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A RETROSPECT.

THE recent disastrous fire at the Hop Exchange, that lofty building to the south of the South Eastern main line from Charing Cross as it nears London Bridge, takes the thoughts of the writer back to the time when the National Telephone Company's Hop Exchange was actually in the Hop Exchange, whence it derived its name. He well remembers how as a lad he looked with a feeling something akin to reverence upon the then District Engineer (now a Provincial District Manager) who was credibly reported to have climbed down one of the stack pipes from top to bottom of the lofty building already mentioned.

The "Hop" Exchange is one instance of many in London where the name of the Exchange has lost its original significance. Probably the number of subscribers connected with the Hop trade forms but a very small proportion of the total number of subscribers on the Exchange in question. The name, however, being such a good one from the operating point of view "sticks," and apparently it will still remain in spite of the somewhat wholesale scrapping of time-honoured names in connection with the coming of the Automatic System. "Lee Green" is another case in point. The Exchange is at Lewisham and is at least three-quarters of a mile away from Lee Green where it was formerly established. The most notable instance of this, however, is the well-known Avenue Exchange, so called by virtue of the fact that it was originally installed in premises on the south side of Leadenhall Street known as "East India Avenue." The name was retained on the removal of the Exchange to Lime Street, and still more recently on its removal to its present *habitat* in Creechurch Lane.

When the writer entered the service of the National Telephone Company, something over a quarter of a century ago, there were in London twenty-five Public Exchanges, and of those only one is still in the same building in which it was then installed, and that is the Bank Exchange, so interestingly described by Mr. J. Webb in the August issue of the JOURNAL. This exchange was then known as "Queen Vic." Of the remaining twenty-four, some have been completely closed and exist neither in name nor in the form of

exchanges substituted for them in the same locality; although one can only wonder whether the development of the service may not in the whirligig of time necessitate the establishment of new exchanges in the same districts. Cases in point are King's Cross, Kilburn, Balham and Clapham. In other cases the old names have gone, remembered only by a few, but the exchanges themselves have been replaced by others near at hand, e.g., Coleman Street has long since been merged in the London Wall Exchange, Holborn took the place of Chancery Lane and Smithfield. Edgware Road is now known as Paddington, Heddon Street as Gerrard, and Deptford as New Cross. On the other hand, in the case of one of the existing exchanges, viz., Westminster, all the subscribers connected therewith were at the time of the transfer of the National Telephone Company's undertaking to the State diverted to one of the exchanges of the latter, i.e., Victoria. The same thing is, of course, equally true of some other exchanges, but these were established at a later date than those with which the present article deals. It might also be recorded that in the meantime other exchanges have come into, and passed out of, being, e.g., Holloway, Peckham, Barking, Harlesden and Hornchurch.

It must not be supposed, however, that because there were then districts in which no exchanges were established, such districts were necessarily without the Service. In some cases this was true, but in others Service was given to the nearest exchange, e.g., Tottenham was served from East, Highgate from King's Cross, Ealing from Kensington, and so on.

In those early days it was not necessary on calling a subscriber to quote the name of the exchange to which he was connected but to call by number only, the operator receiving the call being able by the initial cyphers of the number asked for to find the exchange with which the called subscriber was connected. In other words there was only one series of numbers for London, the numbers being allocated to the exchange in blocks. Had circumstances permitted the perpetuation of this condition of affairs how interesting would be the fight between the big commercial houses for Number One. This number was then in use by a firm of City merchants, a partner of which was a leading spirit in one of the earlier Telephone Companies.

The groups of numbers in use for the principal exchanges were as follows:—

Coleman Street ...	1 to 900.
Avenue ...	1001 to 1500, 2001 to 2500, 4001 to 4500, and 11001 upwards.
Queen Vic. ...	1501 to 2000, 15001 upwards.
Chancery Lane ...	2501 to 3000
Westminster ...	3001 to 3400
Heddon Street ...	3501 to 4000, 35001 upwards.
Hop ...	4501 to 5000, 45001 upwards.
East ...	5001 to 5400
Smithfield ...	6501 to 6900
Kensington ...	8501 to 8900, etc., etc.

Another interesting feature of those early days was that in addition to the alphabetical arrangement of subscribers in the Telephone Directory, there was at the end of the book a numerical list giving the name of the relative subscriber against each number.

As illustrative of the growth of the Service, it is interesting to note that the whole of the work in connection with the compilation of the London Telephone Directory was then in the hands of one lad, who was also responsible for issuing all Advice Notes (or Works Orders as they were then called); that is, he carried out the duties now performed in the Directory and Installation Sections of the London Telephone Service, the two together employing over seventy persons at the present time. It is hoped that this statement will not meet the eye of a certain telephone "expert," or it is feared he will bring it forward as an argument that State control of the Telephone Service means a much larger staff than would be employed by a private company.

It is often contended that rates were much simpler in those days, *i.e.*, before the introduction of the Message and Measured Rates, but in actual practice such was not the case. Even then there were three rates in vogue (1) the Ordinary Unlimited Rate. (2) a special reduced rate for private houses, which was only applicable in cases where a connection was rented at business premises. This rate was then applicable anywhere in London under the conditions mentioned, but was later altered to apply to private residences in the County of London area only, and the restriction as to a business connection elsewhere was withdrawn, (3) a local rate providing for unlimited service on one particular exchange or group of exchanges, with payment of a junction fee for communication with subscribers connected to other exchanges.

In each case the basic rate was for connection under a yearly agreement, subject to 5 per cent, 10 per cent. or 15 per cent. reduction respectively as a 3, 5 or 7 years' agreement was signed.

A table (or pedestal, as it was then more generally described) instrument was charged at a higher rental, 10s. in the case of direct exchange circuits, or 10s. 6d. on extensions. The apparent reason for the differentiation was that the annual charge was two guineas for an extension wall instrument and two and a half guineas was a better figure than £2 12s. to quote for an extension pedestal set. On one occasion a caller at the office, in as great a hurry to get the service as some people are nowadays, on the various rates being explained to him, elected to pay the additional charge for a pedestal set on the ground that he could take the instrument back with him and so have the service at once without waiting for a fitter to come and fix the apparatus as would, he thought, be necessary with a wall instrument.

A tremendous advance has been made in connection with Call Offices. Subscribers could, at that time, on paying a deposit of 5s. each, obtain any number of keys up to five. These keys enabled them to obtain free use of any Call Office in London. The coin collecting box was much more cumbersome than the pattern now in general use, the exchange being notified by means of a stroke on a bell gong instead of by buzzer. The stroke on the bell was given either by a coin dropping on to the gong or by a hammer, actuated by the key inserted in a slot provided for the purpose on the front of the box, striking the gong. This arrangement lent

itself to various forms of trickery. Keys were forged. Pennies were bored and a double string inserted through the hole, enabling the penny to be lowered on to the gong, giving the necessary signal, and then withdrawn for use on subsequent occasions. The front of the coin collecting box was not entirely wood, but pieces of perforated gauze were inserted in front of the bell gongs. In this gauze persons of an economical turn of mind would make holes of sufficient size to permit of a knife or other metallic instrument being inserted to strike the gong and so give the desired signal to the exchange.

Much more might be written as to the changes and developments which have taken place in the last quarter of a century, but enough has been recorded here to show that *tempora mutantur*. It is hoped too that *nos in illis mutantur*. W. G.

THE BAUDOT—XV.

By J. J. T.

WHEN any one or all of the appendix levers L are thrown forward by the action of the armature E² (Fig. XXXVIII) we noted that the foot, t of each individual lever thus actuated was thrown forward towards the edge of the rotating selection disc V of the combiner wheel C. Fig. XL, by means of dotted lines, shows the active position of a single lever L together with a completed view of the interior of the receiver and its front containing-plate 3, beyond which the axle X is seen to extend. This latter extension X¹ carries the type wheel and certain accessories. Reverting to the appendix levers: Fig. XLI gives a back view of the selection disc V showing all five appendix levers, L¹ to L⁵ in their relative positions behind the disc. The dotted circles below the lettering represent the axle-ends of five more levers about to be described, known as *selectors*, shown C¹ to C⁵ Fig. XLIII end-on, and in front-view see Fig. XLII. The selecting disc V rotating clockwise and solidly with the combiner wheel C and its axle X carries a

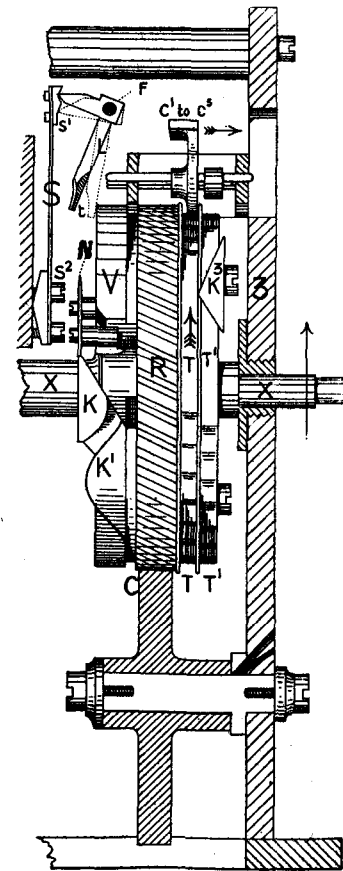


FIG. XL.

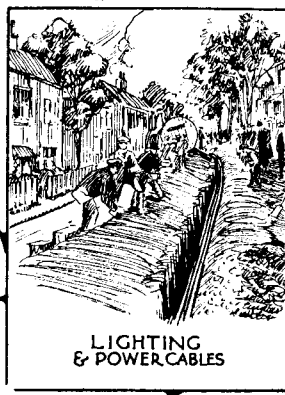
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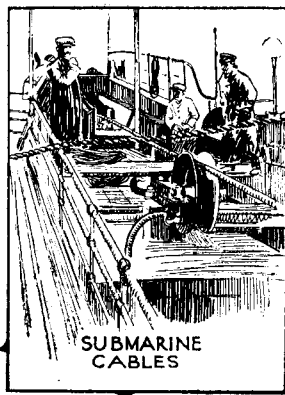
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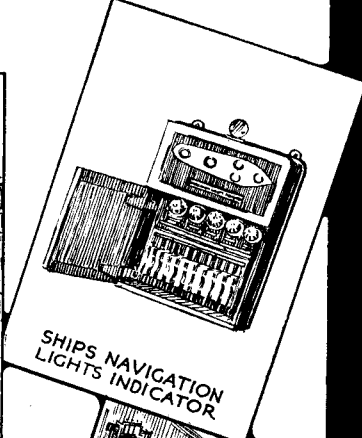
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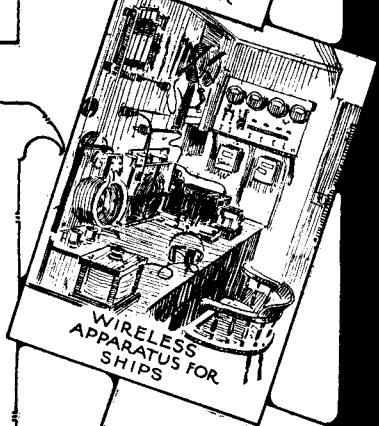
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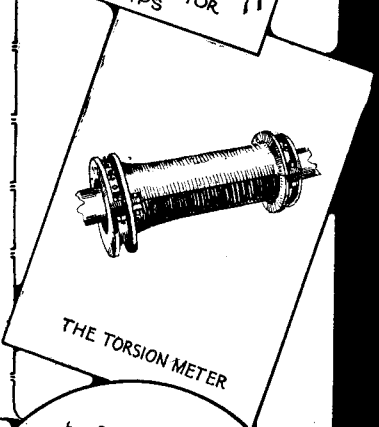
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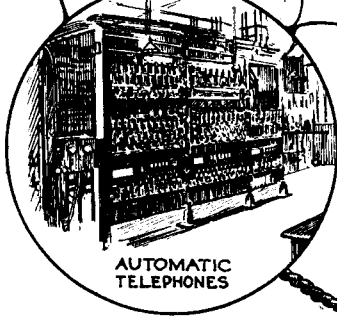
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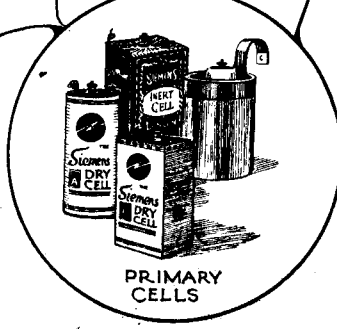
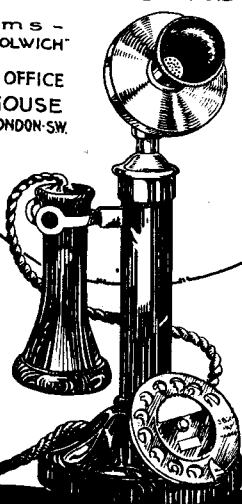
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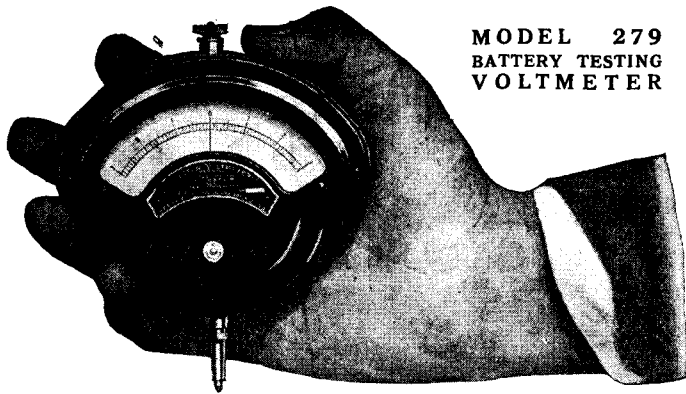
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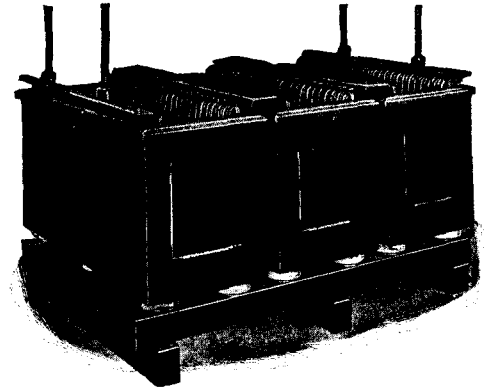
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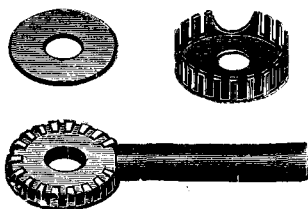
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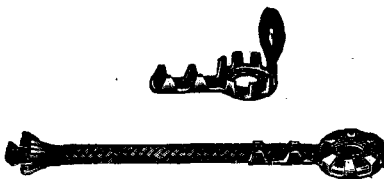
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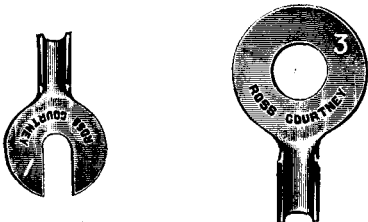
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projection N (Figs. XL, XLI and XLIV) which guides as many of the appendix levers as may have been thrust forward into a curved channel, which, the rotation continuing, leads the appendix levers thus selected up to the apex of the cam K, but immediately the cam K¹ (Figs. XL and XLI) leads the feet of these levers out again, the rejecting impetus thus given throwing each lever back against its respective spring S (Figs. XXXVIII and XL) and into

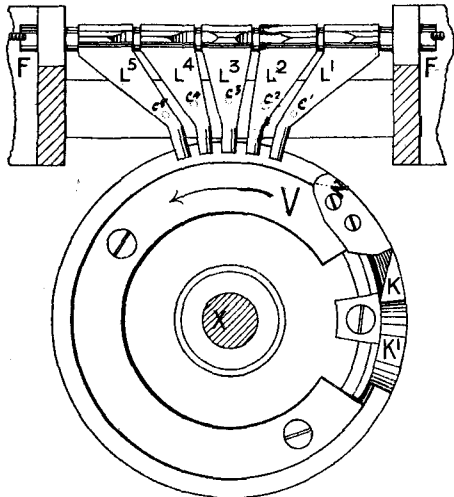


FIG. XLI.

its position of rest in the upper slot ready for the next signal. Each lever, however, in its passage through the curved channel upon reaching the apex of the cam K has been led so far forward as to butt up against the axle-end of the selecting lever or selector immediately in front of it (Figs. XL to XLII).

