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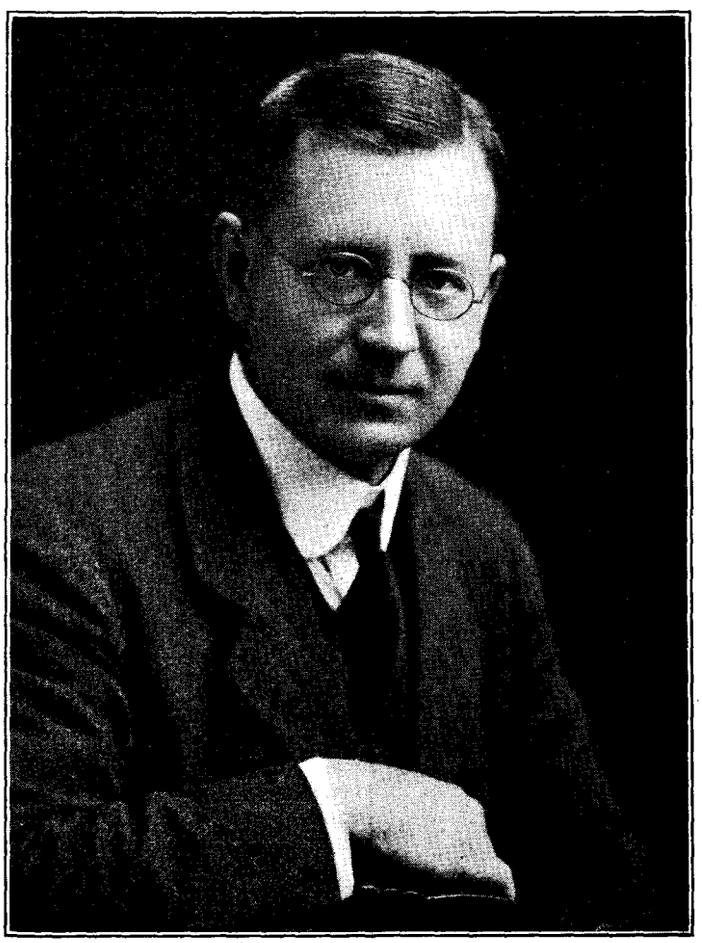
TELEGRAPH AND TELEPHONE MEN AND WOMEN.

XXXVIII.—

SIR HENRY BUNBURY, K.C.B.

No apology need be made for presenting to our readers as a Telegraph and Telephone man Sir Henry Bunbury, K.C.B., the Comptroller and Accountant-General of the Post Office. It is true that Sir Henry Bunbury's responsibilities and activities range outside the field of telegraphs and telephones, but they are of a very substantial character within that field; and the officers at headquarters responsible for the administration of telegraphs and telephones have come to regard Sir Henry, in a very real sense, as one of themselves. His singular combination of the critical and the constructive faculties, his wide experience in the administrative and financial world, and, not least, his quickness of sympathy and his unfailing geniality have won for him a unique place in the Post Office service. His advice as Comptroller and Accountant-General is sought, not as an official necessity, but because it is invariably helpful and far-seeing.



[*Photo by Mullins, Ryde.*

Sir Henry Bunbury came to the Post Office in 1920, having previously been, in succession, Treasury Officer of Accounts, Accountant and Comptroller-General of the National Health Commission, National Health Commissioner, and Accountant-General of the Ministry of Shipping. He had already made acquaintance with telegraph and telephone matters as a member of the Committee on Engineering Accounts which sat in 1910-11. He quickly settled into his new post; and there are rumours that in consequence of his appointment the Accountant-General's Department regards itself as the most fortunate department in the whole of the service.

ON SPEAKING TO NEW YORK.

THERE were three thoughts dominating my mind at the close of that first conversation with America.

I had just returned from a brief sojourn in a country where the life of the people is still largely lived under the primitive conditions which ruled hundreds of years ago. The bricks from which their houses are built are still made, by hand, of mud and straw baked in the sun: still their women sit at the house-door in the open air grinding with a hand-mill their corn into flour. Then to step from the ancient Eastern ways into an experience of the latest of those modern marvels which the Western world is so constantly discovering and converting to her service! That was the first thought—one of contrast.

The second was one of wonder—that this great thing had been done at all. It required a little imagination, because the transaction itself, while having an element of pleasure and even of the commonplace, had nothing of the wonderful to distinguish it from any other telephone conversation. One great delight was to hear the American operator say in response to the first attempt "I'm sorry, Mr. M's line's busy." It was my first experience of "the voice with the smile" to the idea of which the American service journals have by now accustomed us. It was said in a kindly tone with a distinct but not unpleasant American twang, and I wondered whether my Scottish accent caused as pleasant a thrill to the operator as her American one did to me. Unlikely! My call came through later and we talked of ordinary things. Not until it was over did one realise the wonder of it. The speech was as if only a thin partition wall divided us, and yet 3,000 miles of sea rolled between.

The third thought which appealed to one was the remance of it. Once I saw a great ocean liner crossing the Atlantic on its way to New York. We were going south to the Mediterranean; it was going west and passed across our bows its speed so great that almost as we looked it was hull-down on the horizon. Yet even at that speed it would take five days to reach where I had now got—in speech at least—in a space of time measured by seconds. We have been making history and may not realise it; and history is the romance of life.

Telephone service to America has now become a procedure more or less routine. We make out tickets, render accounts, book calls, answer enquiries and in course of time it will all be regarded as an ordinary part of the day's work. Yet in an age of marvels, this is amongst the greatest, and one likes to think, sentimental though it be, that what might otherwise be a humdrum task may become alive with interest because coloured by the spell of wonder and romance.

J. F. S.

THE C.T.O. LIBRARY.

THE Annual Report of the C.T.O. Library for last year shows the Library to be in a very flourishing condition. Record figures were established during the year, no less than 42,781 books having been issued. The membership has increased from 2,000 to 2,495, the increase in the number of women members being very marked. The total number of books in the Library is rather more than 2,800.

The Library has been in existence for 39 years, but it hides its light under a bushel and not many officers outside the C.T.O. are even aware of its existence and of its value in increasing the amenities of life in the C.T.O.

THE TELEFUNKEN-KAROLUS-SIEMENS SYSTEM OF TELEPHOTOGRAPHY.

THE basic principles and methods adopted in practice in order to realise the electric transmission of images, are along the lines that electrical currents proportional to the shades and tints of the various points of the image to be transmitted should be successively transmitted to a receiver where they are then converted into luminous values. In the design of apparatus constructed with this end in view the supports or holders of such images are spread out upon cylinders which are made to revolve in perfect synchronism with similar cylinders at the receiving station while changing in the direction of their axes. By this method the elements of the image are successively manipulated by means of a small spot of light projected on to the cylinder. Two luminous relays are used, one at the transmitting station and one at the receiving station, these two relays having the respective functions of converting the light values into values of electrical currents and converting the electrical values into light values again, the latter being received on a sensitised plate.

By the courtesy of Messrs. Siemens and Halske of Siemenstadt it has been possible to publish the following outline description of the special telephotographic system mentioned above, together with the illustrations. No attempt has been made to give minute details. The system is undoubtedly an excellent one, and will naturally receive closer attention in the technical circles interested.

The actual transmission and reception of photographed printed matter dealt with by this system were recently witnessed by a number of engineers and practical telegraph experts, and the special means adopted for ensuring perfect synchronisation when utilising the system by radio appears to be particularly sound, although in this respect there was at the moment no opportunity of proving out this interesting point.

J. J. T.

For telephotographic transmission in the widest sense of the term, in which is included not only the transmission of actual objects but also writings and impressions of all possible description, the fineness of the image of the text transmitted cannot by guaranteed to the receiver unless a very small mesh of decomposition and very small photographic designs of the received image are used.

The fineness of the mesh necessitates that any single character must be formed of a large number of separate photographic marks say 100 to 200. If we desire to attain sufficiently high speeds of transmission with such a method, in which each character necessitates a quantity of impressions, only apparatus with negligible inertia must be employed for the electrical manipulation of the transmitted image and for the creation of the received image by the luminous-ray relay actuated by the received currents.

The telephotographic system about to be outlined has been developed by the triune collaboration of Telefunken Berlin, Professor Doctor Karolus of Leipzig and Siemens and Halske of Siemenstadt.

For the decomposition of the transmitted image and for its distant reproduction on film or photographic paper, revolving drums in synchronism are used, for which rotation is simultaneously combined, with a relative movement in phase with the optical transmitting system or receiver in the direction of the axle of the drum. The manipulation of the transmitting station and the exposal at the receiving station utilise the pointed end of a cone of intense light covering a space of only $\frac{1}{25}$ m.m., which follows a fine screw-thread of $\frac{1}{5}$ m.m. over the surface of the image to be transmitted, and as a result of the combined movements described.

For the electrical analysis reflection is used for the breaking up of the different tonalities of the original image, sketch, &c., to be transmitted. Thanks to the passage of the varying light and dark elements of the image under the luminous spot the rays are proportionally more or less reflected upon an open photo-electric cell. This cell is in ring form (Fig. 1) and is the special design of the Telefunken organisation. It permits the revolving drum which carries the original to be transmitted to be placed very near the photo-active surface of the potassium which intercepts the rays. In this manner nearly all the light coming from the surface of the image across the central opening of the ring is captured by reflection and it is thus possible to transmit the original document itself and to avoid the long process employed hitherto of an auxillary transparent image.

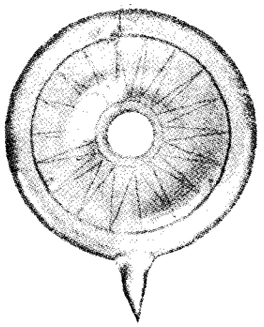


FIG. 1.—SIEMENS' PHOTO-ELECTRIC CELL.

This special photo-electric cell is practically without inertia, at least up to several hundreds of thousands of frequencies, and by reason of its great sensitiveness relatively low amplification may be used.

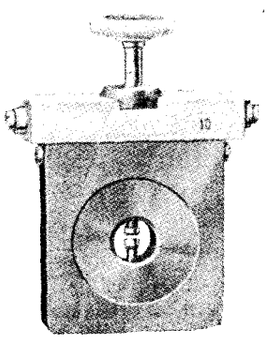


FIG. 2.—KAROLUS CELL.

The oscillations of the current, due to the light in the photo-electric cell (Fig. 1) are used, after suitable amplification, for the modulation of a carrier wave either for wireless transmission or for transmission over wire circuits.

After demodulation of the carried oscillations in the receiver, the low frequency received is led to the Karolus cell (Fig. 2) after suitable amplification of its tension: this varies with the nature of the manipulation and, according to the repartition of the elements of the transmitted image, i.e. their relative light and shade.

The latter cell is of entirely new design and is named after its inventor Dr. Karolus who has brought it to a very fine stage of perfection. The professor utilises the "Kerr" effect—double electric refraction of polarised light. It permits, without inertia, action upon the break-up of the cone of luminous rays reaching the film according to the oscillations of the received current. It is in fact a miniature condensor permeable to light and filled with nitrobenzine: the amplified low frequency is led to the small plates which constitute the electrodes. The light polarised by a *nicol* arrives at an angle of 45° with regard to the direction of the field.

In this electrical field it is decomposed into two rays which travel across the fluid at two different speeds. At their exit these are intersected by a second *nicol* and by reason of the elliptical polarisation, there results a different light intensity according to the tension of the excitation.

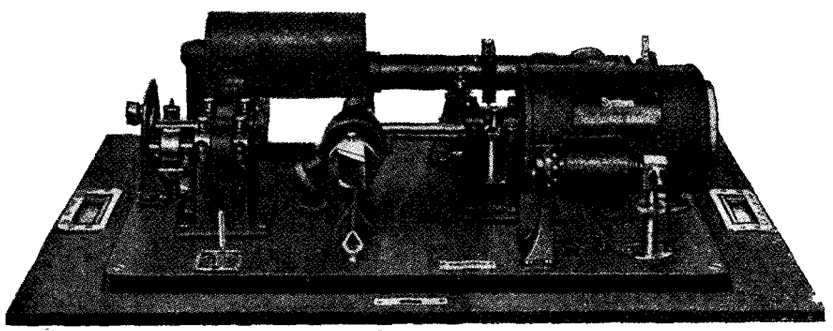


FIG. 3.—GENERAL VIEW OF EXPERIMENTAL SET OF SIEMENS' TELEPHOTOGRAPHIC APPARATUS AS USED FOR WIRELESS TRANSMISSION.

By reason of the absence of inertia of the "Kerr" effect up to extremely high frequencies (above 100 millions per second) it is now possible to attain very high speeds of transmission. Trials made between Berlin and Leipzig have furnished the following times of transmission. For an image 10 × 10 c.m. transmitted between Berlin and Leipzig by

(1) A pupinised telephone circuit = 90 seconds.

(2) By wireless on a wavelength of 850 metres } = 20 ,,

With the use of short waves this latter time should be capable of still further reduction. During the above-mentioned periods no less than 250,000 image-elements were actually transmitted in each case. Every detail of the sketches, small manuscript, or of the ordinary daily newspaper was reproduced with perfect definition. In the case of radio transmission to maintain absolute precision of synchronism between the transmitting and receiving apparatus a new method has been adopted by means of which synchronisation and phasing needs only to be adjusted once every 24 hours. The precision of this particular method is said to be in the neighbourhood of 1/100,000 of a revolution.

Fig. 3 shows a general view of an ordinary experimental set as used in conjunction with wireless tests between Leipzig and Berlin.

PHONOGRAM EQUIPMENT.

BY D. H. THOMSON.

ON page 71 of the January, 1927 (No. 142) issue of this JOURNAL is a brief description of the continuous panel ancillary phonogram equipment which is gradually being installed at some of the larger "appointed" offices. Further information on the subject may be of interest.

Fig. 1 gives a general view of the equipment at Sheffield which was the first office to be provided with more than twenty positions

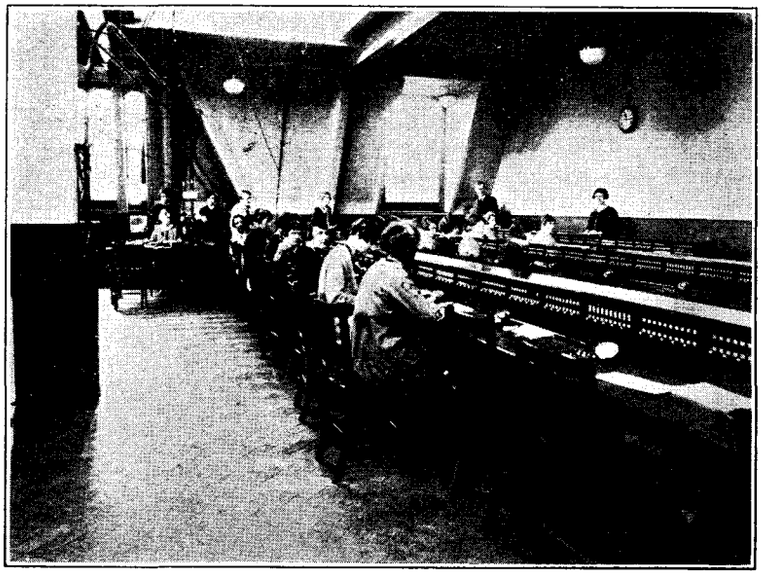


FIG. 1.—SHEFFIELD PHONOGRAM ROOM.

of the new pattern. Actually, there are equipped two "suites" each of twelve operator positions, and one of six positions (the latter can be seen in the background) but space is available on this suite for extension to twelve positions at a later date.

The panels are fixed uniformly along the back of ordinary standard telegraph tables slightly modified for the special conditions,

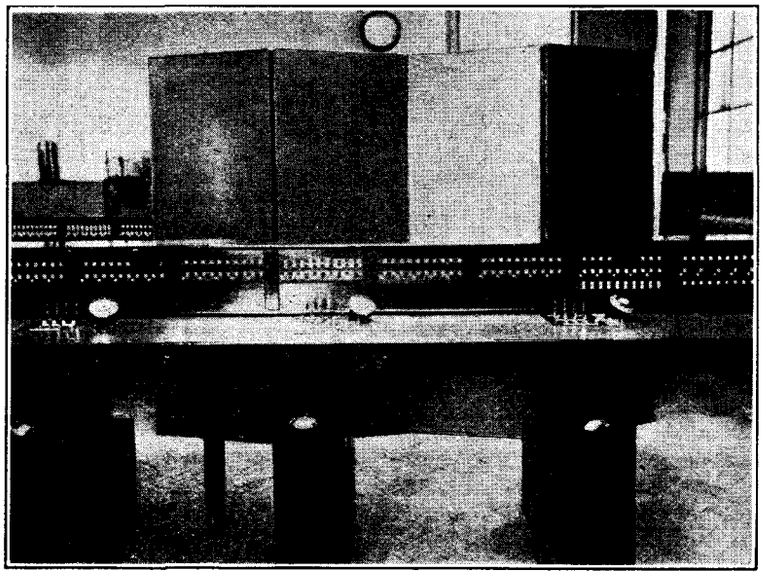


FIG. 2.

but, as the weight of the equipment is borne partly by the keyboard units, a front view of which is shewn more clearly in Fig. 2, ordinary table legs are required only at suitable intervals at the back of the tables. The keyboard units which contain the operator's cord circuit and associated apparatus, including plug and key shelf and supervisory lamps, are slipped into position by slotting the table top. A back view of the units in position is shewn in Fig. 3. Access to their interior is readily available back and front by means of

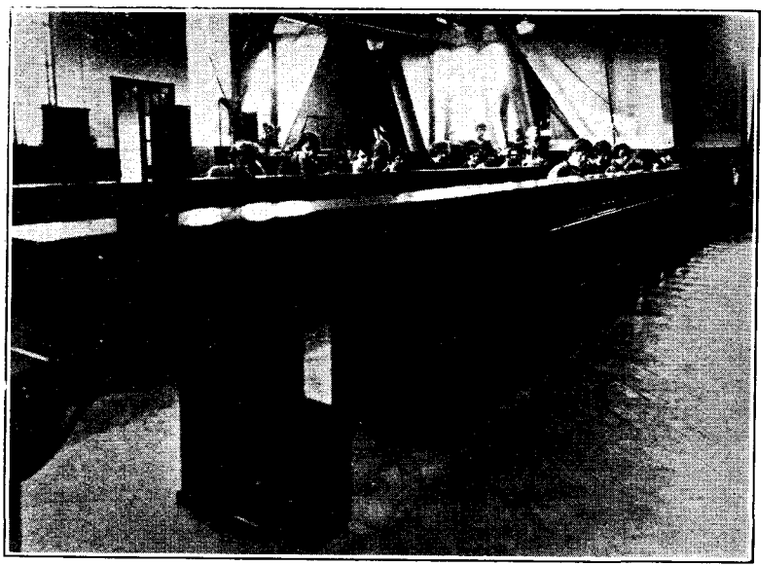


FIG. 3.

moveable panels. The position of the operator's instrument jack, in duplicate, and dial are also shewn in Fig. 2.

For concentration purposes the incoming circuits on the second and third suites are reproduced with calling lamps on two panels of the first suite and a key is associated with each circuit. These keys disconnect the calling lamps on the second and third suites and bring into use those on the concentrator positions and vice versa according to the position of the keys.

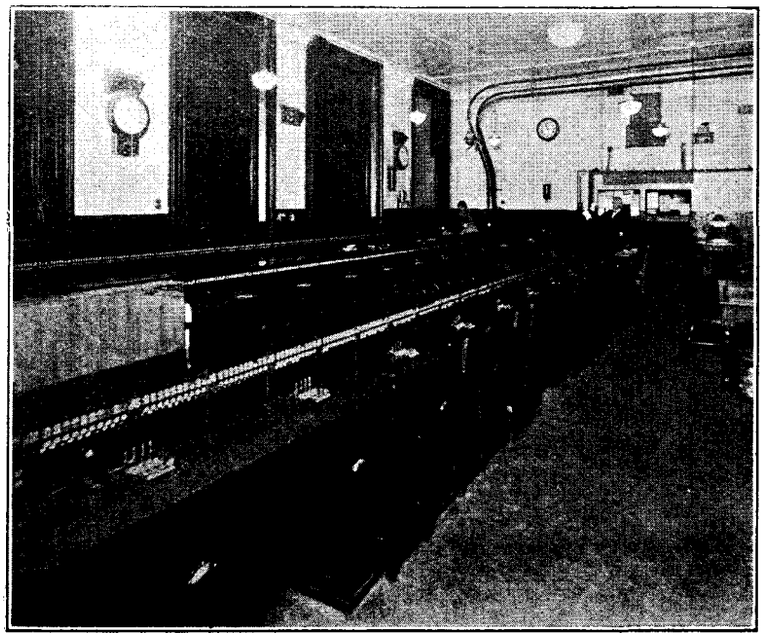


FIG. 4.—MANCHESTER PHONOGRAM ROOM.

