by no means the least important. Up-to-date information on the subject, however, has to be sought in the proceedings of the various wireless societies or in the technical press, and for those who go down to the sea in ships, whether on the bridge or in the wireless cabin, these sources of information are practically closed. The present book is an attempt to remedy this state of affairs, as far as single-frame direction-finding apparatus is concerned.

After two introductory chapters dealing with general electrical principles and the use of valves, a chapter is given dealing with the principles of direction finding which are applicable to any system.

This is followed by a chapter containing a résumé of the various systems in use, but with special attention paid to the Siemens' single-frame system. The fifth chapter deals with the installation of a single frame system on shipboard, with instructions for operating the Siemens' direction finder.

In the next chapter are discussed the various causes of error in the bearings given by directional apparatus, with methods for checking and allowing for such errors.

The seventh chapter deals with maps, and the eighth and ninth with the application of direction finding to practical navigation.

In the tenth chapter certain causes of error not dealt with in Chapter VI are considered, and the concluding chapter deals with beacon stations, sound signalling and echo-sounding devices.

Appendices are given dealing with the care and maintenance of accumulators, a graphical method of determining the "half-convergency" to be applied in given circumstances to adjust an observed great circle bearing for use on a Mercator chart, some useful notes on plane and spherical trigonometry and a graphical method of determining and allowing for the parallax errors which may occur when a direction-finding station is being calibrated by visual observations.

The book is well printed, the diagrams are clear, and the reproductions of photographs of apparatus are excellent. It should be of great assistance to all those concerned with the type of direction-finding apparatus with which it particularly deals.

"*Electrical Engineering Practice*": Volume II. Meares and Neale. 4th Edition. (Chapman & Hall, Ltd. 25s. net.)

The second volume of this book, which has now reached its fourth edition, has been brought up to date, rewritten and enlarged, deals with the transformation, conversion and storage of electricity systems of supply, wiring systems, lighting, heating, welding and cutting.

The aim of the authors has been not to provide a highly technical book but a good general book for the practising electrical engineer. With this end in view the simplest methods of treating various problems have been followed and copious illustrations with full descriptions have been provided, while useful information is given as to the relative efficiencies and costs of various types of plant.

The chapters on transformation and conversion deal fully with all types of converting and transforming plant from the motor converter, static transformer, thermionic valve, down to the crystal; a useful chapter is provided dealing with the installation and maintenance of secondary cells.

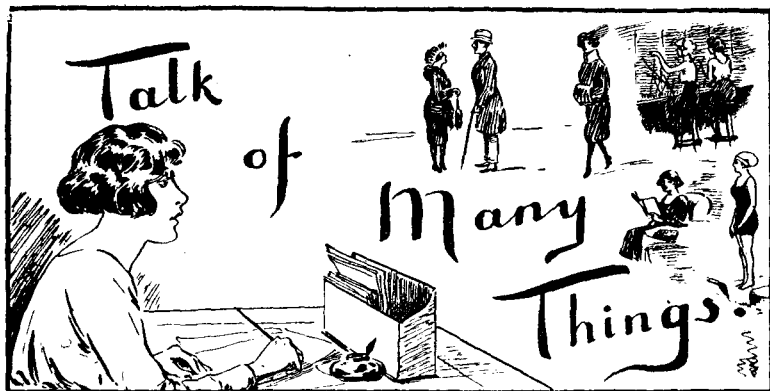
Useful information is given for the mains engineer and in connexion with the wiring of buildings for lighting and power, and the design of illuminating systems, while the chapter on heating deals with domestic heating and with furnaces for electro-metalurgical and other industrial processes, the information on these and on welding, &c., being essentially practical.

A bibliography is appended to each chapter which includes references to official regulations and standardisation reports. Extracts from the I.E.E. Rules are included conveniently in the various chapters on the plant to which they refer.

The volume can be recommended as a good and practical reference book, the information given on the subject included being very much fuller than that given in the usual pocket or year books but at the same time it is so arranged as to be as easily accessible.

J. McG.

WE TELEPHONISTS



A Moth-Eaten Fragment.

BERTIE is one of the best. There are, of course, Berties and Berties, but none quite like *the* Bertie. It is difficult to explain what there is about my friend Bertie which makes him different from and better than any and all the other Berties, but there it is and there you are. He and I have known each other since our rattle and bottle days. We ran neck and neck in school and shoulder to shoulder out of school. From our dawn we have played and worked, eaten and drunk, lodged and tramped, sighed and laughed together. I helped him to write his first (and unavailing) love-letter. He has a heart like a crock of gold and a hand-grip like that of a dentist. By-the-way, have you ever shaken hands with a dentist? If not, don't—they're quite good fellows, of course, but—well, don't! To return to Bertie—you probably wonder (with a yawn) why I ever started to tell you about him. I know it's always frightfully boring to hear about paragons and to be treated to copious extracts from the lives of the saints. It is necessary, however, in order that you may appreciate our relationship—a regular right-down David and Jonathan partnership in which the concerns of each are common property.

Recently I dropped in to see Bertie. He was shelling the winkles for Sunday's tea, but I perceived at once that "something was up." He was distinctly blue and full of gloom. He was not shelling with his customary gay abandon; his sparkle of wit was absent and no quip fell from his lips. There was no graceful flourish of the nut-crackers as he evicted the succulent mollusc. He was performing his task in a joyless manner and his distraction was such that ever and anon he would drop a nude winkle amongst the spent shells, or vice versa. You know what it's like when you drop a pea amongst the empty pods—how you dive and how the elusive little pellet burrows to the very bottom of the basin. Well, to capture a missorted winkle is even more tiresome. "Hullo," I said, "how do; have a good holiday?" He looked at me with the air of a man who thinks to-morrow is pay-day and then finds that his calendar is fast. "So so," he said, "but things have occurred which have taken the sun out of life. I have had a bitter blow." He paused and then said fiercely "Look at me, and tell me what I look like." "Bertie," I said gently, "even between friends that's not a fair question. Unburden your soul to me." "Yes," he said, "I will, but it's a sad tale"; and fingering a shell nervously and absently he told me.

It appears that while on leave he met a man and they struck up a holiday acquaintance. They sought each other's company and walked and talked together. "He seemed to be quite a decent sort," said Bertie. Then one day conversation turned citywards and the fellow said to Bertie: "Are you a civil servant?" "Yes," said Bertie, modestly, "how did you guess?" "Oh, I don't know, er—well, you just looked like one." Here Bertie groaned. "Ye gods," he said to me, "has it come to that? Do I look the part? Has the machine left its mark upon me? What does a typical civil servant look like—is he fat and ponderous, solemn and precise, dignified and pedantic? Does he look like a cabbage or a caterpillar? Is the mark of the beast upon me. Do I—he shouted—really look like a civil servant?"

I stole away silently, for the tears of a strong man—and that man your friend—are harder to bear than a drop in the bonus. For once I could not comfort him, because in truth, he must, to the unseeing and unsympathetic eye, appear portly and respectable. Even I have lamented his adoption of tortoiseshell and spats and a tail-coat, but I know what is behind his ample shirt-front—just Bertie, frayed but unafraid.

PERCY FLAGE.

Left over from "The Eclipse."

1.

If you're waking, call me early,
Call me early, Mother dear:
For I must go to view the show,
From the roof or somewhere near.

I have a piece of coloured glass,
So at the break of day,
If you'll call me early, Mother,
To the roof I'll wend my way.

2.

And all the neighbours, Mother,
Perchance will rise as well
To see a sight unequalled quite,
Or so I have heard tell.
And some will hie to Hampstead Heath
To see it there, they say:
So call me early, Mother,
Upon this joyous day.

3.

I rose at four, dear Mother,
To have an early view,
I seized my mack and foot mitts
And my goloshes, too.
And with my piece of coloured glass
I went out in the rain
To see that wonderful eclipse
That I won't see again.

4.

For two hours, Mother, in the damp
I gazed with anxious eyes.
And every minute hoped to see
That wonder in the skies.
I tarried still, dear Mother,
Long past the break of day,
But nothing did I see, Mother,
No gleam, no cheering ray.

5.

And now to-day, dear Mother,
I suffer grief and pain.
An awful cough came on at dawn,
Caused by the mist and rain.
My voice is weak, dear Mother,
My temp. is ninety-nine —
In 1997, Mother
I hope we'll have it fine!

D. D., Central.

To Mr. Flage:

An Appreciation.

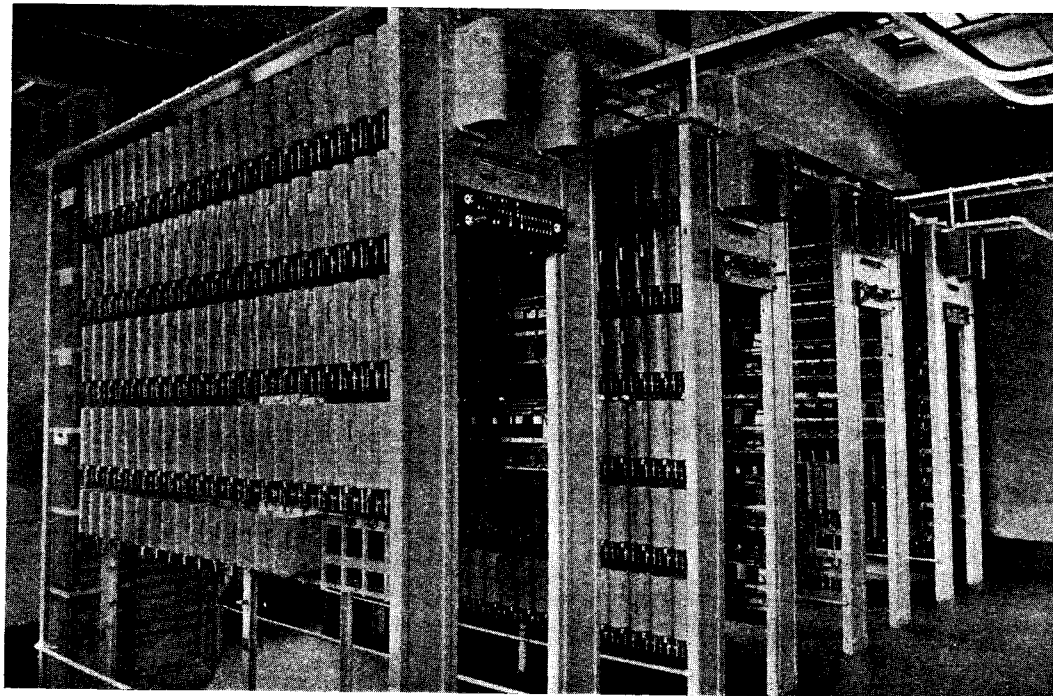
Dear Mr. Flage, your words so sage
We follow on the ladies' page.
They always fill us with delight,
And make us feel so gay and bright.
There's such a tonic in your tone,
We cease to grumble and to moan;
And when the journal first comes out
We fly to you without a doubt,
For not a moment do we lose
Your cheery message to peruse.
Now, Mr. Flage, just tell us this—
Are you a "Sir" or just a "Miss,"
For we with safety can assume
You write beneath a *nom-de-plume*.
And now we'll have a score of guesses—
Do you deal with T.O.S.'s?
Or do you just deal with accounts
And total up the Subs' amounts?
An awful thought has just struck me
Perhaps you are the P.M.G.!
And now we'll try a new direction
Perchance you're in the Service Section—
Whate'er your office, Mr. Flage
You're welcome on the ladies' page!