These selectors, C¹ to C⁵ (Figs. XL to XLII), are of peculiar shape, and each carry a trailing foot. They are each capable of

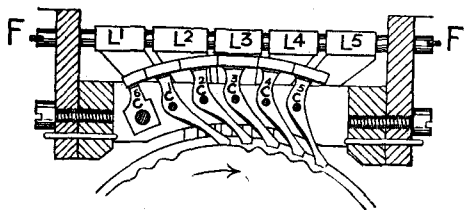


FIG. XLII.

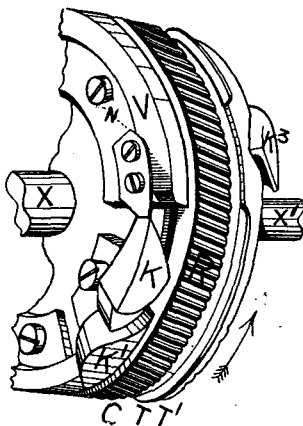


FIG. XLIII.

individual movement to and fro in the direction of the arrow (Fig. XL) but they can only move at right angles to that direction solidly and as a body, together forming with C⁶ (Fig. XLII) which is footless, a solid arc, the centre of which is coincident with that of the combiner wheel C. When no signals are being received the entire arc of selectors remains quiescent, only coming into action

when one or more of the selectors are thrown forward by the action of their respective appendix levers. In the position of rest the feet of the selectors trail over the periphery of the back disc, or rest track T (Fig. XL): see also Figs. XLIII, XLIV. When actuated the thrust of the corresponding appendix lever and its forward movement, guided by the selection disc V, is just sufficient to push the corresponding selector from its position over T to a corresponding one trailing over T¹.

The discs T and T¹ carry a number of slots and blank spaces (see TT¹, Fig. XLIV) which bear the same relationship to one another as do the marking and spacing currents respectively of the Baudot code. For example, the letter P is represented by five consecutive slots on T¹ and five blanks on the disc T, while the letter G is represented by "blank, slot, blank, slot blank" on T¹ and "slot, blank, slot, blank slot" on T. There is naturally only one position on the two discs where this combination can be met,

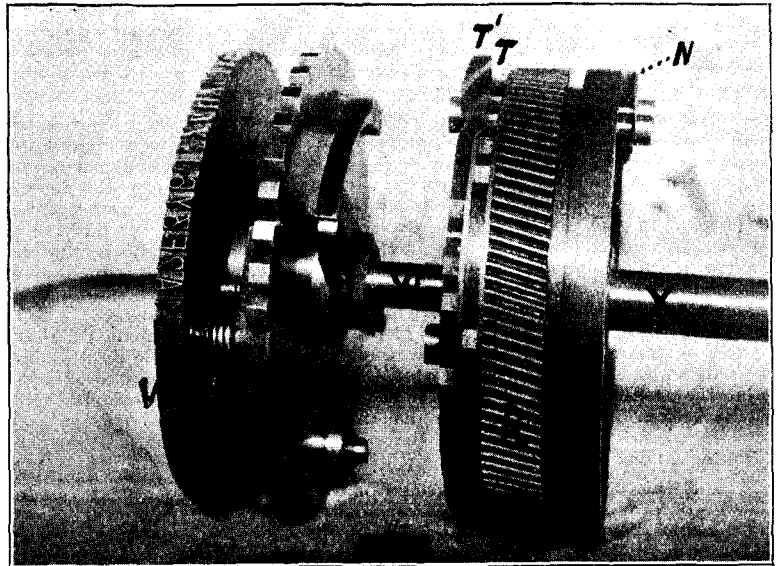


FIG. XLIV.

as also that of any other combination represented by the Baudot alphabet. Thus, when our letter G is signalled, electro-magnets 2 and 4 are energised, their respective appendixes attracted, the appendix levers 2 and 4 are thrust forward, caught up and pressed against the axle ends of selector levers 2 and 4, which are now positioned, 1, 3 and 5, trailing over the disc T, and 2 and 4 over T¹. Gentle pressure derived from a finely-tempered steel spring attached to C⁶ (Fig. XLII) presses the five selectors on to the respective peripheries of T and T¹, and the combiner wheel C (Fig. XL), rotating, there arrives a moment when the corresponding combination of slots and blanks on the two discs reaches the five selector feet. As the selectors can only move from right to left as a solid body and not individually, the only movement possible is at that moment when the correct combination is reached. At that moment they drop into their respective places following the electrical permutations of the keyboard at the distant end. This point reached they are immediately jerked out of their respective slots by the rotation of C, which then brings into action a replacing cam K² (Fig. XL) which leads the forward selectors back from the working track T¹ to the rest track T by means of a cross-over path provided. All is then ready for the next letter.

* It will have been noticed that the electro-magnets of a Baudot receiver are placed in correct numerical sequence and not in the same order of their corresponding keys on the Baudot keyboard, a position necessitated by the evolution from the original Baudot as then designed.

(To be continued.)

THE NAMING OF EXCHANGES.

By P. W. H. MAYCOCK.

THE "automatic atmosphere" which for so long has hung suspended over the ancient and cherished ideals and institutions of the London Telephone Service like the sword of Damocles. Your pardon, Mr. Editor, but the allusion is too hackneyed to complete; and, after all, the breaking-off point may not be deemed inappropriate by those who mourn the passing of the "human touch" in the telephonic art! Let it suffice to say that it has descended. We live—those who are "alive"—on the Calculus—Integral, Differential, Infinitesimal, and—to the non-mathematical mind—Infernal! We move in curves, parabolic hyperbolic, and diabolic; and we have our being in a veritable mist of the nightmare formulae by which that most admirable science of mathematics is ever ready to demonstrate, with comfortable assurance and to the sublimated essence of an electron, the value of x —the unknown, and probably the unknowable! On the surface it may seem that this has little to do with the naming of exchanges; but in reality its appropriateness is twofold. It is a mark of up-to-date-ness to begin with a more or less graceful allusion to the automatic atmosphere; while, in its subtle disintegration of the old world of telephony to make way for the new heaven and the new earth of the girl-less millennium of the new telephony, the automatic atmosphere has already begun with exchange names, thus giving a new prominence to the subject of this article. Under the manual system an exchange is identified in terms of language: under the automatic system in terms of number. It is, therefore, necessary to devise a system which shall make the first readily expressible in terms of the second.

The problem has been solved with characteristic ingenuity by our American brethren. Leaving out the letters Q and Z, the alphabet is divided into eight groups of three letters; and each of these groups, in consecutive order, is denoted by a number, beginning at 2. Thus, A, B, and C are each denoted by 2; the letters D, E, and F by 3, and so on. On the dial of each automatic telephone each group of three letters is shown in close proximity to its numerical equivalent, with the result that the subscriber, who in his innocence imagines he is dialling C-E-N for Central, is in reality transmitting the numerical code 236. It will be readily understood that under this system every exchange in a given area must have a different numerical equivalent. Examination of the numerical equivalents of the present London exchange names—which necessarily have been fixed without regard to automatic limitations—reveals a number of instances in which numerical equivalents are duplicated; and the opening of the first "Panel" automatic exchange—to be called "Blackfriars"—early next year has made it necessary to change eight existing names before the end of the year. Here the automatic atmosphere first makes disintegrating contact with the old order of things.

But this only touches the fringe of the question as it affects London. Of the 67 provisional automatic areas comprised in the development scheme new names have to be found for 38; while the provisional names of the remaining 29 areas will have to be tested in regard to their suitability from the phonetic point of view.

And the limitations of the automatic atmosphere are not the only obstacles that modern development has placed in the way of the selection of exchange names. On the manual side, the automatic atmosphere has its humble counterpart in the Toll atmosphere; which, though it lacks the impressive mystery of its more comprehensive rival, is nevertheless a factor to be reckoned with. The Toll system of working, under which the subscriber passes direct to the local exchange telephonist the name of the distant exchange in the case of calls to the nearer provincial areas, will shortly bring into the daily use of the local system 77 new names. Just as the automatic atmosphere forbids the clashing of numerical equivalents, so the Toll atmosphere forbids the clashing of sounds as between local and Toll exchanges.

Together, the two features of development have converted what was a comparatively simple operation into one of no little difficulty, necessitating a complete revision of the methods formerly employed in the selection of exchange names and the laying down of the framework of a comprehensive procedure susceptible of development in accordance with the more exacting conditions; and since the problem is one likely to confront telephone men in other areas, a short description of the methods now being developed in London may be of general interest.

Under the old conditions, the main criteria of suitability of a given name for use as an exchange name were:—

- (a). That it should have at least some topographical significance.
- (b). That it should possess reasonably good phonetic individuality when compared with the names of the other local exchanges of the area.
- (c). That it should be euphonious, and free from unpleasant associations.

These conditions must still be met, while two others have been added: (a) that the new name must possess a numerical equivalent different from that of any other existing or recommended local exchange name, and (b) that it should not clash phonetically with the name of any of the 77 Toll exchanges. That the new conditions have greatly restricted the field of selection will be readily understood. It is necessary to state them at some length in order that the reason for the process of elimination described in the following paragraphs may be fully understood.

The first step in the selection of a name is fairly obvious. A map of the area on a scale large enough to show clearly the more important local features

is obtained and the actual or probable site of the exchange is marked. Using this as a centre, the map is carefully examined and the names of the principal districts, streets, squares, parks, or other local features are extracted, all names which on the surface appear suitable being included even where an exceptionally promising name is found in the first instance. Experience has shown that transmission tests sometimes reveal defects in names which at first sight would be accepted without question; while in any case the processes of elimination described later make it necessary that the preliminary list should be as long as possible in order to ensure the survival of a sufficient number of alternative names to make a further scrutiny of the map unnecessary. Before the examination of the map is begun, the district superintendent concerned is asked for any suggestions he can make as to a suitable name. On receipt of his report the complete list of provisional names is examined, and any name that may have been chosen already as a provisional name under the automatic development scheme is rejected.

The list is now ready for the second elimination—the removal of names which do not comply with the "numerical code" requirements of the automatic system. The numerical equivalent of each of the provisional names is ascertained, and any name possessing a numerical equivalent identical with that of any existing or recommended name is removed from the list.

The surviving names are now subjected to a third elimination—to meet the requirements of the manual system. Each provisional name is closely scrutinised in relation to all names of existing or recommended local exchanges and also in relation to those of the Toll exchanges already mentioned. Names on the provisional list which on inspection are clearly similar in sound to existing or recommended names are rejected.

The fourth elimination is concerned with the question of phonetic length. Admittedly a matter which permits wide differences of opinion, the standard adopted is that the name should not be of less than two syllables nor more than three. Experience of single-syllable names in London suggests that their number should not be increased, despite the undeniable attraction of brevity. Generally speaking, the more distinctive character of two or three syllable names will more than compensate for their slightly increased time-value in transmission. All single-syllable names on the provisional list, therefore, are excluded if phonetically suitable two or three syllable names have been found.

The list now contains names which, so far as examination apart from actual telephonic use can show, have claims to consideration. Their practical value can now only be determined by experience; and it is at this point that the decisive test is applied. Lists are prepared containing the provisional names distributed among the names of all existing exchanges, other recommended names, and the names of such Toll exchanges as may suggest possibilities of confusion with the provisional names, which are listed in fairly close proximity to those existing or recommended names which they seem most to resemble. Each provisional name appears six times in the list, and all names have arbitrary exchange numbers associated with them. The order in which existing or recommended names appear on the list is varied from time to time; and these names are repeated sufficiently often to permit each of the names under test appearing in six different associations.

Stencilled copies of the list are then sent to each District Superintendent for the transmission tests. The conditions of the test are that all the names on the list should be passed in the order in which they appear by a telephonist at an A position at the "transmitting" exchange and written down as they are received by a "recording" telephonist at the distant exchange working from a service telephone at a supervisor's desk. Before the actual transmission is carried out both "transmitting" and "recording" telephonists make themselves generally familiar with the new names. This is done in order that the tests may be representative of working conditions, under which all exchange names are well within the knowledge of the exchange staff.

The names are passed in this way over three different junction routes of noticeably good, average, and noticeably poor transmission efficiency respectively, the transmitting telephonist passing the names strictly in accordance with standard methods of articulation, taking particular care, however, that while standard methods are fully observed, the new names are not emphasised in a way which would give them undue prominence. On completion of the tests, the list of names compiled by the recording telephonists are forwarded to the transmitting exchange where the new names—as recorded—are underlined in red to facilitate analysis at the Headquarters traffic branch. Transmission tests of each group of provisional names are made in all five traffic districts, the procedure thus ensuring that each provisional name is passed 90 times in circumstances closely approximating to those which would obtain if the names were in common use. Though the number of transmissions may appear somewhat small, the test is made a severe one by the fact that one third of the transmissions are carried out over circuits of noticeably poor transmission efficiency, whereas in actual practice nothing like this proportion of a day's traffic would be handled under such difficult conditions. It is open to argument whether in this respect the test is not too severe, and experience may suggest the desirability of some modification. The test has the advantage that when a name has to be chosen at short notice a severe test can be applied without the expenditure of time and labour involved in the preparation and testing of very long lists of names. The tests taken, the "recorded" lists are assembled at Headquarters for analysis.

Transmission errors fall into two main classes (a) cases in which the provisional name is confused with an existing or recommended name, and (b) those in which the provisional name is incorrectly recorded but not confused with any other exchange name. Of these two classes of error, the

first is the more important, since in ordinary course familiarity with the new name will generally reduce the percentage of error under category (b). The final analysis, therefore, is designed to show the percentage of the total transmissions of each class of error and of the two classes combined, in regard to each traffic district and as applied to the group as a whole. In addition, the actual names for which the provisional names had been mistaken are recorded.

Selection of a name is largely determined by the arrangement of the tested names in "order of merit" as measured by total percentage of error. As a rule, names with a percentage in excess of 10 are regarded as unsuitable unless exceptionally free from risk of confusion with existing or recommended names and when examination of the actual names recorded in error shows that they bear such a close phonetic resemblance to the correct provisional name that a telephonist would at once know what was intended directly the provisional name came into common use. Of the names with a percentage of error below 10, that showing the lowest percentage of confusion with existing names is usually chosen. If the difference in this respect is but small, the name with the best topographical significance is selected, so long as its associations are not unpleasing.

Many flashes of unconscious humour illuminate what at first sight appear to be dry-as-dust lists of names. Visions of Christmas must have been passing before the mind of the recording angel who on a recent occasion and in all seriousness wrote down "Mint Street" as "Mincemeat"! Another, with subconscious memories of the cinema, saw "Harbour Lights" in "Marble Arch"; while "Botanic" was variously interpreted as "Mechanic," "Platonic," "Masonic," and "Satanic"! Some of the best-known names have fallen victims to the impish tricks of telephonic speech. Few would recognise in "Ar" and "Tar" the well-known "Tower"; while "Prince" is very effectively disguised as "Frimp"! "Albert" is transformed into "Obutt" and "Kelvin" into "Charles Inn" and "Cows End"! But perhaps the master-stroke of irony was achieved by the genius who recorded "Maryland"—a name proposed for an East End area—as "Fairylnd"! Far be it from me to hold up to ridicule the perpetrators of these quaint conceits: they have too often gladdened the hearts of those called upon to do the more or less humdrum spadework inseparable from the preparation of a statistical case. And they can certainly claim to have written one really interesting paragraph in an otherwise dull article!

If no topographical name survives the transmission tests a more or less arbitrary name must be sought. Hitherto efforts in this direction have been restricted to a search for the name of some person, place, or event, prominent in the local history of the district; while the old-world equivalents of modern names may in some cases give names which are phonetically suitable. So far, it has been possible in London to avoid the use of these arbitrary names; but the restrictions of the automatic atmosphere as manifested in its number-code makes this a matter of great and increasing difficulty; and it is already a question of practical importance whether the time has not come for the Post Office to break with its traditions of devotion to the topographical name in favour of arbitrary names drawn from the world of Science or Art—or possibly even of commemorative names of national significance. The advantage of such a system would be that directly the class of men is determined, those names suitable phonetically and numerically can be selected in readiness for immediate use in cases where search for a good topographical name has proved fruitless.

In the space of a short article it is impossible to do more than touch upon a few of the main points of the subject, which is of wider significance than appears at first. To mention one point:—a pleasing exchange name has a marked service value from the development point of view, for not only is such a name a direct inducement to prospective subscribers, but it also goes a long way to minimise the natural objection of subscribers who may be transferred to the exchange from other districts for administrative reasons such as the correction of areas, or the formation of new areas. Much of the public dissatisfaction manifested in connection with the transfer from London Wall to Clerkenwell arose from the fact that the latter name was generally held to refer to a less attractive portion of the City than that denoted by "London Wall." It is in such cases as this, where the territorial name of the area served by a new exchange is not rich in attractive modern associations, that the great value of arbitrary names will be found.

And the exchange name has come to stay. Never while man is mortal will the Central subscriber think of his exchange as "236"; and long after the glow of the last calling lamp has faded, amid a wilderness of whirring cranks, line-finders, and selector will be found lone relics of the Old World of telephony—the exchange names.