Additional keys are provided for an extension of a group of circuits to the Telegraph Instrument Room during the periods when the Phonogram Room is closed.

An Information Desk is provided with circuits to the phonogram positions and others peculiar to the position. Calls for "Enquiries" may be received direct from the main local exchange, or from any phonogram position. Two pairs of double-ended cords are provided at each phonogram position so that when one pair is in use for extension to the Information Desk the other can be used for ordinary traffic.

On the Supervisors Desk listening lines terminating on the operators headsets are provided, in addition to other facilities.

Fig. 4 gives a general view of the new equipment at Manchester which was brought into use shortly after that at Sheffield. At

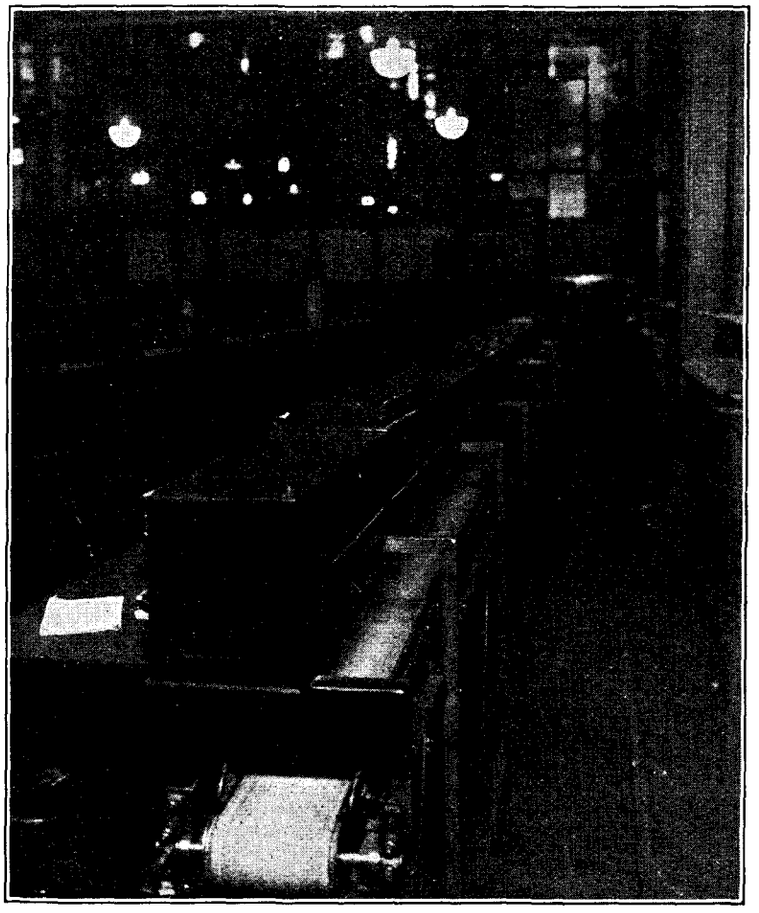


FIG. 5.

Manchester, however, forty-five positions have been provided, and, in view of the volume of A phonogram traffic the first suite of positions is fitted with a belt conveyor, which is shewn in Fig. 5. When the reception of an A phonogram is completed the relative form is "posted" on to the belt conveyor through a metal slot and conveyed to the date stamping and numbering point. A belt conveyor has also been provided at Liverpool where new equipment was brought into use on January 15.

The results obtained with the continuous panel equipment have been so satisfactory that consideration is being given to the question of installing experimentally at the Central Telegraph Office one or two suites of positions for A phonogram work.

The equipment at present in use at the Central Telegraph Office is of the concentrator type on a large scale. Until recently

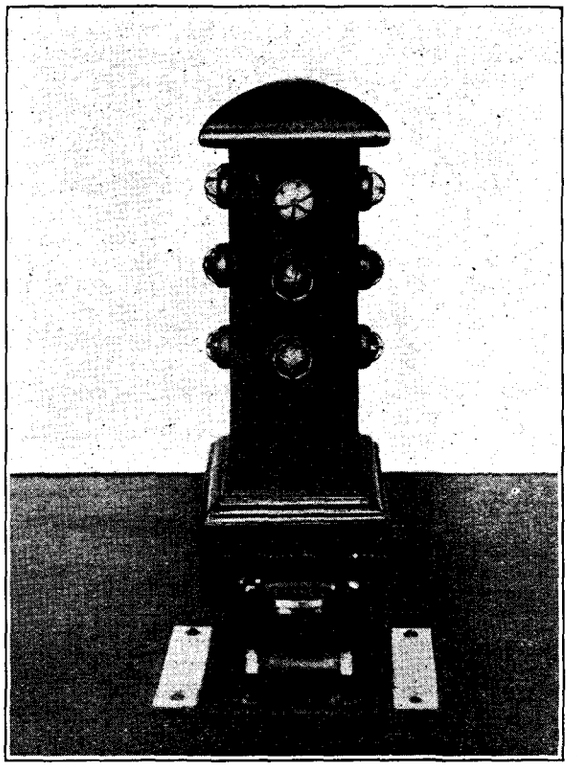


FIG. 6.

only one supervisory lamp was provided at the concentrator, and one at each phonogram operator position, in association with the operator's cord circuit; and in view of certain difficulties which were being experienced in answering and clearing it was considered desirable to modify this arrangement. Three supervisory lamps, W, G

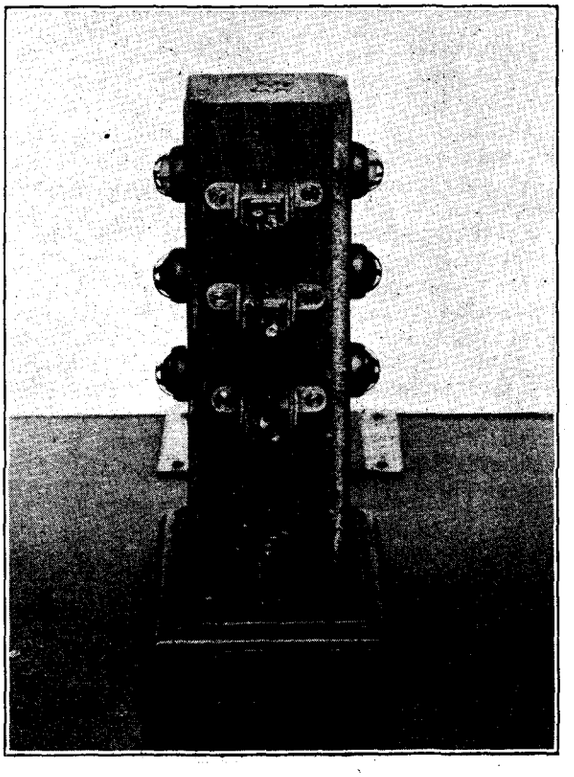


FIG. 7.

and R, Fig. 8, are now provided at each phonogram operator position P, and two, one white, W^1, and one red, R^1, at the concentrator, C, in association with each cord circuit. The lamps at P are accommodated in a small wooden pedestal, illustrated in Fig. 6. Three caps are associated in the same horizontal plane with each lamp, one on each side to assist supervision from any point, and one in the front of the pedestal. The top lamp cap is white, W, the centre green G, and the bottom red, R. The back of the pedestal, with cover removed, is shewn in Fig. 7. As formerly, two three-position keys A and B, locking in the forward (except B) and back positions, are provided at P, but the functions of key A have been slightly modified. When a call is received at C, the operator at that point inserts in the appropriate jack a plug on which is terminated a disengaged position P. Lamp W glows. The operator at P then presses key A to the speaking (back) position; lamp W darkens, lamp G glows, and continues to glow during the transaction until

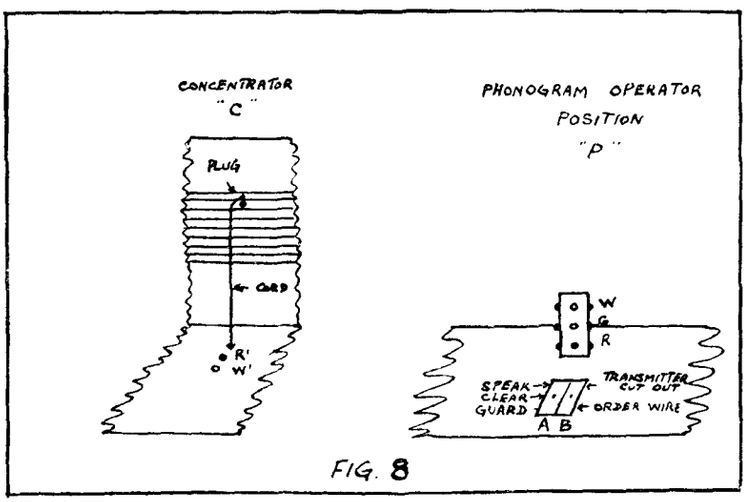


FIG. 8

the operator says "Good-bye" to the subscriber. If no further work has then to be done with the message key A should be restored to the normal or "clear" position, causing lamp G to darken, lamp W^1 at C to glow, and the calling supervisory lamp at the originating exchange to glow. If, however, there is further work to be done with the message when the operator at P says "Good-bye" to the subscriber, key A should be drawn to the forward position causing lamp G to darken, lamp R at P to glow, lamps W^1 and R^1 at C to glow and the calling supervisory at the originating exchange to glow. In other words the "clearing" signal is given to the concentrator, where the junction should be cleared, and the exchange as before but lamps R and R^1 will continue to glow until the operator at P restores key A to the normal or clear position. Lamps R and R^1 are therefore guard lamps, controlled by the operator at P, that indicate to the operator at C and the sectional supervisor respectively that the operator at P is temporarily not available, and that work incidental to actual reception is in hand. It will thus be seen that a visual indication is given of the various stages of a transaction. Further, if through inadvertence a call is extended to a position P which is not staffed, lamps W and W^1 (a clearing signal at C) will glow indicating the error to the concentrator operator and to the sectional supervisor.

These changes have proved to be distinctly beneficial to the quality of service and to the operating and the supervising staff.

PROMOTION.

MR. W. THYNE, Staff Officer, Glasgow, to District Manager, Canterbury. Prior to Mr. Thyne leaving Glasgow he was presented with a handsome "grandmother" clock by the staff.

THE TELEPHONE TIDE.*

BY HORACE DIVE, LONDON TELEPHONE SERVICE.

"SPEECH," wrote Emerson, "is power. Speech is to persuade, to convert, to compel." It is the most potent factor in human relationship, and those of us who, in our daily work, are concerned in widening the area over which a direct interchange of speech is possible or in other ways facilitating the interchange of ideas and information through the agency of the telephone, can take pleasure in the knowledge that we are fulfilling a task of real and lasting advantage to mankind, individually and collectively.

It is of undoubted value to each one of us to marshal our thoughts for presentation to another, and the point is well made by the great Lord Bacon in the following passage:—"Whosoever hath his mind taught with many thoughts, his wit and understanding do clarify and break up, in the communicating and discoursing with another. He tosseth his thoughts more easily, he marshalleth them more orderly, he seeth how they look when they are turned into words, finally he waxeth wiser than himself."

We may surely be truly proud of assisting others to wax wiser than themselves, by placing at their disposal greater and ever greater facilities for intercommunicating speech.

I want if I may to give you yet a further quotation—this time from Charles Dickens. One can understand his feelings when he wrote "the electric telegraph will never be a substitute for the face of a man, with his soul in it, encouraging another man to be brave and true." How true and yet in a measure how false in the light of the development of this time! Out of the electric telegraph has proceeded the telephone and as you are no doubt aware television as an accompaniment of telephony is something which we may expect to experience as an accomplished fact in the quite near future. We may therefore claim that whilst the electric telegraph may never be a substitute for the face of a man, yet it has provided the key which has unlocked the door to admit us to a state wherein we shall be able, no matter at what distance, to look into the face of a man, with his soul in it, and receive from or give to him courage to be brave and true. Let us hope the facility may always be used for such noble purposes. The development illustrates the danger of prophecies and sweeping statements.

I want to turn now to the coming of the telephone. Last year was its jubilee and in London we had a luncheon to celebrate that event. Oddly enough its jubilee has coincided with one in which Birmingham is greatly interested, that of the association of the house of Chamberlain with the activities of parliament, for it was in 1876 that the late Mr. Joseph Chamberlain was first returned to the House as one of the two representatives of your City. At Harrow School they have a song which sets out (I quote from memory):—

When Raleigh rose to fight the foes
We sprang to work and will.
When glory gave to Drake the——
She gave to us the Hill,
For we began, when they began
Our times' are one.
Their glory thus shall encircle us
Till time be done.

Something of the same sort might be written of the Chamberlains and the telephone. Certain it is that the association between that family and the Post Office is intimate and cordial. I remember as quite a junior officer in the Accountant-General's Department being greatly impressed on reading a long minute in Mr. Austin Chamberlain's handwriting. He had penned it at Balmoral when acting as Minister in attendance there, and although I do not now recall the precise matter to which it related I do remember most distinctly the joy one had in finding that a Postmaster-General could write a hand of delightful evenness and one which presented no difficulty of any kind in its reading. It was also absolutely to the point, as was that same gentleman's speech in the House of Commons when the Bill for the purchase of the National Telephone Company's undertaking was presented to the House several years later.

The inventor of the telephone—Alexander Graham Bell, died comparatively recently and the circumstances of his discovery were reported at length at the time so that they are still fresh in the mind. He was professor of vocal physiology in Boston University where he was concerned with the teaching of deaf mutes, and it was in association with this work that he became interested in the possibility of transmitting human speech electrically. The story of his research is picturesquely set out in the following letter which I have culled from an American Telephone Journal, but for the veracity of which I can take no responsibility. It purports to be addressed by James Smith to his wife Janet and to have been written while on a business trip to Boston, in June, 1875. It is dated June 2 and runs as follows:—

"Dear Janet,

Not very much to say to-day. Very hot here in Boston—I walk about with my tongue hanging out like a dog's. Went to see M. this morning. After that I did a few errands—one of which took me to Chas. Williams shop on Court Street, just off Scollay Square. A

*Paper read before the Birmingham Telephone Society.

noisier place I never hope to visit. By the way I met an amusing sort of chap there, quite by accident—blundered into his workshop looking for W. 'Beg pardon'—said I, and this chap looked up from a funny little thing he was tinkering with and smiled very pleasantly in an absent-minded sort of way—tall chap—thin—big nose—black hair—funny look about the eyes as though he were all worked up about something. Before going, I asked him out of curiosity what that thing was he was tinkering with. He looked queer for a minute—hesitated—then said it was a machine to carry the voice over a wire. I laughed, and backed out . . . Interesting looking chap—a bit cracked, though, evidently. . . . 'Voice over a wire'—Imagine! Yes, really quite mad, you know.

Well, I must stop—write soon—how is Fanny?—Yours ever,
JAMES."

That very afternoon, in a tiny shop on Court Street, the full twang of a clock spring was reproduced over an electrified wire for the first time, and Alexander Graham Bell—a "tall chap—thin—big nose—black hair," had invented the Telephone.

The first audible words were received by telephone on March 10, 1876, when Bell called "Mr. Watson, come here, I want you" and those words were duly transmitted to another room in which Mr. Watson then was.

As with most entirely new inventions it was at first difficult to get it taken seriously, but its real value and undoubted possibilities could not fail to win ultimate success, and whatever may have been the case in other parts of this country it was in 1879 that the first telephone exchange was opened in London with seven subscribers. It was housed in Coleman Street and subscribers increased so rapidly that the next year further exchanges were opened at Mincing Lane, Leadenhall Street, Queen Victoria Street, Eastcheap, and Chancery Lane. By 1885 the number of exchanges had increased to 13, but so conservative were the Company in their anticipations of development that they retained one sequence of numbers for London as a whole, dividing them amongst the various exchanges. In those days each telephonist's position had accommodation for 48 subscribers arranged in consecutive order. It was a simple matter to set up a connexion when the calling and called subscribers worked on the same operator's position, but for the purpose of effecting calls through other positions and exchanges special strips were provided to afford intercommunication. It was the practice for operators wanting numbers on other positions to shout their requirements across the room. Imagine the conditions in an exchange of 500 lines (large in those days but now regarded as quite small). In these days manual exchanges to provide for as many as 10,000 subscribers are quite common with facilities for intercommunication to the whole of Great Britain and Ireland as well as large areas on the Continent, and with perhaps 250 telephonists seated at the switchboards—yet connexions will be set up rapidly and with a minimum of noise or effort.

As illustrative of the growth of the telephone service in London it is interesting to note that about 25 years ago one individual, a lad, was able to deal with the compilation of the London Telephone Directory.* He was also responsible for issuing works orders for new lines and alterations. These duties at the present time occupy more than 70 persons.

In the early days the operating was done by boys, and no very great care was exercised in their choice either, whilst nowadays (except at night) the work is almost entirely carried out by women and girls in whose selection the greatest possible care is exercised in order to secure the right type. In that connexion I was struck when reading some years ago the Annals and Memoirs of the Court of Pekin, to notice the remarkable similarity between the methods adopted in China, in 1621, to find a suitable helpmeet for the Emperor Tsi Tsing, then aged 16, and the methods applied in the London Telephone Service in selecting telephonists.

The whole empire was notified that comely maidens between the ages of 13 and 16 were eligible, after which the examiners made an eliminating inspection. Those whose height or figure failed to reach the required standard were weeded out until the number was reduced to 4,000. On the following day a much more careful scrutiny was conducted by the two head examiners, who made copious notes of each damsel's features, size of nose, colour of hair, shape of waist and length of foot. Each maiden was required to state clearly her name, age and lineage; if the timbre of her voice did not satisfy the examiners, she was at once rejected. Stammering or thickness of speech was regarded as an insuperable defect. As a result of this scrutiny only 2,000 remained eligible, and on the following day further physical measurements were made, in addition to which each candidate was required to walk a hundred paces in order that her deportment might be observed. Any slovenliness of gait or lack of dignity disqualified the candidate: after this test only 1,000 remained. These were then taken into the Inner Palace where they were subjected to a searching scrutiny by discreet and elderly women of the Palace. Three hundred were ultimately chosen to undergo a month's probation as Palace handmaidens. Those amongst them who shewed signs of stubbornness or of frivolous disposition were weeded out until at the end of the month only 50 remained.

That description with slight modification could be held to outline very closely the course followed in securing the best possible telephone operating staff for London, and, notwithstanding Press criticism, it is certain that a high standard of efficiency is secured.

I do not doubt that you in Birmingham are equally exacting in your tests and equally fortunate in your results. But good as are the recruits for the telephone service one wonders if, by the application of some of the latest suggestions of medical experts, even more excellent results might be secured. For instance, I was reading quite recently that Dr. Alfred A. Mumford, medical officer of the Manchester Grammar School, had published in the *British Medical Journal* his conclusion that schoolboys who show a greater degree of buoyancy in the swimming baths do better in examinations than boys who are less buoyant. That is a conclusion arrived at after a careful study made by the Manchester Medical Society, founded as long ago as 1834. I cannot say how far it might be possible in selecting telephonists to apply such a test, but I do know that all the larger exchanges in London and many of the less large have most successful swimming clubs, and the girls of the London Telephone Service have individually and in teams won a large proportion of the trophies open to women for aquatics. Another report which interested me greatly was that of Sir George Newman, in his capacity as Chief Medical Officer of the Board of Education, and covering the year 1925. Therein he draws attention to the remarkable effect produced (again on boys, though it is not to be doubted the results would be similar in the case of girls) by a daily drink of milk in the middle of the morning. The boys enjoying this daily draught were found to develop additional height and weight, but over and above all to acquire greatly increased vitality. In London, on certain duties, telephonists have been allowed experimentally what for want of a more exact description has been known as a milk relief. The machinery for releasing the girls in turn in the middle of the morning busy period has, however, been found difficult of organisation, and anyone who has had experience of a telephone exchange at such a time can realise the disadvantage of these interruptions to the smooth conduct of the work. If however, further experiments outside the exchange confirm the deductions set out by Sir George, one can imagine that it would be to the advantage of all—telephonists and the Post Office as an employer alike—for the latter to arrange for a daily draught of milk to be supplied to each of the staff at the board at an appropriate hour in the morning, much in the same way as I have reason to believe tea is distributed in the afternoon to our confrères of the telegraph service. I think I ought to refer to one other report before passing from this aspect of affairs, and that is the report of the Treloar Home at Alton where the little patients are given the benefit of the application of the latest theories on the curative properties of sunlight. Sir Henry Ganvain says the effects of the sunlight treatment on these children are most remarkable. It is practically unknown for them to suffer from colds, and they are mentally a year ahead of the ordinary London child. Here is certainly full justification for the practice of the post office in placing its switchrooms on the top floors of telephone buildings and as far as possible locating the welfare quarters where they may enjoy a southern aspect. When the advantages claimed for the new type of glass which admits the beneficent ultra-violet rays of the sun have been finally proved and the cost of such glass more closely approaches that of other glass, I have no doubt that we shall have it supplied as a matter of course in post office buildings. Already I make bold to say that the telephone staff of the department, of which I have a fairly close knowledge, is full of energy, vitality and an unwearying sense of service, so I can safely leave to your imagination what an atmosphere of exhilaration will pervade the switch-room of the future when the buoyancy test is regularly applied and the full effects of milk and sunshine are adding their invigorating influences to an already first class community.