D. D., Central.

Contributions to this column should be addressed: THE EDITRESS,
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Economy Maintenance.



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Automatic Electric Inc.

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

TELEPHONE EQUIPMENT

The Telegraph and Telephone Journal.

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

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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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No. 150.

THE "LATE LAMENTED."

OUR contemporary *Electricity*, in the course of some criticisms of telephone rates, advocates a return to the flat rate system of payment for residence connexions and makes the following singular remark: "Whilst the telephones are out of use they are simply eating their heads off, representing so much idle plant. It is the interest on this capital outlay which we are paying, without having the benefit of unlimited use of the means provided. The nimble penny we are charged up every time we use the phone goes towards operators' services, &c." This last sentence rather understates the case. The penny not only "goes towards" but represents the cost of operating the call, and this charge is based upon the very careful investigations of a departmental enquiry. A similar conclusion as to operating costs was arrived at in a thoroughgoing enquiry into the basis of the telephone rates to be adopted recently undertaken by the German Post Office. If, therefore, the subscriber "does not think twice before using the telephone, knowing full well that it will cost him no more whether he uses it once or 100 times," and if he is paying, say, 4d. a day for calls which it will cost the Administration anything between a penny and eight shillings to effectuate in operating charges alone, the economic beauties of the scheme will be obvious—especially to the subscriber. (We instance 4d. because it is about one day's proportion of the present quarterly London residence rate, but we gather that even this must be considered as high!) The writer certainly goes on to say that operators'

services will be largely replaced by mechanism in the near future. But it must be remembered that it will be long before automatic working actually preponderates in any large telephone system in the world, and in any case it is unlikely that a heavily loaded automatic system will be as cheap to maintain as one on which the calling rate is moderate. For one thing, since the number of line units is based on traffic, a greater number of selectors would be necessary; but, apart from this consideration, the human element is not altogether eliminated from the automatic system, and must needs enter more largely into the working costs the more the calling rate at the exchange is increased.

But still another objection to the flat rate has to be considered. The reckless making of calls because they involve no additional cost to the subscriber was the most fruitful source of engaged lines—of calls, that is to say, set up by the Administration with no advantage to themselves or to the subscriber, involving needless exasperation and waste of time and money. All Administrations which have abolished the flat rate bear witness to the resultant decrease of the "line engaged" trouble.

"Radical reforms are necessary," says our critic, "if we are not to become the most backward nation in the use of the telephone." Whatever reforms are in store, we venture to prophesy that they will not be in the direction of a reintroduction of the flat rate. It has been practically abolished in the largest and most efficiently telephoned American cities. Chicago, Cleveland and Detroit are 100% message rate; New York, Baltimore, Los Angeles, Washington and Pittsburgh about 99%; Philadelphia, San Francisco and Buffalo 97-98 and Boston 96. Germany, Switzerland, Belgium, and Australia have abolished the flat rate entirely, France has abolished it in all the large cities. Telephone Administrations which have once got rid of the bugbear of the unlimited rate, with its inequity of favouring the large user at the expense of the small user, are little likely to revert to it. It has been universally condemned by administrative experts as economically unsound.

HIC ET UBIQUE.

MR. W. T. LEECH has been appointed Director of Telegraphs and Telephones, in place of Mr. R. A. Dalzell, retired, and Mr. F. H. S. GRANT has been appointed Assistant Secretary. We offer both of them our sincere congratulations.

New York has now 33 of its exchanges converted to automatic working, and more than 380,000, or about a quarter, of its 1,500,000 telephones are now operated by machine switching.

At a recent meeting, presided over by Signor Marinetti, the futurist poet, Signor Azari referred to such inventions as calculagraphs and automatic telephones which could almost think with brains of steel. He predicted a future where all animal labour would be performed by machinery, and looked forward to cities adorned by no "useless garbage of trees and flowers, or defiled by the loathsome promiscuity of animals, "but where there would be geometrical buildings of glass and armed cement, and above all, machines, machines, machines!" He also asserted

that machines possessed sensibility and susceptibility in a marked degree. Although it cannot be denied that all machines possess a rudimentary soul, there are brutes who ignore the fact and treat the poor things in a most heartless manner. "Some exceptionally bad cases," exclaims Signor Azari, "have often made my heart bleed!" Hence the necessity of a society for the protection of these ill-treated machines. They must be treated with kindness, for they often refused to respond to the handling of the antipathetic.

KINDNESS TO MACHINES.

Be kind to dumb machines; in marked degree
They have susceptibilities unheard of.
An over-driven bicycle may be
Distraught by woes you never hear a word of.

Engines, automatic, are found to be
Amenable to kindness—never hoax them.
Calculagraphs will multiply by three,
Or even more, with gusto, if you coax them.

Treat, then, with suave consideration gear
Of every sort—valve, cylinder and piston.
Nay, is the dropping of a kindly tear
On a hot bearing too much to insist on?

Kick not a locomotive in the boiler.
You should not thus *disipere in loco*.
Honour the iron horse, that willing toiler
Who needs no spurring but runs *con fuoco*.

Think of your wireless set. Perchance it has
Leanings towards Scarlatti, Bach or Schumann.
Burden it not with floods of senseless jazz,
Do as it would be done by, and be human.

The automatic telephone, which thinks
With brains of steel almost and knows not slumber,
Treat it as kindly as you would the mix
Who gives you (so the legend goes) wrong number.

If you give *her* wrong numbers, you may curse
Yourself, or the telephonist, at leisure;
But if you dial wrongly, and fare worse,
Vent not on the dumb robot your displeasure.

Feelings it has, and in your hour of need
Kindness alone, not cursing, will avail you.
If you're unsympathetic, ah! take heed
Lest an insulted pre-selector fail you!

W. H. G.

TELEPHONES AT THE END OF 1926.

INFORMATION is now to hand of the telephone development at the end of 1926 of the principal telephone-using countries—with the exception of Canada. It is as follows:—

	No. of Telephones.	Inhabitants per Telephone.
United States ...	17,746,252	6.4
Germany ...	2,685,495	22
Great Britain ...	1,510,775	29
Canada (end of 1925) ...	1,144,095	8
France ...	822,870	47.5
Japan ...	636,727	94
Sweden ...	450,646	13.4
Australia ...	424,442	14
Denmark ...	315,894	10.4

No other country has over 300,000 telephones.

THE ELIMINATION OF THE EFFECTS OF ATMOSPHERICS IN WIRELESS TELEGRAPHY BY THE SYSTEM "BAUDOT-VERDAN."

By E. PHILLIPS (CABLE ROOM).

ONE of the greatest obstacles to high-speed wireless telegraphy is the presence of atmospheric. These cause errors, render repetitions necessary, and frequently bring about a complete cessation of work. As it is not possible to remove the cause of these phenomena, means have been sought to overcome their effects. None, however, had met with much success until the genius of a French telegraph engineer, M. Ch. Verdan, of Strasbourg, evolved an apparatus, the trial of which has certainly shown very good results. The inventor has adapted his apparatus to work in conjunction with the Baudot, thus utilising the advantages provided by that system for speedy, secret, long-distance wireless telegraphy throughout the world.

M. Verdan has been working at the perfection of his system for some years, the first distance trials being made between Nice and Ajaccio (Corsica), in 1925. These proved the practicability of the system. The next tests were made between the Eiffel Tower and Toulon, and after the apparatus had been modified in the light of the experience thus gained, long-distance trials were made between the wireless stations at Croix-d-hins (Bordeaux) and Tananarive (Madagascar). The results of these were such as to further demonstrate the soundness of the system, and M. Verdan is at present engaged on the installation of further improvements. The "Verdan" apparatus has been described by M. Lucien Fournier in the February number of *La Science et la Vie*, and I am much indebted to that journal for the illustrations. A detailed description of the principle and the earlier trials was given by M. Edouard Montoriol, in the *Annales des Postes, Télégraphes et Téléphones* of July, 1925.

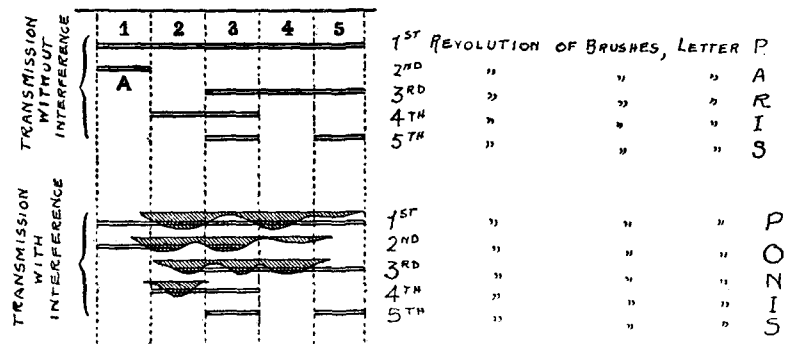


FIG. 1.—SHOWING HOW THE WORD "PARIS" MAY BE MUTILATED IN TRANSMISSION BY ATMOSPHERICS.

The Baudot apparatus itself is now so well known that a description of that system is unnecessary. When trials showed that the application of the ordinary Baudot apparatus to wireless telegraphy was unsafe and uncertain, M. Verdan conceived the idea of a method whereby a signal could at will be automatically transmitted three times and received three times, yet only the last transmission would reach the printing portion of the apparatus, any interference by atmospheric being eliminated during the repetitions. Fig. 1 shows the effect of atmospheric on a plain transmission. Atmospheric will not, of course, affect a transmission if a marking signal is being sent at the moment it appears, but if such atmospheric appears as the brush of the distributor is passing over a segment on which no marking current is being received, it will act as a marking current, and cause a false series of signals to be stored, and, if not eliminated, a false letter would be printed.