THE TELEPHONE AND TELEGRAPH IN AMERICA.

(FROM THE *Saturday Review*).

SIR,—I have read with interest the correspondence with reference to the telephone service in England as compared with that in the United States. The only question discussed appears

to be one of power—water or steam; but I think it pertinent to inquire whether the service is really so much worse in England than here.

During the past few years this service has been a standing joke in the American press, and only the other day a man was arrested in New York for unscrewing the mouthpiece and throwing it away, because he could get neither a connection nor a return of the money he had placed in the "slot." Personally, I have been tempted frequently to make some unlawful demonstration of that kind.

Over and over again, when I call up my home, I am told that the line has been discontinued, or "they don't answer," to find subsequently that the room containing my instrument was occupied at the time, but no bell was heard. When I lived in another house, my number was 165, but almost invariably when I called it, I was given 156. The latter was the number of an invalid lady, who was alone most of the day, and had to leave her couch in order to answer when the bell rang. On the other hand, I was frequently called up late in the evening and addressed as Mr. S— (her brother). I made several complaints to the company, but the annoyance continued until I moved from the house.

Then I had to pay \$5 for cancelling my contract, and about as much more for an installation at the new address, although there was a 'phone there which had been used by the previous tenant, and which I adopted. And for each of three months thereafter I regularly received a bill for service at the old address, and just as regularly two weeks later a notice that, if I did not pay at once, the service would be cut off. I received also bills for the new 'phone, and paid.

Such instances form a frequent topic of conversation among my neighbours and business associates, and if you in England can beat us in this connection, then "God help England."

Said neighbours and associates, when they go abroad, tell you that their telephone system is perfect, and write home that England is "a back number."

As to the telegraph service, which is under Government in the British Isles, and carried on by two competing companies here, it was much more satisfactory to the public in Ireland twenty-three years ago than it has ever been here since, and at a fraction of the cost. If you will permit me, I shall give a personal illustration of this also.

Fresh from the sixpenny telegrams and prompt deliveries of Ireland (which was then under British rule), I was awaiting my first "job" in this country; and at 4 o'clock one afternoon I received a telegram telling me to go to New York at once, a distance of ten miles. I had to pay 25c. for the telegram, and immediately hastened to the city, only to find that the message had been handed in at 9 a.m., and the position had been given to another applicant, when I had not appeared by noon. I also found they had prepaid 25c.; so the message cost 50c. (2s.), and took seven hours to go ten miles! On complaining, I was told it was nothing out of the usual course, as they had no messengers in the office (a town of 10,000 inhabitants), and had to wait until they saw someone willing to deliver the message at my address, less than five minutes' walk from the office. The extra 25c. was charged for this delivery.

At the present day, if one's name is in the telephone directory he is likely to get a telegram on the day it is sent (if handed in early), for it may be 'phoned to him from the receiving office. Otherwise, his chance is a poor one. I have known several cases of a man, who was more than 100 miles from New York, telegraphing that he would arrive by a certain train, and then reaching home long before the telegram did. And all the trains do not run a mile a minute, by any means.

ENNISKILLEN.

Westfield, N.J.

TELEGRAPHIC MEMORABILIA.

"ONE crowded hour of glorious life" was the verdict upon the paper by the Assistant Engineer-in-Chief, A. J. Stubbs, Esq., M.I.C.E., &c., on "Fifty Years of State Telegraphs," read before the Telephone and Telegraph Society on Oct. 18, in the commodious hall of River Plate House, Finsbury Circus. Mr. John Lee, who was absent on official business in Holland, was unable to take the chair, but Sir Andrew Ogilvie, ever ready to help this as every other Post Office institution, kindly filled the vacant seat. Mr. Stubbs held his audience from beginning to end by an uniquely interesting lecture, facilely delivered and punctuated with touches of a dry humour which added piquancy to many a point. It was disappointing to find the hall so sparsely occupied, and it is small compensation to know that so many "would have been present had they known of the event." The lecturer's attitude towards the science of telegraphy may be judged by one of his opening sentences in which he described the history of telegraphy as an "entrancing romance." Here, surely, was no dry-as-dust engineer, a creature of mere figures, equations and calculations, but a real prophet and seer who dared to dream dreams and who read history as the record of man's struggle for knowledge and his triumph in its acquisition. One, too, who realised that the Civil Servant had an honourable occupation in serving the community, and one who also had no doubts regarding the past efficiency of Post Office engineers, joined to abounding confidence in their capacity for even greater achievements in the future. Here and there were little snap-shots of the service rendered to the nation during the war by the engineering department, a glimpse of P.O. ships repairing and laying ocean cables during war-time, feeling and nosing their way into forbidden mine-spread areas so that communication between our island and the continent might be maintained; then a stalwart defence of British telegraph practice, a model for the Empire. As the lecturer proceeded, a comfortable feeling of content passed over the audience as the listeners realised how prominent a part the British Post Office had taken in telegraph and telephone developments. Naturally much interesting matter was compulsorily omitted, a fact which the audience tacitly admitted. It is not every scientific or historic lecture delivered that may be listened to for over one hour and yet leave its listeners, not only untired, but even asking for more.

The number of Telegraph Money Orders from India to this country during the month of October was abnormally high, running easily into a value of six figures measured in pounds cash. According to a regulation laid down by the Indian Government only a very limited number of these telegrams is permitted during a specified period. This was apparently designed to render the transmission of abnormal sums by the telegraphic medium inconvenient and finally impossible. The object of the restriction during the present sensitive condition of international exchange is obvious. "However, where there's a will there's a way" and as there is no regulation controlling the number of TMO's to a person although, as already stated, there is a strict limit to the number and total amount that may be transmitted by any one sender, a very easy loophole appears to have been found, by means of which the regulation has been rendered nugatory. The simple method adopted is that of a multitude of senders to a comparatively few receivers with the result that a veritable procession of Hindu names with varying prefixes and suffixes and permutations of the same has streamed across the cables, even the names of some of the Hindu gods and goddesses being utilised for the purpose!

In direct connexion with these features of the Anglo-Indian Telegraph Money Order business the following excerpt from the most recent Annual Report on The Posts and Telegraphs of India, 1918-1919, should prove interesting:—"The total number of telegrams exchanged between India and Ceylon was 309,566, an increase of 22 per cent. over the preceding year. This large increase is due to a rise in the telegraphic money order traffic and to frequent fluctuations in trade." It may also be added for the information of the general reader that Ceylon has its own currency quite apart from India, which may also account for some portion of the increase, as the factor of "rate of exchange" thus becomes a far from negligible quantity even between these two colonies, geographically so close in proximity, yet governed respectively by two different British departments, i.e., the Colonial and India offices. For the same period the increase of this same type of traffic between the United Kingdom and India closely approximated to 100 per cent.

This same report, by the way, reminds one of the curious functions at times and in certain places, which are performed by Government Post Offices, a special paragraph being devoted to the item that, "The Post Office obtained 11,844 lbs. of quinine for sale to the public during the year." This is surely related to *The Red Milkman* by Mr. John Lee!

I am indebted to a correspondent for raising the point as to who was actually the originator of the electric telegraph. Elsewhere it has been stated that Charles Morrison, a surgeon, and native of Renfrew, has been recognised by the chief electrical authorities as the originator of the idea of transmitting electrical signals by wires carried above ground on poles and insulated by glass supports. The method this foreseeing scientist proposed was set forth in an article signed C. M. in the February number of *Scots' Magazine*, 1753, which suggested erecting 26 wires, and providing each with a suspended pithball at its end, the energy to be derived from frictional electricity, each pithball to represent a certain letter of the alphabet. The identity of Charles Morrison with C. M. of the above article appears to have been well established and to have been fully recognised by all the electrical and scientific authorities, including, I believe, the Royal Institution. Unfortunately, the burning down of Renfrew town hall somewhere about 1880 destroyed all local records,

but sufficient evidence apparently remained to enable investigators to establish the claim of Renfrew's citizen, as a plaque may be seen in the Science Museum of South Kensington, designed and cast to signalise and to fix the honour upon Morrison. Other brains were at work along similar lines, notably Sommering, whose method employed the release of hydrogen bubbles in inverted test tubes fixed at the end of each individual wire, but to Morrison belongs the inception of overhead insulated conductors as to Ronald belongs the idea of underground insulated lines. Specimens of the actual wire and the glass tubing used by the latter in his garden at Highbury may also be seen in the same museum. An additional point of interest also attaches to the information that an inscription may be seen engraved on a stone at Kelmseott House, Hammersmith, where William Morris, the poet, formerly lived, which reads as follows:—

"The first electric telegraph 8 miles long was constructed here in 1816 by Sir Francis Ronald, F.R.S."

By an unfortunate accident, no reference has yet appeared to the fixtures of the C.T.O. Football Club (Centels F.C.). It is not, however, too late to repair the omission, and one notes with keen satisfaction that an excellent Thursday programme is fixed practically up to March 24. This programme includes several contests with police divisions. Let me hasten to explain that the latter are in the purest sense of the word "friendly" matches! These signs of gradual return to normal conditions are doubly welcome and the reflex will doubtless be felt in renewed health and a shorter absentee list.

I wonder if the following little comment may be permitted on one's experience of the telephone? It is no criticism on the promptitude of staff or the working of apparatus, but quite recently I happened to be in a seaside town, the resident population of which runs into several thousands. In the main road was situated, as was fit and right, the Post and Telegraph Office, ably served. Enter a lady. "I want to 'phone, please?" was the simple request, to be met with a courteous expression of regret that there was no 'phone laid on, but that by walking further down the road, crossing the railway bridge and descending about 20 steps the applicant could obtain a trunk or local call at —, the tobacconist! The applicant was a real lady for she only said, "Oh, dear!"

The promotion of Mr. Thomas, of the Controller's Office, C.T.O., to the sub-postmastership of March, may not be permitted to pass without the sincerest expressions of regret at his departure which have been voiced by his many friends. The March Post Office is indeed fortunate in having for its new head one who is so fully entitled to the appellation—in its purest and best sense, of gentleman.

On Oct. 9 there also quitted the C.T.O. in the person of Mr. J. Fisk, yet another of the most respected of superintendents, one who has a long record of good work performed, and of many an association with T.S. activities, having been a member of one of the first volunteer companies, which preceded even the old 24th, and, to mention but one other link, was prominently associated with the Dining Club. It was evident to all that when the actual moment came for stepping out of the office for the last time as an official, the wrench was a very real one to our much-esteemed friend and colleague. This in itself is no mean tribute to one who has spent over four decades in the Service.

Trials with Siemens' high-speed apparatus between London and Berlin are in progress as this goes to press and have reached an interesting stage.

It is hoped that direct telegraphic communication between London and Prag will, ere long, become an established fact. The re-opening of the London-Vienna wires is also spoken of as a coming event of the near future; as also, but probably at a more distant though not remote date, that between Budapest and the British capital. Thus gradually the healing effect of telegraphy is being felt throughout Europe. Much, very much, remains to be done before a much-to-be desired stability is reached in regard to many of the continental lines, for these have not apparently been left immune from the wearing effects of the recent general upheaval. The glimmers of hope of re-construction which some of us have seen during the darkest hours are steadily gathering force. Not the least of these is the increasing number of recruits for the Foreign and Colonial section of the C.T.O.

It is more than gratifying to place on record the success which has met the appeal for a collection on behalf of the Benenden Recreations Fund. Will all readers please note that this is a Post Office Fund without restriction, and should have the active sympathy of every section of the Service.

Miss Hall and Miss Lloyd are both leaving the C.T.O. for the Ministry of Labour. They leave us with the heartiest possible good wishes from their colleagues of both sexes in the Cable Room and elsewhere. Mr. E. Annible also quits the Cable Room test box duties for a wider sphere of usefulness at the North Walsham Repeater office. He leaves a gap not easily filled on the technical side, and on the social side he will understand our united acclaim of, *Vive le roi!*
J. J. T.

LONDON ENGINEERING DISTRICT NOTES.

THE holiday period is over now and the staff in the district are settling down to a strenuous winter campaign. Fortunately, the summer has been a particularly cool one and so no excuse for slackness, due to the enervating effect of the sun beating down through clear skies on a large and densely populated town, can be made. No doubt the weather which proved disappointing to holiday makers was beneficial in preventing more breakdowns amongst a staff struggling valiantly with reconstruction problems. At

the time of writing there are signs of improvement in the matter of supplies and stores, and there are hopes that the time is approaching when engineers will have sufficient straw or its modern equivalent with which to make bricks, and that it can no longer be said that the road to Hell is paved with stores requisitions.

* * * *

Post Office Telegraph and Telephone Society.—The Post Office Telegraph and Telephone Society opened the Session on Monday, Oct. 18, with an address from the President, Mr. A. J. Stubbs, Assistant Engineer-in-Chief. No doubt the address will be printed in this JOURNAL in due course. It was of *entrancing interest* and was enjoyed thoroughly by those fortunate enough to be present. Mr. Stubbs traced the development of the art of telegraphy in this country from its commencement to the time when it was ruled that a telephone was a telegraph within the meaning of the Act, and so on, to the present time. Many names of men who had done outstanding work in connexion with the development of the art were quoted and it is interesting to note that several of our present-day colleagues were included in the roll of honour. Mr. Stubbs spoke very highly of the important part taken by the Department's engineers in the progress of telegraphy and telephone, and no one is in a position to speak with greater authority on this subject than he. Reference was of course made to the work of the P.O. staff during the War, and a hope was expressed that some day a complete record of such work would be given to the world. No doubt the audience would have been much bigger had individual notices to members been circulated instead of their attention being drawn to the meeting only by means of diminutive posters. This opportunity is taken of drawing the attention of members of the London Engineering District to the excellent series of lectures given during the winter months by this society. Those who can appreciate a varied programme of papers dealing with all phases of the department's work, followed by discussions in which the views of members of all branches of the Post Office are heard, should make a point of attending. The December meeting will be held on Monday, Dec. 13, when Mr. F. C. Cook will read a paper on "Studies in Whitleyism."

Institution Meeting.—The Institution of Post Office Electrical Engineers held its second meeting this Session on Nov. 8, when Mr. G. F. O'dell, of the Engineer-in-Chief's Office, gave an address on "The Influence of Traffic on Automatic Design." The tightly-packed hall testified to the interest taken in anything connected with automatic telephony. Amongst the visitors were representatives from the various manufacturers of telephone plant and many of our colleagues of the Traffic Branch.

Mr. O'dell dealt principally with the methods of determining the number of selector switches required in the various stages of a call, and explained how the correct number could be arrived at with the aid of the theory of probabilities, the employment of artificial traffic investigations and also by actual traffic records.

Considerable attention was given to the important question of the grade of service which should be given to subscribers. The importance of the flexibility of plant to enable variations due to traffic changes to be made readily was emphasised. The human operator may have her faults, but she is able to do something that the machine cannot do, that is, to meet rushes of traffic by spurts of energy. The need of plant flexibility has been abundantly demonstrated in recent years. There are at present very considerable differences between the equipped and traffic capacities of exchanges in connexion with which there is no line plant restriction. These differences are doubtless brought about by changes which are beyond control and unforeseeable, but they do indicate what should be sought for in future systems.

The address was illustrated by a number of slides, showing curves based on theoretical and experimental data.

The discussion which followed was opened by Mr. John Lee of the C.T.O. It was unfortunate that the length of some of the speakers' remarks prevented several would-be speakers being heard.

Cable Breakdown.—The bursting of a high-pressure water main in Oxford Street recently caused considerable damage to the department's plant, some 890 circuits being affected. The trouble was located to a manhole which contained a cable head and some multiple joints. After all the water had been removed from the manhole, the conductors of the cables were examined and it was found that water had penetrated the cable distribution head and the multiple joints. The insulating paper was very wet. A number of torch blowing lamps, three motor desiccators and the Museum Exchange desiccator were at once brought into use to prevent the damage spreading, and to dry out the cables. A number of the wires affected carried junction circuits, and these were quickly diverted to other routes so far as spare circuits were available. About 30 faults were cleared by the evening of the 7th, and by midday on the 9th practically all the circuits were again working. The water had penetrated so far into one of the cables that it was necessary to renew the whole length of 144 yards. It was noticed that electrolytic action had taken place in all the cables affected. The inconvenience to the subscribers is to be regretted, but there is no doubt that but for the prompt and suitable measures taken by the Sectional Engineer and his assistants, the damage would have been considerably greater.

Church Parade.—The Post Office Division of the Metropolitan Special Constabulary Reserve paraded on Sunday, Oct. 31, for Divine Service at Westminster Abbey. The Division mustered on the Horse Guards Parade and was played to and from the Abbey by the Band of the "A" Division Metropolitan Police. About 300 officers and men were present. Of these 8 officers, 54 sergeants and men were drawn from the staff of the London Engineering District.