This is rather a digression and I must return to the earlier years.

As the number of subscribers increased it became necessary to provide in the exchanges equipment which would facilitate the connexion of any one subscriber to any other, and the telephone engineers of the day designed what is known as the multiple type of switchboard. Under this type, as its name suggests, there was provided a multiple or multiplication of the lines on the exchange so that the operators taking calls from subscribers on that exchange were in a position to make a connexion to any other subscriber on that exchange without assistance.

The switchboard then regarded as standard (and several remain in use in London to-day) were of the "magneto" type under which the subscriber gave the signal to the exchange on an indicator which was operated by a magneto current produced by the turning of the handle of a generator fitted to the telephone. It was necessary for local batteries to be associated with each subscriber's telephone and the chief trouble was, from a maintenance point of view, the gradual exhaustion of these batteries and their necessary renewal, whilst from an operating point of view the telephonist had no supervision of the calls connected at her switchboard.

With the introduction of the central battery type, the first example of which in London was opened at Kensington in 1901, the difficulties just named were overcome. Local batteries were dispensed with and all that was necessary in order to call the telephonist was the removal of the telephone from the hook. In addition the telephonist had now the benefit of what are known as supervisory signals and was able to keep in close touch with the progress of the call.

There is no doubt that the introduction of the central battery system conferred a great benefit on the telephone subscriber, and the presentser vice in a large area like London could not be given with the magneto system.

All exchanges in London within the 10-mile circle of Oxford Circus now work on the central battery system, which has itself been considerably improved chiefly by the addition of automatic aids.

*This refers to the Directory for the Post Office system in London; not to that for the larger National system.

Within the last few years the automatic or machine switching method of making connexion between subscribers has reached a degree of importance and its early advent in London is anticipated. It will no doubt bring in its train new problems, and both in London and Birmingham (where automatics are also to arrive soon) we must prepare ourselves to meet these problems.

The Post Office, as you know, is not only at pains to secure the highest possible grade of staff for employment in its service, but also takes care that the recruits shall receive a thorough and careful training. In London we certainly have a model operating school to prepare the student telephonist for work in manual exchanges, and the department has in hand arrangements for providing an equally efficient school for training the staff in the processes necessary for handling efficiently the manual work arising in connexion with automatic exchanges. Every effort is made to simplify and make smooth the work of the telephonist by providing her with standard expressions to meet all the normal steps in the operation of a call. These expressions afford opportunities for facetious exploitation by the writers in consciously and unconsciously humorous journals, and it is possible that at times those for whose help and guidance the expressions are standardised may find them a little irksome. It is well-known that in the training of children one of the things against which many of them fight valiently is the enforcement of standard expressions of civility. Some kindly person gives to a small boy or girl a sweetie and its mother or nurse urges it often in vain to say "ta." The same difficulty arises when the child is being taught the standard formula in which to present a request for food or other requirement—"If you please may I have." In course of time the standard expression is adopted and undoubtedly does much to sweeten the relationships in a community of individuals. The use of standard expressions being of real advantage in the wider field of ordinary human relationships it is easy to appreciate its special advantages in the conduct of a service, such as the telephone service, one definite requirement of which is that it should be conducted free from misunderstandings and with the maximum of speed which can be achieved consistently with efficiency. It is well, therefore, that the subscriber should know the terms in which a particular condition will be communicated to him; and that the telephonist should have ready an accepted form of words in which to advise the subscriber of difficulties or keep him in touch with the progress of a call. It is the unexpected that happens, and if the telephonist *met by an unusual circumstance deals with it in the spirit and tone set by* the standard expression she will, I am sure, gain nothing but praise from those who supervise her work. That even the most carefully worded standard expression can be mistaken at times is evidenced by an experience which a London Information Desk officer had on one occasion of general pressure, when a complaining subscriber told her that she had asked repeatedly for a particular number and all the telephonist would tell her was that "the Johnsons are engaged." "I know nothing of the Johnsons," said the complainant, "and am not interested whether they are or are not engaged." The telephonist had actually been trying to make the caller understand that the "*junctions*" were engaged. The story serves to illustrate how essential in telephone operating is clearness of speech.

To help the telephonist in her difficulties is the supervisor, an individual at once firm and of honeyed sweetness. If she has to correct a telephonist she does it in the spirit of Roger Ascham, who you will remember was the tutor of Lady Jane Grey and an individual of extraordinary enlightment. "If" says he, "your scholar do miss sometimes, chide not hastily, for that shall both dull his wit and discourage his diligence, but monish him gently, which shall make him both willing to amend and glad to go forward in love and hope of learning."

(*To be continued.*)

MACHINE TELEGRAPHY.*

BY A. P. OGILVIE, HEADQUARTERS TRAFFIC SECTION.

As a schoolboy I remember being greatly interested in the erection of a large building with inner walls of beautiful white glazed tiles. When I learned that this, to my eyes, beautiful structure was to be used as a model bakery, admiration and wonder are the only words which adequately described my feelings. Hitherto my experience of bakeries had been gained from illicit peeps into gloomy, evil smelling cellars, insanitary and ill ventilated, from which were emitted hot stuffy smells not always appetising and savoury.

As my fairy palace was nearing completion I overheard a conversation of which it was the subject and I was grievously pained to learn—as all proverbial eavesdroppers do—some bad news. Monsters were to be confined within the white shiny walls to steal away the livelihood of those phantom shapes which flitted to and fro in the gloom of the underground cellars; our daily bread was to degenerate to a mass resembling a piece of oily waste. This was a plot to foist on to unsuspecting housewives a conglomeration, known as "machine-made bread," devoid of taste and flavour. Wheels and levers were to take the place of hands, and—if all be true—feet, of honest and perhaps underpaid men who for years had kneaded and tramped dough in their efforts to build up worthy sons and daughters of a Merry England.

That conversation made a great impression on my young mind and I marvelled later at the apparent success of the venture. I felt guilty and hesitant the first time I ate a piece of machine-made loaf but it tasted good and, although it interested me little then, I learned that it was cheaper than the others.

Two years ago those memories came back to me as I stood before an exhibit at Wembley. White clad figures controlled the operations of another monster which gobbled up flour and water at one end and delivered at the other crisp, well-baked loaves nicely wrapped in paper. The remarks I overheard then were more complimentary—"Isn't it wonderfully clean and hygienic! I wonder why all bread is not baked and wrapped like that" and so on. The moral is, I think, obvious.

For many years the Morse alphabet has dominated our working lives. We have dwelt in an atmosphere of dots and dashes. By its aid courtships have been made and broken, lives have been sweetened and saddened. Its devotees cannot see the passing of so old a friend without a touch of tender regret and, perchance, sorrow. We fain would remember only the virtues, the glories of the past, but in truth it must be said in fairness to the friends who now woo our favour that beneath the film of sentiment and romance there lie other memories of travail and bitterness.

When all is said and done the machine telegraph has been very patient. Eighty years ago one, of the name of Highton, with a genius unrecognised in his age, suggested a system of telegraphing which contained the elements of the modern telegraphic machinery. His system consisted of a transmitter with six keys or tappers connected in three pairs, which were operated by depressing appropriate keys—as we now do Baudot keys. Permutations of an equal unit alphabet were transmitted. At the receiving station the combination was set up on a series of six electromagneto and by means of sliding rods a printer was actuated which translated the signals and printed the characters on paper. It is believed that this system contained the first hint of making use of a printer with typebars for printing on a circular platen. Poor Mr. Highton, half his application and genius devoted to the production of a typewriter for commercial purposes might have made him a millionaire and gained for him immortal glory! As it was his machine telegraph needed three wires to work and, as his inspiration did not carry him to a conception of multiplex, the Highton system remained an unfulfilled promise.

Over a long period only two machine systems achieved a measure of success, the Hughes invented in 1854 and the Baudot multiplex first introduced in 1874. Hughes machines were installed on several circuits in this country but have since been superseded except on cross-channel circuits in the Foreign Gallery of the Central Telegraph Office. The Hughes system enjoyed and continues to enjoy a much greater vogue in other European countries, but the march of multiplex threatens to sweep it from international routes at any rate. The multiplex invented by Emile Baudot had none too happy a childhood and Baudot worn out by privation, overwork, and worry, ended his days in a madhouse. His invention was not an immediate success even in his own country and it was not until 1897 that a set was installed in this country on an Anglo-French circuit. Originally the system was worked simplex, two arms on a quadruple set being employed for sending and two arms for receiving, but in 1905 Colonel Booth arranged the system for duplex working thereby doubling the capacity of line and apparatus.

Some three years prior to this date Mr. Donald Murray brought to the notice of the British Post Office a high speed printing telegraph with a five unit alphabet. Telegrams were prepared for transmission on a type keyboard machine by perforating a tape which was collected and passed through a transmitter running at high speed as in Wheatstone working. At the receiving station the perforated tape was reproduced by a receiver moving in unison with the transmitter and subsequently passed through a translating typewriter which printed the telegrams on a roll of forms. Mr. Murray's original intention was to transmit press telegrams so that the received perforated tape could be used to actuate a linotype machine, thus avoiding the operations of translation and resetting.

The Murray Automatic system was first installed in this country between London and Edinburgh and later between other offices; subsequently it was withdrawn, and Mr. Murray, profiting no doubt by the experience of these trials, developed the apparatus which is now known as the Murray Multiplex. Murray may be said to have modernised the multiplex system and Mr. H. H. Harrison, the well-known authority on printing telegraphs has said of him:—"To Donald Murray must be given the credit of first clearly laying down the broad principles on which a printing telegraph should be designed."

At this time—between 1902 and 1905—the Morse sounder held pride of place in the British and American telegraph organisations. Large centres were served by duplex and quadruplex Morse channels involving in some cases the use of from ten to fifteen wires. The standard of operating skill was high and on occasion excellent results were obtained: on the other hand perpetual key operating was baneful in its effect on the staff and the output on many circuits was quite disproportionate to the energy expended. While channels were numerous—to our minds extravagantly so—the traffic carrying capacity of each was comparatively low. Sudden fluctuations in the incidence of the work were not easily overtaken unless large reserves of staff and lines were available and as recourse to Wheatstone was discouraged congestion on the main routes was not infrequent. Some change became imperative. It was hastened by the appearance of the Creed, an invention which revived hopes in those who pinned their faith, and with much reason, to the ubiquity of the Morse. Mr. Creed may be said to have modernised Wheatstone as Murray has the Multiplex.

The appearance of the Creed Receiver and Printer ended the days of Morse operating on the main routes of the British Post Office service. Instead

*Paper read before the Birmingham Post, Telegraph and Telephone Society on Jan. 12, 1927.

of a multiplicity of hand worked channels and wires, one or two circuits equipped with high speed Wheatstone and Creed apparatus were substituted. This development was materially assisted by the production of keyboard machine perforators. Many were tried and the proverbial few chosen. Gell's machines were the first to reach the standard required and a number were brought into use. Later another perforator made by Kleinschmidt made a good impression, and it shared with the " Gell " in the continuous Wheatstone development then taking place. It may be interesting to mention here that Mr. Creed invented a type-keyboard perforator in those early days which was actuated like his reperforator by air pressure but it was not developed commercially. Within recent years however a new Creed Wheatstone perforator of an advanced design has been introduced with success.

In the midst of this renewed activity in Wheatstone there came a direct challenge from the multiplex. An underground loop between London and Birmingham was equipped with quadruple duplex Baudot apparatus, afterwards extended to afford duplex working on six arms. Satisfactory results led to other circuits being similarly equipped and there arose a rivalry between what may be described as the Morse school and the multiplex school as to which system should be standardised. To settle the matter the Postmaster-General appointed a Committee to " enquire into systems of High Speed Telegraphy and to report thereon." It was a Committee of talents, and the report was a masterly survey of the position which has been accepted ever since as a charter for the telegraph administrator.

For the purpose of this paper I should like to quote briefly a few of the conclusions :—

(1) Systems on the multiplex principle are definitely superior to the automatic high speed systems on the large majority of main circuits for ordinary inland commercial telegraph work.

(2) The application of type-keyboard signalling instruments to the present Baudot circuits is desirable.

(3) Of the multiplex systems at present available the Western Electric has given the best results.

It will thus be seen that the policy of what is now referred to as autoplex or automatic multiplex working was determined by the acceptance of the Norton Report some ten years ago.

The outbreak of war lead to the withdrawal of Morse operators from the Post Office and accelerated the installation of Baudot apparatus for which temporary operators could be trained more readily than for Morse, and by 1920 multiplex had replaced Wheatstone Creed and morse sounder on all the main routes.

While this change from Morse to multiplex was generally and fundamentally successful certain detail improvements have been essential. There had to be, as in many other conversions, a process of cleaning up after the major changes were completed. The stability of many circuits fell short of the standard anticipated and a small Committee was asked in 1922 to enquire into the causes of instability in multiplex working and to make recommendations accordingly. The conclusions arrived at after consultation with supervising and dirigeur officers and representatives from the local engineering staffs throughout the country, were favourable to certain changes being made and it was arranged to standardise the use of several features such as :—

Mechanical correction
Retransmitters on divided circuits
Silver strip brushes, and
Adjustable weight vibrators.

It can now be said that these alterations, together with a more extensive experience in multiplex working on the part of the staff, have reduced the time lost owing to stoppages for apparatus trouble to less than 50% of the previous figure, and the improvement continues.

Having exploited the Baudot system successfully and having reached a degree of stability that is satisfactory it may be asked : " Why not rest content ? " " If the telegraph service is decadent, why torture its last moments by innovation and change ? " Reasonable questions perhaps of weary men and women numbed with a sense of disappointment but indicative of a despair as fatal as the contentment and lethargy of a victim of a narcotic. We cannot afford to stand still. In its present economic position the telegraph system must progress or perish. On the authority of the Accountant-General the cost of an inland telegram amounts to 1*s.* 8*d.* while the revenue received averages 1*s.* 3*d.*—a deficiency of 5*d.* on each telegram handed in. That figure may or may not be possible of reduction by allowances for public utility services but such adjustments would not materially affect the irresistible fact that viewed as a business proposition—and that is how it is viewed by the average taxpayer—the telegraph system is a subsidised industry. It would be out of place in this paper to discuss the soundness of that point of view, the fact to be faced is that it exists and will continue to exist to the detriment of the service until a more favourable balance sheet can be presented. With telephones shewing a profit and telegraphs a loss, the tendency will be for capital to be more readily available for telephones and for a more kindly eye to be turned to their development.

I am in entire agreement personally with efforts to attract traffic but it seems to me that the first step towards reducing the price of a telegram should be to produce it at less cost, in other words to make the system more productive. Can this be done ?

An analysis of the items which go to make up the cost of dealing with a telegram shews that 80% of the expenditure is apportioned to staff costs, and 20% to plant costs. Granted that we all agree that a reduction in the price of a telegram is desirable, even imperative, to maintain and develop the telegraph organism, the comparatively large proportion of costs required to meet operating charges forces attention to the question of improving output, not by additional pressure on the individual but by arranging for better machinery and improved organisation. Let me dispel any misapprehension on this point. In staffing, say, concentrator Morse sets and a Baudot position the basic standards taken would not be the same. In both cases you might have an hourly traffic of 48 telegrams, but two operator hours would be scheduled for the concentrator sets and one operator for the Baudot position. I should, I imagine, get little support if I argued that the Baudot operator in these circumstances worked twice as hard as the Morse operators or expended more mental and physical energy. Output, therefore, is largely a matter of making it easy for operators to do work for which they are fitted, and it is in the direction of providing up-to-date machinery, careful and thorough training and comfortable well organised conditions that I personally look for improvement in the economic position of the telegraphs. Until such an improvement is in evidence a reduction in charges is unlikely and without that the scope of the telegraph will be further circumscribed as competitive services become cheaper and more efficient.

Superior as the Baudot system may be to others which it has superseded it is surely not the final word in telegraphic progress. The Baudot five-tapper key for example is an anachronism. An operator skilled in Baudot key manipulation cannot apply that skill to any other system or machine and is in consequence, so much less valuable. Then the restriction to five fingers of the movements involved in signalling is not good practice : it develops the use of certain digital muscles and nerves, leaving the remaining fingers and thumbs idle and somewhat in the way. A maximum signalling speed of 30 words a minute which is dependent on the acceptance of every available cadence is also comparatively slow, especially as with the additional work of numbering, timing and signing telegrams the operator can only maintain an effective speed of approximately 25 words a minute.

These considerations have influenced the policy of newer countries and in our Dominions and in the United States the multiplex system is developed mainly on the lines suggested by Murray, that is with type-keyboard manipulation, automatic transmission and tape or column printing, an arrangement which has become known as autoplex or automatic multiplex.

The advantages are material. The total speed of the circuit can be increased without intensifying the task of the signalling operator or increasing the wastefulness of lost cadences. A type-keyboard perforator and a transmitter are available for signalling on each arm, but the perforator is not connected with the line circuit and the operator is free to work on the keyboard at his or her natural speed. The perforator mechanism will respond readily to the speed of the fastest operator and as readily to the speed of the slowest. Permutations of the five-unit alphabet—either the Baudot or the Murray arrangement—are punched across a broad tape which feeds into an automatic transmitter, fitted in close proximity to the perforator. The automatic transmitter takes the place of the five tapper key in the circuit and is driven by the cadence impulse which in manual working produces an audible signal. These arrangements in actual practice have rendered possible an increase in the circuit speed of quadruple multiplex from 120 to 140 and 160 words a minute, representing an improvement in the maximum signalling capacity of from 17 to 33%. In addition, the relationship between the operator and the line speed has altered. Instead of being controlled by cadences, many of which are ineffective from a productive point of view, the operator is free to prepare and store up telegrams in the form of perforated tape at a much faster rate than they are transmitted and so make possible the use of practically every cadence by keeping the transmitter continuously fed. The saving in line time which this feature alone has effected represents in practice an increase of about 16% in output as compared with manual signalling.

It is claimed therefore that automatic transmission on a quadruple multiplex circuit working at 140 words a minute (a channel speed of 35 words a minute) provides a traffic carrying capacity at least 30% greater than that of manual Baudot.

(*To be continued.*)

REPORT OF TELEPHONE PROGRESS IN THE SHEFFIELD DISTRICT

DURING THE YEAR ENDED DECEMBER 31, 1926. (ABRIDGED.)

IN addition to the City of Sheffield the district comprises the towns of Rotherham, Barnsley, Chesterfield and Worksop, together with their immediate surroundings, covering altogether an area of about 750 square miles and containing a population of approximately 1,270,000.

In spite of trade depression and the coal dispute, which seriously affect the development of industrial districts such as this, the numbers of telephone stations has increased by 1,243, the total number now being 22,076.

Exchanges.—There are now 49 exchanges in the district, every part of which is well covered.

In order to provide accommodation for the increasing number of subscribers three exchanges (Goldthorpe, Grindleford and Royston) have been removed to more commodious premises and switchboard extensions have been carried out at seven exchanges (Bamford, Cudworth, Dronfield, Hoyland, Maltby, Rotherham and West).

Call Offices and Street Kiosks.—

		Increase during 1926.
Number of Call Offices working (including Kiosks)	453	42

207 kiosks are now in use, having been installed in nearly every populous part of the district. Many have also been provided in the smaller towns and villages. The outstanding advantage of kiosks is their availability for service at any time of day or night, and judging by the extent to which they are used it is evident that they are appreciated by the public.

