THE

Telegraph and Telephone Journal.

VOL. XIII. APRIL, 1927. No. 145.

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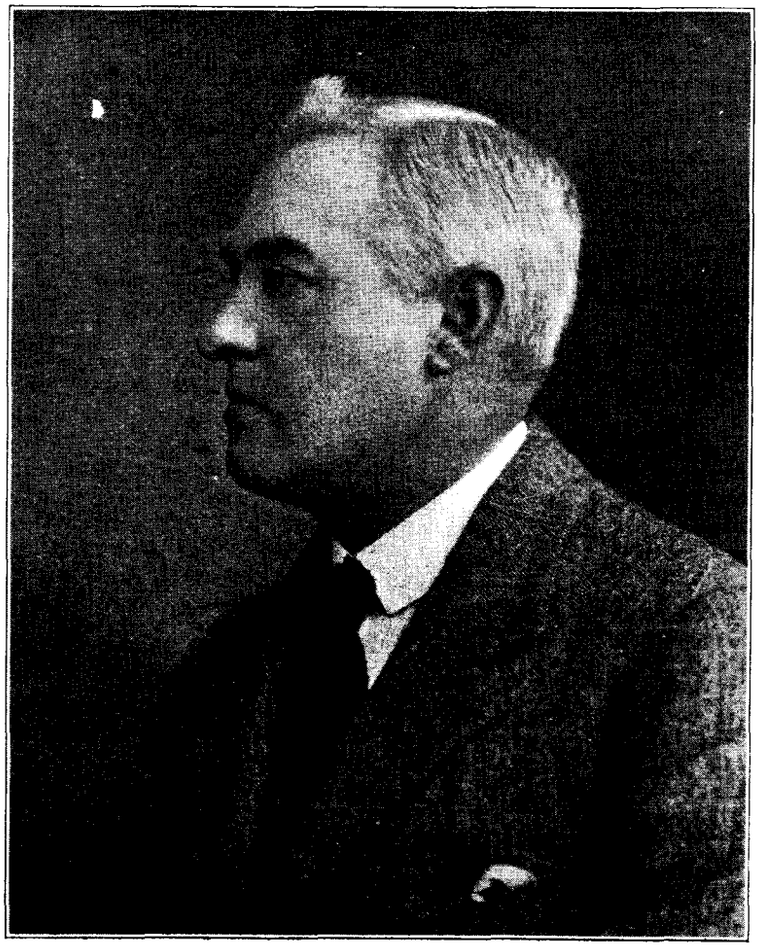
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

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.

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

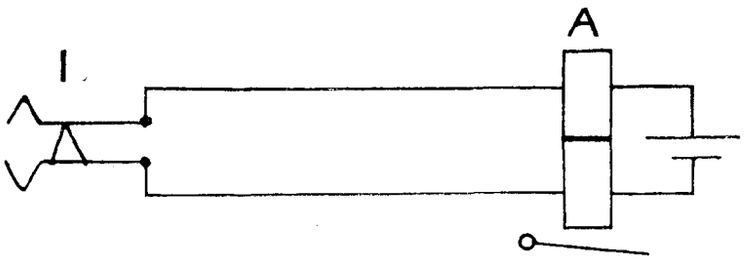


FIG. 1.

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

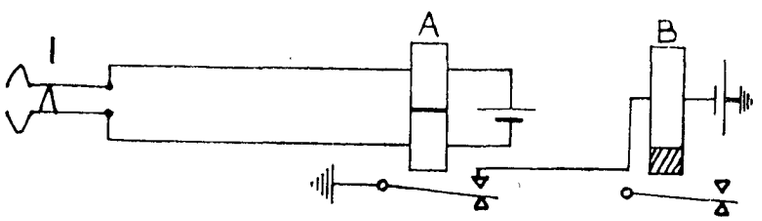


FIG 2.

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.

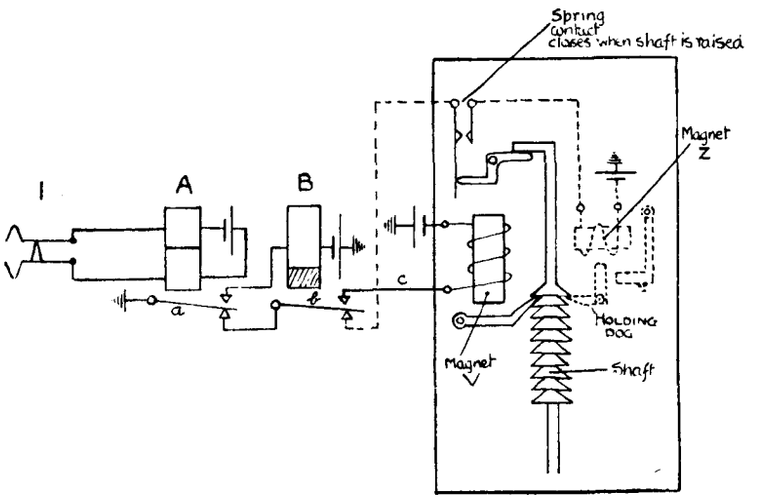


FIG. 3.