Denman Chess Club.—The first match of the season was played on the 3rd inst., against the London Telephone Service and resulted in a win for Denman by 7½ to 2½ games. Full score:—

DENMAN.		L.T.S.	
Board No.			
1	Mr. Cornwell ... ½	Capt. Rathbone ... ½	
2	" Slattery ... 1	Mr. Coburn ... 0	
3	" Barrett ... 1	" Larkins ... 0	
4	" Wenman ... 0	" Bostock ... 1	
5	" Francis ... 1	" Hinshilwood ... 0	
6	" Gardiner ... 0	" Kirchoff ... 1	
7	" Eastop ... 1	" Gray ... 0	
8	" Petchley ... 1	" Wiles ... 0	
9	" Freeman ... 1	" Haugh ... 0	
10	" Nevill ... 1	" Gregory ... 0	

A Nasty Shock.—The engineer responsible for the well-being of the exchanges south of the Thames suffered a shock the other night. Someone rang him up shortly after midnight and announced the startling news that



STOP WORRYING THE BEAST! WE ARE GETTING HER THERE AS FAST AS WE CAN.

(Adapted with grateful acknowledgments from a drawing by "Poy" in the *Evening News*.)

one of his exchanges was ablaze. Naturally somewhat perturbed, he asked his informant for particulars and he was told that the *sixth* floor was well alight. Then, of course, it came out that the Hop Exchange was concerned, which, as our readers may know, is an imposing building in Southwark Street devoted to the merchandising of the fragrant hop, and not the Hop Telephone Exchange, which is a quarter of a mile away. Much relieved he went back to bed.

A New Word.—A newspaper with a tremendous circulation and a penchant for attacking the telephone system, in reporting Sir William Noble's opening address before the Institution of Post Office Electrical Engineers, gave him as referring to the "Efficiency of the telephone service in the United States." We do not think he used this particular word, but nevertheless we offer it to our readers as a really good portmanteau word expressive of official efficiency, and we say it with due modesty—well applicable to ourselves.

The following letter received by one of the engineers in pre-transfer days will be read with interest. Coming events apparently were strong enough in June, 1911, to leave some doubt in the writer's mind as to the identity of the company whose clerk he was interviewing, hence the term "National Telephone Service Post Office Company." In the midst of references to "gramophones" chemical wires, "X-rays" and shocks electric, it is not easy at first to see that the complaint is against the humming noise caused by

overhead wires near the house. It would be interesting to know whether the company's engineer managed to satisfy the complainant:—

11, HEREFORD ROAD,
BAYSWATER, W.

June 9, 1911.

SIR,

To-day I had a clerk from the National Telephone Service Post Office Company in answer to my letter with reference to these wires which are across my street and over my head. He assured me all their wires were underground so that I could not hear noises. He said these were National Gramophone wires over me. Now I beg to state that I have *no such* in my premises as Gramaphones. I, therefore, beg you will at once remove any such wires which are annoying me *night and day*. If they be these chemical wires to *indicate* where X-rays is kept, if it is Mr. Butterfield's premises you must remove them. I will not allow myself *affected* by any such wires. I am so severely shocked at times *electric*. Causing me great pain. I must now *insist* and *command* any such wires at once removed from hovering in, or on or round about my premises. I have no such employers as *servants*. I believe the annoyances to be coming from Westmoreland Road, a man by the name of *Crocksford & Co.* I have received so much annoyance from same parties. I will now take proceedings against them and their wires. If they have anything to do with Otto House or any such houses, I beg to state *they* have nothing to do with me from *any* such houses. Kindly send and remove these wires at once. I am not a *trader* neither is my landlord. Causing me so much annoyances. The sounds are Gramaphones talking also of *Ajax drums* in either of these I am not a dealer or an hirer so apply to you and give you my *orders* to remove any wires that are so annoying me.—Yours truly,

R. H. N.

Some little while back, reference was made in these notes to hobbies. It may be of interest to some to know that the illustrations accompanying the articles on the London Engineering Department are from photographs taken by an amateur photographer on the Denman Street Clerical Staff, Mr. J. E. T. S. Hilton, who will be pleased to provide copies at a very small charge.

Recently the authorities responsible for the underground railways of London issued in the daily press a manifesto explaining their difficulties and printed the moral with sketches by "Poy." We suggest that the difficulties that beset the Post Office in their efforts to overcome arrears due to the War are far greater than those experienced by the Underground Railway Co. Perhaps the P.M.G. will consider the advisability of also issuing a manifesto. One of Poy's cartoons slightly modified as above will serve to illustrate it.

REVIEWS.

"*The Civil Servant and His Profession.*" Sir Isaac Pitman & Sons, Ltd., 3s. 6d. nett.—We have no hesitation in recommending this book to those of our readers who were unable to attend the series of lectures delivered to the Society of Civil Servants in March, 1920. Those lectures are here reproduced in handy book form and we here find Sir Cecil Harcourt Smith, the late Sir Robert Morant, Lord Haldane, Sir Sidney F. Harmer, Mr. E. F. Wise and Mr. John Lee at their very best. All civil servants should peruse these testimonies to the wide scope of their profession if, as Sir Cecil Harcourt Smith says, they are to possess that "guid conceit of ourselves" which is only another expression for self-respect.

"*Vocabulaire en Cinq Langues avec repertoire alphabétique.*" Par Henri Viard. Gauthier-Villars et Cie, Paris. 108 pp. Price 7 francs 50 with temporary increase of 100%.—This is a very useful and up-to-date vocabulary of expressions used in wireless telephony and telegraphy in five languages. The appendix sets out the American and International Morse codes and contains some useful mnemonic hints with regard to them; also in five languages, viz., English, French, German, Italian and Spanish.

WE acknowledge with thanks from colleagues in Stockholm Nos. 40 and 41 of the Swedish journal, *Svensk Trafiktidning*.

RETIREMENT OF MR. F. COWLEY.

On the occasion of the retirement, in August last, of Mr. F. COWLEY, Telephone Superintendent for Ireland, it was decided by a number of his colleagues of the late National Telephone Company, Limited, and the staffs of the Irish Districts (Dublin, Belfast and Cork) to present him with some token of their esteem. Considerable regret was felt that, on account of Mr. Cowley's ill-health, which necessitated his absence from Ireland, it was not possible to arrange a formal presentation in Dublin to convey to him the best wishes of his colleagues and the Telephone staff. A pair of field glasses and a silver urn were, therefore, forwarded to him, and he expressed a wish that his best thanks be conveyed through the medium of these columns to those who participated in the gift.

THE TELEPHONE AND TELEGRAPH SITUATION IN GERMANY.

BY W. H. GUNSTON.

ACCORDING to Dr. Bredow, of the German Postal Administration, the telegraph and telephone systems of that country are in a critical condition. There is a deficit for the current year amounting to two milliard marks, whilst before the war there was always a handsome surplus. With the constant rise in the price of materials and salaries it has been found impossible to make these services pay their way. Wages are six to eight times as high as formerly; the price of iron wire has risen by more than 3,000 per cent., of copper wire by 1,200 per cent., of underground cable 2,000 per cent., of telephone apparatus by 2,000 to 3,000 per cent. Traffic has increased heavily since the war, and repairs and extensions necessary (the latter involving 1,000,000 kilometres of wire), will entail an expenditure which cannot possibly be covered by revenue.

The Government is, therefore, faced with the choice of maintaining the services on the present basis at the expense of the taxpayers and at a huge loss, or of placing them on an independent basis and raising them to their former level of efficiency. The charges for telephone service have been twice doubled since 1914, but as the cost of erection and maintenance of plant has increased about twelve and ten times respectively a great disparity has existed for several years between the benefits enjoyed by telephone users and the expenses of the administration. To bring these two into accord, a telephone tariff based on industrial and economic principles is being introduced. The flat rate will be abolished, as it is injurious both industrially and technically, giving preference to persons making constant use of the telephone at the expense of those using it less frequently. It may be recalled that in 1907, the Postal Administration projected new tariffs involving the withdrawal of the flat rate, but the introduction of these tariffs was postponed owing to the protests of larger users, and they were never put into effect.

Dr. Bredow states, according to the *Berliner Tageblatt*, that dissatisfaction had been caused by the proposed new regulations. The protests were, in his opinion, entirely unjustifiable. The existing tariff was unpractical and would be done away with, but the new rates would by no means correspond with the depreciated value of money and rise in prices. Referring to the forced telephone loan—a charge of 1,000 marks payable on main lines and 200 marks on extensions—he said that this was an action which called for gratitude on the part of the public, as without it the entire system must inevitably have collapsed. The sum of money thus obtained might in case of necessity prove sufficient to place the system on some sort of working basis, but further funds would be required if the urgently-needed extensions were to be carried out. Since the introduction of a higher tariff, 123,000 notices of cessation had been received. On the other hand, 111,000 new applications had been obtained.

The new tariff was designed to place the service on a sound financial basis. It was thought that at no distant date the deficit would disappear, and, given political stability and the whole-hearted support of both officials and employees, a reduction in rates might then be possible. The re-establishment of the telephone service was in full swing and appreciable improvements had been introduced. Construction work under existing conditions, however, advanced slowly and it must be years before the German telephone system reaches its former level of efficiency.

It may be added that the number of telephone stations in Germany has increase from 1,421,000 before the war to 1,767,156 despite the loss of Alsace-Lorraine, the Polish provinces and other territory. Berlin has now 187,892 stations, Hamburg 80,697, Munich 41,504, Leipzig 37,732, Frankfort 35,003, Cologne 33,764 and altogether 21 towns have a total of over 10,000 stations.

EDUCATING THE PERVERSE PER VERSE.

WE understand that the London Telephone Service had under consideration a scheme for furthering the education of telephone subscribers on the mnemonic principle by means of short rhymed instructions which we presume would have taken the place of those headlines in the *Telephone Directory* which evoke so much comment in the Press. The scheme was not adopted, but we have received from an anonymous correspondent who seems to be in touch with "the other side," the following efforts in the same direction by well known hands.

Loath'y 'phone, or e'er my fingers
Wake thy distant lantern's slumber
Let me see if still there lingers
Recollection of her number.
Yes, I know, the fray's beginning;
Guard, O Gods, my tongue from sinning.

Maiden stern, thy query cheating
Re the number of her circuit
Was not lost by my entreating,
Yet it doesn't seem to work it.
Nearer still my lips I get—so—
And my voice I make more mezzo.

Clearly now I breathe the digits,
Prefaced by the name of Hesper*:
Shortly I shall get the fidgets:
Soon I hear a strange voice "yes" purr.
Oh, the devil: fives and nines
Sound the same upon the lines.

Firmly, through my craning neck, "O"
Mouthing like a broad Omega
Hear I yet no answering echo:
What's the matter with the beggar?
Ah, I listen, listen vainly:
Yet I may not speak profanely.

Often must I firmly say "No"
'Ere I hear her speak her name.
I believe, *salis cum grano*,
Now she's got it, all the same.
Yes, we speak, and soon the throbbing
"Vale" o'er the wire is sobbing.

All is over: Fasten rigid
The receive in its socket.
The monition leaves me frigid:
Suffer me awhile to mock it.
None shall ring me, if I know it,
Till I've shed my rôle of poet.

R****T B*****G.

* *Sane intelligendum est* "Western Exchange."

Out of the P.B.X., where pendulous
The cords drop idly and the maidens knit
And fitters that do everything but fit
Maintain the lines removed from haste or fuss,
Haply there comes a call: thou, turning thus
Unto the orifice thy lips admit
And breathe into the darkling heart of it.
The name whereof thy soul is amorous.

Yea, breathe thy name and hearken to his own,
Thy friends, and interchange in emulous tone
The words that bid him buy or bid thee sell:
And when thy soul is sated with the 'phone
Let memory bid thee teach the wire to moan
With the last wind of passionate farewell.

D. G. R****I.

"A TYPICAL CALL."

TENNYSONIAN FRAGMENT.

I sat in anguish at the telephone,
Within my ear the intermittent buzz
And the receiver in my languid* grasp.
For forty-seven minutes by the clock
I with my broker laboured to hold speech
Anent the purchase of some rubber shares,
And thirteen times the angry resonant wire

*This was wrong: "grasp the receiver firmly."

At regular intervals reverberant
Had stated that his number was engaged
While seven times I held sweet intercourse
Not with my broker, but some other wight.
With bitter close-compressed lips I cursed
The Gods, the P.M.G. and the Exchange,
When thro' the inspissated gloom there flashed
The image of a face once seen by me
At a suburban hop, and introduced
As Supervisor on the Dud Exchange,
Wherein my line through mazes intricate
And convolutions of the copper loop
Connected with a jerk and found repose.
Then, as in some dark dungeon after pain
And torture, when the door on grating hinge
Back-flung recoils and floods the cell with light
And radiance, and the strong deliverer's cry
So sat I chortling, and my tears were dried,
Nor more than fifteen minutes yet elapsed
'Ere I had held sweet converse with my friend
—It ended on his side with ere swift word
The wire transmitted shuddering as in' grief.
But that I recked not—I had bought the shares
And in a rising market; and I rose
And blessed the goddess of the permanent glow
Urania, Polyhymnia, or as Form
One Forty-one prosaically states,
Assistant Supervisor, Bessie Jones.

SOUL TELEPHONES.

INFORMATION has been received from New York that Mr. Edison is perfecting a machine to enable mortals to communicate with the spirit world by telephone.

According to the *American Magazine* for October he firmly believes his invention will establish communication with the souls of the departed by "purely scientific means." Undoubtedly this is extremely interesting from a scientist's point of view. Mr. Edison's explanation of his delicate instrument is fascinating in theory but hardly practicable.

Assuming that the inhabitants of the spirit world are able to ring up when they fancy any harrassed beings still toiling along on this earth, who will be responsible for the payment of these calls? Telephone operators, like other mortals, work for money—not love—and somebody will have to pay, as this traffic between the living and dead, if established, bids fair to become enormous. The only way out of the wood will be to reverse the present order of procedure and send the accounts to the person called. This will be double torture to some poor mortals if undesirable friends or relatives keep up a bombardment of messages from the "other side."

Wrong numbers will become a complicated problem, and it is to be feared that even Mr. Edison will be unable to avoid these lapses.

Certain advantages would be obtained. For instance, no murderer could escape justice, owing to the victim being able to give information firsthand by telephone.

With all due respect to Mr. Edison's genius let us hope he fails, as the disasters likely to arise from such an innovation are unlimited and far outweigh its benefits.

R. A. R.

THE POST OFFICE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

The revised programme for the remaining papers before this Society is as follows:—

1920.
Dec. 13. Monday.—"Scientific Management," by Mr. John Lee (Controller, Central Telegraph Office).
1921.
Jan. 17. Monday.—"Wireless Communications," by Lt.-Col. C. G. G. Crawley, R.M.A. (Deputy-Inspector of Wireless).
Feb. 21. Monday.—"Studies in Whitleyism," by Mr. F. C. Cook (Accountant General's Dept.).
Mar. 21. Monday.—"Imperial Telegraphic Communications," by Messrs. A. Avery and H. A. Betteridge (Central Telegraph Office).
April 18. Monday.—"Some features of the American Telephone System," by Mr. R. P. Crum (Traffic Section, Secretary's Office).

The Telegraph and Telephone Journal.

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

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		J. W. WISSENDEN.
Managing Editor - -		W. H. GUNSTON.

NOTICES.

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

VOL. VII.

DECEMBER, 1920.

No. 69.

AUTOMATICS FOR LONDON.

THE *London Telephone Directory* grows and grows. It has become almost the standard work of reference for those who are in search of the addresses of particular persons. We shall hear later on something of the methods by which this vast volume is brought up to date and issued. At the moment it is enough to recognise in it the tangible expression of the growth of the London Telephone area. If Bismarck said of London "What a place to loot!" the enthusiastic admirer of automatic telephones may say of it, "What a place to reconstruct!" Mr. Pink, in his paper before the London Telegraph and Telephone Society, gave us a vision of what it entails. There were no purple patches in his paper and no need for purple patches. He held his audience breathless by a careful and precise and detailed statement of the new Blackfriars Exchange and of the complex arrangements which have to be made to fit that exchange in with the vast manual system of London. The new exchange is to be "Panel" automatic. Later on we shall publish Mr. Pink's paper in full and we leave the details of the traffic arrangement to his admirable exposition. At the moment we are concerned only with the arrangements which he explains for fitting in this new automatic with manual plant on a large scale.