Local Calls.—The number of effective local calls during the year reached a total of about 14,000,000, being nearly 4% above the total during the previous year. This figure would have been higher but for the general trade depression.

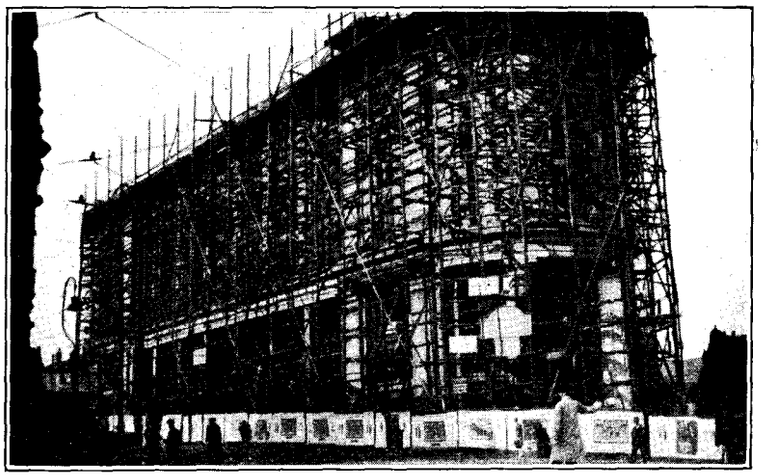
Trunk Calls.—The number of effective Trunk calls during the year amounted to about 1,500,000, being 2% above the figure for the previous year. This comparatively small increase was due to the unsettled industrial situation.

Telegrams by Telephone.—

Number of Telegrams received from the public during the year	140,656
Number of telegrams telephoned to subscribers	125,819
Total	266,475

For dealing with telegrams by telephone new and improved apparatus has been installed and is now working at the Sheffield Head Post Office.

New Trunk and Junction Circuits.—60 additional circuits connecting one exchange with another have been provided during the year and every part of the district is well supplied with circuits.



PRESENT STATE OF NEW TELEPHONE BUILDING, SHEFFIELD.

Main Underground Cables.—During 1926 a new cable was completed between Sheffield and Rotherham, providing additional direct underground communication between these two places. A new duct and cable have also been completed and brought into use between Sheffield and Worksop. The duct line has been extended from Worksop to Mansfield in preparation for a new cable which it is proposed to provide in 1927.

Wire Mileage.—Additional line plant has been provided during the past year. The mileages of open and underground wire in 1925 and 1926 are shown below :—

	1925.	1926.
Open Wire	21,034	21,316
Underground Wire	97,771	107,429

Automatic Exchanges.—During the year automatic exchanges have been opened at Chesterfield and Staveley and it is anticipated that the Sheffield automatic scheme will be working early in 1927. At Sheffield it has been necessary to provide ten new exchanges, of which nine will be purely automatic, the other one being at the Head Post Office where the whole of the operating staff will be stationed and will deal with Trunk calls, special services, enquiries, &c.

In addition to the large building now being completed at West Street, Sheffield, new buildings have had to be erected for the exchanges at Beauchief, Oughtibridge, Owlerton, Sharrow, and Woodhouse. In the other cases, existing buildings have been adapted to meet the new requirements. Over 10,000 subscribers are involved in the scheme.

Service.—The service rendered to subscribers has been kept under continuous review, the operating of 5,923 calls having been specially observed during the year. The average time of answering subscribers' calling signals was 4.89 seconds, 72.25% of the calls being answered in five seconds or less. The average time taken by telephonists to disconnect calls after receipt of subscriber's clearing signal was 4.69 seconds.

Operating School.—During the past year 34 pupils were in training for posts in the exchanges.

Post Office representatives have visited 505 Private Branch Exchanges where they have given instruction to the subscribers' own operators in the manipulation of the apparatus.

Telephone Removals.—The work involved in removing subscribers' apparatus from one position to another, &c., is considerable, over 1,000 such items having been dealt with during the year.

E. GOMERSALL, *Superintending Engineer, North Midland Engineering District.*

A. SIRETT, *Postmaster-Surveyor, Sheffield.*

DEATH OF MISS GRAHAM, NEWCASTLE-ON-TYNE.

IT is with the deepest regret that we have to record the death, on Jan. 30, of Miss Graham, Supervisor of the Newcastle-on-Tyne Central Exchange. Miss Graham was at work to within two days of her death, apparently in her usual health, and her passing came as a great shock to her many friends and colleagues.

Possessing an outstanding personality, capable and efficient, with a keen sense of humour, she had a way of extracting the best from those under her and in return took infinite pains to improve the working conditions of her staff.

When one reviews the details of her service one indeed realises the growth of the telephone system. Joining the service of the Northern District Telephone Company at Tyne Dock Exchange as a telephonist in 1889 at a time when girls were beginning to take the place of boy operators, Miss Graham was transferred to South Shields six months later, and in 1890 she was appointed Clerk-in-Charge at Newcastle. The District office at that time was at Sunderland, Newcastle being only a secondary office having less than 300 exchange lines, the exchange being housed in most unsuitable premises in the basement of Exchange Buildings, on the Quayside. In 1896 a transfer was made to the present premises which, commodious at one time, are now taxed to their limit to accommodate the thousands of subscribers' lines which have been added during Miss Graham's service. In all she has

served under seven District Managers, Mr. Clay, Mr. Bailey, Mr. Wormull, Mr. Drummond, Mr. Worte, Mr. Archer Smith, and the present District Manager, Mr. J. D. W. Stewart.

Miss Graham was a great organiser, and, apart from official duties, such institutions and charities as the Newcastle Royal Infirmary, Dr. Barnardo's Homes, "War Seals," and Poor Children's Holiday Associations have reason to thank her for her fine work on their behalf.

The funeral took place at Harton Cemetery, South Shields, on Feb. 1, and amongst those members of the staff present to pay a last tribute of esteem and affection were :—Mr. J. D. W. Stewart, District Manager, Mr. Baldwin, Asst. Superintending Engineer, Mr. Andrews, Sectional Engineer, Mr. Howieson, Traffic Superintendent, Messrs. Gwyther, Davison, Tait, McLauchlan, Wright, Brewis, Nicholson, Cooke, Gibbons, Duncan and Neville, Misses Cowburn, Beavis, Raine, Gordon, Davidson, Thompson and Mrs. Scott, of the Central and Trunk Exchanges.

Amongst the many beautiful floral tributes were wreaths from the Local and Trunk Exchanges, the District Manager's Office, the Controlling Officer's Association, the Engineering Department and the Telegraph Branch.

STATEMENT OF TELEPHONE PROGRESS IN THE LONDON AREA DURING THE YEAR 1926. (ABRIDGED.)

THERE has been no alteration in the boundaries of the London telephone area during the year. The area covers 750 square miles and extends from Reigate to Waltham Cross and from Tilbury to Hayes (Middlesex). The impending conversion of part of the London system to automatic working has rendered it desirable to regard the area as divided into two portions. The first portion, known generally as the automatic area, comprises the exchanges situated within a ten-mile radius of Oxford Circus. Exchanges in the London area, but outside this automatic area, will continue to work on the manual system.

With the opening of seven new exchanges, and the closing of Bank and Latchmere, the number of exchanges in the London area is now 112 (including Trunk and Toll exchanges) as compared with 107 last year. The Toll exchange deals with calls to the provincial towns within a radius of approximately 30 miles of London, and the Trunk exchange deals with calls to all districts in England (other than those served by the Toll exchange), Scotland, Ireland, and those countries in Europe which can be linked to the British telephone system.

The number of exchange lines connected to the London exchanges at the end of 1925 was 269,801. At the end of 1926 the number was 298,766, the net increase for the year being 28,965 or about 10.7%.

The number of telephones (the unit usually employed in comparative telephone statistics) necessarily exceeds the number of lines, as many lines have extension telephones working in conjunction with them. The total number of telephones—exchange and private—at the end of 1925 was 476,813. The number at the end of 1926 was 519,969, the net increase being 43,156 or about 9.0%. The 500,000th London telephone was installed on July 16, 1926, and the occasion was marked by a brief ceremony in the Press Gallery of the House of Commons when the telephone was formally handed over by the Controller of the London Telephone Service to Mr. Harvey, Chairman of the Press Gallery. The telephone is fitted with a small tablet bearing a suitable inscription.

During the year there has been an increase in the number of Private Branch Exchanges (P.B.X.), the total number now being 22,970 as compared with 21,000 a year ago. Of this number 97 are automatic. Orders have been placed for 18 new automatic installations and schemes have been formulated in ten other cases. With this type of P.B.X. it is still necessary to employ a telephonist to deal with public exchange calls, but the automatic P.B.X. system enables a person at any extension to get through to any other extension without the intervention of the private branch telephonist.

The largest automatic branch exchanges are those serving the Port of London Authority and the London County Council. The initial equipment for the Port of London Authority provides for 740 extensions, and this can be supplemented to cater for 1370 entensions ultimately. The installation at the County Hall has a capacity of 50 exchange lines and 800 extensions and has been working satisfactorily for three years.

Very many requests for removal from one address to another and for alterations to apparatus are received in the course of the year. The work is generally of an urgent character and is given special attention. Approximately 30,000 removals were effected during 1926.

The number of call offices working at the end of 1925 was 4,403. At the end of 1926, the number was 4,686 the increase for the year being 283.

CONVERSION TO AUTOMATIC SYSTEM.

The preliminary work incidental to the conversion of the London area to automatic working is well advanced. Owing to the great extent of the London telephone area and to the large number of exchanges by which the subscribers are served many complex problems arose for settlement. A system has been designed to meet all the required conditions. Specifications for exchanges to accommodate more than 100,000 automatic lines have been issued, and others are in course of preparation.

The installation of automatic equipment is in progress at the Holborn, Western, Sloane and Bishopsgate exchanges, and some of these should be available for service during 1927.

The installation of equipment at the "Tandem" exchange (the new Junction exchange) is rapidly approaching completion and this exchange should shortly be available for service.

A further step which formed an essential preliminary to the introduction of automatic working in London was taken during the year. The telephone numbers of subscribers working on exchanges in the automatic area were changed to four figures. Where the previous number consisted of two or three digits only, the conversion to a four-figure number was effected by prefixing two cyphers, or one cyper to the existing number. Numbers consisting of a single digit were eliminated.

EXCHANGE DEVELOPMENT.

If the anticipated rate of telephone growth is realised it will be necessary during the next five years to construct and open 60 automatic exchanges within the ten miles from Oxford Circus, and 25 manual exchanges outside that radius but within the London telephone area. These new exchanges will provide for the replacement of worn out plant, as well as for growth.

To familiarise subscribers with the proper procedure, the first three letters of the names of those exchanges to which they will have direct access are now printed in the Telephone Directory in block type. Other changes made in the Directory consist of a three-column setting in place of a two-column setting per page, and the printing of the telephone number on the right of the column instead of the left.

Incidentally, it may be of interest to mention that the London Telephone Directory now contains approximately 268,500 entries. The number of directories issued during 1926 exceeded 700,000 and the weight handled was approximately 1,500 tons.

LINE PLANT.

Much progress has been made during the year with schemes for improving the standard of speech over telephone lines in the London area. This has involved the provision, on a large number of routes, of cables with conductors of larger gauge than that previously employed. "Loading" has also been extensively utilised to improve speech transmission, i.e. the electrostatic capacity, which is an inherent characteristic of underground wires and is detrimental to the purity of speech transmission, is neutralised to a large extent by the addition of inductance coils at suitable points.

The total mileage of single wire provided for subscribers' lines and local junctions is now 2,030,000, an increase during the year of 225,000 miles. The total mileage on Dec. 1, 1918, was 1,100,000. The greater proportion of the wires are carried in underground cables which vary in size, and contain from 20 to 2,000 copper wires. They are lead sheathed and are drawn into earthenware ducts or iron pipes to protect them from mechanical injury. There are 7,402 miles of ducts or pipes, an increase during the year of approximately 1,000 miles.

The total length of pole line in London is 5,533 miles and the length of single wire carried on these poles is 59,250 miles. It is of special interest to note that while the total length of wire increased by 225,000 miles during the year there was an actual decrease in the length of overhead wire due to the policy of substituting underground wires wherever that course is economical.

In the process of placing wires underground, a certain amount of disturbance to vehicular and pedestrian traffic is inevitable. The resulting inconvenience is reduced to a minimum by taking advantage of road repaving operations and also by providing at one time sufficient plant to ensure that the ground shall not have to be re-opened within a reasonable period. Where it is practicable to do so, Post Office works are carried out in co-operation with other authorities who require to lay mains in the same street.

A scheme of co-ordination has been entered into with the Ministry of Transport and with the London Boroughs, whereby the department's duct-laying operations are effected in conjunction with road-paving works on the basis of a twelve months' forecast of requirements.

GENERAL STATISTICS.

A tabular statement is attached giving particulars of certain items of interest in connexion with the London Telephone Service illustrating the growth and general development during the past six years.

W. A. VALENTINE, *Controller, London Telephone Service.*

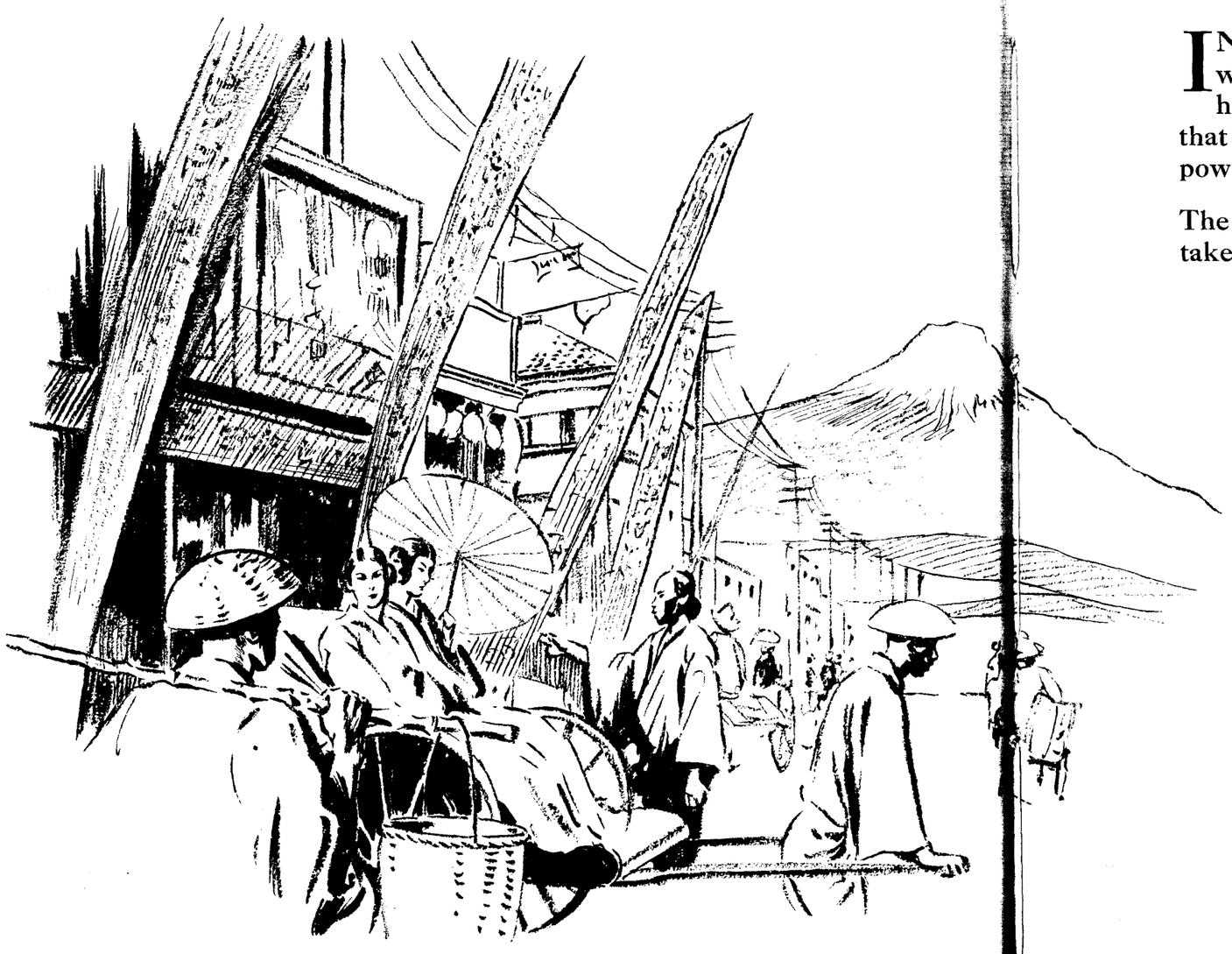
R. McILROY, *Superintending Engineer, London Engineering District.*

PARTICULARS ILLUSTRATING THE GROWTH AND GENERAL DEVELOPMENT OF THE LONDON TELEPHONE SERVICE DURING THE PAST SIX YEARS.

	1921.	1926.
Number of exchanges	87	112
Number of lines	181,606	298,766
Number of telephones (exchange and private)	545,797	519,969
Number of call offices	3,674	4,686
Number of originated calls	304,817,674	499,473,766
Number of Inland trunk calls originated in London	3,214,913*	4,002,603
Number of Continental calls	160,270*	265,028
Number of calls observed	106,544	111,810
Average time in seconds from commencement of call until telephonist answered	5.2	5.7
Average time in seconds from commencement of call until called subscriber answered	36.2	38.6
Percentage of calls completed on first application	78.9	82.4
Percentage of calls ineffective due to "number engaged"	14.5	11.8
Percentage of calls ineffective due to "no reply"	3.0	2.8
Proportion of telephones to population	1:21.74	1:14.96

January, 1927. *1923.

Across the Pacific—



IN the years that have passed since the doors of Japan were opened to international intercourse, this island nation has made such strides in industry, commerce and education that it may well be counted among the world's foremost powers.

The modern Japanese business man is quickly learning to take advantage of every means available for the more expeditious transaction of his affairs. Typical of this process of development is the adoption by the Japanese Government of Strowger Automatic telephone equipment as the standard for future development. In Tokio, several offices have already been converted, while others are in course of construction. A recent order for a 200-line Strowger P-A-X for the Imperial Household is further evidence of official acceptance of this newer, more rapid and accurate method of telephone communication.

STROWGER AUTOMATIC

Automatic Electric Inc.

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

The
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NOTICES.

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

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THE USES OF STATISTICS.

IN our January and February issues we published statistics of the telephone development of the world at the latest possible date, gathered with some pains from all available official and semi-official sources. These statistics were presented in the only manner in which we consider statistics should be presented, that is to say, straightforwardly, without selection, suppression, or tendencious arrangement. They were left to tell their own tale, which, to telephone men, is an old one, varying little from year to year, of the enormous superiority of American over European development, the superiority of the development of what, for lack of a better term, we may style Teutonic countries over Latin countries, and so forth. Telephone systems grow so rapidly—varying from a 4% increase a year in highly developed states to 10% and upwards in more backward countries—that each year now shows an addition of about a million and a half telephones to the world's total. It is therefore obvious that telephone statistics only a few years out of date may nevertheless be some millions out of date, and that it is desirable to review them year by year as soon as they are available in any completeness. On this score alone one might imagine that a detailed summary of the telephonic development of the world, arranged in continents and countries, would furnish matter of interest and instruction to the lay as well as to the technical reader. Statistics of births, deaths, crimes, suicides, marriages, bankruptcies, cricket, divorce, exports, imports, railway traffic returns, football and froth-blowing are assumed to intrigue the newspaper reader and are served up to him with circumstance and regularity. Students of the Press will, however, have observed that almost the only feature of our telephone statistics which was deemed of sufficient interest to regale the public with was the fact that the telephone development of Iceland was better per head than that of Great Britain. What moral this is supposed to point we are unable to discern. Iceland has a population numbering about the same as that of Thanet; it has no railways and few roads. It is the home of the sagas and a land for which we have every admiration, but in what way it is suitable for comparison with Great Britain we know not. Is it possible that the admirers of the Icelandic telephone system imagine that it is worked by a private company? If they do we are sorry to undeceive them. A very capable government department is responsible for the telephone system of Iceland, which possesses nearly as many telephones as Bournemouth, Southport, or similar middle-sized English towns.

HIC ET UBIQUE.

"The number of telephones in the United States," says the *Daily Express*, "is officially estimated at about 17,800,000—about sixteen times as many as the number in Great Britain." This is surmounted by the heading, 18,000,000 Telephones.