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

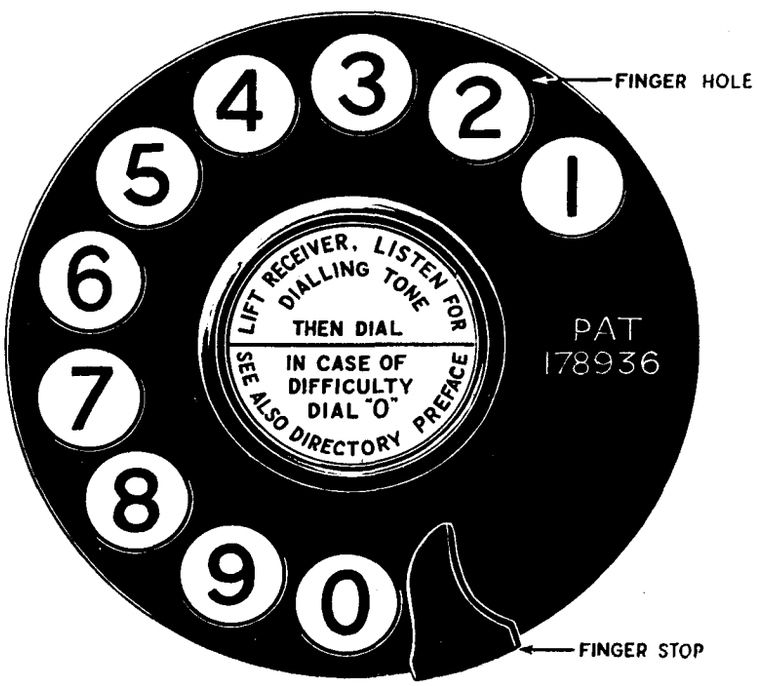


FIG. 4.

* British Engineering Association Report No. 136 (1923).

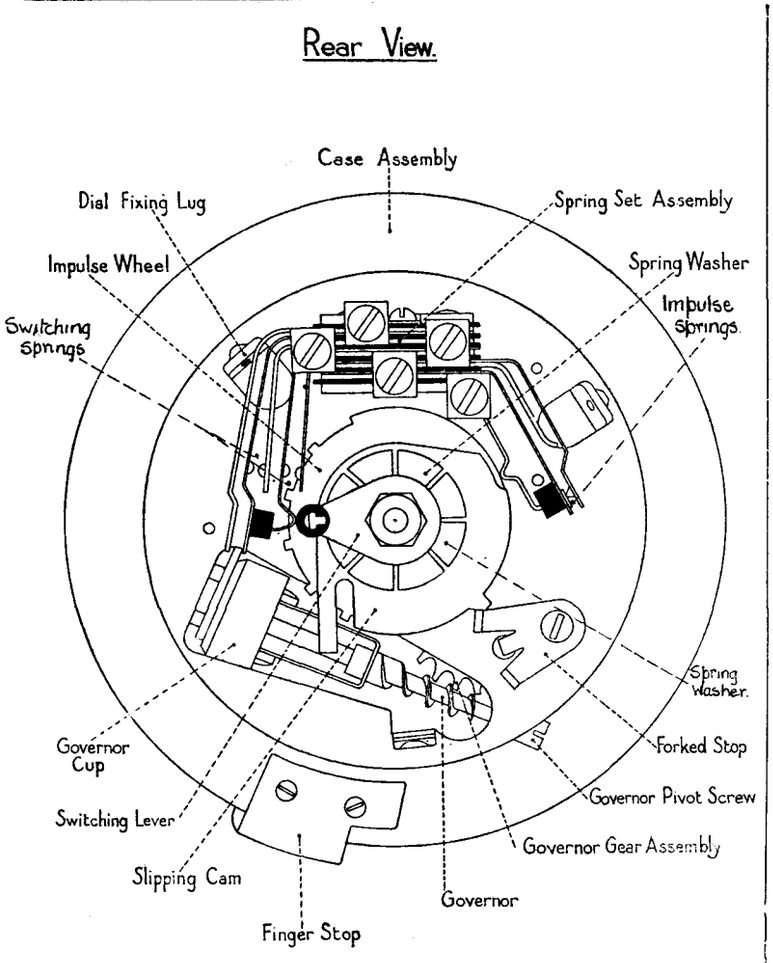


FIG. 5.