The dial has a new development. In addition to the digits there are allotments of twenty-four letters of the alphabet, three to each of eight digits. It takes seven motions of the dial to discover a London subscriber, and of these seven motions three are letters and four are figures. The three identifying letters are to be printed in an indicative way in the directory, thus—"HOLborn" and the Holborn subscriber 2631 will thus become "HOL 2631." If there are less than four digits in the number, preliminary ciphers

are to be introduced. Thus the earlier motions of the plant will grope their way through the maze of junctions to the appropriate exchange. There are devices for re-directing—admirable Post Office word—the process; there are arrangements for searching other lines when all the normal lines are engaged; there are arrangements on each manual board for flashing up the required number (for the cleverest of automatic plants cannot whisper to the "B" operator); there are even more subtle devices at chosen centres for flashing all the seven indications, three of them to indicate the exchange and to be translated into letters; there are "tandem" exchanges for through automatic working, and there are automatic registers and methods of storing the signals which open up an amazing vista of the conquest of complications. When the New Zealander sits upon the ruins of St. Paul's he will be able to meditate upon a telephone organism the full detail of which profoundly impressed us in the long by-gone year 1920.

Where there is no vision the telephone traffic expert perisheth. Mr. Pink had his historic moment. In calm and restrained language he showed us what is bound to come to pass, alas, long after most of us have succeeded in calculating accurately the amount of bonus due to us at the sad moment of pension. Here is an opportunity for study and research which fulfils the needs of the hungriest. There is the allotment of junctions under this scheme and the provision of alternative routes, the increase in complications on the residual manual boards when more and more automatic exchanges have been included in the congeries, the increased complexity of the junction centres and of the tandem switching centres, the concentration for a night service which will go along sweetly by itself and of a Sunday service of week-day quality which will not offend the susceptibilities even of a suburban churchwarden. Speakers followed Mr. Pink, one and all oppressed by the real solemnity of the occasion. For it was an epoch-making moment, and Mr. Lee's flicker of mere cheerfulness was in vain. Those who come after us may look up the files of this JOURNAL, if they wish, and see how we regarded this momentous initiation into the mysteries of the London telephony of the future. We pass to them this heritage. We have lived our day, and in season and out of season have striven to give the public—and have not striven in vain—a thoroughly sound service which is more worthy of comparison with other telephone services in the world than some people suppose. They have the silent machines where we had the telephonists as loyal comrades; they have all the aids for indicating faults and deficiencies—if there are faults and deficiencies in that halcyon day—which ingenious science can provide. They have opportunities for study and research and timely provision which surpass our opportunities. We bid them go forward and live up to their advantages.

BRAIN WAVES.

Do we not sometimes overlook the all-important fact that however intricate and wonderful a machine may be, it still is but a machine and lacks a brain to direct an action or to conceive the moment's need? To our relief, indeed, its study does not carry us into the uncertain but much-trodden paths of psychology, despite

the fact that poetic imagination has from time immemorial endowed ships and other inanimate objects with souls.

If, however, we pause but a minute for reflection we realise that human intelligence is a necessary part even of the simplest jobs. The unguided vacuum-cleaner could not discriminate, and our diamond studs or ear-rings—if any—might perchance vanish instead of yesterday's crumbs and cobwebs. The motor without a driver would run amok or turn towards open fields and pastures new, leaving us without the week's washing. And a skipperless boat would drift hither and thither at the caprice of every tide and puff of wind, with much loss to the food profiteers.

There is the same need for intelligent control in telegraphy and telephony. Without it, telegraphy would indeed become what a journalist has described as mere "dashed dottiness." In telephony; automatic exchanges are the last word in machine switching; but the control is only shifted from the exchange to the subscriber. He must select the right number, and transmit his demand correctly in the pre-arranged way to the machine, guiding its actions until his line is connected with that of the person he wants. If he has selected the wrong number or misguided the machine, there is no operator to blame and his only remedy, according to a well-known Postmaster, is "to kick himself as a silly ass." The connexions completed, the conversation pursues its normal course and at the direction of the subscriber, the machine releases both lines. If every telephone was directly connected with the public exchange and its number easily found in the directory, the subscriber's control would meet all needs; but the telephone service serves not only the man with one telephone, but also him that hath many. And the bigger the subscriber's business, the more complex his telephone system and the more urgent the need for an experienced brain to direct his incoming calls to the proper unit. We know how impossible it would be for a customer in person to select for himself the department of a universal provider in which he will find the particular gadget he wants. How much more difficult would it be for him to find his goal if the only help were a list of telephone numbers with a necessarily abbreviated classification? The desire would most surely go before the coveted article left the emporium. In all automatic private branch exchanges, it is therefore necessary, because of the need of guidance, to provide manual equipment to deal with incoming traffic, and the result has many advantages. The Post Office saves 90 per cent. of the underground wires needed for direct lines, the Stores increases its sales and the customers are satisfied. The only person who has any cause for dissatisfaction is the writer of anonymous paragraphs who periodically proclaims "The Doom of the 'Hello Girl.'" And who cares a jot for him and his brain waves?

HIC ET UBIQUE.

New telephone tariffs were introduced in Sweden in October last under which the subscription in Stockholm has been increased to £16 10s. including 5,000 calls, £23 2s. including 8,000 calls, and £27 10s. including 10,000 calls. We learn from the *Financier* that those increases have aroused a storm of indignation all over the country and that almost every day there are reports in the papers of meetings and petitions to the Administration from chambers

of commerce and other public bodies on the subject. Before the Allmänna Company was acquired by the State competition kept the rates at an unremunerative figure, but the Stockholm subscriber doubtless looks back with regret to the old uneconomic charge of £4 10s. and thereabouts for which he obtained service in 1914.

An echo of the Greenwood case. Carmarthen Post Office during the trial broke all local records in regard to telegraphic matter. Thirteen extra telegraphists were drafted into the town from Swansea, and the staff has dealt with an average of 70,000 words daily of Press matter alone.

The telephones, too, were busy all day, and the reports were received in London almost as quickly as if the trial had taken place there. In fact, the verdict reached the capital within three minutes of its announcement in Carmarthen.

AFTER a lecture given by Mr. Sidney Webb on Friday, Nov. 12, on "The Administration of Industry" in the "Coming Commonwealth," the following question was put to Mr. Webb:—"How is it, if Nationalisation can do so much for industry, that a large concern like the Telephone Service is now twice as costly and only half as efficient as when it was under commercial control?" Mr. Webb, after repeating the question, said his reply to the questioner must be a complete negation. The Service, as witnessed by the general opinion of users, is *not* inferior to that rendered by the late Company, and if the enquirer would take the trouble to examine the back files of *The Times* he would find on comparison that the criticisms of the Telephone Administration were as numerous and as virulent under the Telephone Company as they are to-day. As far as the cost is concerned, even the questioner states that this is only twice as great. Now what other commodity has advanced only this much in price? The Post Office Services as a whole have only increased to double the pre-war prices—truly a triumph of National Organisation! But he—the lecturer—did not suggest that the present constitution of these Services was his ideal or represented the final word in the matter.

Mr. Webb added that, in our ills as in our advantages, we have short memories, and sat down amid loud and prolonged applause.

We hardly need remind our readers with any particular insistence that these are the opinions of Mr. Sidney Webb and not of Mr. Laws Webb.

MR. J. ROWLAND KNOX, says our Plymouth correspondent, has pointed out the difficulties to be overcome by those managing telephone concerns in the East. We also have our difficulties in the West, as will be seen from a perusal of a letter received recently, copy of which I enclose:—

Sir,—The Post Office X—having a Phone and the Price 3d. Pence for a call I was ring up 3 times and they would not let me know anny thing about it unlett my made went thir to by sumthing I was not awair of the call.

I also have got a sister in law loking to be a mother I sent and asked if she was taking ill in the night if I could use the Phone and Mrs. X— sead I would not be able to use it after 10.30 at night.

it being the only Phone at X—, would you kindly let me know whate is to be done if my sister in law was to be taking Ill I could not ring for a doctor ore the nurces of X— Street.

hoping you will see in to the matter

Your turly

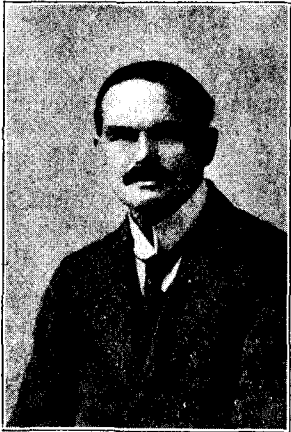
from the Wife of Paymaster Commander X— R.N.

EDISON, says the *Sporting Times*, is trying to get into telephonic communication with people in the next world. As if there was not already enough trouble trying to get into telephonic communication with people in this one!

FIFTY YEARS OF STATE TELEGRAPHS.*

BY A. J. STUBBS, M.INST. C.E. (*Assistant Engineer-in-Chief*).

I propose in my treatment of the subject of my address to-night to approach it rather from a historical than a propagandist viewpoint; to deal with the facts, the actual happenings, the growth and development of the art while Telegraphs have been under Government ownership and control; rather than to make a case for or against and to show that State monopoly in Telegraphs is or is not calculated to retard progress.



I cannot but be conscious that my subject really needs the genius of an F. E. Baines and the "psychology" of a John Lee to express the entrancing romance with which it is really saturated. I can only hope that as the duty has fallen to me the few dry-as-dust details that I submit will be invested by your imagination with the halo that is its due.

Early History.—Now in a historical survey, just as in a physical survey, a base formed between distant points is best calculated to facilitate accuracy of observation; and it may, therefore, be helpful if we look back beyond the period under actual survey to see the method of progress by which the position attained by the companies at the time of the transfer had been reached. We

need not look far back to the dim past when flickerings showed where able men were working to produce the light, but only to that clear and certain light that gleamed from a little office at Euston Grove (Euston Station), where, in 1837, after much experiment, William Fothergill Cooke and Professor Charles Wheatstone demonstrated to the London and Birmingham Railway Company the practicability of sending signals by electricity for business purposes. I have a photograph of an account against the "London and Birmingham Railway Company" from William and Lewis Cubitt for sundry works done at the Euston Grove Station and attending upon Mr. Cooke. The circuit was run from Euston to Chalk Farm. The 5 needle instruments used were the progenitors of the Single Needle.

Wheatstone and Morse.—We quite justly in England recognise Cooke and Wheatstone as the fathers of practical telegraphy; but it is well always to remember that knowledge is international and that progress in one department is rarely due to the work of one man. In more recent years this has been exemplified in the patenting upon one day of a telephone by Thomas Alva Edison and by Alexander Graham Bell; and in the development of the Radiographic system by many workers which culminated in the revolutionary work of Marconi. The same conditions existed 50 years ago, for while Cooke and Wheatstone were developing their needle telegraph in England, in the same year Professor Samuel Finley Breese Morse in America produced before Congress his famous Embosser. Two years before he had been appointed Professor of Arts of Design in the University of New York. This Morse embosser was improved by Thomas John, who invented the Ink Recorder in 1854. I suppose we ordinarily think of the *Sounder* as Morse's invention. It is not. Writing in 1880, Preece described the *Sounder* as "a self-invented system which is creeping gradually into very extensive employment. It is almost universal in America and very general in England. There is no record of its introduction, but I believe that it originally came into existence in America about 1851." We really had the same class of development with the Needle Instrument, which operators learned to read by sound and then added tin plates to make the reading more certain.

Telegraph Companies.—From that experiment at Euston Grove the practical usefulness of the telegraph became recognised and from time to time various companies were floated to introduce fresh development and inventions. One of the most flourishing and progressive was the Electric Telegraph Co., which later became the Electric and International. It was incorporated in 1845, and about that time it built offices in Founders Court, with galleries on right and left of the public hall. These galleries were used for administrative as well as operative purposes; but the eastern galleries left their title to telegraph instrument rooms for half a century, and even now, after lapse of three-quarters of a century, many a man speaks of the great floors of the Central Telegraph Office as the galleries. The Electric Telegraph Company continued to use the single needle, but adopted also the Morse writer. The United Kingdom Company followed the Electric Telegraph Co., but had also a few Hughes instruments. The British and Irish Magnetic Co., used the Bright's bell which, it is interesting to note, had as its prototype the aural form of Steinheil's telegraph of 1837. Another company was the London and Provincial, which used the single needle. Their single needle

transmitter was of the drop-handle type. The two tapper commutator is peculiar to the Post Office, having been designed by Theiler at Mr. Culley's request, soon after the transfer (Engineer-in-Chief 1870—1878). These and the Universal Private Telegraph Co., were the principal companies existing in 1869; but there were also several smaller companies.

Thus, gradually the telegraph system spread until men came to recognise that it was an important factor in the social, and an essential in the commercial, life of the nation, and some genius (or several) conceived the idea of Government ownership under control of the Post Office. Of course such an idea was strenuously opposed. It first saw the light, according to Baines, in 1852, being the subject of a paper by Captain Galton. Baines himself appears to have framed a full scheme in 1856; but vested interests of all sorts had to be overcome, and it was not until the general public became thoroughly convinced that the telegraph was a national necessity that the proposal could get serious consideration. The mainspring of the movement for the acquisition of the Telegraphs by the State was the public expectation that the Post Office would be able to provide for the benefit of the nation as a whole an improved service at a rate which would bring it within the reach of all classes of the community.

Companies' Charges.—The United Kingdom Co. had attempted to introduce a uniform 1s. rate for any distance, but had to revert to distance rates. In 1869 these were 20 words for

1s. up to 100 miles,

1s. 6d. up to 200 miles,

2s. over 200 miles in Great Britain; to Ireland 3s. to 6s.

These charges were subject to an extra payment if two or more companies were concerned, and also to extra charge for delivery beyond a limited radius.

A large number of offices were at railway stations, a natural result of most of the telegraph routes being on railways, and "town offices" were opened only at the great business centres. For instance, in Edinburgh the competing companies' offices were within a half mile radius circle, leaving the rest of the city with no provision whatever.

Restricted Use.—Stockbrokers, betting men and others engaged in speculative business were the chief patrons of the telegraph, but as stated by Mr. Scudamore "the general public, puzzled by a variable and complex tariff, and disheartened by the distance of the telegraph offices from their doors, had got to regard the telegraph as a medium of communication which they might use in times of sore necessity and then only, and to look upon a telegraph message with a feeling amounting to fear."

So step by step the idea of State ownership and Post Office control marched forward, until in 1867 the Government decided that it should be accomplished, and Frank Ives Scudamore, Assistant Secretary to the Post Office, who (by instruction of Postmaster General Lord Stanley of Alderley) had been working to this end since 1865, found himself with orders to go ahead with the scheme.

Telegraph Transfer Act.—It is curious to observe that the Act of 1868, which authorised the Postmaster General to acquire the business of inland telegraphs, did not confer any monopoly of telegraphic communication. This, which was so obviously the crux of the whole matter that it is difficult to believe its omission at any stage, was provided for in the Act of 1869.

The actual physical transfer took effect on Feb. 5, 1870—the jubilee of which is marked in my mind as a lost opportunity, an occasion the celebration of which would have afforded the Post Office a golden opportunity of proving to the British public, and indeed to the world, that the Post Office Telegraph and Telephone System is by no means the effete and unprogressive institution that some critics would have it believed.

When, in 1891, we celebrated the jubilee of the introduction of the Penny Post—now, alas! departed—it evoked so much interest and enthusiasm that the profits that accrued from the celebration benefitted the Rowland Hill Fund to the amount of £22,000.

Cost of Telegraph System.—The arbitration for the settlement of terms was not concluded until 1879, a marked contrast with the time taken to clear up the National Telephone Company transfer of the telephone system. What a costly business that settlement was! When the total bill came to be footed up it showed a Capital account of £10,948,173 the main items of which were:—

Paid to Telegraph and Railway Co's.	£7,808,000
Cost of Extensions: charged to capital account until 1873	2,132,000
Buying out Vested Interests	190,000
	£10,130,000

Mr. Baines gives in a sentence a little insight into the conditions of purchase. He says "To the Electric and International Telegraph Company was paid a sum of £2,938,826 9s. That was the statutory compensation to a company whose property in 1856 stood in the market at no higher value than £566,080 plus some debentures." No wonder the opposition to the transfer collapsed! and no wonder the Telegraphs have never paid!!

* A paper given before the Telephone and Telegraph Society of London on Nov. 15, 1920.

Transfer.—So, on Feb. 5, 1870, the Right Hon. The Marquis of Hartington being Postmaster-General (Dec. 30, 1868-Jan. 24, 1871); Sir John Tilley, Secretary (March 15, 1864—April 3, 1880); and Mr. Frank Ives Scudamore, Second Secretary to the Post Office (1868-1875), the State Telegraph Department of Great Britain and Ireland opened its doors for business. Its example has been followed by every civilised State, with one exception. I remember being taken that day by a big brother to see the outside of one of the new Postal Telegraph Offices. Little thought I then that ten years later I should become and for over 40 years remain an insignificant speck in that mighty atom of Postal Telegraphs. Then my chief interest was in such telegraph stories as that of the old lady who carefully addressed a new pair of boots to her son and hung them for transmission on the telegraph wires; no doubt hoping to “diddle” the Post Office on telegrams as her forebears had many a time done on letters in the days before Sir Rowland Hill.