To him that hath shall be given. First of all 200,000 telephones (no inconsiderable number) are popped on to the actual total, and then we are told that the United States has about 16 times the number of telephones there are in Great Britain. To have this they would require 24,000,000 telephones, which would mean the addition of another trifle of 6 millions!

"After London to New York by wireless telephone," says the *Manchester Guardian*, "we are now told that in a new fleet of Antarctic whalers each vessel has been equipped with wireless telephony, which, it is expected, will be 'of great service in finding and killing whales.' But not if the whale knows anything about telephone tactics. At the first glimpse of a vessel within the local exchange area all sensible whales will leave the receiver off and go to bed. Or, if they haven't time to do that, they will make answer, in a very thin, small voice: 'Hello! Hello! . . What's that? . . . Certainly not—they've given you the wrong number again. This is a shrimp speaking.'"

An agreement has been made between the city of Smyrna and the L. M. Ericsson Co., granting a concession for 35 years for the installation and operation of a telephone service in Smyrna and the surrounding district. A special company with a capital of about $212,000 has been formed, says *Commerce Reports*, with the city and the company as shareholders. The first telephone station, which will be automatic, will begin with 2,000 lines, to be enlarged later to 10,000.

Owing to the geographical position of America in relation to Japan, *The Christian Science Monitor*, of Boston, Mass., printed the announcement of the death of the Emperor of Japan the day before he died. The Mikado died on Saturday, Dec. 25, yet the notice appeared in *The Monitor's* issue of Friday, the 24th. This extraordinary occurrence is, of course, accounted for by the fact

that American time is so far behind that of Japan that the message sent by electricity travelled faster than did the sun, on his journey from East to West. Still, it was an unusual thing to read in a Friday's paper of an event which occurred on the following Saturday. —*Northern News Service.*

Extract from an official letter from a lady who had tried several wireless sets and found them unsatisfactory so far as she was concerned.

"I took out a wireless licence in January, but of course it is no use now. May I exchange the wireless licence for a dog licence for a new dog which I have on a month's trial."

We hope the lady will not ask us at the end of the month to exchange the dog licence for a gun licence as she wants to shoot the dog.

A further extension in America of the transatlantic telephone service took place at 1.30 p.m. (British time) on Saturday, Feb. 26, when the service became available to and from all places in the States of Washington, Oregon, California, Nevada and Arizona.

These States constitute the *Fifth* American zone.

The charge for a call from any place in Great Britain to any place in the *Fifth* American zone is £17 8*s*. for the first 3 minutes, and £5 16*s*. per additional minute or fraction thereof.

With the extension indicated above, the transatlantic service will be available from any place in Great Britain to any place in the United States of America.

OUR CHILDREN'S TEA (STREATHAM).

ON Jan. 15 we gave our annual children's tea. The huge family of 110 poor children were gathered from North Lambeth, and I believe they had the time of their lives.

At 4 p.m. they all arrived armed with their tickets and smiles on very expectant faces, soon they were attacking with relish the two kinds of jelly and various kinds of cake. Several of them were espied stowing away cakes in pockets and even inside jerseys—as one boy put it, he couldn't eat more than three lots of jelly and seven cakes at one time, but he thought he'd like another feed later on! So we had to start a paper hunt, and soon every kiddie had a bulky parcel of cakes and even jelly! for various members of their respective families.

After tea they were allowed ten minutes to take home their cakes, and then the entertainment began. The "Streatham Orpheans" were arranged in state on the stage in the hall, which we had decorated with chains and balloons the previous evening, and as the kiddies filed in they struck up lively choruses which the youngsters yelled lustily, while several of them gave exhibitions of their skill in Charlestoning!

Next, we had the conjuror. How they yelled with delight and wonder at his clever performance (I believe we enjoyed it just as much as they!) By this time bags of sweets had been passed round and all were munching happily. But now, several pairs of eyes were seen to be wandering to the Christmas Tree, which was brilliantly lit up and laden with dolls, which had been dressed by members of the female staff. Father Christmas (Mr. Hopping) was meanwhile behind the scenes adjusting his whiskers and being "made up" to look rosy and mysterious. When he appeared there was great excitement and each child was presented with a toy, the *Fairy Doll* from the top of the tree being given to the smallest girl. As they made their way doorwards, oranges, apples and novelties were distributed among them and all departed wreathed in smiles and full of good things, to judge by their expressions our efforts were rewarded, they had enjoyed themselves.

Great thanks are due to the engineering staff, who were responsible for the illuminated tree and the "jazz" music. We're *ever* so proud of our "Orpheans."

After the children had gone a dance was held for the helpers, prompted by the kindness of the Vicar, the Rev. Matthews, who showed his appreciation by joining our musicians and playing a banjo.

The whole affair was a huge success, everybody enjoyed themselves immensely and I think they all join with me in saying, "Roll on, next Christmas, and let's have another tea!"—F. G. RUSSELL, Streatham Exchange.

THE DESIGN AND ERECTION OF POST OFFICE BUILDINGS.*

BY H. G. WARREN, A.R.I.B.A.

ALTHOUGH most of you may be familiar with the general lay-out of postal and telephone exchange buildings, yet there are circumstances which make it desirable for me to describe, briefly, the typical planning of these buildings in this country.

In a Post Office Plan the public office generally occupies the front position on the ground floor and, is approached by one or more entrances from the street. This allows the sorting office to be placed either at the rear or side of the public office. Instrument rooms should be placed on the staff side of the public counter with the messengers' room adjoining. The postmaster is provided with a room either on the ground or first floor, and in all except the smaller offices, the general public should be able to gain access to the postmaster without passing through the official part of the premises. The writing staff should have a room near that of the postmaster. The women's welfare accommodation should be placed conveniently near the points at which the women are employed. The men's welfare accommodation is generally provided at the end of the sorting office to which it forms a convenient unit for future extension. Trucks, cycles, and motors are housed in buildings erected in the yard.

The "Third Report of the Committee on Accommodation and Fittings, 1925," details certain standards which are followed in the planning of a post office. The most important of these can be summarised briefly as follows:—

Public Office:—
- Length of *Counter*:—4 feet for each counter clerk (minimum 18 feet); additional 2 feet for each Money Order and each Parcels clerk.
- Width of counter:—Minimum 3 feet.
- Depth *behind* Counter:—For a counter less than 20 feet = 5 feet; for a counter more than 20 feet = 6 feet.
- Depth in front of Counter:—For a counter less than 20 feet = 10 feet; for a counter more than 20 feet = 11 feet.

Sorting Office:—At small offices: 40 square feet per head. At large offices: 50 square feet per head.
Postmen's Offices:—27—35 square feet per head.
Instrument Room:—50 square feet per head (maximum used).
Gangways:—4 feet 6 inches in sorting office; 4 feet in instrument room and phonogram.
Postmaster's Room:—Staff 1—50 = 132 square feet; 51—100 = 144 101—200 = 160; above 201 = 180; 1st class offices = 300.
Asst. Postmaster or Chief Supt.:—120—144 square feet.
Sub Postmaster:—Small separate room.
Writing Staff:—60 square feet per head for 3 or less; (100 square feet minimum) 45 square feet per head for over 3.
Locker:—1 square foot.
Wash Basin:—8 square feet.
W.C. (internal):—27½ square feet.
Urinal:—10 square feet.
Hat and Coat pegs:—2½ square feet if w.c.'s internal; 2 square feet if *w.c. external.*
Long Lockers:—To take place of cube lockers and hat and coat pegs. 4 square feet single; 2 square feet double tiers.
Delivery Room:—7 square feet per head; 35 square feet each supervising officer, 75 square feet minimum.
Special Room:—200 square feet maximum all offices with P.M.'s salary over £600.
Supervisor's Room:—Separate if ultimate staff 8 or more.
Sick Room:—Total ultimate staff of 40 or over.

The nucleus of a Telephone Exchange Plan is naturally the battery, apparatus and switch rooms. These can be either *en suite* or with the battery and apparatus rooms under the switch room. Rooms for normal stock, works order, and linemen, are provided either in the main building or the yard and the cable chamber should be in a position which enables the cables to be fed to the main distribution frame in the apparatus room. The ladder, motor van shelters, trucks, cycles and foremen's lock-ups, are erected in the yard. The women's welfare is placed conveniently to the switch room. The sizes of telephone exchange rooms depend on the layout of the equipment, and the number of staff employed and using the rooms at one time. Yard space at exchanges varies, but an average requirement is 300 square feet.

The welfare accommodation in post offices and telephone exchanges is based partly on the number of staff using the room at one time and partly on the maximum staff employed. For a total staff of 20 women approximately 420 feet super are required to provide for cloaks, cooking, and retiring rooms, whilst a staff of 28 men require approximately 320 feet super for the same purposes.

Postal and telephone exchange buildings can be either Class 1 or Class II. Property, the freehold of which is vested in the Crown, is known as a Class I.

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

building and post office buildings of this class are erected and maintained by His Majesty's Office of Works. It may not be known generally that departments such as the War Office and Admiralty control their own Class I. buildings.

When buildings are held on lease by His Majesty's Postmaster-General, they are known as Class II. buildings and are, with few exceptions, designed, altered and maintained by the architectural assistant to the secretary of the General Post Office.

As far as an architect is concerned, the methods employed to produce a post office building are similar to those used in the design and erection of any other class of building, irrespective of its use. This being so, to a great extent I have to deal this evening with general methods and associate these with post office buildings as far as possible.

I propose to deal only with new buildings and not with the alteration and conversion of existing premises to meet departmental requirements.

From its inception to final completion a building passes through the following well-defined stages :—

(1) Survey of the site.
(2) Preparation of the sketch plans.
(3) Design of the elevations.
(4) Preparation of the workings, drawings and details.
(5) Writing the specification.
(6) Commencement, progress and completion of the building work.

I want you to come with me into the architect's office and watch the progress of a case through the above stages.

(I) SURVEY OF THE SITE.

As a rule the first intimation received by the architect of a contemplated scheme is a request to inspect one or more sites.

It is necessary at the outset for the architect to be supplied with particulars of the probable accommodation required to enable him to decide the area of land required. If the scheme is large a rough outline sketch plan should be prepared with the view of ascertaining whether the sites under consideration are of sufficient size.

Experience would appear to indicate that the average provincial postal building requires a site with a frontage of 60 feet and a depth of 150 feet. No hard and fast rule can be laid down, however, and each case must be considered on its merits.

When a site has been found sufficient in area for the proposed building, it is surveyed and inspected in detail. Enquiry is made whether the site has been included in an area scheduled under the Town Planning Acts, as in such case the local authority may have a prior claim, and the class of building to be erected on the site may be restricted. The nature and positions of the boundaries must be investigated carefully. Cases are not uncommon in which it is found that small strips of what may be described as "no man's land" occur between the frontage of the site and the public road or roadways. It may interest you to know that if the boundaries are defined by hedges with a ditch on one side, in the absence of proof to the contrary, the boundary of the site is taken as the side of the ditch farthest from the hedge ; on the assumption that a person digging a ditch would throw the earth, which afterwards forms the hedge, on his own land. If the site is bounded on any side by a boarded fence with wooden posts and horizontal members, the boundary is measured to the outer face of the boards. To repair such a fence, other than by acrobatic means, it would be necessary to trespass on the land of the adjoining owner.

It should be ascertained whether the roads abutting on the site have been taken over and are repairable by the local authority, as the Department might be liable for road charges, based on frontage, in the event of the local authority taking over the roads subsequent to purchase. If the boundaries are party fence or main walls, and the land is situate within the area covered by the London Building Acts, the rights of the adjoining and building owners are clearly laid down. It is necessary for the building owner to serve on the adjoining owners notices setting forth in detail any works proposed in connexion with the party walls.

It is necessary also in London, to serve a notice on adjoining owners setting forth details of the intended work in every case where it is proposed to build within ten feet of the adjoining property.

Outside the area administered under the London Building Acts, the London practice in respect of party fence and main walls is followed in most cases.

The investigation of Easements should follow that of the boundaries. In this connexion it is well to remember that an easement may be defined as a privilege enjoyed by an *owner of land* in respect of the ownership of such land in or over the *land* of his neighbour, whereby the latter is bound to submit to some definite *use* of his land or to refrain from some definite use of it himself. An easement can never exist " in gross " or apart from the ownership of land. For example, a Public Right of Way is not an easement because it is a privilege enjoyed by a community at large and is not a right attached to the ownership of land.

We are not concerned this evening with the manner in which an easement can be acquired, but passing reference should be made, perhaps, to the legal maxim that " a grantor may not derogate from his own grant." In practice this would mean that a vendor selling part of his land and retaining the other part could not by any subsequent act prejudice or lessen the rights transferred to the vendee.

The importance of easements cannot be over-estimated, and even at the risk of wearying you, the matter must be dealt with more fully.

Among the rights that may become easements are :—

(1) Rights of light.
(2) Rights of air.
(3) Rights of support.
(4) Rights of way.

(1) *Right of light* is not really a right to the light but a negative easement which curtails a neighbour's ordinary right to build as he pleases over his own land. Under the Prescription Act, 1832, 20 years' enjoyment gives absolute right, if such period of enjoyment dates immediately before the bringing of an action. Interruption must be for a period of one year, so that in practice 19 years and one day establish an absolute right.

The theory of the 45° angle of light being left unobstructed arose from the old Metropolitan Building Act which enacted that the height of a building must not exceed the breadth of the street. Such angle is not recognised by the Courts.

It has been laid down (1904) by the House of Lords that the owner of ancient lights is only entitled to the uninterrupted access through his ancient windows of such an amount of light as is necessary according to ordinary notions for the ordinary purposes of inhabitancy, or business *without* regard to the particular purpose for which he used the light.

A point which can be easily overlooked when investigating an easement of light, is that an owner of ancient lights may pull down and rebuild his house and he may bring forward the wall in which the windows are or he may set it back without losing his rights. All that he is required to shew is that the same quantity of light which passed through the old windows is passing through the new ones.

(2) *Right of Air.* It has been held that no right to the flow of air can be acquired by statute unless it comes through a defined aperture on the servient tenement. Twenty years' enjoyment would establish a *prima facia* claim to an easement of air.

An easement can be acquired for the escape of air from a building over adjoining land for the purpose of ventilation.

The position of air bricks and vents which might dominate the site must be noted therefore. It is found generally that agreement can be reached with the adjoining owner or owners by an undertaking to provide alternative means of ventilation.

(3) *Right of Support.* An owner of land has a *natural right* to the support *given to his land* by that of an adjoining owner. There can be no natural right of support to a building, such a right can be acquired as an easement at Common Law by 20 years uninterrupted enjoyment, *if* the enjoyment has been open and without concealment.

There is an *implied grant* of support to buildings erected by a purchaser of land from any land or buildings retained by a vendor, when the vendor has sold land to the purchaser for " building purposes."

(4) *Right of Way.* We have already seen that Public Rights of Way are not easement in that such rights exist apart from ownership of land.

A Private Right of Way can be used only for the purpose of going to and from the land to which the right is attached and cannot be used as access to other land except to reach a highway.

A servient owner is not bound to keep in repair a right of way. The dominant owner is entitled to do any necessary repairs himself.

There is no rule, as is sometimes supposed, that 20 years' use establishes a *public* right of way. Twenty years' enjoyment of a Private Way gives *prima facia* right and 40 years' enjoyment absolute right under the Prescription Act, 1832.

If no easements dominate the site to an extent likely to unduly restrict its development, a measured survey of the site is made and the levels taken. These levels can be related to a local datum, such as a stone curb, iron post or some object of a permanent character, but preferably they should be related to the nearest ordnance survey bench mark, the positions of which are shewn on all ordnance survey maps and their height above ordnance datum (level of mean tide at Liverpool) given.

There is another matter which, perhaps, should have been mentioned earlier. If the site happens to be on the side of a hill, it is important to ascertain the formation of the sub-strata. Deposits of clay in layers are likely to cause the subsoil to slide when the weight of the building is placed on the site. Cases have occurred where one portion of a building has parted from the other consequent on this sliding action.

The survey of the site is completed by ascertaining the positions of any soil and surface water sewers and the depths of their inverts and also the positions and depths of any gas, water and electric light mains.

The presence of water in the subsoil is investigated at a later date by the sinking of trial holes.

The survey of the site is plotted and the levels shewn. Sufficient data are now available to enable the sketch plans to be prepared.

(II) SKETCH PLANS.

It is difficult to describe the feeling of satisfaction which accompanies the production of a sketch plan representing the correct solution of a problem. It may require days, and in large schemes, weeks, before the solution is found. In some cases the ideal solution is never found.

If on the walls of this hall were hung twenty designs for a postal building, submitted in open competition, it is almost safe to say the winning design would have a plan free from eccentricities and giving positive results to any test applied.

Experience has proved the most economical plan to be the rectangular type. Projections on a plan increase the cost because they involve the departure from simple construction. The covering of a rectangle with a pitched roof is a simple operation, but the introduction of projections would necessitate the trimming of the roof timbers, and the formation of valley gutters, with consequent cost in outlay and upkeep.

Except in small schemes it is not always possible to employ the rectangular plan, and the need for expansion produces the second or L shaped type.

By the addition of blocks we obtain the T and H shaped and finally the enclosed courtyard type. A combination of these types is employed in large schemes and consists of a rectangular plan for the ground floor with the L, T, H, shaped or enclosed courtyard type of plan for the upper floors. Maidstone and Reading Post Offices are examples of this combined type of planning.

The presence of ancient lights and other easements may influence the type of plan, as at the new Telephone Exchange in Wood Street, London. In this case we have the rectangular plan on the ground floor with the H shaped type on the upper floors.

In all these types, if pitched roofs are contemplated and the building occupies a corner site, endeavour must be made to keep the spans and heights of the blocks similar, so that no breaks occur in the ridge lines. This ensures a good mass for elevation purposes.

I am informed that nearly 80% of those present this evening are interested in the engineering side of postal work. In these circumstances, before I proceed further, it may be as well to point out that an architect works from mass to detail, whereas an engineer would appear to work from detail to mass. I mention this because I feel some of my hearers may be surprised to find the mass plan being considered before the internal details. An architect is trained to visualize his building as a whole at the outset. He cannot approach his problem in any other way. If the mass of plan and elevation are conceived on the right lines then the details of the scheme will work out satisfactorily. On the other hand let the mass of plan and elevation be conceived on wrong lines and the scheme invariably will be unsatisfactory.

When the general shape of the plan has been decided and roughly outlined, the accommodation required is scheduled and allocated to the various floors. In this manner a comparison is obtained of the superficial areas required on each floor. These areas are increased to allow for passages, staircases, and sanitary blocks.

Each of the upper floors in post office plans can approximate in area that of the ground floor minus the sorting office, yard and outbuildings. The areas of the required accommodation are compared with those available on the outline plan and any necessary adjustments made.

The floor areas are divided next into suites or groups. In the case of a combined post office and telephone exchange these would comprise (*a*) public office, sorting office and men's welfare accommodation (*b*) battery room, apparatus room, and switch room (*c*) women's welfare and (*d*) residence. These suites or groups are drawn on the floors to which they have been allocated, enabling the positions of the staircase or staircases, passages and the sanitary blocks to be decided.

The foregoing procedure gives the architect a rough plan conceived in mass. The next consideration is the layout of the steelwork, which must be settled before the plan can be considered in detail. Beams which would project into the rooms below must be placed so that the resulting ceiling panels are symmetrical. The sizes of the steelwork are not calculated until the working drawings are in hand, the requirement at this stage is simply the position of the beams, so that supports can be provided at the necessary points and stanchions in the middle of rooms obviated as far as possible.

To finish the sketch plan it is necessary to draw in the various rooms, stairs, lobbies and building fittings. Trouble may be experienced at this stage with the chimney breasts. These, being costly, must be placed in positions which allow as many flues as possible to be gathered into one stack. The stacks must not pierce the roofs in the centre of hips or similar positions and they should balance on the elevation wherever possible. Chimney stacks which do not balance or are out of centre have a disturbing effect when seen in elevation. As far as possible chimney breasts, sanitary blocks and staircases should not occupy positions required for future extensions.

When engaged on the details of a postal plan, the architect is not unmindful of the Post Office Surveyor, Engineer-in-Chief and his friends in the Traffic Branch. Experience teaches him the advantage of leaving some of the details for the consideration of others.

(To be continued.)

PROGRESS OF THE TELEPHONE SYSTEM.