It is not always necessary to repeat the signals sent. When atmospheric are absent, or in so small quantity as to be negligible, the signals are sent only once, and the apparatus can then function as an ordinary Triple Baudot installation (three channels). When atmospheric are more numerous, one repetition may suffice; while, when they become so numerous as to stop any other method of working, the two repetitions can be given, and a "clean" slip ensured. The change-over is made by means of a switch.

We will now consider the means whereby the process of elimination is carried out. The apparatus is shown in Fig. 2. It is disposed in four groups, and driven by a motor. Two of these groups compose the "control," providing means whereby the sending telegraphist may check the signals he is sending out; the other two form the receptive agents, and act only under the influence of the currents received from the distant station. The two groups are independent of each other, and the "control" sets may therefore be used merely for local transmission, practice, or regulating.

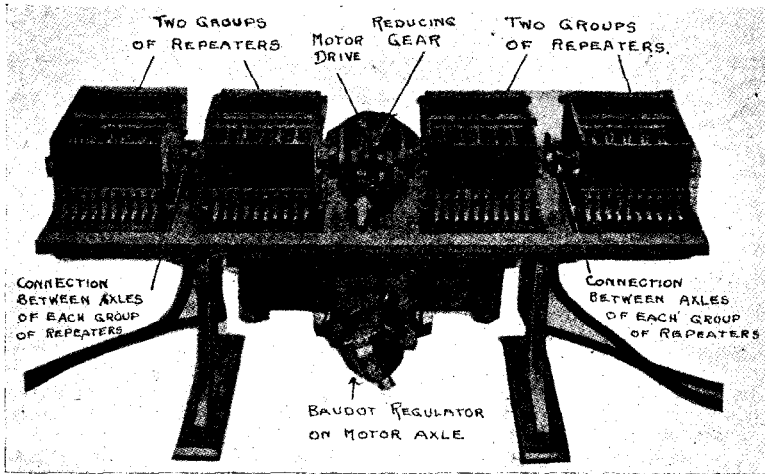


FIG. 2.—VIEW OF A "VERDAN" INSTALLATION FOR THE ELIMINATION OF ATMOSPHERICS.

It is to be emphasised that the repetitions are only of currents and not the letters themselves. Neither the first emission of the signals composing the letter T, for instance, nor its first repetition, reach the electro-magnets of the printing apparatus. It is only the final repetition which reaches the electro-magnets of the traducteur and actuates them in such a manner as to cause the printing of the letter on the paper band. A letter, or a word, or a message is therefore received only once, and that may be as much as four seconds after it has left the transmitting key of the distant station.

Atmospherics, therefore, however numerous they may be, are unable to affect the receiving apparatus. In order to have any effect, they must have a duration of four seconds, or they must appear twice at two-second intervals, at the time when the brushes are passing over a segment on which there is no marking current. The probability of such a happening, calculated on the experience of the trials, is only once in a hundred thousand. Thus it may be said that the actual Baudot receiving apparatus is all but perfectly protected from their influence.

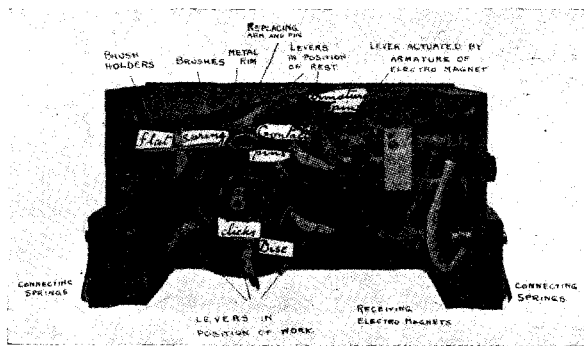


FIG. 3.—INTERIOR OF CASE OF "VERDAN" REPEATER.

Fig. 3 is an illustration of the apparatus by which this result is achieved, and Fig. 4 shows the plan. In Fig. 4, B is the electro-magnet, through the coils of which the transmitted or received current flows to earth. E is the armature, pivoted at one end, and provided with a catch at its centre. In the position of rest this catch engages with a notch at the end of the lever, L, which is pivoted at Z and has its movement limited by the screw, V. L is furnished with a pin at P. R is a disc of non-conductive material, mounted, with four others, on an axle driven by an electric motor—see Fig. 2. These discs turn in a clockwise direction, six times slower than the distributor, that is, they make 30 revolutions a minute, or one revolution in two seconds. The disc, R (Figs. 3 and 4), is fitted with a metal rim continuously in contact with a brush, A (Fig. 4), and electrically connected to the axles, O, of each of the levers, D. These levers are capable of turning from left to right about their axles, under the action of a spring placed on the reverse side of the disc, R, the movement being limited by the pin, G. The position of rest of the lever is as shown at D. This lever carries on its inner extremity a pin, H, the function of which is shown later. The outer extremity of the lever has a notch, T, into which the pin, P, of the lever, L, engages when the armature, E, is attracted and L is consequently released. Below each lever, D, is a click, F, held by a small spring. The interior extremity of the lever, D, engages in this click when the notch, T, engages with the pin, P, and the lever is forced to move in a reverse direction to that of the disc. The lever will then remain in the

position D' during the rotation of the disc, but when it reaches the upper part again, the pin, H, makes contact with the upper surface of the flat spring, "S," which is terminated by a curved portion as shown. This flat spring is connected to the local battery (see Figs. 5 and 6), so a current is transmitted via the pin, the axle of the lever and the metal rim to the brush, and thence to another electro-magnet, B, in the neighbouring box, or to the electro-magnet of the printing apparatus, according to the stage of the repetition. At the transmitting station a current is also sent into the aerial. When this position has been reached by the lever, D, it is released from the working position by the action of the arm, M, which meets the arm, N, on the reverse face of the disc. This is mechanically connected with the click, F, and causes it to release the lever, which falls forward into the position of rest.

The connexions of the sending and receiving diagrams should now be studied (Figs. 5 and 6). The electro-magnets, B, are connected to segments 6 to 15 of Ring 1, which is connected by the brush arm to the continuous Ring 4. Segments 1 to 5 are connected to the electro-magnets of the receiver, or local record.

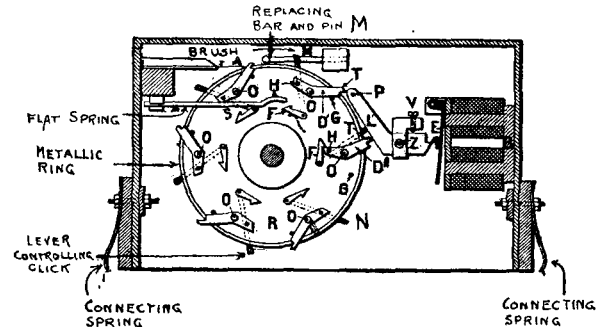


FIG. 4.—PLAN OF "VERDAN" REPEATER.

Ring 5, unsegmented, is connected, at the sending station, to two relays in parallel. The armature of one of these relays is connected with the aerial, and when it is attracted to the marking side, a path is provided for a current from a local battery into the aerial system. The armature of the second relay is connected to Ring 4, and makes connexion for the storage of the signals and their repetition and printing (Fig. 5).

In Fig. 6, Ring 5 at the receiving station is connected to the armature of the receiving relay. When this has been attracted to the marking position by the passage of a current, suitably magnified, from the aerial, a path is provided for a current from the local battery via the segmented Ring 2, and brushes, to unsegmented Ring 5, armature of relay, left-hand contact of relay, to Ring 4, by brush to segmented Ring 1, and so to the corresponding electro-magnet, B, either of the Retarder, or of the printing apparatus.

The manner in which a "parasite" is eliminated can now be seen.

Assume that the transmitting station (Fig. 5) is transmitting the letter G. For this letter keys 2 and 4 are depressed, marking currents being sent from segments 12 and 14, and spacing currents from segments 11, 13 and 15.

At the receiving station (Fig. 6) the relay should be actuated only as the brushes are passing over segments 12 and 14, on Rings 2 and 1, as the two stations are running in synchronism. The electro-magnets, B, corresponding to these segments, in the first group of retarders, are actuated, and the levers, D, are raised to the working position and held by the clicks, F (Fig. 4). Two

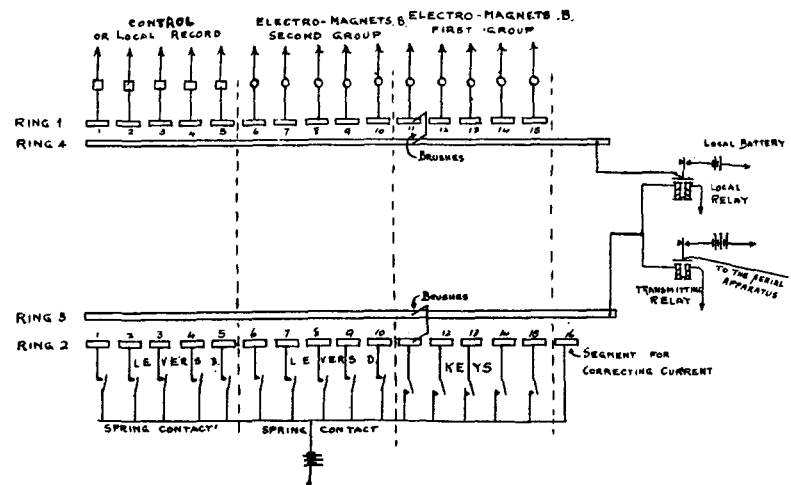


FIG. 5.—DIAGRAM OF TRANSMITTING ARRANGEMENT

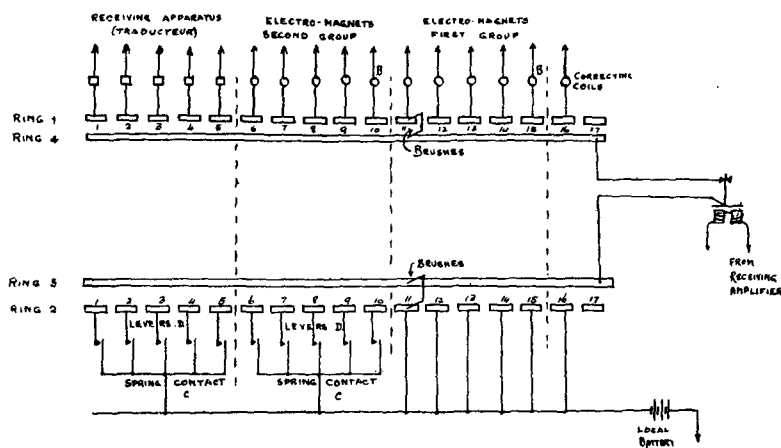


FIG. 6 DIAGRAM OF RECEIVING ARRANGEMENT

FROM 'LA SCIENCE ET LA VIE

seconds later the levers reach the upper portion of the discs, and their pins make contact with the flat spring, S, closing the contacts, C. A similar sequence of movements has taken place at the sending end, and the closing of the contacts coincides with the reception of a repeated current in the coils of the relay. A path is thus provided for a current from the local battery through the appropriate segments 7 and 9 of Ring 2 by the brushes to Ring 5, armature and stop of relay to Ring 4, brushes to Ring 1, and so to the electro-magnets of the second group of retarders. Two seconds later still a similar thing happens, except that the currents are repeated into the electro-magnets, 2 and 4, of the traducteur, causing the printing of the required letter.