The Day of Small Things.—May I take my own entry into the Engineering Department as something of a datum. Only the year before, Graves (Engineer-in-Chief, 1878 to 1892) had certified the last of the accounts relating to the transfer. His headquarters staff numbered about 18 technical and clerical, all told. Preece's section of the staff occupied rooms 110 and 111 on the third floor. The remainder of that floor was occupied by Mr. Fischer (the Controller of C.T.O.) and his staff; the “Galleries;” the Medical Officer; and probably some other departments. The rest of the Engineer-in-Chief's staff was in the range of four rooms on the ground floor facing Newgate Street; and the Postmaster-General, the Secretariat and the Receiver and Accountant-General shared the rest of G.P.O. (West). In 1876 a Select Committee of the House of Commons, referring to the appointment of Mr. Baines as Surveyor-General of Telegraphs, said, “he might be assisted by an efficient engineering officer as Inspector-General of Lines. . . . An electrician might also be appointed. [They evidently could not otherwise provide for both Graves and Preece.] The principal re-organisation which the Committee recommend is that there should be no separate engineering department as a distinct branch of the Telegraphic Service, but that the engineering officers, etc., . . . should culminate in the Surveyor-General.” The Surveyor-General is no more, but in these days, the Engineering Department would constitute a pretty big base upon which the Surveyor-General could “culminate”!

Sometimes now when I hear the striking of the C.T.O. time bell, I think of those days, nearly 40 years ago, when it fell to me to make that same bell “ring” instead of “clang.” Some of you will think that my effort was not entirely successful, but there are not many other electric bells of that date that are still on active service to-day!

Statistics.—Here let me work off a few statistics about the transfer I will take my figures from the Postmaster-General's report of 1880. As in seeking facts in this connexion, I have found not only that figures can prove anything but that they can be anything, I quote my authority!—

	1869.	1870.	1920.
	(Companies.)		
Offices	2,488	2,800	13,967
Instruments	2,200		21,193
	(presumably for the 1,992 companies' offices.)		
	1869-70.	1920.	
Route (miles)	5,651		
Wire (miles)	49,990	*3,739,566	
Submarine Cable	139	†19,556	
Staff—			
Men	2,035	25,645	
Women	479	350	
	2,514	‡25,995	
Messengers	1,471		
Messages	6,500,000	94,004,000	
Parliamentary News, words per diem during Session...	6,000		

* Includes Telephone wires.
 † Includes Atlantic cable.
 ‡ Includes only Engineering Department staff.

Preparations.—Of course great preparations had to be made prior to the transfer, and these were carried on to such good purpose that in time for the transfer the number of railway offices transacting public telegraph business was increased from about 500 to nearly 1,800 and 1,000 Post Offices were opened for telegrams. Re-organisation, of course, played a very important part in the development. Duplicate offices were closed, leaving circuits available for other purposes, omnibus circuits which had been the rule with the multiplicity of companies were converted to direct main circuits, such circuits being fed by omnibus circuits obtained by re-arrangement and the building of minor sections. Extensions were made in all directions so as to make of the whole a balanced national system. The plan of campaign is very interestingly described by Baines in his “Forty Years at the Post Office.”

By the end of 1871 the system comprised over 5,000 offices with over 6,000 instruments and 83,000 miles of wire on 22,000 miles of route.

Growth of Messages and Mileage.—The growth of telegraph traffic during the past 50 years and the relative growth of the mileage of wire used for

message purposes are shown by the curves. As regards messages the numbers are:—

1870	8,606,832
1871	9,850,000
1872	12,473,796
1884	32,843,120
1885	33,278,459

then on Oct. 1, 1885, the 6d. tariff (like the Penny Post, since killed by the War) was introduced and the numbers went up—

1886	39,235,813
1887	50,243,639

until the 6,500,000 of 1869 had become in

1915	91,179,000
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By that year (1914-15) the 2,500 telegraph offices of 1869 had increased to 14,222, half of which were being worked by telephones.

C.T.O. “Records.”—One of the picturesque incidents of State Telegraphs may perhaps be mentioned here in connexion with statistics—Queen Victoria's Diamond Jubilee (1897). Special arrangements were made, with the co-operation of the Cable Companies, for the transmission of a message from the Queen to the British Dominions beyond the seas, and immediately before Her Majesty left Buckingham Palace to join the great procession to St. Paul's Cathedral, she pressed a button which gave the C.T.O. the signal for despatch of the message. I know that there are at least three press buttons which their owners say she pressed, although she thought she only pressed one! Incidentally the previous day established a record at that date of messages from the C.T.O., the total number being 195,411 telegrams. “Records” of business at the C.T.O. appear to be generally associated with the relations between the nation and our Royal House. Besides the Queen Victoria's Diamond Jubilee, 195,411, we had Queen Victoria's Funeral, 199,155; and the postponement of King Edward's Coronation in June, 1902, the numbers on June 23, 24 and 25 being respectively 201,559, 311,039, 314,126. However, the latest “record” for messages was on Sept. 29, 1919, when the Railway Strike gave C.T.O. the job of handling 355,353 messages—close on double the Diamond Jubilee record! The present normal day's work is 120,000 to 165,000 per diem; and about 90,000,000 per annum.

Inter-Relations of Post and Telegraph.—It is a characteristic of the British nature to disparage its own work, and to do less than justice to its own institutions. I was recently impressed in reading some article in a United States journal upon the development of telegraphy, to find at the end of almost every paragraph, “Again American genius was equal to the occasion,” or words to that effect. All our work is accepted as a matter of course, and it is only when something is wrong that we recognise it as being due to our own efforts. In Bright and Lardner's “Electric Telegraph” (1867), it is explained that the extraordinary development of the telegraph system in the United States was probably largely due to the comparative slowness and uncertainty of their postal communication. On the other hand, 15 years after the transfer the Postmaster-General explained that a very great factor in retarding the expansion of our telegraphs was the extraordinary efficiency and speed of the letter post. I believe that that same comment might be applied to-day in regard to the use of the telephone. To-day even our letter post has been deteriorated by the War—but it is a great factor still. I have often reckoned it easier to send a friend a note rather than call him to the telephone late at night.

In 1885 the development of the use of the telegraph had been so steady that we stood at the head of all European countries in messages per head of population per annum, the numbers being:—

United Kingdom	1.84	Germany	.66
Switzerland	1.27	Austria	.42
France	1.08	Italy	.31
Belgium	.87	Russia	.10

In that same year the National Telephone Company published a statement that their message business was equal to 280 millions of messages 100 words long! That, too, was obviously calculated to retard development of telegraph traffic.

1.—**Finance.**—(a) It goes almost without saying that the telegraphs have never been treated as an earning department of the Government Service. The costliness of the acquisition cut off any such idea at the inception of the system. In the first 25 years the receipts exceeded the expenditure by nearly £1,800,000, but the interest due on capital and not paid exceeded £5,850,000. This, however, was not entirely due to the capital outlay; other items contributed, such as Press telegrams, free railway messages and reduced tariffs.

(b) **Press Telegrams.**—The Act fixed the price of the second and every subsequent copy of a press telegram at 2d. for 70 words—and copies of course were multiplied accordingly. In 1890 press messages cost the sender about 4½d. per 100 words, and it was estimated that this resulted in a loss to the Post Office Telegraphs of £300,000 a year, in spite of every possible effort to work the business with the utmost economy.

(c) **Railway Free Telegrams.**—Then railway companies, which, under their agreements with the telegraph companies who used their system, had enjoyed the privilege of sending their telegrams free, were granted the same concession over the Postal Telegraphs. Under that concession, for instance, a few years ago my negotiations for a special train for a Sunday School treat were carried out on the railway company's side by long telegraph messages delivered to my house by Post Office messengers—it saved the company stationary and stamps!

In 1869 probably the concession appeared a very innocent matter. The free messages sent in 1871 numbered 116,000. This had increased in—

1876	...	...	...	244,000
1880	...	...	...	432,000
1890	...	...	...	1,535,000

At this stage when it appeared that the cost to the Post Office was £80,000 per annum, it became clear that the department must call a halt; and negotiations were opened with the companies with a view to restriction of their exceedingly wasteful use of the Government plant and staff. The result was that the use gradually decreased.

In the next years the numbers were—

1892	...	...	...	1,554,000
1893	...	...	...	1,529,000
1894	...	...	...	1,154,000
1895	...	...	...	1,048,000
1896	...	...	...	1,339,000

when there remained but few companies with whom agreements had not been concluded. In 1919-20 the number had fallen from 1½ millions to 922,000.

2.—6d. Telegrams.—On Oct. 1, 1885, the minimum charge for an inland telegram in the United Kingdom was reduced from 1s. (for 20 words and address) to 6d. for 12 words including address. The capital expenditure necessitated for the increased plant needed to meet the increased business was £450,000, and it was estimated that the reduction cost the revenue about £170,000 a year.

In spite of the material reduction in the number of words that could be sent for the minimum charge so large a proportion of the messages was brought within the minimum that the average charge per message, which was 1s. 1d. in 1885, came down to 8d. in 1886. In London the local telegrams more than doubled in two years, being 1,800,000 in 1884-5 and 3,800,000 in 1886-7. The corresponding figures for the whole country were 33 millions in 1884-5 and 50 millions in 1886-7.

The 6d. tariff was increased to 9d. on Nov. 1, 1915, and this year (but after the Jubilee) a further increase has brought us to a 1s. minimum at 1d. per word.

1. Extension of Telegraphic Facilities.—Although money-earning was placed beyond the reach of the Post Office Telegraph System by the political exigencies of its birth the whole spirit of the Administration has from the very first been directed to giving the utmost possible benefit to the community for its ownership of the Telegraphs at the least possible cost. In 1888 a Select Committee of the House of Commons recognised that the Post Office worked in the main on business principles and added that “the high business character of the Post Office Department is in no small degree due to the fact that it has been administered in this spirit and from this point of view.”

To what extent then has the Post Office attempted to meet the public expectation that it would provide an improved service for the national benefit? I will detail very briefly a few of its efforts to this effect.

(a) Telegraph Stamps.—As an obvious accounting convenience in 1876 distinctive stamps for telegrams were introduced, but they were an equally obvious inconvenience to the general public, and accordingly their use was abandoned in 1881 (Nov. 1) and postage stamps were again made valid for telegraph as well as for postal purposes.

(b) Guaranteed Offices.—In certain cases the Post Office had found it essential to call for a guarantee in respect of the opening of a telegraph office at a place which was practically certain to be unremunerative. The liability of the guarantors was often a very onerous one as it covered the whole expense including rent of the office. A great measure of relief was granted in 1891-2 by conceding that the guarantee liability should be calculated only in respect of working expenses and maintenance.

At the same time an Act was secured by the Post Office whereby Rural Sanitary Authorities were empowered to undertake the guarantee and to charge the rates with any expense incurred.

As one of the concessions which marked the celebration of the “Diamond Jubilee” of Queen Victoria in 1897, it was agreed that only half of any deficiency in the annual cost of a Guaranteed Telegraph Office should be contributed by the guarantors. This led to a great increase in such offices.

(c) Delivery of Telegrams.—(i) Night Delivery.—In pursuance of the policy of popularising the telegraph by simplification of the system of charging, in 1892 it was arranged that when delivery of messages was free by day it should also be free at night, although the normal delivery office might be closed.

(ii) Extension of Free Delivery.—To celebrate the Diamond Jubilee it was arranged that thereafter all telegrams should be delivered free within a radius of three miles from the delivery office; and corresponding reduced charges for portage beyond the 3-mile radius were made. This was estimated to cost the Post Office £52,000 the first year.

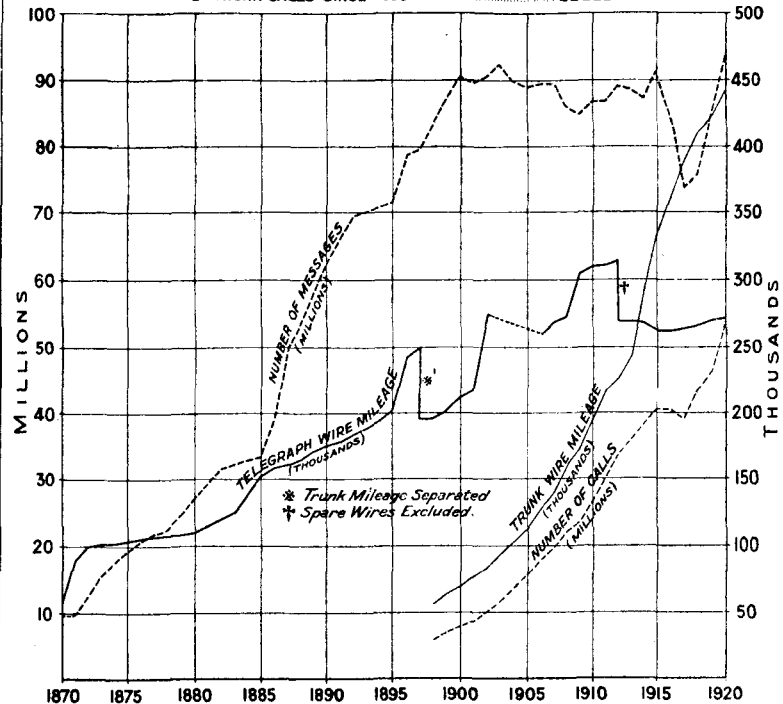
(iii) At the same time it was arranged that within the London District free delivery should be made at all hours.

(iv) About 1908 telephone exchange subscribers began to be encouraged to arrange for their telegrams to be addressed for delivery by telephone—greatly expediting delivery and relieving the messenger service. The messages are “confirmed” by post.

(v) Another very useful development is the arrangement whereby telegrams that would be received after closing of the transmitting circuit are treated as express letters where such treatment is more expeditious than complete transmission by telegraph could be (1910-11).

DIAGRAM SHOWING ANNUAL GROWTH OF—

- a WIRE MILEAGE OF PUBLIC TELEGRAPH LINES
- b " " " TELEPHONE TRUNK LINES
- c TELEGRAPH MESSAGES SINCE 1870
- d TRUNK CALLS SINCE 1898



(d) Telegraph Money Orders.—The great convenience of a provision whereby money could be sent by telegraph, introduced in 1889, was extended to all Telegraph and Money Order Offices on March 1, 1892. The year before the War, over £2,500,000 was so transferred under 699,000 messages. A poundage ranging from 4d. for £1 to 1s. for £10 was charged plus at least 9d. for the official telegram.

(e) Telegraphic Withdrawals from the Savings Bank.—On Jan. 1, 1894, depositors in the Savings Bank were first allowed to withdraw deposits by telegraph. It was observed that advantage was taken of this very freely immediately before and after Bank Holidays. This is another of the things shut down by the War.

(f) Day Cable Letters and Week-end Cable Letters were introduced in 1911. Day Cable Letters are accepted for delivery to places in Canada, Newfoundland, U.S.A., &c., on the next day but one after acceptance. The Week-end Letters are accepted on any day up to Saturday for delivery not earlier than the following Tuesday. The rates are respectively about one-third and one-fourth the ordinary cable rates.

(g) Night Telegram Letter Service.—At a charge of 6d. for 36 words it was arranged in 1912 to transmit messages between open-all-night offices after the usual posting hours to be delivered by the first post next morning.

(h) Deferred Cable Messages.—Plain language extra-European telegrams (sent mainly by people who cannot avail themselves of code) were (1910-11) provided for at half-rate, subject to liability to deferment, not exceeding 24 hours, in favour of fully-paid traffic. The scheme included Australia, New Zealand and Canada. The scheme was extended subsequently to embrace other British Dominions, the U.S.A., South America, China, Egypt and the bulk of the French and Portuguese colonies.

(j) Colonial Communication.—In 1906-7 the Post Office introduced a scheme whereby messages could be transmitted between the United Kingdom and South Africa by telegraph at each end and by post between Southampton and Cape Town.

(k) Advisory Committees.—With a view to ensuring that practical suggestions by business men for working the telephone system should get proper consideration and that well-founded complaints should receive attention, the Postmaster-General instituted Telegraph and Telephone Advisory Committees (1912). In 1914-15 there were 49 such committees.

(l) Abbreviated Telegraphic Addresses.—It appears that abbreviated addresses were used from a very early—probably a pre-transfer—date; but while addresses went free there was little inducement to register such an address. When the 6d. tariff introduced charge for the address, the economy of the system became so great that the schedules in London became unwieldy, and in his next report the Postmaster-General found it desirable to discourage registration as it had become the cause of delay to such messages, which had invariably to be specially treated. By 1912 the difficulty had become so acute, with 40,000 addresses registered at C.T.O., that it was agreed to give any registrant the option of adding an “Indicator” word which would automatically indicate the proper delivery office, this word not being chargeable. The concession is widely appreciated.