A REVIEW of the past year's working shows that notwithstanding the interruption to business caused by the general strike and the dispute in the coal industry, the net increase in stations exceeded by nearly 5,000 the growth in the previous year. The effects of the general strike were particularly felt in May and June when the new orders showed a decline of 3,404 on the previous year's totals but in the latter six months of 1926 there was a marked recovery, the new stations added being 7,025 in excess of the figure for the corresponding half-year of 1925.

The total number of stations in the Post Office system on Dec. 31, 1926, was 1,477,000, an increase during the year of 119,092, or 8.8%. The figures for London, England and Wales (excluding London), Scotland and Northern Ireland are given below :—

	Total No. of Stations.			
	At Dec. 31, 1925.	At Dec. 31, 1926.	Increase.	Increase %.
London	476,813	519,969	43,156	9.1
England and Wales (excluding London)	733,840	800,016	66,176	9.0
Scotland	129,314	137,949	8,635	6.7
Northern Ireland	17,941	19,066	1,125	6.3

The total number of residence rate installations at the end of December, 1926, was 291,700, of which 110,170 were connected with London exchanges and 181,530 with Provincial exchanges. During the year 1926, the net addition in residence rate installations was 41,596, as compared with 34,536 business rate installations.

The total number of Public Call Offices working at the end of December was 21,493, an increase of 1,515 during the year. The London total increased from 4,395 to 4,686, and the Provincial total from 15,583 to 16,807.

Included in the total of 21,493 call offices are 2,716 street kiosks, 984 of which were added during the year 1926. At Dec. 31 last, there were 418 kiosks in London—practically double the number at the end of the previous year, and in the Provinces, 2,298, an increase during the year of 778.

During 1926 a further 156 new exchanges in rural areas were opened for service under the rural development scheme, making a total of 991 opened since the inception of the scheme in June, 1922.

At Dec. 31, 1926, rural party line stations numbered 9,958, a net addition for the year of 204, or 2.1%. With the increased provision of rural exchanges from which it is possible to provide exclusive line service without heavy additional charges for extra mileage, the demand for this class of service has declined.

The number of rural railway stations connected with telephone exchanges at the end of 1926 was 721, representing 803 telephones. Forty-seven circuits were added during the year 1926.

It is estimated that the number of effective calls originated during 1926 amounted to 1,072 millions, an increase of 73 millions, or 7.3%, over the total for 1925.

The number of inland trunk calls dealt with during November (the latest statistics available) was 7,796, 474, an increase of 773,145, or 11% over the figure for the corresponding month of the previous year.

Calls made to the Continent during November numbered 24,288 and from the Continent, 26,958.

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

LONDON—Fitzroy.

PROVINCES—Lytham, Huyton, Brighouse, Shipley, Hexham, Camberley.

And among the more important exchanges extended were :—

LONDON—Pinner.

PROVINCES—Douglas (Glasgow).

During the month 99 new overhead trunk circuits were completed, and 120 additional circuits were provided by means of spare wires in underground cables.

TELEGRAPHIC MEMORABILIA.

THE following description of the short-wave installation carried by the *Carinthia* will no doubt be specially interesting to the C.R.O., London, and the staff who dealt with the traffic via Dollis Hill Research Station at the time.

The description, now somewhat abbreviated, is excerpted from the *Electrical Review* :—

" Before leaving this country, the vessel was fitted with a special short-wave transmitting and receiving installation manufactured by Messrs. Siemens Bros. & Co., Ltd., Woolwich, at the request of the shipowners. The apparatus was specially designed for the ship. A special single-wire aerial was erected to which the transmitter was inductively coupled, but arrangements were also made so that the ship's main aerial could be employed as an alternative. The transmitter has a wave range of from 25 to 50 metres and employs a specially-constructed 500-watt anode dissipation (intermittent rating) valve, capacity-reaction being employed to control the oscillations. The necessary high-voltage can be obtained either as rectified a.c. from the vessel's long-wave continuous-wave transmitter, or from a specially-designed d.c./d.c. high-voltage machine installed underneath the operating table. Low-voltage for the filament is obtained either from the long-wave c.w. transmitter or from a special winding on the machine referred to above. The whole of the transmitting gear is mounted in a wooden case, which is metal lined for screening purposes. The receiver consists of a simple single-valve circuit thoroughly screened.

" Through the co-operation of the British Post Office, arrangements were made for traffic to be worked through its research station at Dollis Hill, and the Radio Corporation of America also arranged for messages to be transmitted from and received at its stations at New York and San Francisco. During the Christmas season the *Carinthia* despatched 700 greetings by wireless direct to the Radio Corporation's American stations when the vessel was approaching New Zealand, at an average distance of about 10,000 miles. She is the first British vessel to handle commercial messages on short waves (i.e., under 100 metres) with a British Post Office station.

" When off Cape Leeuwin, Australia, she worked with the New Brunswick station, New Jersey, owned by the Radio Corporation of America, at a distance of nearly 12,500 miles."

The Westinghouse Electric & Mfg. Company have placed on the market a single-element oscilloscope which can be utilised as an oscillograph. Invented for the use of electrical engineers, who would thus be able to *see* alternating-current wave-forms and phase relations, it can be used, says a scientific review, as a phonoscope to enable totally *deaf* persons to understand speech by actually looking at the audio-frequency waves of any ordinary radio receiving set or telephone. A spot of light, reflected from the mirror of the galvanometer, moves back and forth on the ground glass of the " Osiso," as the new apparatus is termed, following the instantaneous changes in the current ; a rotating polygon of mirrors gives a time component to the moving spot of light so that an observer may see waves of light. Each sound has a different wave shape : a pure note appears as an endless repetition of a " sine " wave. The height of the wave is a function of the loudness of the sound ; the length of the wave, from crest to crest, is inversely proportional to the frequency ; thus, with each sweep of each mirror, the number of oscillations that appear stretched out in a record of light are proportional to the frequency of the note. When a high note is being viewed many oscillations are apparent with each sweep of each mirror ; when a low note is being viewed, only a few oscillations appear for each sweep of each mirror. The waves change with pitch and with different voices, but certain similar characteristics remain for each vowel sound. Any ordinary telephone microphone may be connected in series with dry cells and the vibrator ribbon of the " Osiso " ; one may speak into the microphone and see the voice waves dance in the rotating mirrors. By certain changes in the apparatus one may hear and see the audio-frequency at the same time. No photographic action is required to receive the audio-frequency waves. A deaf person may be taught to understand speech by sight in a class and, though such instruction would take much time, it seems probable that it would be more successful than the method of reception by feeling.

The following two paragraphs, which appeared in the London *Times*, are reproduced because it is understood that the photo-telegraphic system under trial between Germany and Austria is the same Karolus system, an outlined account of which appears in the current issue of the *T. and T. Journal*. Says the *Times* :—

" A service for the exchange of pictures between Austria and Germany by wireless telegraphy will, it is hoped, be inaugurated before long. The Königswusterhausen station in Germany is to serve Rosenhügel as the return station during the preliminary experiment. The public service will be in the hands of the Austrian Marconi Co. (Radio Austria) and the Austrian Broadcasting Co., and will include within its range Great Britain and all other countries willing to co-operate. The system adopted by Austria deals with photographs and graphic reproductions of every kind, 4 in. square.

" The tests, which are being undertaken by the Austrian Marconi Co. jointly with the Telefunken Gesellschaft, of Germany, and which it is hoped will lead to the establishment of a public service for the exchange of news and pictures, will extend over a considerable period. The experiment will be in connexion with the Karolus-Telefunken-Siemens system. Tests made last year yielded good results, but only one-way, and were therefore inconclusive."

The *Electrical Review*, commenting, adds :—" The results of the first transatlantic experiments in the transmission of pictures and writing in facsimile by the system have now become available in Europe. Messages of acknowledgment from Rio de Janeiro and Buenos Aires showed that, in spite of atmospheric difficulties, the images were received there with encouraging clearness. Two certified facsimiles were reproduced in the *Times* (of London) on Jan. 28, which explains that though most of them were rather plainly marked with the vertical lines characteristic of facsimiles received under experimental conditions and some showed slight distortion, the pictures were, on the whole, remarkably clear, and print and script passed the essential test of legibility. The Telefunken Gesellschaft is fully satisfied with the results of this 6,000-mile transmission from the Nauen wireless station to Rio ; in view of the atmospheric disturbances there was some doubt whether the images would get through at all. Transmission to Rio was begun on a wave-length of 40 metres, but owing to atmospheric disturbances a change was made to 25 metres. The time taken was from five to ten minutes, compared, it is stated, with 1½ hours required by other systems which have been tried over long distances.

" A transmitter is being built for the Rio station, and is nearly completed. Short-distance transmission in Europe is regarded as almost past the experimental stage. The average rate of transmission between Berlin and Vienna on the 1,300-metre wave-length is 30 seconds."

The only further comment that may be made at this juncture is the surmise that the experiment of Jan. 28 was not made with the Karolus-Telefunken-Siemens system, but perhaps this is not inferred.

The following, from the *P.O.E.E. Journal*, has been held over for some considerable time, but it is indeed a remarkable instance of what may be called the vitality of electrical plant when good material and good workmanship are combined.

The writer once saw half a dozen Baudot Multiplex sets after they had been standing under the roof of a corrugated iron shed exposed to a tropical sun for six months ! *They* looked sick enough, yet recovered and worked well for years, but I do not think that they would have survived the fate of a private automatic telephone branch exchange equipment installed in the basement of a cotton mill after complete inundation due to an exceptionally heavy thunderstorm in Lancashire.

" The charging machine, ringing machine, one battery of secondary cells, and practically the whole of the automatic equipment were submerged. When the storm had abated a fire engine pumped the water out of the basement, which had been filled to a depth of about 4 ft., and, besides being soaked, the apparatus was found, on removing the relay covers, to be smothered with a film of slime and green rubbish. The idea of salving the equipment was formed, and mud remaining after washing with a hose was removed from the relays and cable forms by the use of fire extinguishers, and all surfaces were wiped with clean cloths. The machines, after further washing and wiping, were dismantled and placed in the boiler house to dry. The cells were emptied, cleaned, and refilled with acid and, pending the availability of the charging dynamotor, they were charged through a resistance direct from the mains. The ordinary heating apparatus of the room was found to be quite inadequate if the water were to be evaporated before the plant was damaged by corrosion. A motor desiccator, a number of blow lamps, and as many electric radiators as could be obtained were brought into use. The most efficient way of removing the moisture, however, was found to be the use of " vacuum cleaners " reversed and used as blowers, with the suction sides arranged to draw the heated air from blow lamps through metal tubes in which were placed bags of calcium chloride. The water standing on the relay springs and other parts was removed by the use of blotting paper and the cable forms that had been submerged were opened and boiled out with wax. All the relay armatures were removed and cleaned, every contact throughout the equipment was cleaned, and every spring was tested for tension and adjusted, if necessary. Immediately following the flood, notice had been given to the manufacturers of the possibility of a demand being made for plant to replace the damaged equipment, but, thanks to the quality of the original apparatus and to the initiative and the persistent efforts of the staff, the installation, as it stood, was restored to service on the morning of the seventh day after the flood. Six hundred relays, one set of secondary cells one charging machine, one ringing machine, and the associated wiring and cabling were submerged, but the whole of the plant was salved and is still in use, with the exception of one choke coil and three transformers in the ringing equipment and eight relays and four condensers in the automatic switching equipment. Twelve months have elapsed since the flood, and the occurrence of faults in the automatic apparatus has been at the rate of one fault per circuit per annum, a figure which, although about four times as great as the normal for this type of installation, cannot be regarded as high in the circumstances described."

A MARVELLOUS CRYSTAL SET.—By means of a 6-ft. box kite used by Dr. Ellison at the Armagh Observatory, Ulster, for experiments on atmospheric electricity, an unusual reception feat was recently accomplished. Shortly after noon on Jan. 3, while the kite was flying at a height of 2,500 ft., the observers received smart shocks from the steel piano wire to which the kite was attached, and strong cracking sparks were drawn from it. The wire was attached to an iron post and earthed, and then connected to a No. 1

crystal receiving set made by the Brownie Wireless Co., which humble instrument enabled the North American broadcast radio-telephone stations to be heard loudly and with ease. This experiment may be tried anywhere, dear readers, with every hope of success, provided you obtain permission to use an aerial over 800 yards high !

TELEGRAPHY *v.* TELEPHONY.—In order to bring into effect the decision of the International Commission for Aerial Navigation that wireless telegraphy instead of wireless telephony shall be used for normal communication between air liners and aerodrome ground stations, which was embodied in regulations that came into force this year, flying mechanics of Imperial Airways, Ltd., are being trained as operators at the Marconi Co.'s College at Chelmsford. Hitherto wireless telephony has been employed for the convenience of pilots who have themselves been able to speak direct to Croydon or other aerodromes. With the increasing volume of air traffic, however, it has been considered advisable to relieve the pilot of large passenger-carrying machines of this duty, and *Morse-code telegraphy is to be gradually introduced in order to speed up traffic and avoid confusion.* To provide for this change, the regulations lay down that all machines carrying 10 or more passengers must include a qualified wireless operator in the *personnel*, who will give his undivided attention to the wireless service. No change in the apparatus used on Imperial Airways machines will be involved, as the Marconi AD-6 aircraft set, which is their standard equipment, may be used either for telephony or telegraphy by the simple movement of a switch ; telephony can still be used, of course, when desired. The italics were not in the original paragraph but are the only comment necessary.

Colonel R. E. Crompton, C.B., speaking some short time since on his visit last year to the U.S.A., made two small observations which throw a useful sidelight on the presumed universal efficiency and "last-word" standard of American organisation. The colonel said that he went to the U.S.A. expecting to learn, but he was disappointed, for the problems that were so vital to us did not seem to concern them over there. "*Our careful and delicate control of capital costs did not exist in the U.S.A., and their wasteful use of electric lighting had no parallel.*" He also stated that, "the streets are congested with cables, producing difficulties which are not yet solved."

The London *Daily Mail* says that it is claimed that quicker communication between this country and South Africa is now possible, as the result of two years' experiment by the engineers of the Eastern Telegraph Company. By abolishing the system of relaying messages from the islands of St. Vincent, Ascension, and St. Helena, and speeding up the rate at which the signals travel along the cables, it has become possible to receive messages in Capetown at the same instant as they are dispatched by the instruments in London. The new system of regenerator working, as it is called, will enable messages to be transmitted as fast as a person can talk, so it has been called "cable telephony." There will be no increase in charges.

Query : How fast can a person talk ? If this is the actual speed definition of our friends the Eastern Telegraph Company, it is certainly not up to the usual standard of their technical precision !

Congratulations to Dr. Adolphe Franke, the president of the Siemens and Halske Company, of Berlin, to whom the German Electrotechnical Society has awarded the Siemens-Stephan Memorial Plate. This is the Society's highest award and is granted every five years to the person who is considered to have rendered the greatest service to electrotechnical progress in general and to the Union in particular. Dr. Franke has been associated with the Siemens & Halske Co. for 40 years, and is known for his work in connection with high-frequency measurement apparatus for telephony and radio work.

In connexion with the Antarctic short-wave wireless, a paragraph writer in the *Westminster Gazette* makes the following pithy comments :—"Since October, 1924, when Mr. C. W. Goyder, of Mill Hill, confirmed his claim to be the first person to establish two-way communication with Britain's remotest dominion, there have remained very few long-distance wireless "records" to be set up.

"In default of land stations to be reached, however, Mr. Goyder has now added to his many wireless laurels by exchanging morse messages, over a considerable period, with the whaler, *Sir James Clark Ross*, now some 250 miles within the Antarctic circle, just as he did with the MacMillan North Pole Expedition in August, 1925.

"It has long been obvious that any place on the earth may be reached by wireless, but Mr. Goyder's most recent achievement is notable because it shows how amateurs continue to "blaze the trail" of long-distance communication, and because it is a further proof of the superiority of the short wave for this class of work, small power only being needed."

If one wished to prove the fallacious in any particular proverb, the history of Thomas Alva Edison would surely weaken one's faith in the oft quoted, "a rolling stone gathers no moss." Edison attained his 80th birthday on the 11th of last month, and his biographer relates that he commenced his career a newsboy, was a *telegrapher* at 15, became printer, publisher, telephone inventor, electric light and power engineer, moving-picture and phonograph inventor, manufacturer of electric lamps, dynamos, cement, storage batteries and concrete houses.

It may really be said of Edison that money was no lure, neither had he any great conceit of himself. "Genius" ? said he to someone who thus referred to him, "Genius is just one per cent. inspiration and 99 per cent. perspiration," nevertheless, genius he undoubtedly remains, and as such we place him on our humble telegraphists roll as "one of us" !

The C.T.O. will certainly be the loser by the translation of Mr. C. Harvey, Principal Clerk (Old Class) of the Controller's Office to the postmastership of Blackburn, while the latter office will be among the fortunates in obtaining so capable a chief, cheery, broad-minded and kindly spirited withal.

Mr. Arthur Simmons will also be missed from the chargeship of the Imperial Cable, as by the flux of time this long-experienced Asst.-Supt. reached the age-limit on the 11th ult.

The high technical abilities of Mr. Simmons were only to be appreciated to the full during times of difficulty, when his quiet tenacity alone inspired confidence. On these occasions he never spared himself, even meals were at times forgotten, a very reprehensible thing, Arthur !

Two other Asst. Supts. have also reached the 60th milestone, it is noted, Mr. Peapell, closely associated with the working of the Anglo-Russian cable, and friend A. F. Bullard.

The Cable Room promotions, vacancies filled, and new appointments, are as follows :—Mr. Vander Ent, Superintendent ; Messrs. Halls and Symes, Assistant Superintendents ; and Mr. H. C. Smith, Overseer. To these, and to Mr. E. Griffith on his retirement, the sincerest wishes for the future.

On the 8th ult. direct telegraphic communication was re-established between Liverpool and Antwerp for the first time since August, 1914. This was done by means of a split Triple Duplex Baudot and Baudot re-transmitters in the Cable Room, London. The complete scheme will give the following on a single loop between London and Liverpool, viz. : (1) Liverpool Central and London (Cable Room), (2) Liverpool (Central or Cotton Exchange), London and Havre-Bordeaux, (3) Liverpool-London-Antwerp. From sketches the writer has seen on the French side it is deduced that the Baudot installation at Bordeaux carries a further extension to Toulouse !

The necrology of ex-Cable Room men has been heavy recently, and include Messrs. Beechey, Cale and Dausques, all ex-Submarine Telegraph officers, and although the two last-named have been on the retired list for some years, it is sad to relate that Mr. Beechey had only left the service but a few weeks when he passed away.

AUSTRALIA.—Reuter's Trade Service in Melbourne stated that "The Commonwealth Government has decided to appoint a Royal Commission of Inquiry in Australia. In making the announcement, the acting Prime Minister said the question had been for some time engaging the attention of the Federal Government. The *personnel* of the Commission, which will be composed of experts, has not yet been announced ; it will consider broadcasting within the Commonwealth, and will examine alterations suggested as desirable in policy and practice. The Postmaster-General said that the Government was following the steps of Great Britain, though on a smaller scale, as the Australian Commission would consist of only three members ; everything, including a suggestion of Government control of broadcasting stations, would be determined according to the findings of the Commission."

The same agency also cables that "the success of the radio exhibition held in Melbourne last year was so satisfactory that it has been decided to hold another about next March or April. Larger accommodation has been secured in the Exhibition Building, Melbourne, and all interested in wireless are giving enthusiastic support.

"Following the successful practice in Great Britain, the Melbourne broadcasting station (3 LO) is to erect relaying inland stations at three different centres, probably at Ballarat, Bendigo, and Sale, or Bairnsdale. One station will be provided in Gippsland, as there is a large population to be served in that area, and observations have shown that fading is worst there. The power used will probably be half that of 3 LO, which works on five kilowatts."

The same agency is also responsible for the following two paragraphs :—

"Arrangements are said to have been completed for the erection of a new broadcasting station in Melbourne, of the "B" class, on the top story of a high building in the centre of the city ; it will receive no revenue from licence fees, but will rely solely on advertising for its income. The call sign will probably be 3 BO and the wave-length 255 metres, with a power of 500 watts. Provision is being made for suitable programmes of music and other special features, and one minute's advertising will be allowed between each item. The station will operate for four hours on each of six evenings a week, Mondays to Saturdays. At the present time Melbourne has two "A" class broadcasting stations (3 LO and 3 AR) and with the new station it will have two "B" class stations (3 UZ and 3 BO).