If a "parasite," or atmospheric, makes its appearance, say, while the brush is passing over segment 1 at the first time of reception, it passes through the electro-magnet joined to this segment and causes it to bring a lever into the marking position, thus storing the letter H. But when the contact with the flat spring is made by means of this lever, the armature of the relay is still in the spacing position, as no marking current was sent from the distant station (unless another parasite has made its appearance at that moment), and consequently there is no path for the current. The lever is then replaced by the action of the instrument, and the signals from segments 12 and 14 only are passed to group 2. Even if it does happen that the atmospheric arrives at the moment when the brush is on segment 6, thus causing an extra to be stored in the second group, another atmospheric must appear as the brush is passing over segment 1, in order that a false letter may be printed. This contingency is extremely remote.

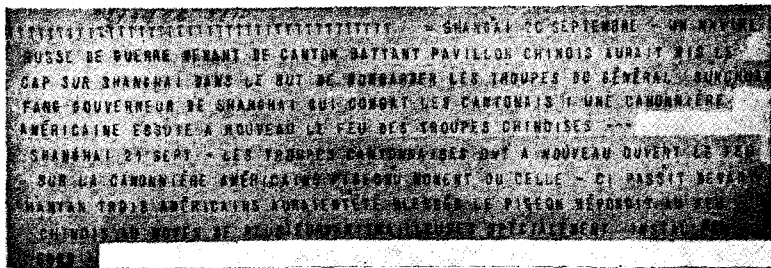


FIG. 7.—REPRODUCTION OF MESSAGE RECEIVED FROM MADAGASCAR BY "BAUDOT-VERDAN."

Fig. 7 is a reproduction of a message received in Madagascar from the Bordeaux station by means of the "Baudot-Verdan." The sequence of T's at the beginning shows that the instrument is correctly regulated. There are some errors, but none are due to "parasites." In line 1, "h" was omitted from "Shanghai" by the sending telegraphist. On the 7th line "Pigeon" instead of "Pigeon au"; and later "Passit" for "Passait" are due to the non-functioning of the receiving relay owing to the weak currents received. A similar fault is found in the next line.

The wavelength used was 17,000 metres.

Two further examples of the working of this apparatus may be cited. M. Montoroli, in his description of the trials between Nice and Ajaccio, says that on one occasion Ajaccio was asked to send a long string of G's (this combination being made up of keys 2 and 4, leaving the first, third, and fifth contacts open to "parasites," which were numerous that day), and at the same time, in the "Baudot-Verdan," a series of automatic Morse signals were sent.

The receiving "Baudot-Verdan" had thus to deal with two causes of interruption, but, out of 1,710 "G's" that were sent, only 13 were altered, or 0.76%.

In the Madagascar trials, M. Verdan states that telegrams have been safely received by this apparatus even at times when aural reception was impossible owing to atmospheric.

In view of these remarkable results, we may possibly agree with the optimistic conclusion reached by M. Fournier. "Henceforth," he says, "wireless telegraphy is completely sheltered from the influence of atmospheric. It can proceed, without hindrance, to the conquest of world communication. We are here in the presence of a system of mechanical telegraphy the possibilities of which are almost unlimited, since the retardation of two seconds may be extended to an hour, to a day, or even a year: the only requirement being that the rotation of the discs of the retarders shall be so arranged as to give the repetition when required, whether it be next day or next year."

[We are indebted to *La Science et la Vie* for the plans here reproduced.—Editor.]

TELEGRAPHIC MEMORABILIA.

ARGENTINA.—From Buenos Aires, Reuter's Trade Agency informs us that the market for radio equipment shows signs of development, the value of apparatus and parts imported having exceeded by several thousand pesos that of last season. The number of receiving sets in use is estimated at 159,000, a large proportion being crystal sets. The market is described as particularly promising for valve sets and parts.

AUSTRALIA.—The *Electrical Review* states that the transmitting station at Ballan and the receiving station at Rockbank for the "beam" wireless service between Australia and Canada have been completed by the Marconi Co., and the Australian transmitter has been adjusted for communication. Early completion of the Canadian stations is awaited.

It is also announced that the coming into force of the duties upon valves for wireless telegraphy and telephony imported into Australia has been again postponed—to Jan. 1, 1928.

AUSTRIA.—*World Radio* declares that after more than a year's negotiation between the Ravag and the Provincial Government of Lower Austria it has been decided to erect the new Linz station on the Freudenberg mountains. It will probably be finished early in the autumn. Of all the provinces of Austria, only Salzburg and Vorarlberg now require stations, and probably Vorarlberg is sufficiently well served by Innsbruck to make unnecessary a station of its own on any similar scale.

From the same source we also learn that at the last meeting of the Board of the Ravag, Dr. Schwaiger submitted a bold plan for the development of Vienna broadcasting and for building a relay station at Linz. Rosenhuogel is to be provided with new transmitting plant and its power raised to 60 kw. this summer, when the engine, accumulator, and power rooms will be considerably enlarged. A studio, 90 ft. by 39 ft., will be built, in addition to two studios of the size of the present one and a third of smaller dimensions for talks, as well as rooms for testing and technical equipment. This work will involve an outlay of 12 million schilling.

BOHEMIA.—As part of the celebrations in connexion with the 700th anniversary of the establishment of the town, a radio exhibition is to be held in Leitmeritz, Bohemia, from the 4th to 12th of the present month.

BULGARIA.—The Bulgarian "Telegraphia" Co., the constituent general meeting of which was recently held in Sofia, and which will manufacture telegraph and telephone apparatus, has a capital of 5,000,000 leva (about £8,000 at current exchange). Half of this has been subscribed by the Bulgarian Government, 10% by private shareholders, and the remaining 40% by the Czecho-Slovakian "Telegraphia" Co. of Prague.

CANADA.—The Canadian National Railways, reports the *Electrical Review*, recently placed in operation the first unit of a "carrier-current" telegraph system. The introduction of the system between Montreal and Toronto increased the capacity of the single wire between these two centres eleven-fold, an improvement of service which, under the old system, would have been made possible only by eleven new wires between the two centres. "Carrier" waves, similar to those radiated from a radio broadcasting station, are sent forward along wires, instead of through the ether; the "carrier wave" itself is an alternating current of very small actual power, but of high frequency. By the use of oscillators in conjunction with condensers and coils, "carrier waves" of different frequencies are set up, the range most adapted to commercial purposes being between 3,300 and 10,000 cycles, which permits of ten different messages being transmitted over one set of wires at the same time; by the utilisation of still higher frequencies as many as thirty channels might be secured over one pair of telegraph wires. The generation of individual frequencies, which act as the carriers of the messages, is accomplished by the use of a vacuum tube in an electrically oscillating circuit, and it is necessary to impose the signals which correspond to the telegraph message on this carrier. This is done by connecting the contacts of a telegraph relay to the oscillating circuit in such a way that, when the telegraph relay contacts are opened and closed, the carrier frequency is interrupted for the duration of the telegraph signals. A number of waves of various frequencies, each with its telegraph message impressed on it, are transmitted over a single

pair of wires to the receiving station, where they are separated by means of selective circuits and passed through vacuum tube amplifiers. The "carrier" system of telegraphy is said to be virtually immune from electrical disturbances of all kinds, including ground currents. Experiments have shown that with the wire grounded uninterrupted service is possible, and even when the wire is broken the "carrier current" bridges the gap. On one occasion when the entire pole line, wires and all, were submerged for a considerable time the system worked without interruption.

It may be added that Mr. E. Yokoyama recently described the wired wireless system on the four principal e.h.p. lines in Japan, at the recent E.H.P. Congress in Paris, where Mr. L. Grant discussed the matter from the American point of view, showing the great economy even when fitting the necessary apparatus to lines of no more than 100 miles in length, and M. Dubois also described some of the latest improvements.

CZECHO-SLOVAKIA.—In order to prevent over production and undue competition in the country, the Czecho-Slovakian Ministry of Commerce recently resolved that the manufacture and sale of radio sets and apparatus in the country may only be carried on under official licence. So far 72 manufacturing and 1,030 selling licences have been issued, and it is considered that these numbers are at present sufficient to supply the demand. It is hoped, however, that the projected establishment of broadcasting stations in Karpathian Russia and Eastern Slavkia will give rise to an increasing demand.

Under the recently-signed commercial treaty between Czecho-Slovakia and Hungary, the duties upon a number of classes of goods upon importation into Czecho-Slovakia have been reduced. Among the goods affected are telegraph and signalling apparatus, small switches and fuses, &c. The reductions apply to goods of United Kingdom origin.

DENMARK.—The number of radio listeners continues to increase. During June there was an increase of 2,638 listeners, and on July 1 the aggregate number had reached 146,997.

EAST AFRICA.—The Nairobi correspondent of *The Times* states that the British East African Broadcasting Company, with a capital of which 75% has been locally subscribed, has been formed after nine months' negotiations with the Government, culminating in the issue of a licence. The chairman is Lord Delamere. It is intended to use a short wave to relay programmes from world stations. The company is also starting an "Empiradio" telegraph direct service from Nairobi to London at 30% below the Cable Company's rates.

FRANCE.—Reuter's Paris agency states that the wireless-telephone station at Lille, which is to serve Northern France, has been formally inaugurated by the Ministry of Posts and Telegraphs in the presence of the local authorities. Hitherto, although Southern France has been well provided with wireless centres at Bordeaux, Toulouse, Marseilles, Lyons, &c., the north has not.

A radio exhibition is to be held at Chambéry (Savoy) from the 17th to 25th of the present month.

GERMANY.—A powerful wireless transmitting station is at present in course of installation in Zeesen by the Telefunken Gesellschaft, of Berlin, on behalf of the German postal authorities. It will work on a wavelength of 1,250 metres.