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

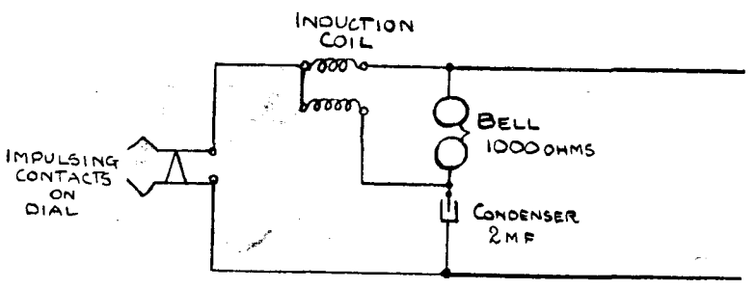


FIG. 5A.

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

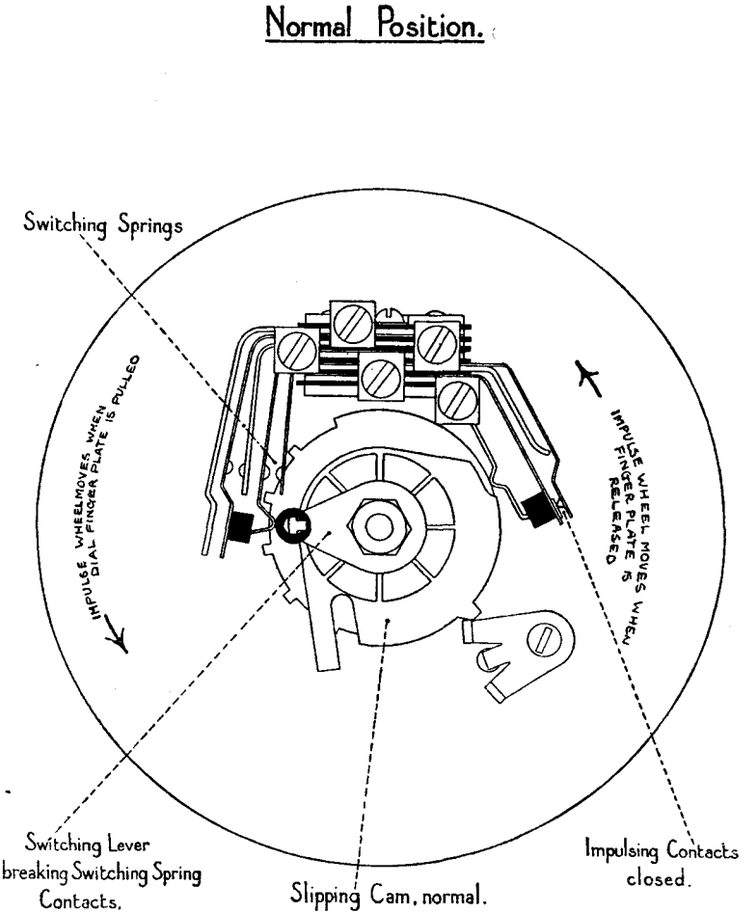


FIG. 6.

can be employed in setting up connexions between telephone subscribers, and as will be shewn, 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"