"Good progress is being made with the local manufacture of wireless equipment. One of the largest manufacturers of radio parts is the Electricity Meter Manufacturing Co., Ltd., whose lines are marketed under the name of 'Emmco.' The latest addition to its plant is machinery for the manufacture of headphones, which are now being turned out in large numbers.

Regarding the latter matter, the *Times Engineering Supplement* recently said :—

"In connexion with broadcasting in Australia a change is going on which will afford increased scope for British manufacturers of wireless apparatus. Whereas listeners—of whom there are now 165,000—formerly bought parts separately and constructed their own receiving sets, they are now buying sets ready for use. The kind most needed are four-valve superselective sets which can be worked on either a short or long wave-length with practically a turn of a knob. Fortunately, British manufacturers are making rapid headway in the Australian wireless market. It is very significant that while American imports declined from $1,052,000 in 1924 to $675,000 in 1925, British imports increased in the same period from £74,355 to £148,722."

The *Electrical Review* says it is reported from Melbourne that Amalgamated Wireless, Ltd., has claimed the exclusive Australian patent rights for the principal articles used in the construction of radio receiving sets. The company has notified manufacturers that it requires them to pay royalties of 12*s.* 6*d.* and 17*s.* 6*d.* per valve in respect of each set sold. The report also states that the company is endeavouring to make this claim retrospective, and this has caused some concern among the smaller traders. The Commonwealth Government holds a large interest in the company, but is reported to have declared that it does not intend to take any action.

On the other hand, the Melbourne agent of Reuter's cables as follows:—

"Wireless dealers in Melbourne and Sydney have formed a co-operative company to contest the demands of Amalgamated Wireless (Australasia), Ltd., which claims a royalty on apparatus covered by 145 patents."

From the Trade Section of the same agency it is understood that details have been completed of important proposals for conducting organised research into problems connected with broadcasting in Australia. The Broadcasting Co. of Australia Pty., Ltd. (which operates 3 LO) recently offered the University of Melbourne a grant of £500 a year for three years to enable the University to undertake wireless research work. The offer has been accepted, and it is understood that a similar offer has been made to the University of Sydney by Farmers Pty., Ltd. (2 FC). The research work will be performed by the Faculty of Science under the direction of the Dean (Prof. T. H. Laby).

AUSTRIA.—It is understood that the official inaugural ceremony of the Klagenfurt station, wave length 272.7 metres, took place on Jan. 30; this is claimed to be one of the best relay transmitters in Europe.

BELGIUM.—*World Radio* reports that the engineers who met recently in Brussels under the chairmanship of M. Raymond Braillard, president of the Technical Commission of the International Radiophony Union, examined the subject of transmission interference on long wave-lengths; provisional regulations were decided upon and a detailed programme of tests arranged. Another matter discussed was electrical interference caused by tramways, lifts, illuminated signs, &c. The Conference coincided with meetings of the Bureau and of the Juridical Commission of the Union, presided over by Herr Giesecke and Dr. Sourek respectively, and Radio Belgique entertained the delegates (among whom were representatives of Russian broadcasting).

The Société Belge Radio-Electrique, of Brussels, in its report for last year, states that it has established a short-wave wireless telegraph service between Belgium and the Belgian Congo, which is now working satisfactorily.

BOLIVIA.—Reuter's Trade Agency at La Paz notified that a wireless station is to be erected at Lake Gaiba, in Eastern Bolivia, and the purchase completed of apparatus temporarily installed on the s.s. *Saavedra*. The Marconi Company, which holds a 25-year monopolistic contract for telegraph services in Bolivia, has undertaken to provide special apparatus for short-wave transmission.

Commerce Reports states that Brazilian trade prospects have been improved by the projected stabilisation of the milreis at $0.125 and the subsequent adoption of a new currency unit, the "cruzeiro." Transactions in electrical goods have recently indicated considerable improvement both as regards direct importations and sales from stocks. Two American companies have been awarded contracts for the electrification of the Paulista Railways. The radio business is said to be dull in Rio de Janeiro, but satisfactory in Sao Paulo.

For the benefit of our Telegraph Money Order conversionists the new *cruzeiro* is valued at about four milreis.

BULGARIA.—A 5-kw. transmitter to replace the present one at Sofia is contemplated; it will cost £30,000 and is not likely to be ready before the end of the year. Public subscriptions are to be invited at once by the Government.

CANADA.—The *Financial News* writes as follows on the new trans-Canadian telegraph circuit:—"The Canadian Pacific system has started work on a second trans-Canada telegraph line, 3,000 miles in length, extending from Montreal to Banfield, on Vancouver Island, passing through Sudbury, Fort William, Winnipeg, Moose Jaw, Calgary, Nelson, Penticton, Vancouver and Alberni. At Banfield the line will connect with the second Pacific Cable Board undersea circuit that goes to Fanning Island, Suva, Auckland and Sydney. The work will be completed in about two months, at an estimated cost of about $423,520, and will forge another link in the chain between Great Britain, Canada, New Zealand, and Australia."

According to *World Radio*, reception in Canada has been far from satisfactory of late, owing to the clash of wave-lengths and to the fact that, following the decision of a Chicago court, certain United States stations are poaching on Canadian channels. It is hoped that the necessary legislation conferring full authority on Mr. Hoover may be introduced at Washington. The wave-lengths of the broadcasting stations in some Canadian cities may be changed as a result of negotiations now in progress between Lieutenant-Commander C. P. Edwards, Director of Radio for the Dominion of Canada, and the Hon. Herbert Hoover, Secretary of Commerce in the United States, who has jurisdiction over the broadcasting stations in the Republic.

CHINA.—Despite all the upheaval in this wonderful land, one part of the Celestial country appears to "carry on," despite what may be happening elsewhere, and *Commerce Reports* is therefore able to report that the contract for a 2-kw. station, with a wave-length of 250 to 550 metres, for installation at Mukden, was awarded to a French firm. An American firm received the contract for the installation of a 1-kw. station with a similar wave-length in Harbin. These two broadcasting stations should be in operation early in 1927, and a new market for receiving sets will be opened as the installation of receiving sets was previously prohibited, except for military purposes, in Manchuria outside of the South Manchuria railway zone. Receiving sets will be taxed and licensed according to type and size; the licence fee for crystal sets to be approximately $3 a year, valve sets $6 a year, and a tax of 10% *ad valorem*, in addition to the regular Customs duties, will be imposed on imported sets. Dealers in radio receiving sets will be licensed; a deposit of approximately $5 will be required of all dealers prior to the issue of the licence.

DENMARK.—The law relative to annual licence fees was recently revised. All apparatus acquired or constructed after Oct. 1, 1926, is subject to a fee of 5 crowns in the case of a crystal set and of 7.5 crowns in the case of a valve set, or set in which valve amplifiers are used. These figures represent a reduction of 50%.

GERMANY.—At the end of 1926, says the *Electrical Review*, a total of 1,376,564 licences had been issued, the number of applications during December having been 39,442. Unlicensed listeners are said to be fewer in Germany than in any other country. The fee is payable monthly (2*s.*).

According to *World Radio*, though the power and range of all the following German stations remain unaltered, their transmitting strength will from now onwards, in accordance with the agreement recently concluded at Geneva, be stated as follows:—

	Wave-length.	*Old kw. figure.*	*New kw. figure.*
Köenigswusterhausen ...	1,300	10	8
Frankfurt (Main) ...	428.6	10	4
Hamburg	394.7	10	4
Leipzig	365.8	9	4
Munster	241.9	3	1.5

The low-power stations, Elberfeld (468.8 m.), Bremen (400 m.), Hanover (297 m.), Dresden (294 m.), Dortmund (283 m.), Cassel (272.5 m.), Kiel (254.2 m.), and Gleiwitz (250 m.), hitherto represented by 1.5 kw. will now have each 0.7 kw. Langenberg will have 25 kw., instead of 60 on the old basis.

GREAT BRITAIN.—The following are the new wave-lengths in use at the stations mentioned hereunder:—

Station.	*Old Wave-length. Metres.*	*New Wave-length. Metres.*
Birmingham	491.8	326.1
Bournemouth	326.1	491.8
Bradford	254.2	252.1
Edinburgh	294.1	288.5
Hull	288.5	249
Stoke	288.5	249
Dundee	288.5	249
Swansea	288.5	249

The 249-m. wave is the international common wave-length.

Several Continental stations, besides those in this country, have changed and exchanged wave-lengths for test purposes recently.

The commercial accounts for the British Post Office for the year ended March 31, 1926, show, with the exception of the year 1919, the biggest surplus of any year since 1913. The surplus on the postal account amounted to £7,416,266, but there was a loss of £1,299,214 on the telegraphs. The telephone account also showed a surplus to the extent of £550,830. This gave a total surplus for the year of £6,667,882, over £1,000,000 more than the surplus for 1925, and surpassed in 1919 by the total of £7,447,556. The income side shows that postal business brought 58.36% of the receipts, telegraph business 7.82, and telephone services 25.75%.

At its second meeting, on Feb. 14, the Wireless Organisations Committee decided to ask the Postmaster-General to take an early opportunity to assure listeners that a system of high-power regional distribution effective for the transmission of alternative programmes will be fully expedited so far as his Department is concerned. The Wireless Organisations Committee, it will be recalled, is representative of four national societies, viz.: the Radio Society of Great Britain, the Radio Association, the Wireless Association of Great Britain, and the Wireless League. Capt. Ian Fraser, the blind M.P., who is prominently associated with the Wireless League and Radio Society, accepted the chairmanship of the Committee, which has as its main function the establishment of an effective liaison between the national societies of listeners and experimenters and the B.B.C. on matters of mutual interest.

The following written reply to a question in the House of Commons regarding the interpretation of the exact covering authority which was constituted by the Postmaster-General's licence will relieve the anxiety of quite a number of licensees. Lord Wolmer is reported to have said: "A receiving licence entitled the licensee to use apparatus in the premises occupied by him. One licence will cover any number of sets installed in the same premises for the use of the licensee, his family, or his servants, but any other person occupying a portion of the same house under a separate tenancy and desiring to install receiving apparatus must take out a separate licence. When a licensee runs telephone leads from his set to the house of a neighbour, or to any premises other than those in his own occupation, for the purpose of conveying broadcast programmes thereto, a separate licence is necessary for such premises."

GUATEMALA.—*Commerce Reports* gives the following interesting information regarding telegraph and telephone matters in this little-known republic :—" The telegraph and telephone systems are operated by the Government as one unit. The combined systems reported a deficit of 13,477,666 pesos for the year 1925 (the latest figures available). There were 261 telegraph offices operating at the end of the year, of which 5 were inaugurated in 1925 ; the 11 new central telephone stations opened during the year brought the total in operation on the country to 87. Telegraph lines aggregated 6,871 kilometres, and the national telephone lines had a combined length of more than 3,603 kilometres. At the end of 1925 there were 1,992 telephones in use in the Republic, representing an increase of 775 instruments since 1923. Work on the new automatic telephone system in the capital city has begun.

INDIA.—Complaints are made regarding the inefficient telegraph service between Burma and India, and when the Director-General of Posts and Telegraphs recently visited Rangoon, the Burma Chamber of Commerce represented to him that a submarine cable should be laid between Rangoon and India ; however, the sea bed is singularly unfavourable to such an enterprise. A senior officer of the engineering branch has been instructed to inspect the lines between Burma and India, and Rs. 1¼ lakhs have been sanctioned for the overhaul of these wires. It may be added that the country has always been a difficult one for overhead construction in the rainy season, and the laying of underground lines is not easily practicable.

TELEPHONES IN BURMA.—The Posts and Telegraphs Department has, during the past two years, linked outlying places by public telephone circuits. In every case this has been done by making use of the existing telegraph wires, as the traffic would not be sufficient to justify the cost of erecting special telephone wires. The facilities thus provided have been much appreciated by the public, and Mandalay has in this way been linked with Maymio, Rangoon, with Pegu, Thanatpin, Syrian, Kauktan and Tavoy with Harmingyi.

RANGOON'S FIRST WIRELESS TELEPHONE.—The Port Authorities in Rangoon have introduced a wireless telephone, the first one in Burma, between the Port Offices and the pilot vessel *Beacon*. The telephone is fitted with an automatic calling device, and the installation is capable of communicating with vessels at sea for a distance of 200 miles.

IRISH FREE STATE.—The preliminary arrangements are being made for the establishment of the Free State Advisory Committee under the provisions of the Wireless Telegraph Act. The Provisional Advisory Committee already in existence will be superseded by the new body. The Ministries for Education, for Lands and Agriculture, and for Posts and Telegraphs, are to be represented on the Committee.

NEW ZEALAND.—The installation of powerful broadcasting stations at Auckland and Christchurch has been completed by the Radio Broadcasting Co. of New Zealand, Ltd., a subsidised company organised to operate a chain of broadcasting stations throughout New Zealand on a uniform basis. says *Commerce Reports*. The Auckland station is already in service, and the stations at Christchurch, Wellington, and Dunedin soon will be installed. It is estimated that about 8,000 licences were issued in 1926. Practically all of the equipment used in this area is American.

PERSIA.—Reuter's Teheran agency reports that a general local and foreign wireless service was established at Teheran on Jan. 28 for the first time.

POLAND.—The latest addition to European long-wave stations, says the *Electrical Review*, is that at Warsaw, transmitting on 1,013 metres with an input of 10 kw. to the main oscillator valve, which was built by Marconi's Wireless Telegraph Co., Ltd. The transmitter (a QD 8 set) was designed on the same lines as that at the Daventry station, the six main units being contained in aluminium frames : four are open and contain the valves for the independent drive, main oscillator, modulator and rectifier circuits, and the two enclosed units are the speech transformer and the coupling unit for the drive main oscillator grid circuit. The station belongs to the Polish Broadcasting Co., and has been built at Fort Mokotow on farm land belonging to the municipality. Power is obtained from the city supply at 3,000 volts, three-phase, being transformed at the station to 210 volts. The rectifiers, main modulator, and main oscillator valves are of the Marconi cooled-anode type, and the drive and sub-modulator of the glass air-cooled type. The aerial is carried on two self-supporting lattice steel masts 75 metres high, and the aerial current is 50 amperes. The range of reception in Poland is 75 miles with a crystal receiver and 375 miles with a two-valve receiver ; the station has been heard in this country, when the B.B.C. stations were closed down, on a 2-valve receiver. Short wood poles were used to carry an earth screen which was erected to compare results with those obtained with an " earth " proper, and the letter was found to give the better performance.

Reuter's Warsaw agency also gives a list of new radio services, thus :—" Direct wireless communication has been opened between Poland and Syria, the Lebanon, Transjordania, Palestine, Egypt, Eritrea, and Abyssinia, and *vice versa*. Regular exchanges have been arranged between the central wireless station at Warsaw and the Orient Radio Co.'s station at Beyrouth."

The British Commercial Secretary at Warsaw has informed the Board of Trade that according to statistics from the local Press the number of broadcast receiving licences issued in Poland increased from 4,977 in 1925 to 34,556 in 1926. On the other hand, the number of dealers declined from 269 to 239, indicating that Poland has also experienced the usual process common to the initiation of a wireless industry, in that numbers of small firms which went into the business, lacking both experience and capital, have not been able to withstand even favourable conditions.

PORTUGAL.—From Milan, Italy, we learn that a definite contract has lately been arranged between the Società " Italcable " and the Portuguese Government for the laying of new submarine telegraph cables between Lisbon Malaga, Azores and Cape Verde. The Italian submarine cable system will, as a result, be notably increased by a new cable which, starting at Anzio, will cross the Tirreno and then continue across to Corsica and Sardinia, thence to Barcelona and on to Malaga.

SANTO DOMINGO.—Reuter's agency at San Domingo reports that a broadcasting station, the first of its kind in the Dominican Republic, is shortly to be erected at Monte Cristy in accordance with plans adopted by the Minister of Promotion and Communications. A preliminary grant of 30,000 dollars has been provided for in the 1927 budget for the installation of a 1,000-watt station. Broadcasting is to be used for literary, scientific and other educational purposes, and as a means of propaganda for commercial agricultural and sanitary measures.

SOUTH AFRICA.—The *Engineering Supplement* of the London *Times*, a few weeks ago, wrote as follows regarding broadcasting :—" Broadcasting in South Africa has to contend with several disadvantages, one of which is the small and scattered population and another the geographical situation of the country, which makes it very difficult to receive European and American programmes. Now comes a report that the present owners of the Johannesburg broadcasting station have decided to close it. The news has a direct concern for Great Britain, in view of our substantial exports to South Africa of wireless apparatus. The growth of this trade in recent years has been considerable. Official figures (which include wireless telegraphy apparatus) are :—1923, £26,096 ; 1924, £264,313 ; 1925, £84,459. America's share of the trade is so small as to be negligible. The interest of South Africans in broadcasting is as keen as ever, and it will develop rapidly when the problem can be solved of picking up B.B.C. programmes regularly. Meanwhile, there is a scheme to keep the Johannesburg station in operation under new control, and it is to be hoped that it will prove successful."

Just as the *T. and T. Journal* had gone to press last month, however, the news came that, " Amid expressions of regret and appreciation, the Johannesburg broadcasting station, the most important in the Union, closed down on Jan. 31."

" As the result of a conference of those interested in the resumption of broadcasting, three schemes have been submitted to the Minister of Posts and Telegraphs, who had promised to issue a licence for any scheme chosen by a representative committee. The *Times* understands that the Minister favours the proposal of the Mayor of Johannesburg that the cost of broadcasting shall be borne by the Reef municipalities. He is definitely of opinion that sooner or later the service must become a State-aided enterprise. While negotiations are proceeding, the Transvaal Radio Society undertook to resume the service."

U.S.A.—Says *World Radio* : " ' Time on the air ' is sold for from $25 to $400 an hour, and the average is considered to be about $200 per hour. Few stations broadcast more than eight hours a day, and most of them no more than six. If six hours could be sold every day of the year at, say, the average rate of $200 per hour, which is unlikely, the revenue would be $438,000 annually. Most advertisers desire the time between the hours of 8 and 10 at night, and a station that averages one hour per day for 365 days considers it is doing well, which means an average income of $73,000 per year." Apparently there are likely to be very few millionaires from the radio-diffusion advertising section !

Reuter's New York agency is responsible for the two following paragraphs :—

" The first month's operation of the transatlantic radiophone service has been a commercial success, according to the management, which states that the receipts satisfactorily exceeded the expenditure, adding that Americans lived up to their reputation as extravagant telephone users, having made an average of nine calls for every five British calls."

" A commercial telephone service between Chicago and Detroit and London was inaugurated on Feb. 12."

New York City's newest station (WGL) was opened on Jan. 30, and marked the inauguration of the activities of the International Broadcasting Co., which operates the station ; its power is 1 kw., and wave-length 442 metres, which figure may be changed to 422 metres if interference occurs.

The new Atlantic Broadcasting Corporation, with headquarters in New York, has purchased the Grebe group of stations, including the new 5,000-watt transmitter WABC. The new organisation has its studio and reception rooms in Steinway Hall ; all transmitters are located at Long Island. An elaborate mixing or fading system in connection with a large number of microphones, permits, says the *T. and T. Age*, the proper blending of the various elements of the broadcast presentation. The frequency control system of the 5-kw. transmitter is of such stability that a change of even one-tenth of one per cent. in wave-length is not likely to occur.

In connexion with the recently-inaugurated transatlantic radio-telephone service, work is to start at once on the erection of a new receiving station in Fifeshire, says the London *Daily Express*, on the estate of Sir Donald Makgill, Bart., of Kemback. Three lines of aerial masts will radiate from the station for a distance of three miles each, and in the event of the station proving satisfactory, substantial buildings will take the place of those now to be erected. A lead-encased cable will be laid between Kemback and Cupar Post Office.

A tentative agreement has been reached at Washington, where conferences have for months been considering the problem of air control and order regarding wireless transmission. The agreement appears to have the support

of adherents of the White Bill, which the House of Representatives passed, and of those favouring the Dill Bill, which the Senate passed. According to *World Radio*, it contains no provision for censorship, calls for the creation of a commission of five, the members of which are to be appointed by the President of the United States, and to serve for six years ; each commissioner will represent one of five zones created. The Commission will have jurisdiction as to granting, renewal and revocation of all station licences and making regulations for a period of one year, at the end of which the Commission shall decide only controversial matters which the Secretary of Commerce of the United States places before it and appeals from decisions he has handed down. The decrees of the Commission are to be final, to be reviewed only by the courts. Complete control over operators and the issue of their licences is given to the Secretary of Commerce. All administrative functions are entrusted to him. After one year he will be given original jurisdiction over the granting and renewal of station licences in relation to which there is no controversy or appeal. The Commissioners will receive £10,000 a year for the first year, and thereafter $30 a day and travelling expenses.