The Munich Postal Administration, with commendable enterprise, is to allow responsible firms to erect receiving sets for prospective customers during a week as a test without the licence fee being paid, in order to allow purchasers sufficient time to satisfy themselves about the set they desire to purchase.

The healthy state of the German broadcasting industry is indicated by the number of subscribers at the end of the second quarter of this year. On June 30 there were 1,713,899 subscribers, an increase, compared with last quarter, of 78,171. Reckoning three listeners to every set licensed, about 10% of the German population may be considered to be listeners, says *World Radio*. By the end of the year it is hoped to reach the 2,000,000 figure.

The first official attempt to speak by wireless telephone from Berlin to Buenos Aires, a distance of about 7,000 miles, was made during the evening of Aug. 3, says *The Times*. Speech passed in the outward direction only, as there was no transmitter in Buenos Aires, and was uniformly good. The messages were spoken into a microphone at the Voxhaus, whence they were transmitted over land telephone lines to the Nauen wireless station, 20 miles north-west of Berlin, which radiated them by a special short-wave transmitter, of which one example has been manufactured by the Telefunken Company. The receiving station was at Villa Eliza, not far from Buenos Aires, the final stage being accomplished over the ordinary telephone lines. If the favourable results are fully confirmed, it is intended to institute a public service after proper equipment has been installed near Buenos Aires.

GREAT BRITAIN.—The Financial Editor of the *Electrical Review*, in the middle of last month, wrote the following interesting paragraph, interesting, that is to say, to students of both cable and wireless developments as indicative of the closeness with which the old and the new means of communication are being watched by investors, and the newer wakefulness of submarine cable shareholders since the success of the Beam services.

"Cable stocks are steady," recorded the writer, "the only noticeable movement being a rise of a point in Anglo-American Telegraph preferred," and, as had been previously mentioned, "Great Northern Telegraphs by £2 on top of a gain the previous week.

"The Eastern Telegraph Company has announced reduced cable rates from this country to the Union of South Africa, to take effect at once. Week-end telegrams are to cost no more than 4d. a word, that is, a fifth of the reduced ordinary telegram rate. The wireless group is quiet, with Canadian Marconis steady at 5s. 10½d. It is evident from official statements which have appeared that, although control of the Canadian Marconi is not to pass out of British hands, there has been a good deal of buying on behalf of the American Radio or other United States interests. It is announced that wireless telephony is to be established between Berlin and Buenos Aires."

In connexion with the last item regarding radio-telephonic communication between Berlin and Buenos Aires, this receives further confirmation in a *Times* paragraph. See above, under "Germany."

Committee of Inquiry into the Working of the British (Inland) Telegraphs.—On July 29 the Postmaster-General announced in the House of Commons that he was about to appoint a Committee to examine the possibility of effecting substantial economies in the working of the inland telegraph service. The Committee, accepting the scales of pay awarded by the Industrial Court, would report on what changes were necessary to extinguish or, substantially reduce, the continuing deficit on the service. The Committee would start work in the autumn and would consist of Sir Hardman Lever (chairman), Lord Ashfield, and Sir Harry McGowan. In the last four years the average loss has been £1,478,125; last year it was £1,299,214.

At the Annual Meeting of the Globe Telegraph & Trust Co., Ltd., Sir John Denison-Pender (chairman) said that the results had again been very satisfactory and they anticipated that if they obtained the same return from their investments for the current year their income would be increased by £5,000. They had accepted an offer for the purchase of their holding in the Cuba Submarine Telegraph Co. by the Direct West India Telegraph Co.; that involved a small capital loss. The Submarine Cables Trust terminated last year. The trust had paid 6% free of tax, on its certificates; those certificates were redeemed by a yearly drawing at £20 premium; and each reversionary coupon now received £153 2s. 6d. Thus that investment had proved a very good one; the company had from time to time purchased reversionary coupons and had made a profit of £116,000 in that way. The profit made had been partly re-invested in cable stocks, and it had enabled them to widen their investments by the purchase of a few telephone stocks and shares. The lease of the American Telegraph Co.'s two cables to the Western Union Telegraph Co. would terminate in 1932 and there would then be a considerable depreciation in the value of the bonds.

Parliamentary Questions, &c.—On July 11 Captain Fraser asked the Secretary of State for the Colonies if any views were expressed at the recent Colonial Conference as to the desirability of establishing in this country a wireless transmitter capable of conveying to the Colonies for redistribution the programmes of the British Broadcasting Corporation; and if the representatives indicated that their Governments would be prepared sympathetically to consider contributing towards the expenses incidental to such a service after the initiative had been taken by Great Britain.

Mr. AMERY said that it was the general view of the representatives that the institution of such a service, if found to be practicable, would be very widely appreciated overseas. While it was considered premature to ask them for an undertaking to contribute until the necessary experimental work in this country was further advanced, he did not for a moment anticipate that the dependencies would show reluctance when the time came to share the expense involved in instituting and maintaining such a service.

On July 26 Sir W. Mitchell-Thomson, Postmaster-General, informed Mr. Day that the contractors hoped to be in a position soon to hand over the stations for the Anglo-Indian beam service for the official test, but they were unable yet to fix a date.

[Memo. :—As we go to press it is announced that the official tests have been satisfactorily carried out.—Ed., *T. & T. Jnl.*]

Cable Telegraphy.—Rate Reduction.—Following on recent reductions in rates to Australia and New Zealand, and a request from the Postmaster-General of the Union of South Africa for corresponding reductions in South African rates, the Eastern Telegraph Co., Ltd., decided to reduce the telegraph rates between Britain and the Union of South Africa, from Aug. 1. Corresponding reductions will also be made for telegrams exchanged with South-West Africa, Southern and Northern Rhodesia and Nyasaland.

An all-round reduction in rates for telegrams to South America was announced on July 25 by the Commercial Cable Co. and also by the Eastern Telegraph Co., via Eastern Madeira, and the Western Union Co.

British Dominions Broadcasting Experiment.—Mr. Gerald Marcuse, the well-known amateur wireless transmitter, of Caterham, Surrey, has been given a licence by the General Post Office to enable him to broadcast regular radio programmes from this country to the Dominions. His programmes will be transmitted three nights each week from studios in the London area on a short wavelength. He expects to begin transmitting early this month.

The *Wireless Trader* states that owing to an increase in exports in June the total value of shipments of British radio apparatus for the first half of the year from these shores was only £7,784 lower than for the first half of 1926. The actual figures were: 1926, £664,304; 1927, £656,520 (including re-exports). Our principal foreign customer was Japan, which imported goods to the value of £103,181. Holland's share was valued at £35,053, while France was credited with £25,419, the United States with £25,041, Argentina with £14,402, Russia with £13,982, Portugal with £13,887, and Italy with £13,088. The largest share of all was taken by Australia (£124,950); other important Empire

customers were India (including Burma), £43,924; New Zealand, £33,022; Canada, £16,351; and the Irish Free State, £13,937.

GOLD COAST.—The Governor of the Gold Coast, in his annual address to the Legislative Council, had some interesting things to say on telegraph and telephone matters in that colony.

It would appear that about 1,710 miles of new telegraph line and 36 new telegraph offices have been inaugurated since 1919, and 1,700 miles of existing line have been entirely reconstructed, iron telegraph poles replacing tree trunks and wooden poles; 1,760 miles of trunk telephone line are now in use, compared with 189 miles in December, 1919, and practically all important centres are now connected by telegraph and telephone.

Commenting on these figures and the stress placed upon "the importance of wireless communication in connexion with the prevention of wild, disturbing, and baseless rumours and the value from a psychological point of view of the establishment of a radio-telephone broadcasting station at Accra in order that the English Daventry programme might be made available to Europeans and others living an isolated life up country" by Mr. Ormsby-Gore, Parliamentary Under-Secretary for the Colonies, a leading article in the *Electrical Review* remarks that: "The possibility that wireless broadcast telephony in this country (Great Britain) has passed its zenith of popularity is sufficient reason for enterprising firms to turn their attention to the possibilities of the more remote export markets."

HOLLAND.—The interest which was recently created by the successful transmission from the Eindhoven (PCJJ) station (wavelength 30.2 metres), which was received in India, Dutch East Indies, South America, Australia, &c., in addition, of course, to European countries, has induced the station to experiment further in order to ascertain the most suitable time for transmission to various countries throughout the world. For this purpose a special short-wave transmission commenced on July 26 at 10.40 G.m.t. and continued until July 27 at 10.40 G.m.t. Enthusiasts who were successful in hearing the station are asked to communicate direct with Philips experimental broadcasting station at Eindhoven, Holland, stating the results obtained.

INDIA.—The *Electrical Review* says that the statement telegraphed to England from Bombay that the England-India "beam" wireless service was officially inaugurated in Bombay on July 23 by the Viceroy, and published in certain quarters, was not correct. The Viceroy visited Bombay to open the broadcasting station, and while there he inspected the Central Telegraph Office of the Indian "beam" service and exchanged messages with the King. Before the monsoon season started, it was expected that the official Post Office tests would be completed in time for Lord Irwin to inaugurate the "beam" service officially on July 23. For some weeks past the English and Indian stations have been in daily communication at high speed, but when the monsoon began it unexpectedly caused trouble on the Indian land lines connecting the Central Telegraph Office with the wireless stations, which could not be officially opened until the Post Office test had been passed.

The Viceroy duly inaugurated the Bombay station of the Indian Broadcasting Co., Ltd., on July 23. Its call signal is 2BY and its present power is 3kw.; receiving licences are being issued at Rs. 10 (15s.) per annum.

The new programme of the Indian Wireless Department includes extensive reconstruction. At Karachi, the existing 30-kw. spark transmitter is being dismantled and replaced by a 6-kw. valve set for continuous-wave and interrupted continuous-wave signalling, and telephony, while a new receiving station will be erected in the neighbourhood of the aerodrome, including a direction-finding installation for ships and aircraft.

At Bombay the existing station at Butcher Island is being dismantled and a new coast station is being erected at Santa Cruz which will contain a 6-kw. valve transmitter, 5-kw. spark transmitter, and a direction-finding receiver. Seven of the inland stations, viz., those at Allahabad, Delhi, Lahore, Quetta, Peshawar, Mhow and Nagpur, are also being remodelled by the installation of modern continuous-wave transmitters and appropriate receivers. At Delhi a new transmitter has already been installed.