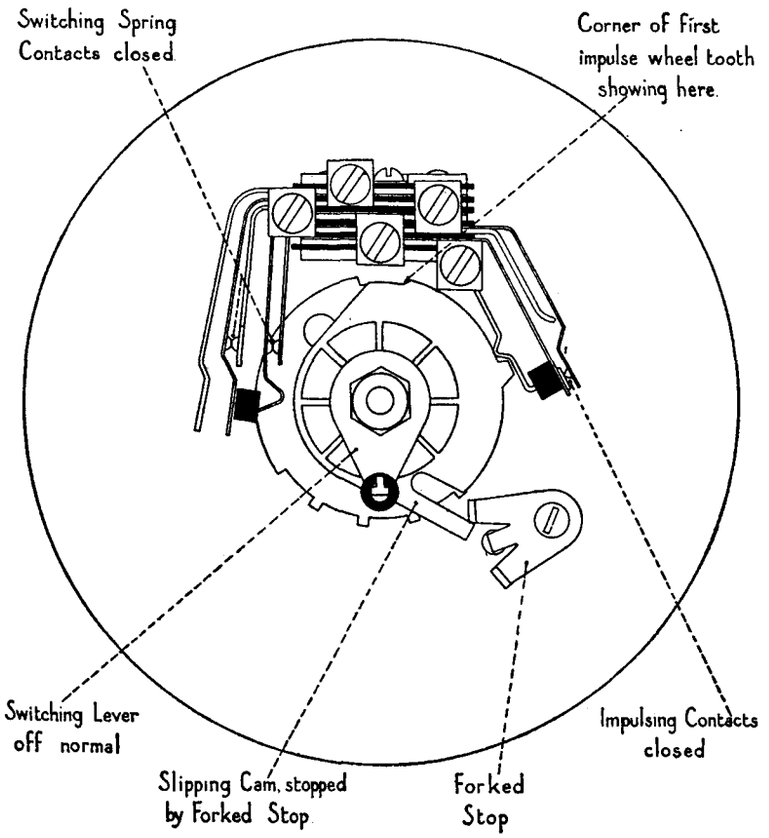


FIG. 7.

One Impulse Sending.

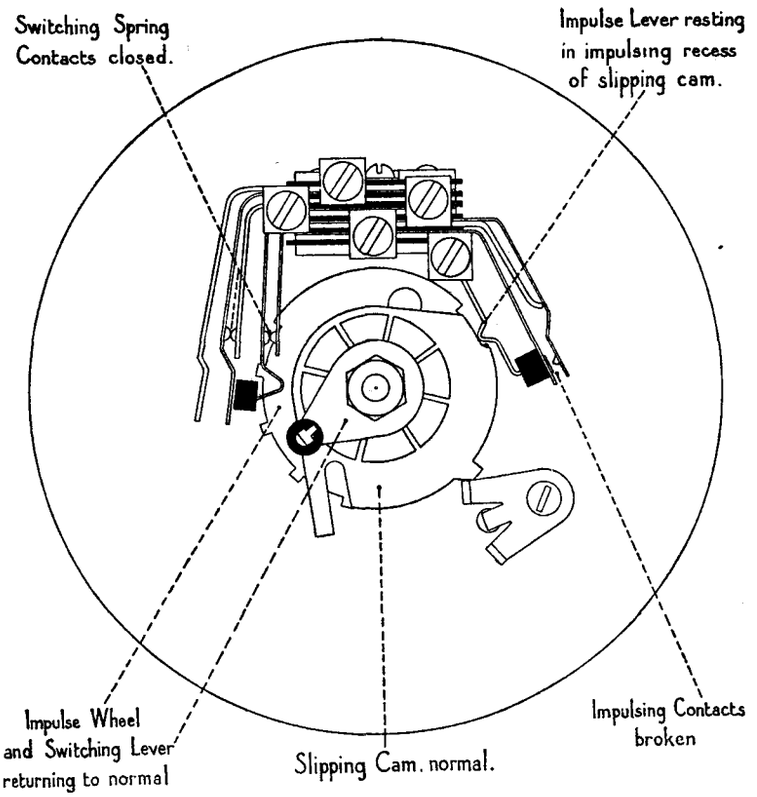


FIG 8.

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 pins 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 Controllership 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 licenses 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. Emlem 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 is 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.

H. J. E. S.

—Reuter (Cologne).

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 retrogade.

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 :—

	London.	Provinces.
Telephone Stations—		
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
	265,049	296,415	561,464

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.