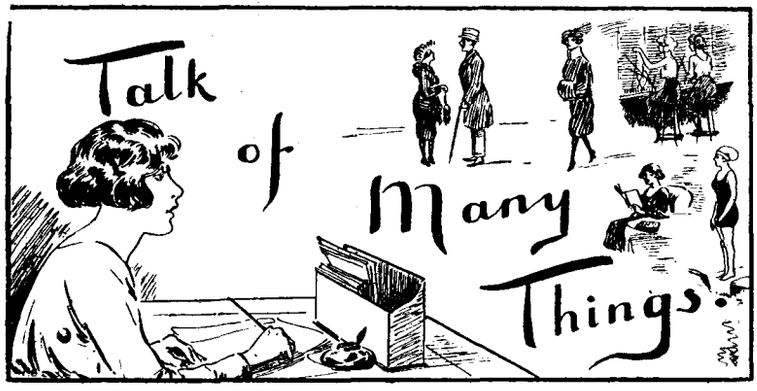
VENEZUELA.—Reuter's agency at Caracas cables that the Government has bought about 118 acres of high-lying land for a radio-telegraph station in the Cutia sub-division of the Federal District (population 140,000), at a cost of 600,000 bolivares (1 bolivar = 9½*d.*)

"And still we love the evil *cause*
And of the just *effect* complain :
We tread upon life's broken laws,
And murmur at our self-inflicted pain."

—"The Shadow and the Light," *Whittier.*

J. J. T.

WE TELEPHONISTS



Early Rising.

REPETITION brings conviction. Even burglars will agree that there is at least an element of danger in repetition, but I was not considering the matter from their point of view. I was thinking rather of advertisements and proverbs. They are, of course, quite dissimilar, but nevertheless they have characteristics in common. They parade in the trappings of truth, they fascinate, they have the tentacles of an octopus and, by subtle workings, they undermine the sturdiest independence of thought and action. The victim, once within their grasp, will believe anything—even that ginger is black and white. Their *modus operandi* differs, however, for while the advertisement mouths its monotonous messages from hoardings, the interior of public vehicles, and from magazines and newspapers, the bacillus of the proverb is spread by man himself by word of mouth. Of the two, the proverb is possibly the more deadly, for while there are spots on the face of the earth which as yet are free from the fungus of advertisement, there is literally no escape from the uttered or remembered proverb. Not infrequently they are in opposition. It is said that "Familiarity breeds contempt," but if that were true it would follow logically that the fewer advertisements one saw for Bink's Soap the more highly it would be esteemed and used. I use Bink's Soap simply because I was haunted by the constant recital of its virtues. No spot was free and the whole world seemed like a graveyard in which every epitaph eulogised Bink's Soap. At first I read the announcements with an air of detachment. Soap at that time did not interest me, least of all Bink's. Then a vague interest was aroused and in the naïve way of a certain judge I said "What *is* Soap?" Later, I paused to consider whether perhaps Bink's Soap might not be freer from the alleged unpleasantnesses of all and any other soap. Then I passed through various stages of interest in Bink's Soap. Sometimes I would snort with rage when I saw it mentioned ; sometimes I would laugh or emit strange oaths. Finally I crept into a chemist's shop and brought a tablet, and, reluctant to waste the money I had paid, I used it. Thus my demoralisation was completed.

At present I am worried by a proverb. It has been hammering at me for years, and I am realising that constant dripping may wear away a stone. The continual struggle to maintain my disbelief is wearing me out and I feel that my strength is fast waning. How much longer can I resist the proverb "Early to bed and early to rise, makes a man healthy and wealthy and wise?" Just why the philosopher limited his dictum to men I cannot say. He may have considered that the health, wealth and wisdom of women were such as to need no artificial stimulus. Or he may have thought that although healthy and wealthy nothing could possibly be done about their wisdom. That however, is a very base thought, and I hasten to repudiate it on your behalf, ladies. Of course, I know it's all wrong, because if it were true I should be in a terrible fix. A moderate acceptance of the saying might secure a degree of health and wealth. The great difficulty would be to determine the precise period which should elapse between rising *from* and going *to* bed in order to obtain the maximum amount of wisdom. I feel sure that in my case I should always be in bed—and there's a great deal of wisdom in that.

PERCY FLAGE.

A Sad Story.

Derek fell asleep ; it had been a hot summer day with absolutely nothing doing ; added to that he had taken a goodly number of aspirins which, as every one knows, should only be taken one at a time. So Derek fell asleep. . . . That wouldn't have mattered so much if he had awakened in time to go home : alas ! 5 o'clock came—6 o'clock—the great door clanged to, and darkness crept stealthily around. Terrible as that was, all would have been well had he awakened in the morning. Albeit somewhat faint, verily might he have recovered his manly strength with the aid of ye rashers and ye eggs ; but it was not to be ! The days passed into weeks, the weeks into months, and at the end of five years Derek had developed a passable beard.

The effect of the aspirins at this time began to wear off and one day Derek suddenly sat up and began to take notice. His first instinctive feeling was of anger, so naturally he took up the telephone.

"Hallo there—Hallo ! Hallo ! Where on earth are you, Exchange. Why the deuce don't you answer ! ! This is what we pay you for, isn't it—keep us waiting while you fool about—Exchange, EXCHANGE ! "

He paused for breath and instantly a sweet, low voice spoke to him.

"Your pleasure, Sir ? "

"What—what ! " he raged, "Who're you talking to ? Tell me the time and look sharp about it."

He was really longing to know the time. A lacy cobweb was resting lightly on the face of the clock. But that wretched Exchange woman would *not* satisfy him.

"Tut, tut ! " she murmured gently, "I'm willing to give you a chance, but I can't allow you *too* much licence. Now just what is it you want ? "

"I WANT THE TIME ! " he bellowed.

A faint purring sound on the line ; then a different voice.

"Now then, what is this ? Explain at once, Sir, why you are wasting the Operator's time."

The tears began to trickle down Derek's cheeks.

"I w'want the time," he murmured, brokenly.

"Have you not just heard the time signal ? Your telephone must be out of order, or perhaps you have been asleep ? "

"Yes, that's it ! " he said eagerly, "I've been asleep."

"It is now three past twenty-four."

"Three past—you must be mad ! "

"Dear, dear, your manners leave a good deal to be desired. The very first clause in the Agreement deals with persons like you ! Beg your pardon ? "

"I was just pinching myself to see if . . . you must be one of those automatic fiends trying to work your jokes on me. When does the automatic business come into force ? " There was a long pause, then the voice at the other end of the line spoke clearly—deliberately—

"I don't know whether you are in earnest, but because your telephone has not been used for many years I will give you the benefit of either having been away from civilization or of having lost your memory. Five years ago the automatic system was installed. It was eagerly acclaimed and for a time all went well. But when the busy season was at its height, the poor subscribers found no satisfaction in grumbling at a dial. It couldn't hear them ; it couldn't get into trouble for answering back. Moreover, they missed the voice of the telephonist—but this of course they would not own. When matters were becoming desperate, the Great and Illustrious Men of the Country held solemn conclave thuswise :—

"Inasmuch as intelligence and courtesy should be fostered in this noble land and that the fair fame of aforementioned should not be smirched by reports of subscribers having smashed their dialling plate because it stared back at them when they shouted at it, it is considered right and proper that one call out of each ten shall be diverted to the Exchange Telephonist."

Greatly to the surprise of the Great Men the Exchange Telephonists rose in a body and declaimed :—

"Peace we have had for many moons. Why should we once again be disturbed ? " Nor would they be pacified until an Agreement was drawn up, the first clause of which laid down the rule that the subscriber must modulate his voice nicely when speaking to the telephonist, and never use the telephone if he feels angry."

Derek gave a grunt, turned over and—woke !

W. M. G., Albert Dock Exchange.

PLUGS

Your requirements will be amply satisfied if your plugs are made by the T.M.C. Good workmanship and materials assure it. We make plugs of every type. Send us your next enquiry.

The
Telephone Manufacturing Company
Limited

Hollingsworth Works, West Dulwich
LONDON, S.E.21

Telephone: Sydenham 2460-1. Codes: Bentley's, A.B.C., 6th Ed. Telegrams: Bubastis, Dulcrox, London.

Contractors to

British and Colonial Post Offices; Admiralty; War Office; Air Ministry; Crown Agents for the Colonies; India Office; and Telephone Companies throughout the World.

Makers of the "Laryngaphone" Noise-proof Telephone.

Sydenham Tennis and Swimming Clubs.

A dance in aid of the above clubs was held at Dartmouth Hall, Forest Hill, on Jan. 20.

It proved a social and financial success,—and this in spite of the influenza epidemic.

Mr. Raison, who proved himself a popular M.C., distributed the swimming prizes won by members of the exchange staff.

The second dance of the season will be held on Mar. 9. M. A.

Putney: Poor Children's Tea.

This year the staff at Putney arranged two short plays, for the entertainment of their little guests at Fairlight Hall, Tooting.

Variety was the keynote of the evening. It was well in evidence at the tea table, but here all the "varieties" quickly disappeared, and soon the youngsters were joining in a few popular songs, led by a Jazz Band.

"The Fairies Work," a little play produced by five members of the staff, caused peals of laughter, whilst cries of admiration greeted the pretty little flower play which followed.

It was indeed a pretty sight—the girls in their flower frocks and the illuminated platform and pillars, which had been so artistically arranged by the engineers.

But time passes quickly, and after a performance by the clown, during which there was wild excitement, the evening closed with the distribution of dolls, toys, and bags, the bags containing fruit, nuts, and sweets. E. R.

The Lost Cord.

(*With apologies to Adelaide Anne Proctor.*)

Seated one day at the switchboard,
I was weary and ill at ease;
And my fingers wandered idly
Over the register keys.
I know not what I was saying
Or what I was dreaming then,
But I heard a mighty buzzer
Like the sound of a great Amen.

It flooded my whole receiver
Like a "Howler" long and loud,
It fell on my fevered spirit
Like the sob of a wailing crowd.
'Twas like the discordant echo
From the tongue of a scolding wife;
It seemed to contain the heart-cry,
Of a weary telephonist's life.

I have sought, but have sought it vainly,
That one lost cord divine,
Which brought from the soul of the switchboard
Such dreams to this head of mine.
It may be the supervisor
Will speak on that cord again
Or it may be that only the Test-board
Knows the truth of that loud Amen. A. G. O.

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

LONDON TELEPHONE SERVICE NOTES.

Accounts Branch.

IN spite of the epidemic of colds and influenza, which generally depletes the staff early in the year and has been specially virulent this year, the accounts for the current quarter were all dispatched between Jan. 10 and 28. Now that there are over half-a-million telephones in London the number of accounts to be sent out is nearly 260,000, so that the work involved in their preparation and dispatch is necessarily heavy. The highest number dispatched in any one day this quarter was 23,177.

Following the departure of the accounts, indeed coinciding with the later stages, comes the arrival of the payments which means an orgy of receipt writing and posting in ledgers and much activity on the part of the cashiers. At the time of writing the peak period has been passed, the amount of money dealt with on the heaviest day reaching the sum of £101,300.

The development of the telephone service, which has necessitated the opening of new exchanges and the extension of most of those already existing, is naturally reflected in the number of accounts to be dealt with. For some time past each quarter has shown a net increase over last quarter's figure of approximately 5,000 accounts. But this net increase does not give a real indication of the number of ledger alterations involved by cessations, new lines, removals, changes in and additions to apparatus, &c. During the quarter ending December, and therefore covering the period since the last dispatch of accounts, 24,868 advice notes were issued, and, in due course, were dealt with on the ledger sections.

Correspondence arising from the accounts is also a big item, and it is not until one comes to deal with it that one realises the great variety of queries which can be raised on a simple account. In January 12,609 letters were received and dealt with. Some correspondence has its humorous side which creates a welcome diversion. A recent example was a communication in Esperanto which, however, the combined efforts of several brains succeeded in translating into a tale of woe about an ineffective call made from a call office to the writers' own telephone. He had apparently anticipated that it would not be understood and was somewhat taken aback when called up and asked for certain details which had been omitted, no comment on the language being made. It seemed rather a pity that the joke could not be returned by a polite official communication in Zulu or Chinese!

A little party of people in the Controller's Office have specially interested themselves in the welfare of blind persons in poor circumstances, and assist in carrying on clubs for them in various districts through which they are provided with entertainment and help in time of need or illness. Funds are raised by means of concerts, &c. In November last a concert was held in aid of the blind at Hoxton which added over £13 to the funds for that district. On March 9 another concert will be held in the Refreshment Room at Cornwall House in aid of the club for the Paddington blind, and the support and interest of any members of the staff will be welcomed by the organisers.

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Contract Branch.

The following letter came to hand a few days ago:—

"Sir,—Would you oblige me by fixing a Sine [*sic*] out Side my shop you may Telephone from Here as this is anewsagents [*sic*]. I feel sure it would be an adventure to both."

One cannot help suggesting that so risky an adventure should be postponed *sine die*.

A post-card advertising internal extensions in the following terms was enclosed with the last quarter's account for residental lines:—

"HAVE YOU A LIGHT IN EVERY ROOM?"

Of course you have. You would find it very inconvenient to be obliged to go to a certain room in order to get a light.

But you are doing this when you have but one telephone.

Less than ONE PENNY a day will give you an additional telephone. Think of it. IF INTERESTED kindly fill up and return this postcard.

The Controller has received a letter from the Telephone Development Association congratulating him on its production and the following appeared in *John Bull* on Jan. 29 last.

"To R. A. Dalzell, Esq., C.B., C.B.E., Director of Telegraphs and Telephones.

Dear Sir,—I heartily congratulate you on the forward move made in actually advertising your telephone service. I like the conversational method of the postcards distributed, which in perfectly clear, non-technical language informs the ordinary householder of the benefits to be secured by adequate installations. The telephone service is setting an example that should result in a big increase of revenue.—JOHN BULL."

It is interesting to find that the card has attracted the attention and approval of some outside bodies who have had a wide experience of advertising methods. Some hundreds of orders for extensions have already resulted from its issue, and arrangements are being made to follow it up by another one which will accompany the next account.

A recent announcement in the newspapers illustrates the difficulties of development study officers in estimating the demands for lines that will arise from building sites.

It is well-known that Bush House only occupies about a third of the valuable Aldwych site which belongs to the London County Council, and it has been generally anticipated that two more buildings, similar in size to Bush House, would be erected on it. It now transpires that a proposal to utilize it for the erection of four theatres is under consideration. Four theatres would not require a dozen lines apiece but Bush House at the present time has over two hundred exchange lines installed and the future demand is likely to be heavy.

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London Telephonists' Society.

The London Telephonists' Society held their fifth meeting of the session at the City of London Y.M.C.A., 186, Aldersgate Street, E.C., on Friday, Feb. 4, 1927.

In accordance with what may now be considered an old established custom the meeting opened with a short concert, the items of which were provided by the staff at Holborn Exchange. The audience—about 150—were very appreciative and at the conclusion passed a very hearty vote of thanks to the artists for providing such an enjoyable programme.

The principal features of the evening were two papers, the first "Contract Work as affecting the Traffic Branch," by Mr. W. Glenny, and another "The Telephone School" by Miss A. M. Kingshott.

Mr. Glenny's paper opened with an appeal for a wider enthusiasm and a fuller appreciation on everybody's part of the mutual interdependence of the different branches of the service, and in passing referred to the extent to which Contract Branch returns were affected by the quality of the service given. The lecturer then proceeded to the main theme of the paper, namely, to describe the function of the development section and the duties of that section's personnel whom he likened to perepatetic prophets. These prophets Mr. Glenny divided into major prophets and minor prophets and an account of the joys and woes, and adventures too, of these officers added a pleasant touch of humour to the more serious details of the paper which dealt, as its title indicates, with those phases of the work of the Contract Branch which so closely interlaces with that of the Traffic Branch.

We hope that the Society will arrange further lectures on other aspects of the work of the London Telephone Service. It is all to the good that the members should be brought into closer contact with the various phases of the work and immense ramification of our most important service.

The second paper was charmingly read by Miss A. E. Reekie in consequence of the absence of the writer Miss A. M. Kingshott, who was unfortunately unable to be present. It gave a very interesting description of the school equipment and a detailed account of the progressive training of new entrants with the enrichment of many a little personal reminiscence of the feelings and trepidation of these young folk who continually pass through the school preparatory to commencing their business career.

Both papers were well received and considerable discussion followed each. The meeting closed by passing a very cordial vote of thanks to the two principals whose papers had afforded a very pleasant and instructive evening.

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Traffic Branch.

Whereas last year a weekly total of ten million calls was only reached at the peak periods of the year, it would seem that this figure will characterise the slack periods of 1927. This total was exceeded for five out of the first six weeks of the new year.

There are signs that Tandem Exchange is reaching completion, for a force of supervisors and telephonists have taken up occupation at the new building.

A considerable number of telephonists have undergone a period of preliminary training in the new art of key-sending.

The experimental equipment which was working for some time at City Exchange has been removed, having served a very useful purpose from both technical and traffic points of view. Difficulties (some of them quite unanticipated) in wedding the automatic to the manual system were encountered and overcome, and much valuable knowledge was gained.

Mr. W. F. Dobson has returned from his visit to New York where he spent a month in connexion with the opening of the Anglo-American Service. He speaks in the highest terms of the hospitality and assistance he received from everyone with whom he came into contact.

On this side we have been happy to make the acquaintance of Mr. E. J. Padmore of New York, and trust that his brief stay with us has been as pleasurable to him as it has been to us.

The making of good contacts in the personal sense are as important in securing good service as well made connexions are in an engineering sense.

Culled from the Exchanges.

Central.—A second whist drive was held on Dec. 3 at which there was a good attendance. The following description has been received :—

THE WHIST DRIVE.

It was the Central whist drive,
And when our work was done,
We hied us all to Slaters'
To have a night of fun.

The prizes stood in grand array
Replete with bag and brolly,
The patrons eyed the spoils with glee
And murmured "Oh how jolly."

At seven-thirty by the clock
We all sat down to play,
The M.C. rang a bell and said
These rules you must obey.

The losing gent, he moves one down,
The lady she goes higher,
The winning gent moves to the right,
That's all, now I'll retire.

Then there was silence in the room
As cards were sorted out,
Until a secret number came
Which caused a clap and shout.

The supper time soon came along
And we fell to with zest,
With sandwiches and trifle too,
The food was of the best.

But all good things are over soon
And it was quite a shock
When we just gave a passing glance
And found it ten o'clock.

And when the scores were totalled
We gathered round in flocks
To see the handsome prizes
Presented by Miss Cox.

The winners we applauded
And mourned our meagre score,
So everyone enjoyed the drive,
We hope we'll have some more.

D.D.

The Swimming Club held their second social evening on Jan. 25. The evening was a success both socially and financially, thanks to the enthusiasm of the committee. Good fun was enjoyed in the way of games, music, and dancing, to which interest was added by the awarding of small prizes. A good number of old friends joined in. A similar function has been arranged for March 1.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Promotions to Assistant Supervisorship Class II :—

Miss N. L. CURRAN, to Hop Exchange.
Miss D. L. TAYLOR, to Hampstead Exchange.
Miss B. M. AUSTEN, to Trunk Exchange.
Miss W. A. WAPLING, to Trunk Exchange.
Miss A. F. STOODLEY, to Central Exchange.
Miss A. R. E. HALL, to Sloane Exchange.
Miss E. A. MAY, to Putney Exchange.
Miss E. G. WEEKS, to Lee Green Exchange.
Miss R. WILLIAMS, to City Exchange.
Miss M. M. E. TANNER, to Gerrard Exchange.
Miss E. WAKEFIELD, to Willesden Exchange.
Miss G. M. WINKLEY, to Kensington Exchange.

Resignations on account of marriage :—

Miss M. A. PINNELL, Telephonist, of Central Exchange.
Miss G. BACKHOUSE, Telephonist, of Central Exchange.
Miss A. F. ROACH, Telephonist, of East Exchange.
Miss J. M. WESTWOOD, Telephonist, of Paddington Exchange.
Miss I. M. ROBERTS, Telephonist, of Putney Exchange.
Miss C. A. MILLARD, Telephonist, of Trunk Exchange.
Miss E. E. HAYWARD, Telephonist, of Woolwich Exchange.

Traffic Staff promotion :—

Mr. J. WEBB, Assistant Superintendent Class II to Assistant Superintendent Class I (acting).