The Indian correspondent of the *Electrical Review* states that the Bengal Chamber of Commerce has addressed a communication to the Government of India expressing its view with regard to the agreement between the Secretary of State for India and the Indian Broadcasting Co., Ltd., and also the subsidiary agreement attached to it, so far as they relate to the importation of wireless apparatus. The Chamber states that the 10% tribute to be paid by member importers to the Broadcasting Co. under the subsidiary agreement (which will be added to the sale price) is, in point of fact, a payment which listeners will make to the Company. The Chamber contends that the agreement was primarily designed to compel importers and distributors of receiving apparatus to act gratuitously as debt-collectors for the Broadcasting Co., which may be justified on the ground that there is no reasonable alternative, but there can be no justification of compulsion to the gratuitous surrender of patent rights. It is certainly desirable, the Chamber considers, that the Broadcasting Co. should keep up-to-date, but not at the expense of the importing manufacturer simply because he is assisting the Company by importing and distributing apparatus and collecting for the Company, free of charge, contributions due to it from listeners. The provision would, in fact, heavily penalise the importer who is importing his own manufactures, as against the importer who is not also a manufacturer, for the latter, being only a middleman, invents and patents nothing. The Chamber finally takes objection to Clause 4 (c) of the subsidiary agreement, whereby a member is bound to accept and abide by any modifications of the provisions of the agreement that may be effected with the previous written approval of the Director-General of Posts and Telegraphs.

IRISH FREE STATE.—In Dail Eireann the Minister of Posts and Telegraphs was asked what special privileges, or rights, attached to an experimental licence, as compared with the ordinary receiving licence, and whether he was prepared to consider the reduction of the fee charged for an experimental licence from £1 to the rate charged for an ordinary licence. Mr. J. J. Walsh said that, from the technical point of view, the maintenance of a distinction between experimental and ordinary receiving stations was no longer a matter of much importance, and the question of regarding the ordinary licence, the fee for which was 10s. a year, as covering the use of any form of receiving set was under consideration.

Replying to a question recently in Dail Eireann, Mr. J. J. Walsh, Minister for Posts and Telegraphs, said that a separate licence for portable wireless receiving apparatus was issued only to a person who already held an ordinary licence for the possession of apparatus at his permanent address. The owner's normal address was recorded on a portable licence, but the latter could be used in any part of the Irish Free State.

Progress is being made with the rebuilding of the General Post Office, Dublin, and a new studio for the Dublin broadcasting station is also being constructed in connexion therewith. The old studio in Little Denmark Street will then be closed down, but the transmitting apparatus will be retained at the McKee Barracks.

ITALY.—The Department of Overseas Trade, London, has issued a report upon the commercial, industrial, and economic situation in Italy, dated March, 1927, by Messrs. E. C. Donaldson Rawlins and H. C. A. Carpenter, respectively Commercial Counsellor and Commercial Secretary to the British Embassy, Rome.

In dealing with telegraphic and telephonic communications in Italy a condensed report thus epitomises the present situation:—

"Although 1,538 telephone circuits, comprising 36,700 km. of line, have been handed over to private enterprise, the State still operates 266 interurban and international circuits (38,650 km.), and the operation during 1926 was successful.

A new cable has been laid between Anzio and Barcelona, passing through the Straits of Bonifacio. This cable will be continued by way of Malaga to join up with the existing Italian Atlantic cables. Telephone communication has been established between Rome and Zara, use being made of the submarine telegraph cable.

A committee has been set up for the control of the broadcasting services, and in addition to this control the committee is charged with examining and reporting on the most suitable methods to be adopted for the development of broadcasting from the technical, artistic, and educational points of view."

MALAYA.—*Eastern Engineering* states that a sum of \$34,000 has been added to the Federal estimates of the Federated Malay States for the erection of wireless stations and quarters for operators and mechanics at Port Swettenham and Batu Pahat, Johore. In this connexion, Malayan Broadcasting Services, Ltd., has been floated to broadcast on a short wave and do relay work. Mr. Leslie Cant, who will be manager, has had several years' experience in Australia, while the company is to appoint an experienced programme director.

NEW ZEALAND.—Through the agency of the London *Times* we learn that the Prime Minister, in opening 2YA the Radio Broadcasting Company's new station at Wellington, at present the largest radio station in the Southern hemisphere, stated that the station was ten times as powerful as the existing stations at Auckland and Christchurch, and second only to Daventry (England) in the British Empire. Apart from the station's value from the point of view of entertainment it could communicate with all New Zealand by day and night and it could speak easily each night to the Pacific Islands and to Australia. The Government had assisted in its establishment because New Zealand was thus assured direct communication in the event of a national crisis.

PERSIA.—According to Reuter's Teheran agency two French wireless experts engaged by the Persian Government arrived in that city during the early days of last month.

PHILIPPINES.—Reuter's advise that a Transpacific radio service has been put into operation at Manila. The call signals range from KZAD to KIW, and normal wavelengths from 600 to 2,701 (t.v.). The service is strictly controlled by the Government and the United States Army.

RUSSIA.—It is reported from Leningrad that there are now 56 radio broadcasting stations in operation in Soviet Russia. Of that number, five are in Leningrad and nine in Moscow.

SWEDEN.—Under a new resolution of the Swedish Government, the Broadcasting Co. ("Radiotjänst," Ltd.) has obtained a two years' extension of its licence to the end of 1929, says *World Radio*. At the same time, however, the Radiotjänst's proportion of the licence income has been further reduced; at first the division between the company and the Telegraph Board was equal, but from the beginning of 1927 Radiotjänst was granted only 3.72 Swedish crowns from each licence fee of 10 cr., and now its share has been reduced to 3.30 cr. This division is to be revised yearly, and *World Radio* explains that in several other ways the Government has also strengthened its influence on the company.

SWITZERLAND.—The following numbers of listeners were licensed in Switzerland at the end of May, 1927, according to the Swiss Telegraphic Administration: Geneva, 4,682; Zurich, 30,629; Lausanne, 5,510; Basle, 2,706; Berne, 15,637; total, 59,164.

TURKEY.—Reuter's Trade Service at Stockholm informs us that the Swedish Aktiebolaget Baltic has concluded a contract for the monopoly of supplies of radio receiving apparatus to the whole of Turkey during a period of five years. Aktiebolaget Baltic is to deliver at once apparatus to the value of Kr.250,000, also material for 4,000 receiving sets, which will be assembled in Turkey.

U.S.A.—The Trade Service of the same agency in New York states that the Radio Corporation of America, the largest concern of its kind in the United States, recently placed on the market a complete line of new broadcast receivers featuring circuits which operate in connexion with either alternating or direct current supplied by the house lighting mains, thereby dispensing with all batteries. The new alternating-current receiver, said to be of unusual design, utilises three stages of radio-frequency amplification, a detector, and a two-stage audio amplifier.

The Department of State at Washington having invited the Union Internationale de Radiophonie to be represented in an advisory capacity at the forthcoming International Radio-Telegraph Conference at Washington in October, the Union has nominated as its delegate Capt. P. P. Eckersley, chief engineer of the British Broadcasting Corporation and a member of the Technical Commission of the Union. The principal purpose of the Conference is the revision of the International Radio-telegraph Convention signed at London in 1912 and the preparation of new articles which will be applicable to all the newer developments in wireless science, including broadcasting. The Union has accordingly submitted certain proposals to the International Radio-Telegraph Bureau at Berne for examination by the Washington Conference, including recommendations as to the wavebands to be reserved for broadcasting, which, as the outcome of recent experience and a systematic study of the trend of development in broadcasting technique, it considers to be essential for orderly expansion. The decisions regarding these proposals will rest with the official delegates from the several States members. The signatories to the London Convention of 1912, which regulates the Governmental and private use of wireless means of communication, were 43 States, apart from Colonies and Dependencies.

Plans are being developed by the Western Union Telegraph Company for a new fast-service cable to permit of the transmission of 250 words a minute (against the existing rate of 100 words) between the United States and the Far East. According to *The Times*, two routes are under consideration: one (10,000 miles long) following the existing commercial Pacific Cable Company's line, at an estimated cost of \$16,000,000 (£3,200,000); the other (7,100 miles) from Seattle via the Aleutian Islands, Northern Japan, and Shanghai to Manila, costing \$10,000,000 (£2,000,000). The shorter route offers advantages of greater speed and economy, but it involves negotiations with Japan for landing rights, which are now in progress. The new cable will be of the "Permalloy" type, allowing of the transmission of six messages simultaneously.

A form of loud-speaking device recently patented by Mr. Clinton R. Hanna and Dr. Joseph Slepian, both members of the Westinghouse Electric Company's research staff, has an exponential horn, the underlying principle being proper coupling between the diaphragm and the surrounding atmosphere, and it is claimed to make possible the reproduction, at full volume, of the deep bass of the organ and drum; moreover, the reproducing element is said to be of a radically new type, especially adapted for the horn. The device produces the sound effect of a horn 14 ft. long, but actually is only 48 in. in each dimension, and it is due to its peculiar internal curves that sound of all pitches, low as well as high, receive accurate rendition and correct volume. Although the apparatus radiates from 10 to 20 times more volume than the ordinary loud-speaker, the amount of electrical energy represented by all this sound is only about 2½ watts, says the *Electrical Review*, London. The apparatus was not especially designed for lightness, yet there is no part of it which cannot be carried by hand, with the exception of the great wooden horn, and even that can be replaced by a lighter one at some sacrifice of volume at the lower pitches.

Thanks to the unflinching kindness of telegraphist friends at home and abroad my table continues to be well supplied with news of the craft. I trust I shall not be charged with undue preference, however, if I mention one or two of the publications which at the moment have caught my attention, but I really must congratulate those responsible for the new and August issue of *The Overseas Telegraph*, which, with its arresting cover by Osborn of the Cable Room, its high-class paper and printing, most nearly approaches the standard of "The Zodiac," and would no doubt come still nearer to the level of that company-run magazine, did financial assistance prove as easily available.

Then there is the *C.T.O. Chronicle*, with its reminiscences of 1897. Could any committeeman of that period forget the strain and excitement of those days and hours? Of quite another type is the next production, viz., *L'Echo des P.T.T. de l'Afrique du nord*, published in Algiers, which contains a deeply interesting article by M. Verdan on *L'Appareil Baudot-Verdan*, in which he claims that "the filtration of wireless parasites is to-day happily obtained, and it is to the Baudot that we owe this fact," that is to say, the Verdan-Baudot as now understood. M. Verdan adds the following few words, the full meaning of which will only be understood in our own country by those telegraphists who have come into close personal contact with French telegraphists, and their absolute affection for Baudot apparatus. Says the great inventor: "No French telegraphist will fail to rejoice at the fact —(that by means of the Baudot filtration scheme atmospheric may be eliminated)—and it is the fact of their pleasure that constitutes my joy."