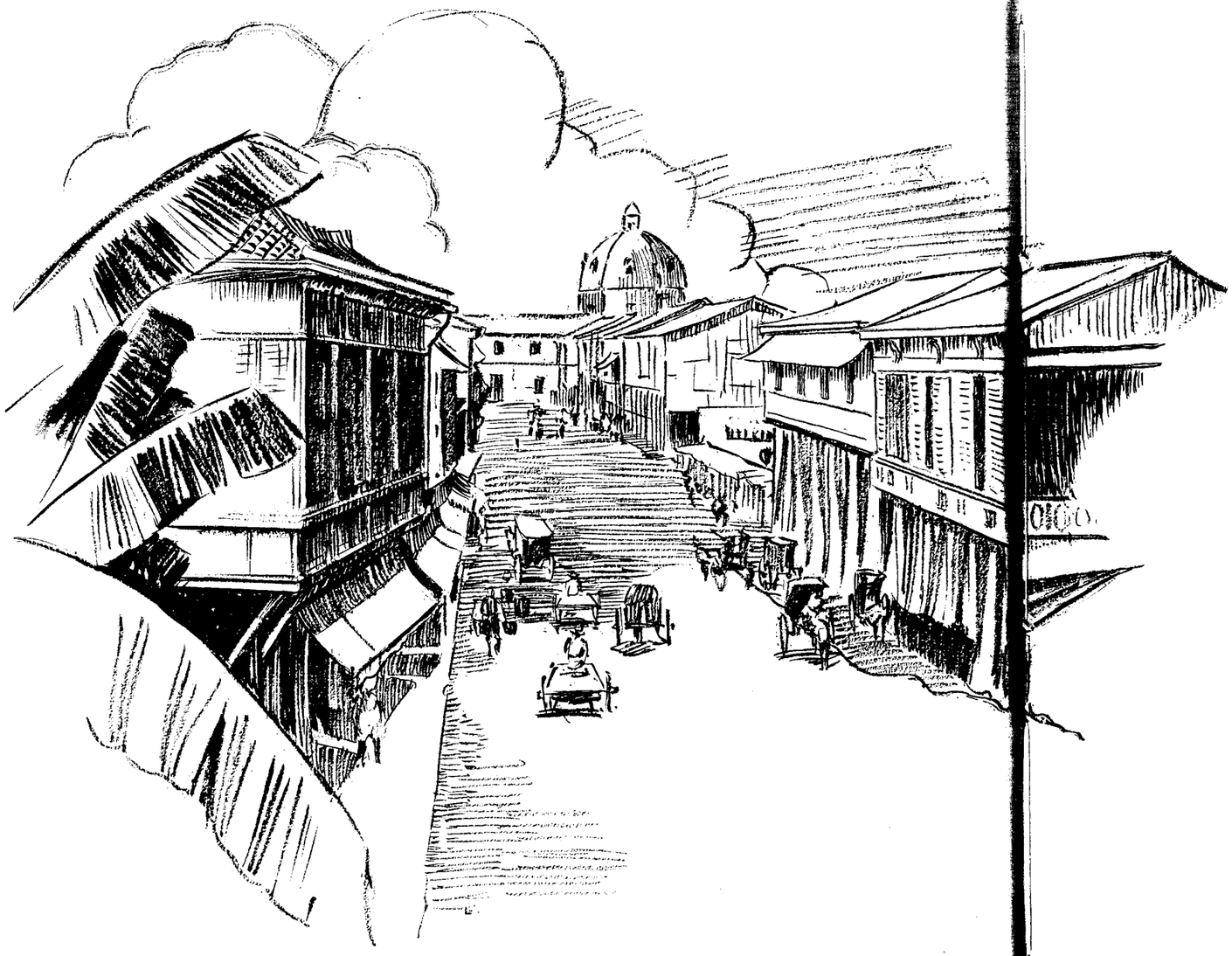
During the month the following additions to the main underground system were completed and brought into use :—

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.

STROWGER AUTOMATIC

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.*

VOL. XIII. APRIL, 1927. No. 145.

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 activities which is considered fairer game for criticism than public buildings. Administrative art has always been a butt for the lampooner. 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 upstair 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.

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

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 situate.

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 shewn 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 thiel 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 asphalte 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 Modulous 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 $\frac{1}{2}$ 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 Stampe, 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 1,006,000 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, aye 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 acquired 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 1 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 1 are not allotted the same permutation, Q is represented by units 1, 3, 4 and 5 while 1 is represented by unit 1. As it is essential that Q and 1 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 Morkrum 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.

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 Varmskog 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.

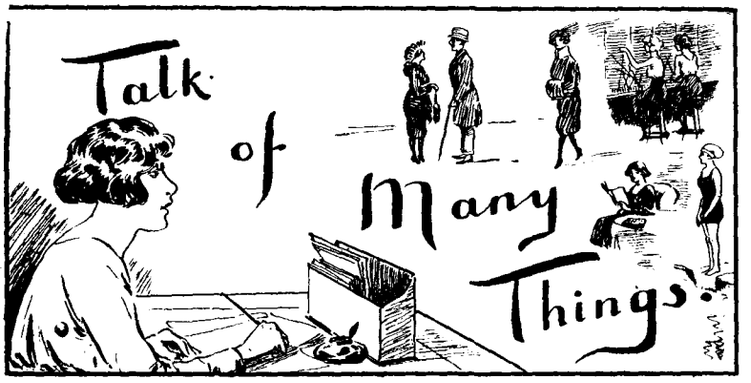
Following tea together, Mr. McQuiston (Traffic Department), who acted as chairman, voiced the feelings of those present when he said that Mr. McFadden had been a popular chief and a real friend to his staff. He was a sportsman, and had won from the staff, and any of the public who had come in contact 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 FLAGE.

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

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 themselved 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'I'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. STAITE, 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.