(m) Coast Communication.—In 1891 the House of Commons resolved that an extended scheme of Coast Communications should be developed. Time after time lack of such communication had handicapped the coastal

life-saving service, and doubtless the scheme that resulted from the resolution of Parliament has proved of immense value and importance, especially in saving of life. It was of course invaluable during the War, when it was very largely extended.

Progress of Development.—Having thus indicated the extent to which expectation of the public that an improved service would result from State control has been met, let us now consider the means by which this has been effected.

(1) *Duplex working* was scarcely known and not really needed in 1869, although devised by Gintl in 1853; but in 1873 Stearns made it a thoroughly reliable system by the application of condensers. We took it up in 1879; came to terms with the inventor for a lump sum of £2,000 a year during the continuance of his patent; proceeded to apply it to our double current system, and were using it for years before other administrations recognised its value. It was very difficult at that time to get accurately differential instruments—the manufacturer said “impossible,” but the Post Office Technical Officers said “difficulties are made to be overcome” and showed the makers how!

We work duplex as a matter of course now, but in those days it was a matter for Headquarters to decide whether a circuit *could* be worked duplex. Even then the poor insulation of the lines made duplex impossible during bad weather; so the “duplex and single” switch was introduced (1874), thus providing that when duplex became impossible the circuit could be worked simplex without change of apparatus.

Duplex has always been important to us, and the purely Post Office development represents almost the entire progress in that system. In 1877 it was applied to Wheatstone fast speed working. The original “Bridge” system of duplex was revised for cable circuit working about 1890, the deficiencies of the previous practice being abolished; and in 1893 Hughes duplex, working London to Paris, was inaugurated in conjunction with the French Administration, technical officers from London conducting the trials at the Paris end.

(2) *Quadruplex*.—In 1972, Edison invented a practical quadruplex system, that Gerritt Smith proceeded to improve. Later on we agreed to pay £25 per annum for each circuit installed. Gradually all defects were eliminated, and by 1884 the “Non-polarised Relay” displaced the extremely tricky and inconvenient “Compound Relay” which was the characteristic feature of Gerritt Smith’s improvement. Mr. Preece reported that at the Chicago Exhibition of 1893 it was extremely interesting to see the American exhibit of a Quadruplex set, which showed practically no development in comparison with the British exhibit, which was a practically new type in all respects.

Since then we have expanded our Quadruplex System so vastly that a mere list of the several variations is quite an imposing matter!

A Quadruplex Repeater is certainly also an imposing Instrument!

(3) *Hughes’ Instrument*.—The taking over of the Submarine Telegraph Company in 1889 at once brought us into relations with Continental telegraph systems, and the Hughes’ instrument. Up to that time, British practice since the transfer had left this beautiful instrument severely alone although it had been used to some extent by the United Kingdom Company. Its costliness and the special training for its operation barred its use here; but it was installed on all the principal Continental circuits. Invented by Professor Hughes in 1855 it had remained practically as it left his hands, except that the Germans had applied a rather more reliable governor. Its special table, its huge weight wound with great labour by a pedal, and numerous minor crudities (such as are to be looked for in an instrument fresh from an inventor) remained unaltered. In 1890 we were making Hughes’ instruments in our own factory, and very soon our form of the instrument, having passed through various stages of development, appeared with direct electric drive, controlled by a rheostat designed by F. Tremain, and the motor readily detachable without interfering with the trainwork; the whole installed on a small base suitable for placing on a table. In 1893, for the first time in regular practice, the Hughes was worked duplex on the Paris circuits.

(4) *Fast Speed Telegraphy*.—(a) *Wheatstone Automatic System*.—The Wheatstone Automatic system was patented in 1858 by Professor Charles Wheatstone and John Matthias Augustus Stroh. I should imagine that Stroh, by his extraordinary mechanical genius, left more impression upon the form and development of British Telegraphs than any two other men. I scarcely spoke to him, but I always feel that the shadow of his genius was over all my design work.

At the transfer the Electric and International handed over 4 sets of Wheatstone, which worked at about 70-80 words per minute. Within ten years we had 173 circuits working at a much higher speed, and last year there were 676 Wheatstone sets in use.

The low tariff for Press messages, which proved such a costly concession made at the Transfer, was the mainspring which drove the Post Office to develop to the utmost the most economical method of conducting this unremunerative business, and accordingly the Wheatstone System was studied and expanded in every way. No detail escaped attention. For instance, probably few of those who wound up the transmitter realised that no more perfect chain has ever been produced than the driving chain that they were using.

When we remove the working part of an instrument without disturbing the driving gear, we are only copying the work of 1880 on the Wheatstone Receiver. Our multiple slip punching is the application of a principle devised in 1883—all because newspapers had a cheap tariff.

In 1890, Preece told Mat. Cooper, who was then responsible for Wheatstone working, that he wanted the speed increased to 400 or 500 words

per minute. It was then 250. Acting upon a principle of design that I always tried to follow, we determined to try the simplest and most obvious device first; and within a few weeks we produced a greatly simplified form of transmitter and had it working at 600 words per minute. For long the instruction was that every morning a speed of 600 should be secured on the circuits and the working speed set at 400.

Electrical research went hand in hand with mechanical development otherwise this high speed could not have been attained.

(b) In 1898, Mr. Creed brought under notice his invention of a pneumatic keyboard perforator. With admirable persistence since then he has developed his system until to-day we are using not only keyboard perforators, but receiving perforators and printers that automatically print from the received slip. In spite of the restriction of such matters by the War, the extension of the use of the Creed has been extremely satisfactory.

(c) About 1898, our attention was called to a form of vibrating relay invented by a Dane named Gulstad. During the war supplies could not be obtained, so we applied a similar movement to one of our Standard Relays, which for our purposes gives even better results than the original. This has greatly improved the standard of Wheatstone working, being particularly noticeable and advantageous on underground circuits.

(d) Various other devices have been adopted to perfect this system. Duplexing of course was one of the first, then “Systematic Wheatstone” working and the gumming-up of slip from which writing-up could be done by a typewriter; but the present trend is undoubtedly toward automatic printing from the received tape.

(e) I have gone rather fully into this Wheatstone system as it is characteristically a British Post Office system, to show that progress in these things is not a mere natural growth but is the result of active work—a matter of pressing forward, of recognising, like the famous sculptor, that “trifles make perfection and perfection is no trifle” I want you to realise that the Post Office Engineer has set his mind upon securing that his job shall be “no trifle”; that beauty of design, perfection of workmanship and keen perception of every possibility of application of technical details, shall place and keep the work of the British Telegraphs in the absolute forefront of the art.

(5) *Repeaters*.—(a) The ultimate perfecting of the fast speed system, however, is largely attributable to the Post Office Repeater. It is true that before 1870 the idea of a Repeater or “Relay” was well-known as a device for introducing a stronger current at an intermediate point; but such an instrument generally actually reduced the speed of a circuit in dry weather. Our Repeaters secure an actual working speed for a long circuit that is the working speed of the worst section of the line upon which it is worked.

I should think that it would be impossible to get a group of inter-working instruments that would reasonably compare with a Fast Speed Duplex Repeater for Wheatstone working—for beauty of design, excellence of workmanship, ingenuity of application and multiplicity of technical details that are applied in order to produce the required results.

(b) The longest circuit ever worked in Great Britain was from Admiralty to the Rosyth naval centre, Invergordon naval centre and Scapa Flow. The length is about 900 miles and includes a submarine cable between Caithness and the Orkneys. There were Repeaters at Preston, Glasgow and Invergordon. This is, of course, insignificant compared with the circuit that was worked one Sunday about 1910 from the Indo Company’s office in London to Rangoon—7,700 miles, passing North Sea cable (about 250 miles), through Berlin, Warsaw, South Russia, Teheran, Karachi, Bombay, Calcutta and Akyab. There were about 20 repeaters in circuit and the speed was 40 words ordinary Morse, with practically Post Office apparatus.

(c) *Sounder Silencer*.—One of the side shows of the Repeater Station is the “Sounder Silencer”—a Post Office design made to order! One day, Eden came back from a Repeater Station to say that with ten repeaters going and two sounders chattering on each repeater the clerk could not sleep at night! Put in another way, the more-or-less attentive clerk frequently failed to recognise a call because of the noise from all the other sounders. Therefore, we ought to have a device for bringing a sounder into circuit only when required. He produced one idea; Cooper made an instrument for “silencing” one sounder, and then Kempe got hot on the subject and, with the aid of the mechanic, made a model of a beautiful instrument. It worked splendidly until the clock stopped, which ensured perfect silence, with all the sounders cut out and the Repeater Station not callable! Good! Kempe proceeded to fit a clever wiper attachment that cut all the sounders in when the clock stopped!

(6) *Water-level Apparatus*.—That was only one of several instruments designed to order. On an earlier occasion Mr. Comport called to see the Nottingham Water Engineer at a psychological moment, when the lower part of the town had been flooded by overflow of the reservoirs. The Engineer explained that the pumping station was over a mile from the reservoirs, and if the messenger who was supposed to advise the engineman when the reservoirs were full failed in his duty, a flood resulted. Comport said: “Why not let us do it electrically?” and took the order! The first Water-level Transmitter and Indicator were the result. There are two stories about that. I will tell you one of them. When the instruments were installed the old watchman at the reservoir thought that he would not be wanted again, so they found him hanging dead behind the watchroom door.

(7) I must not pause long over the *Delany Multiplex System*. It had no chance of trial until the Post Office took it up in 1886. It was a very ingenious and flexible system, but the logic of later developments has cut it out. We improved it so greatly, perfected the various instruments, studied

the theory, analysed the working conditions, even devised a new nomenclature for its variations; and ultimately so improved and simplified the apparatus that, whereas, as it came to us a hexode set at one end of a circuit comprised 43 instruments, our vastly improved installation only needed 32. Of course the inevitable happened. We at once made it double current, and then Mr. Pollock proceeded to duplex it. To-day it is only a reminiscence in the Museum! But we paid the inventor £2,000 a year while we used it.

(8) *Murray Typewriting Telegraphs.*—For twenty years Mr. Murray's inventions have been before the Department. In 1901 his fast-speed scheme provided for perforating slip by a keyboard perforator at about 40 words per minute, passing this through a special transmitter at about 120 words. The received signals operated a perforator by means of a relay, and the resulting perforated slip was then passed through a typewriting instrument which printed the message in type at the rate of about 100 words per minute. This was the first of a multitude of designs that have issued from the active brain of Mr. Donald Murray; and he is still inventing.

(9) *Other Systems.*—I cannot even enumerate all the telegraph systems that have been tried during these last 20 years. Here are some:—

- 1901 Rowland Multiplex Type Printer.
Mercadier Multiplex (Sounder).
- 1903 Buckingham Type Printer.
- 1904 Telepost (Morse).
- 1905 Pollak Virag (Photographic).
Yetman Keyboard Transmitter (Morse).
- 1906 Kotyra Keyboard Perforator.
Gell Keyboard Perforator.
Delany Telepost.
- 1908 Vibroplex Key (Morse).
- 1910 Siemens Photographic Automatic.
- 1911 Murray Multiplex.
- 1914 Siemens Automatic Type Printer.
Kleinschmidt (American) Keyboard Perforator (Morse).
- 1915 Western Electric Multiplex.

(10) *Baudot.*—The Baudot presents to my mind one of the most perplexing problems of this history. It is the invention of a French engineer, patented in 1871. The British Patent is dated 1882, but there is no known record of its ever having been brought to our notice until 1897. I think it must have been considered; (Mr. Tyrell says it was, but not by the Engineers!) but that its radical variation from the standard Morse system, coupled with the fact that in its then form it gave no appreciably better output than the Morse Quadruplex and considerably less than the average Wheatstone, led to its being ignored. When in 1897 it was put in competition with the Hughes, working to Paris with two channels at about 27 words per minute, its four channels averaging 30 words, it was a different matter. It still had not sufficient attraction for our Inland Service.

In 1905, however, A. C. Booth succeeded in duplexing the Baudot and the four possible channels became eight and later on ten or even twelve. No previous multiplex system has survived in practice; but this Booth-Baudot system revived the idea, and all present-day multiplex systems are based upon the duplex Baudot as devised by a Post Office engineer. We have 36 circuits now working, giving 244 Baudot channels. The use of the system is now world-wide, and there is every likelihood that its expansion in some form will continue almost indefinitely.

(11) *Non-electrical Distributors.*—(a) *Pneumatic Tubes.*—The old companies had commenced to develop a pneumatic tube system, and that the Department did not neglect this facility is shown by the following figures:—

Pneumatic Tubes in—	1870.	1880.
London yards	3,887	37,144
Manchester "	817	2,026
Birmingham "	140	917
Others "	—	8,533
	<u>4,844</u>	<u>48,620</u>

At present we have 100 miles of tubes, the lengths being:—

London	about 50 miles.
Manchester	3½ "
Birmingham	4 "
Others	42½ "

In C.T.O. alone there are 4 miles of house tubes.

It is interesting to note that the first pneumatic tube in New York—between the Western Union Company's office and Wall Street—was not laid until 1876.

That the pneumatic tube service is not altogether a matter of small importance may be inferred from the fact that a scheme for working the London West End Branch Offices cost £30,000 to complete.

(b) *Cord Carriers, &c.*—Distribution of traffic within the office from circuit to circuit has always been a serious problem in large offices. About 1912 a "Lamson" carrier was installed at Birmingham, and use of that and other forms has been materially increased since that date. For many years previously we had forms of Cord Carriers installed to a limited extent.

(12) *Intercommunication Switch.*—A notable improvement in service was effected in 1902 by the completion at the C.T.O. of the Intercommunication Switch. This secured the through switching of about one-fourth of the work of London traffic, and greatly reduced delay. It at once saved about 4,000 message transactions per diem at the C.T.O. To-day it saves about 27,000 transmissions per diem. Major Purves was largely responsible for the development of this system.

(13) *Other Developments.*—Reference only can be made to important developments such as—

- 1905 Central Battery Simplex working,
- 1906 Decrement Quadruplex,
- 1907 Central Battery Duplex.

which are among many distinctive Post Office plans.

(14) *Cables.*—Telegraph and Telephone.

(a) *Submarine Co.*—On April 1, 1889, the Submarine Telegraph Co.'s licence expired and its system was taken over. It had cables—

- 5 to France,
- 2 to Belgium.
- 2 to Holland,
- 2 to Germany, one of which was purchased by the German Government.

The price paid by us was £67,163, including the purchase of the cable ship *Lady Carmichael*. Before that, however, we had already found the need for having our own cable ship, and in 1883 the *Monarch* was launched.

A staff of 370 was transferred.

(b) *German Cable.*—In 1891-2 a new cable was laid whereby the telegraph facilities to Germany were considerably improved, and direct communication, London to Vienna, was established.

(c) *First Air-space Cable.*—England has always led the world in submarine cable laying, and the spirit of enterprise in this respect has never been lacking in the Post Office.

The first notable attempt to depart from the beaten track and produce an air-space submarine cable was made by Mr. Willoughby Smith, and in 1898 such a cable was laid between Nevin (North Wales) and Newcastle (County Wicklow). It was not expected that it would give telephonic communication and as a matter of fact it proved unsuccessful; but it was a failure worth while in the progress of the art.

(d) *Paris Telephone Cable.*—April 1, 1891, marked an important step forward in the opening of a telephone circuit to Paris. Every possible precaution was taken to ensure success. The 4-wire cable was specially designed. An amusing incident occurred in this connexion. Mr. Kempe made all the necessary calculations and handed the result to Mr. Preece. The next morning a bombshell dropped—Mr. Preece had lost the papers! Kempe must make all the calculations again. "I can do that all right," says Kempe, "but it will be very awkward if the papers turn up and the figures differ!" Preece hearing this, was greatly tempted not to announce that the papers were found.

The land lines were of extra gauge (400 lbs.) and open wires every yard of the way except for a few test boxes, which had special leads and were placed well up the pole.

A young R.E. negotiated all the wayleave difficulties in the Southern District. In after years, as Major O'Meara, he became Engineer-in-Chief (April 1907 to March 1912). I was assured that in London negotiation of the overhouse wayleaves from Cannon Street Station to C.T.O. took all the time of an engineer for nine months. When I hoped he did not suffer a nervous breakdown my remark was taken as sarcasm!

The result so far exceeded expectations that it gave a real impetus to the subject of Continental communication.

(e) *Loaded Cables.*—During 1911 we laid a coil-loaded cable to Belgium, and the next year a continuously-loaded cable was laid by the French Government between France and England.