According to *l'Echo*, radio working by means of this modification of the Baudot has all but replaced that of the submarine cable between Algeria and France.

The latter cable, however, it should be stated, is not only faulty but in a really parlous condition.

It will have been noted by our readers that an illustrated, descriptive article on this highly interesting and ingenious development of the Baudot system appears in the present issue, and is by a London telegraphist who has for some time specially interested himself in the arrangement.

Having read both Cable Room local journals and noted the eagerness with which the staff were looking forward to the Annual Sports, one can measure fairly well the deep disappointment which must have followed the regrettable but unavoidable decision to cancel that yearly event, to which so many of us—of all ages—look forward.

It is hoped that by next year the extreme pressure upon staff and supervision will have eased somewhat, but the advent of all four "Beam" services had simply made the meeting impossible.

In official language it may therefore be most truthfully said that, "the circumstances were exceptional, &c., &c." but one fears that official language was not the only lingo used! However, "the rain it raineth every day," and Aug. 19 was no exception, and maybe proved some solace to both competitors and to would-have-been spectators.

Let us, however, turn from disappointments to new appointments—tendering hearty congratulations to Mr. F. S. O'Shaughnessy on appointment to the newly-authorised Superintendency of the Cable Room and to Mr. F. Sleat and Mr. W. H. King, who follow him as Asst. Supt. and Overseer respectively. The two latter are provisional.

The long-drawn-out case of the India-Rubber and Gutta-Percha Telegraph Works Co. versus the Western Union Telegraph Co. was decided by Mr. Justice Bateson in the King's Bench Division in favour of the former company, who came to the conclusion that the *c.s. Silvergray* was "competent to do the work, well-equipped and had a thoroughly competent cable engineer" and that "there was no waste of time or cable" in carrying out the cable repairs. His Lordship also thought the captain of the vessel was right when he said that "all cable work was a matter of luck," and luck was required to make it go absolutely smoothly from start to finish. This rather sweeping expression of opinion regarding all submarine cable repair work, one would think, is not likely to go unchallenged, and the technical papers may possibly provide some entertaining correspondence on the matter. Of course, there is a certain amount of luck—good and bad—in this as in all enterprises. Twice in just over twenty years a cable steamer has found a dead whale mixed up with a cable fault as an additional strain upon her grappling gear!

Congratulations to the following officers of the C.T.O. (Inland Department). Mr. E. Cooper, to be Asst. Controller vice Mr. Ford, promoted; Mr. A. J. Jellie to Supt., Higher Grade, vice Mr. Cooper; Mr. H. W. Dunne, Asst. Inspector T. and T. Traffic, Class I, Sec.'s Office, to be Superintendent, Higher Grade, vice Mr. W. G. Hodgson, retired; and Mr. A. E. Bowden, to Supt., Lower Grade, vice Mr. Jellie, promoted.

In connexion with the above, the best of wishes for a restful and happy retirement to Mr. Hodgson, who leaves many a good friend and well-wisher behind him in the C.T.O., and will also find not a few among the ranks of those he now goes to join. Let him test this at the Kew meeting next year!

Gothic Architecture.—Gothic is not only the best but the only rational architecture, as being that which can fit itself most easily to all services, vulgar or noble. Undefined in its slope of roof, height of shaft, breadth of arch, or disposition of ground plan, it can shrink into a turret, expand into a hall, coil into a staircase, or spring into a spire, with undegraded grace, and unexhausted energy.—Ruskin.

J. J. T.

PROGRESS OF THE TELEPHONE SYSTEM.

THE total number of telephone stations in the Post Office system at June 30, 1927, was 1,542,270. The new stations added during June numbered 18,934 and the cessations 8,532, the net increase in stations being 10,402.

The growth for the month is summarised below:—

Telephone Stations—	London.	Provinces.
Total at 30th June	544,913	997,357
Net increase for month	3,966	6,436
Residence Rate Subscribers—		
Total	119,671	193,594
Net increase	1,316	1,729
Call Office Stations—		
Total	4,829	17,666
Net increase	38	127

Kiosks—			
Total	565	2,900	
Net increase	53	76	
Rural Party Line Stations—			
Total	—	10,072	
Net increase	—	36	
Rural Railway Stations connected with Exchange System—			
Total	—	783	
Net increase	—	9	

The number of inland trunk calls dealt with during May (the latest statistics available) was 8,602,351, a decrease of 39,542 compared with May of last year, when traffic was abnormally high owing to the general strike.

The number of outgoing calls to the Continent during May was 27,646, while the incoming calls numbered 28,649.

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

PROVINCES.—Colwyn Bay (automatic), Llandudno (automatic).

And among the more important exchanges extended were:—

LONDON—Hounslow, Mitcham, Purley.

PROVINCES—Anfield, Bradford, Denton, Radlett, Rochdale, Rock Ferry, Southport, Walton (Liverpool), Walton-on-Thames, Worcester, Wilmslow.

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

London—Westerham (section of the London—Orpington cable),

while 75 new overhead trunk circuits were completed, and 83 additional circuits were provided by means of spare wires in underground cables.

Silk and Cotton-Covered H.C. Copper Wire,
Asbestos Covered Wire,
Charcoal Iron Core Wire,
Resistance and Fuse Wires,
Binding Wires,
&c., &c.

P. ORMISTON & SONS,
ESTABLISHED 1793.

79, Clerkenwell Road, London, E.C.
13259 CENTRAL.

Braided and
Twisted Wires,
Bare Copper Strand
and Flexibles of any
construction. Wire Ropes and
Cords, down to the finest sizes, in
Galvanized Steel, Phosphor Bronze, &c.

WHERE TO STAY.

The attention of our Readers is directed to the following list of Boarding and Apartment Houses.

DEAN FOREST.—SEVERN-WYE VALLEYS. Beautiful Holiday Home (600 ft. up). 70 rooms, extensive grounds, motors, golf, billiards, tennis, bowls, croquet, dancing. Electric light. Boarders 50s. to 67s. 6d.—Prospectus: Littledean House, Littledean, Glos.

LAKE DISTRICT.—Beautiful Buttermere. Near Honister Pass, Crummock Water and many easy climbs. Photographers' paradise. Victoria Family Hotel (R.A.C. & A.A.). £4 4s. (reductions up to 25% at quiet times). Taxi from Cockermouth. "A day on a hilltop is worth a week by the sea."—Ruskin.

SHANKLIN.—Glenavon Private Hotel. Comfortable Brd.-res. Electric light and gas fires all bedrooms. Free billiards, splendid cuisine (separate tables). Highest recommendations.—T. Geere. Phone 37.

LONDON TELEPHONE SERVICE NOTES.

Telephonists' Society.

This Society will commence its next Session on Oct. 7, under the presidency of Miss R. James, who has chosen as the title of her address "Notes from my diary." At the second meeting on Nov. 4, Capt. Reid, of the Royal Air Force, will give a lecture of psychological interest. On Dec. 2, Mr. Camp, of the Trunk Traffic Office, will read a paper on "Foreign Trunk Traffic," and in view of the rapid strides made recently in international telephone communications this meeting will be eagerly awaited. On Feb. 3 there is to be a debate on "Is the welfare and social side of exchange life sufficiently developed?" Miss B. V. Lambert will argue that it is and Miss M. Binder will present the opposite view. The debate will be followed by a paper to be read by Miss Pyne, entitled "Recollections of a visit to Chicago."

The usual (and some unusual) competitions will be held, and the Society will again be responsible for the production of an original play from the pen of Miss McMillan. This time the play will be performed on two successive nights.

Tandem.

In last month's *Journal* there was an article, "When we get Tandem." Well, we have got it! At 10 a.m. on Thursday, Aug. 18, the life-blood of telephone traffic commenced to circulate and it is now something more than a name. There have been many detailed descriptions of the processes through which calls pass in their progress from the originating exchange, through Tandem, to the objective exchange, but none of them has summed the matter up so concisely as did an interested visitor, who after listening to a complete technical account of the process, remarked: "Well, its all very simple, isn't it? You just think of a number at Buckhurst and it turns up at Addiscombe."

Accounts Branch.

Mr. C. Magee's many friends will learn with great regret of his retirement through ill-health. He has been suffering for some time from the after-effects of sleepy sickness, and despite a long spell in a nursing home his recovery was not rapid. He has now returned to his friends in Ireland and all his colleagues will unite in the hope that his new environment and native air will combine to give him a new lease of life.

Mr. Magee was one of the earliest servants of the L.T.S., having joined the then General Manager's Office in 1903. At the time of his retirement he was a Higher Clerical Officer in the Accounts Branch, where he had spent practically all his official life. He served with the Army during the War from 1915 to 1919.

A retiring presentation in the form of a substantial cheque is being forwarded to Mr. Magee from well-wishers in the Controller's Office.

Contract Branch.

The business done by the Contract Branch during the month of July was as follows:—

New business obtained	6,966 stations.
Ceasements	3,272 ..
Net gain	3,694 ..

These figures are rather disappointing as the net gain is somewhat less than that of the corresponding month last year. The falling off is accounted for by the general depression in trade. There seems to be a pretty general complaint on the part of everybody that there is no money about.

The Advertising Exhibition recently held at Olympia was marvellously interesting from many points of view. The attractiveness of the advertising posters and folders printed in all the colours of the rainbow and some others, made one wish for a little colour in some of our own over-modest advertising literature. Black and white, or black and buff as it is sometimes, palls after a bit and even two colours would be more attractive and as a result produce more results and so pay for the slight additional cost.

This Exhibition was notable for the fact that the number of telephones to exhibitors reached the high figure of 83%. This is the highest percentage of any recent exhibition and next year, if the Advertising experts hold another exhibition, we may perhaps hope to reach the 100%.

The many friends of Mr. John C. Shortt, who was a clerical officer at the Headquarters of the Contract Branch, will learn with regret that he died on July 20 but a few weeks after his premature retirement on the ground of ill-health. After two short periods of service in Portsmouth and in London, he re-entered the service of the late company shortly before the transfer. Since the transfer he has been connected with the Contract Branch either in one of the District Offices or at Headquarters. For some time past he has been a great sufferer through failing health, and although his premature decease has come as a great shock to many, it was not altogether a surprise.

We were recently asked to make an alteration in the Telephone Directory as a subscriber named Miss Lemon was marrying a Mr. Sole.

The papers are perpetually pillorying us, but are they perfect? What depth of wisdom is contained in the following statement which appeared in a well-known London newspaper on Aug. 1:—

“When the August Bank Holiday falls early in the week as it does this year . . .”

Another newspaper recently suggested that the Post Office staff generally did not do anything to push the wares of the Post Office, more especially with regard to the telephones.

We might well say, “Physician, heal thyself,” for whoever heard of a newspaper man trying to get anybody to buy the newspaper which employs him? Generally speaking, the last thing in the world a journalist wants to talk about is the particular “rag” with which he happens to be connected. However, if every member of, say, the staff of the London Telephone Service were to obtain from their business connexions or friends only one additional station a year, the growth would be nearly 12,000 higher per annum than it is.

Cricket.—We have to record a further defeat at the hands of the Traffic Section who proved to be the better team in the final game played in connexion with the League tournament. Good bowling rather than bad batting was responsible for the small total of the Contracts team, and a drying wicket seemed to favour the bowlers in the early stages of the contest.

The match, however, like the others played this season was thoroughly enjoyed, and the visits to the Chiswick Ground with its excellent accommodation has enabled the games to be played in surroundings which have become quite familiar and homely.

It is hoped with an increased membership next season that the Contract Branch will secure the honours.

With the passing of Cricket, Football is already engaging the attention of those who have made preparations for the winter game.

The L.T.S. will run a team and invitations are extended to the staffs of all Contract Offices to join the section either as players or honorary members. Arrangements have been completed to rent a part of the War Office Sports Ground at Coombe Lane, Raynes Park, and the facilities offered include an up-to-date pavilion and baths. The Club has been accepted for membership of the Civil Service Football League, and arrangements are in hand for completing the fixtures for the 1927/28 season, which will include 22 League games.

The subscription rates, which are very moderate, have been fixed as follows:—

Playing members	...	...	10s. 0d. per annum.
Honorary members	...	...	2s. 6d. ”

Prospective player members should make early application, as it will be necessary for them to be registered with the League before they are eligible to take part in competition games. Practice matches will be played before the season commences.

Applications for membership should be made to:—

Mr. J. A. Dickinson,
Development Section,
(K.D. 1A),
St. Bride Street.
Telephone, City 2000, Extn. 302.

Cricket.

The final of the London Telephone Service League fixtures took place at the Civil Service ground at Chiswick on July 26, when the Accounts Branch, the winners of the League, played The Rest. A very interesting game was witnessed by quite a number of spectators, amongst them being the Accounts Club's President, Mr. Stirling, and Vice-President, Mr. Bold.

Extra time was played in order to bring the game to a finish.

The Accounts lost by 8 runs after a very close contest, the score being as under:—

Accounts.		The Rest.	
H. B. Taylor, run out	... 10	F. Oliver, b. Taylor	... 2
R. Pick, b. Hodgekiss	... 8	S. H. Hodgekiss, run out	... 0
G. Moon, c. Oliver, b. Shepherd	20	F. Thomson, lb.w., b. Moon	... 0
F. Young, b. Canham	... 10	F. R. Grove, b. Taylor	... 0
F. W. Smith, b. Shepherd	... 5	F. J. Crossley, c. Taylor, b. Young	... 19
E. Widdup, c. Canham, b. Crossley	... 18	J. Shepherd, lb.w., b. Moon	... 6
F. Moyle, c. Cox, b. Crossley	... 0	W. Adams, b. Taylor	... 28
A. Edwards, b. Crossley	... 3	C. W. Gerrard, b. Moon	... 14
G. Lewis, not out	... 1	E. Hancock, c. Widdup, b. Taylor	... 0
C. Williams, b. Crossley	... 0	J. Evans, not out	... 10
C. Drabwell, b. Shepherd	... 0	R. Canham, c. Widdup, b. Moon	5
Extras	... 9	Extras	... 8
<hr/>		<hr/>	
84		92	

Crossley took 4 wickets for 30 for the Rest, while Moon took 4 for 25 and Taylor 4 for 29 for the Accounts.

SECRETARY'S OFFICE CRICKET CLUB INTERBRANCH COMPETITION.

SEMI-FINAL.

Buildings and Establishment Branches v. Mails Branch—At Chingford June 20, 1927.

Buildings & Establishment Branches.	Mails Branch.		
Bray, c. Oakshott, b. Dickens	... 29	Appleby, c. Pearce, b. Hambridge	... 14
Scholes, c. Radice, b. Abramovitch	... 37	Andre, c. Peel, b. Newman	... 0
Newman, c. Radice, b. Dickens	... 5	Abramovitch, b. Newman	... 0
Peel, not out	... 84	Oakshott, b. Newman	... 4
Hanson, c. Wyles, b. Appleby	... 9	Tickner, c. Peel, b. Newman	... 0
Drew, not out	... 1	Dickens, b. Newman	... 0
Extras	... 8	Wood, c. & b. Newman	... 0
<hr/>		Figures, c. Scholes, b. Hambridge	... 1
173		Radice, c. Scholes, b. Peel	... 13
Declared for 4 wickets.		Wyles, not out	... 4
Messrs. Garrett, Hambridge, Colyer, Pearce and Waters did not bat.		Sellars, c. & b. Newman	... 0
		Extras	... 2
		<hr/>	
		38	

Newman took 7 wickets for 6 runs.

Telephone Branch v. Telegraph Branch—At Herne Hill, June 21, 1927.

Telephone Branch.	Telegraph Branch.		
Cooper, c. Read, b. Hoare	... 12	Read, c. Watts, b. Beaton	... 48
Watts, c. Read, b. Hoare	... 12	Hughes, b. Wakelin	... 15
Richardson, b. Hoare	... 23	Hoare, c. Watts, b. Beaton	... 66
Wakelin, b. Hoare	... 24	Mallett, not out	... 10
Foster, lb.w., b. Hoare	... 28	Wright, not out	... 0
Bruton, b. Hoare	... 3	Extras	... 16
Fallon, b. Mallett	... 16	Total for 3 wickets	... 155
Pugh, not out	... 16		
Harrison, c. & b. Mallett	... 1	Messrs. Roberts, Martin, Reeve, Long, Darby and James did not bat.	
Beaton, not out	... 3	Beaton took two wickets for 0 runs.	
Extras	... 13		
<hr/>		<hr/>	
151			

Declared for 8 wickets.
Mr. Simpson did not bat.
Hoare took 6 wickets for 65.

FINAL.

Building and Establishment Branches v. Telegraph Branch—At Chiswick, July 18, 1927.

THE weather was ideal and the pitch perfect. Some very good cricket was witnessed by those who were fortunate to get down. Some 40 members sat down to tea. The Buildings and Establishment Branches play the stronger game and won a very good match.

Buildings and Establishment Branches.	Telegraph Branch.		
Bray, c. Welch, b. Price	... 20	Read, b. Newman	... 37
Scholes, c. Read, b. Moore	... 1	Barton, c. Hambridge, b. Pearce	... 3
Newman, c. & b. Read	... 38	Hoare, c. Waters, b. Rixon	... 7
Hanson, b. Moore	... 13	Hughes, b. Newman	... 8
Rixon, b. Darby	... 16	Darby, run out	... 1
Garrett, b. Moore	... 5	Welch, c. Waters, b. Hambridge	... 1
Hambridge, c. Hill, b. Darby	... 10	Belgrave, b. Hambridge	... 7
Colyer, c. Welch, b. Darby	... 5	Moore, b. Hambridge	... 9
Pearce, c. Hill, b. Darby	... 6	Price, b. Newman	... 10
Waters, not out	... 9	Hill, c. Newman, b. Hambridge	... 8
Drew, c. Welch, b. Darby	... 2	Wright, not out	... 0
Extras	... 5	Extras	... 8
<hr/>		<hr/>	
Total	... 130	Total	... 99

Darby took 5 wickets for 34 runs. Hambridge took 4 wickets for 19 runs.

THE FINAL ROUND OF THE SECRETARY'S OFFICE INTER-BRANCH CRICKET COMPETITION

MR READ OF THE TELEGRAPHERS WAS UNABLE TO CATCH MR. NEWMAN OF THE BUILDERS IN THEIR RACE FOR THE HIGHEST INDIVIDUAL SCORE

WHILE MR. DARBY BOWLED OUT FIVE BUILDERS

AND BUT THE MAN WHO REALLY MADE THE GAME WORTH WHILE - FROM MY POINT OF VIEW - WAS MR. PEARCE.

HE FIRST WRAPPED UP HIS FEET IN MANY MILES OF TAPE - AND THEN WENT IN TO BAT.

MESSRS. HAMBIDGE AND NEWMAN DECIDED TO TURN HOUSE BREAKERS AND RATHER SPOILED THE TELEGRAPH OUTLOOK!

HE LOOKED VERY HARD AND HE STARED TO THE 'OFF' - VERY INTENTLY TO 'LEG'

THEN HE PICKED A FEW FLOWERS WHICH MUST HAVE SPRUNG UP ON THE PITCH

AND THEN HE WALKED OUT!

THE TELEGRAPH BRANCH HAD DIFFICULTY IN SELECTING A TEAM FOR ITS CRICKET MATCH AGAINST THE TELEPHONE BRANCH - BUT EVENTUALLY ELEVEN PLAYERS MEN WERE TAKEN TO HERNE HILL

"I'D BOWLER if I well know, Charlie!"

"Come on, team! Perhaps you can pick up Stelfox and Hobbs on the ground!"

HEAVY UP, my man!

WHOLE'S HERE!

"CAN YOU MANAGE ANOTHER, ADOLPH?"

WITH REMAINING ENERGY!

MR. HOBBS

AND MR. READ - USING THE "CRAWL" STROKE WITH GREAT EFFECT

AFTER 5 O'CLOCK, WHEN THE TELEPHONES WON THE TOSS AND DECIDED TO TAKE FIRST SWIM. THEY LASTED 151 LENGTHS AND THEN

RAIN FELL CONTINUOUSLY - UNTIL

AND SPLASHED ABOUT A BIT

SWAM 66 LENGTHS AND 48 LENGTHS RESPECTIVELY BEFORE THEY WENT DOWN FOR THE LAST TIME

THE TELEGRAPH CHANNEL ASPIRANTS ENTERED THE WATER

MR. BEATON WAS RESPONSIBLE FOR THE DROWNING OF THOSE TWO STALWARTS AND, WHILE ALREADY "GREAT" - HE

SWELLED VISIBLY AT THESE SUCCESSES

OUT WHEN MR. MALLETT WITH TWO MIGHTY SPLASHES

SENT THE BALL TO THE EDGE OF THE BATH

AND WON THE MATCH FOR THE TELEGRAPHERS.

MR. BEATON

SIMPLY BLEW UP!

INTERBRANCH CRICKET COMPETITION.