(f) *Cable Sheath.*—Non-corrodible steel. When supplies can be obtained the usefulness of non-corrodible steel is already demonstrated. For instance, its use on a submarine cable now required would reduce the weight of the cable by 7 tons per nautical mile, giving it also corresponding greater flexibility.

(15) *Synchronisation of Clocks.*—A scheme by which the Post Office undertook to synchronise public and private clocks was perfected in 1913 but its full realisation was prevented by the war.

(16) *Secondary Cells.*—I do not clearly remember who installed the first experimental set of Secondary Cells for working the telegraph circuits at Birmingham. The charging was done through about two dozen ordinary 2-way switches; but I originated the first permanent installation there and following it immediately by application of that system to the new office at Leeds, which comprised a complete design, including standard wiring of the test board and the tables. That was in 1896, and the same year we installed Newcastle and hand in hand Bristol, Cardiff and the C.T.O. The installation of the Central Telegraph Office was completed in 1898, when 772 Secondary Cells displaced 25,000 Primary Cells. As the design of the Secondary Cell System has more than once been attributed to the late Engineer-in-Chief, it may be of interest to note that he did not join the Engineering Department

until Oct. 1898. He was the first Engineer-in-Chief who served as a telegraphist. Major Purves designed the rotary form of switch while I was still in charge of designs.

(17) I feel forced to omit from this review matters that are not strictly telegraphic, even though they are electrical engineering.

(a) For instance, in 1883 we installed "the new electric light" at Glasgow and tried it tentatively at the C.T.O.—no had criterion of the progressiveness of a Government Department, seeing that at that time (or later) Preece was running his own installation at Wimbledon and acting as adviser to the Corporation of London on the subject. It was he who suggested tall standards in the centre of the road for lighting purposes.

(b) But there are electric trucks, band carriers, and a host of other devices—even an electric railway—to bear witness that the Post Office is out for live business procedure.

(18) *Bicycles for Messengers.*—Such a detail as the introduction of the use of bicycles for telegraph messengers in 1897 is not without some interest as an item of organisation. It was probably one of the factors in determining extension of the free delivery radius which took effect the same year.

(19) *Construction.*—(a) I should like to say much about construction, as our system is without any possible doubt the most scientific and the most thorough in the world. Our practice is followed by the railway companies, was practically adopted by the late National Telephone Co. and is recognised as standard throughout the Empire.

I must however, leave the whole subject, with one exception.

(b) *Copper Wire.*—The British Administration led the world in the introduction of the use of copper wire for telegraph open wires. It was a bold step—a stroke of genius. I remember when Preece was retiring telling him that I always felt that to be one of the greatest things he ever did. The old man was evidently pleased. He beamed and replied: "I never had such a devil of a fight in my life!" Remembering the economical idiosyncrasy of the Engineer-in-Chief of that time, I could well believe it!

At first the wire was of poor conductivity and worse strength. To-day, with mild steel wire having a breaking weight of about 24 tons per square inch, that of copper is 28 tons; and that with a conductivity of 100 per cent. of standard. The Post Office specification has been adopted as the British Engineering Standard Specification.

(c) Please let me make one more exception, as a tribute to a dear old friend. The Screw Insulator was the invention of a P. St. Office man. It is known and used all over the world to-day—one of the neatest and most useful of engineering devices. Yet J. H. Cordeaux, who retired as Principal Technical Officer to the Post Office, was a splendid business man—but not really an engineer.

(20) *Standardisation.*—Engineering standardisation is one of the most insistent demands of modern engineering practice. Long before it came to the front the Post Office insisted upon its observance. "Standard" Relays and "Standard" Terminals date from how much over 40 years ago I cannot say, but they represent not so much a stock title as a recognised principle of procedure that has been consistently adhered to and has been of the utmost advantage to the Service.

So too with apparatus generally, as well as with Line stores and construction work. "To British P.O. Specification" is accepted as the high-water mark of telegraph engineering practice.

(21) *British Industry.*—One other merit we may claim—we have made a British industry. Even now British telephone manufacture cannot compare in development with that of the United States, where one concern is at the present time adding 100 acres of works to its existing 220 acres. But to the limit of its response, the British industry is utilised, and encouraged to do more. Possibly the manufacturer would like a better guaranteed regular demand, but this it is more than difficult to give while so much uncertainty prevails both as to probable cost and possible output.

Wireless.—(1) Preece's Electro-magnetic System.

(a) Observation of inductive overhearing between some underground circuits in the neighbourhood of Gray's Inn Road and some near-by overhouse wires first suggested to Preece (in 1884) the idea of inductive wireless. The first experiments across the Solent were promising, and then in 1901 some further experiments between the South Wales coast and Flat Holm—an island in the Bristol Channel—showed the scheme to be practicable. I rather fancy that some preliminary experiments were made by Mr. A. W. Heaviside across the Newcastle Town Moor; but I am not sure whether they were not supplementary.

(b) Early in 1895 the cable to the Island of Mull was broken down, and Preece's system was installed to carry on until the cable could be repaired.

(c) Similarly in 1897, the War Department secured communication without a cable to an outlying island $3\frac{1}{2}$ miles distant.

Some circuits on this system continued to give good service for years after Preece retired.

(2) *Wireless Telephony.*—I wonder how many people know that the British Post Office was the first to work a wireless telephone circuit. It was in 1899 that the need for telephonic communication was pressed for between the Skerries Rock Lighthouse and the Island of Anglesey. Cable had proved extremely difficult to maintain, so Preece decided to try his electro-magnetic

wireless system; and it worked, but the open wires could not be maintained on the rock. The same year we worked wireless telephones between Bally Castle and Rathlin Island on the north coast of Ireland.

(3) *Marconi.*—(a) In 1896 a young Italian came to England with a new telegraphic invention. Whether he had a letter of introduction or not, he soon got into touch with Preece, and found him—not a man with a rival system which had to be defended—but an enthusiastic seeker for any improvement. Preece was like that; I have heard him declare that he would be delighted to take Kelvin, Sylvanus Thompson, Ayrton, and all the rest of them on to his staff at any time. So he welcomed Marconi. Soon he was conducting experiments on Salisbury Plain with success over a distance of $1\frac{1}{4}$ miles. Then, after an interval for development, in March, 1897, they compassed 4 miles. Two months after they communicated between Lavernock Point and Brea Down, a distance of 8 miles. That was May, 1897.

(b) The same year need for development of communication with outlying lighthouses and lightships led to experiments with Marconi apparatus, "but, although signals were successfully transmitted a certain distance, no practical results" were achieved.

(c) In 1900 we got good results between Mumbles Head and Ilfracombe—a distance of 25 miles; and later in the same year we were experimenting between Holyhead and Howth— $56\frac{1}{2}$ miles.

(d) In December, 1901, Marconi, at St. John's, Newfoundland, received a signal from his station in England!

(e) By 1911 it had become practicable for any one to send a telegram from any Post Office in the United Kingdom to a passenger on any Atlantic liner fitted with Marconi apparatus at any time during the voyage between Great Britain and Canada or the United States. Think of it! Ten years after we had just managed to work a distance of 25 miles.

(4) *Other Systems.*—(a) In accordance with our regular practice, however, other inventors were not only not discouraged, they were given every possible encouragement. In 1902-3, for instance, we had under trial wireless systems by

Slaby-Arco
Hozier-Brown.
Maskelyne.
Lodge-Muirhead.

No Wireless syndicate can show such a record as that.

(b) It goes almost without saying that in due course every other system—and indeed every other promising device—has been carefully examined and considered. Names of Inventors that occur are:—

Bela Schaefer,
Fessenden,
de Forrest,
Tosti-Bellini,

besides those of many of our own experts.

(5) *Post Office Control.*—(a) The Wireless Telegraph Act of 1904 gave to the Postmaster General control of the installation and working of Wireless in the United Kingdom; and provided that British Ships in territorial waters must hold a license from the Post Office for installing and working an approved system.

(b) In 1909-10, the Post Office acquired control of all coast wireless stations for ship-to-shore communication. The Postmaster General reported that it was hoped that before long there would be a ring of thoroughly equipped stations round the coast of the United Kingdom and added: "The system . . . is likely to prove of the greatest possible value to shipowners as well as to passengers by sea, and I think that shipowners will be well advised to proceed as rapidly as possible with the equipment of their vessels."

(c) Ever observant of the interests of the "men who go down to the sea in ships," it was on the initiative of the British Government that in 1912 special regulations were made by the International Wireless Conference with a view to prevention of disaster at sea and to the observation of distress calls.

Encouragement of Inventors.—(1) One of the objections raised by the opponents of State Telegraphs was that invention and progress would be throttled. Perhaps in those days they remembered the experience of Sir Francis Ronalds at the Admiralty just after the Battle of Waterloo. About 1816, Sir Francis wished to submit his invention of an electric telegraph to the Admiralty (which then was in control of such matters) but he tells us that, without having seen it or having it described, the Admiralty advised him "that telegraphs of any kind were then wholly unnecessary and that no other than the one then in use would be adopted." He felt little disappointed, as it was well known that "telegraphs had long been great bores at the Admiralty."

(2) Memory of this State Department's treatment may have justified the fears of 1869: but twenty-five years later, the Postmaster-General thought the idea was dead; he referred to it and summed up: "to this contention the progress achieved by the technical Department of the Telegraph Service is a sufficient answer."

(3) Not at all! Twenty-five years later still the notable *Times* Commissioner found it possible to say:—

The Post Office monopoly "has been used with disastrous effect to check and harass the development of the Telephone and of Wireless . . . But nationalisation . . . creates vested interests which oppose progress and prevent the development of new ideas, new inventions and new industries."

I wonder where he got *his* memory from? I challenge him or any competent person to mention a single telegraphic or telephonic invention of the past fifty years which has not received adequate and even generous consideration from this State Department, and would dare even to challenge such a person to point to any administration, State or commercial, telegraphic telephonic or any other "ic" that has more generously or more adequately met its liabilities in this connection.

(4) Not to over-multiply illustrations of the attitude of the Department towards invention, it may be excusable to note that amongst the experiments of one year (1900-1) we tried:—

The Telautograph—an instrument for reproducing actual handwriting at the distant stations.

The Telepantograph—an instrument for transmitting actual drawings to a distant station.

The Telegraphphone—an instrument for recording and facilitating the study of telephonic currents.

The Oscillograph—an instrument for recording the minute effects of undulating currents.

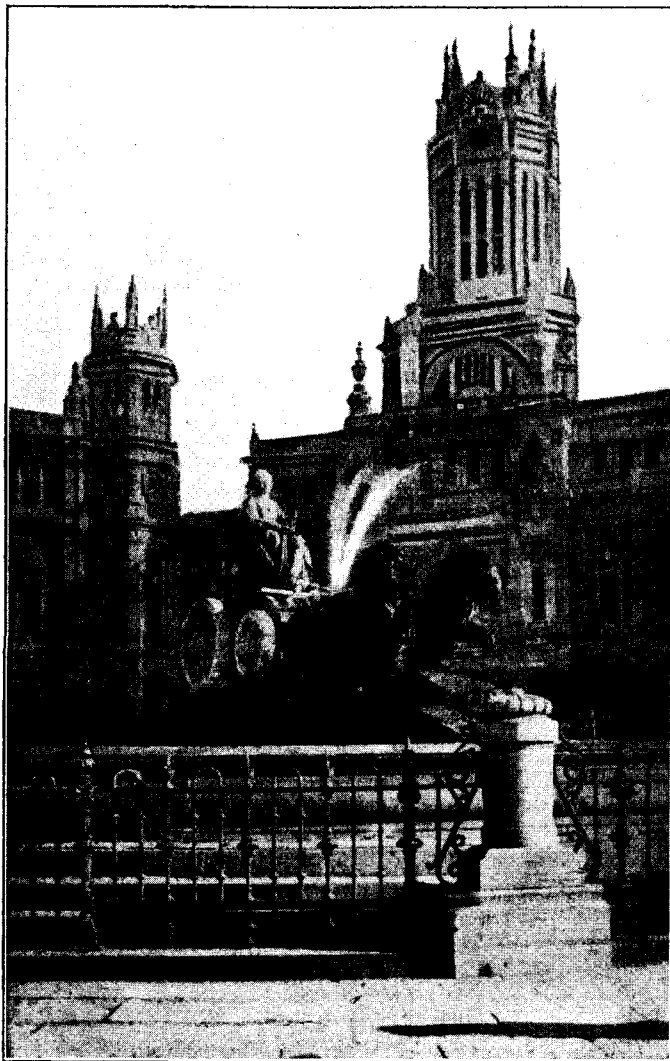
What a curious method of stifling invention!

Here is a list of trials of telegraph systems during another year (1902-3):—

Murray Printing Telegraph,
Buckingham Printing Telegraph,
Mercadier system of Multiplex,
Creed Keyboard Perforator.

Even thus is this "Government machine with its manifold ramifications . . . exerted to restrict and harass any new enterprise."

(To be continued).



HEADQUARTERS OF THE POSTAL AND TELEGRAPH ADMINISTRATION, MADRID.

LONDON TELEPHONE SERVICE NOTES.

Langham Choral Society.—In presenting Berlioz's "Faust" our Choral Society had the good wishes of all lovers of music. The work is one of great merit, and being so seldom sung the opportunity to hear it on this occasion was grasped by a large number of admirers. The difficulties of the work are well known and militate against its more frequent performance even by choirs of long standing. The boldness of the Langham Choral Society in undertaking the work, seeing that this is only the commencement of its second season, called forth the surprise of many. That they were justified in their ambition is established by the success achieved, and the result testifies to the care and enthusiasm which must have been expended by all—Choir, Orchestra and Conductor—in effecting so creditable a performance. The easy and fluent rendering of the choruses in Scene II was particularly noticeable and the clear enunciation throughout by the choir is a point on which they deserve much compliment. The men did exceedingly well in the Easter Hymn, and that item stands out prominently as their best effort on this occasion. The men were unfortunately labouring under the disadvantage of lack of numbers, a factor for which they are not responsible, and which had the effect of dwarfing the merit of their performance. It is hoped that they will not continue to suffer this disadvantage, but in spite of it the Society will undoubtedly occupy a prominent position among other similar societies. The orchestra performed its part splendidly and its rendering of the "Rakoczy March" and the "Ride to the Abyss" calls for special mention. The audience numbered over 2,000 and at the conclusion one heard on all sides comments of real appreciation.

The society now enters on a period of preparation for another work which it hopes to present in February next; meanwhile a most earnest and pressing invitation is issued for additional male voices.

London Telephonists' Society.—Two very useful papers were read by members of the Controller's Office at the November meeting of the London Telephonists' Society, one by Miss A. M. Scott, entitled "Trunk Tickets," and the other by Miss M. H. Knights on the subject of the *London Telephone Directory*. Both papers were of an educative nature, valuable and interesting as affording to the traffic staff an insight into the work of the Controller's Office. One could not help noting the similarity between certain of the difficulties experienced in the Exchanges and in the Office. Both sides were brought to appreciate to some extent the manner in which the shortcomings of one affect the other. An exchange of knowledge between different branches closely associated in a complex organisation makes for efficiency, and for the ease and comfort of all. The Accounts Branch have their troubles with subscribers against whom debits are raised incorrectly through indistinct writing in the preparation of tickets in the exchanges, and from phonetic errors which lead to incorrect particulars on phonogram tickets. The exchanges are troubled by *Directory* discrepancies which result in such request as "Please intercept all calls for 7 lines at once." Papers of this nature do not perhaps attract the largest audience, but their value is not to be assessed from that standpoint.

The members of the Society are looking forward to the December meeting when Mr. M. C. Pink will read a paper entitled "My impressions of London Telephones," by Sadie Worth, Telephone Operator, New York City.

Mr. O'Dell's Paper.—At the meeting of the Institution of Post Office Electrical Engineers (London centre) held at the Royal Society of Arts on Nov. 8, Mr. G. F. O'Dell of the Engineer-in-Chief's Department, read a paper entitled, "The Influence of Traffic on Automatic Design." The paper dealt almost exclusively with the determination of the fundamental principles for the calculation of the number of switches necessary for the traffic which may be anticipated in a particular instance. The apparatus employed in machine switching is costly, and it is therefore essential that its provision should be restricted to the minimum which will give a reasonable standard of service during the period of maximum traffic pressure (the busy hour). The volume of traffic arising during the busy hour is subject to fluctuations from a multitude of causes, small and large, causes which themselves are variable, so that the volume of traffic for a particular busy hour is largely a chance quantity. As a consequence the theoretical methods which have been employed in the solution of these problems depend on the theory of probabilities. Mr. O'Dell instanced the association of the theory of probabilities with games of chance and its use by insurance companies in computing the expectation of life. Mr. Lee, in a well-chosen speech, referred to its use also by bankers in determining the amount of fluid money required to meet the demands of their clients. Doubtless many of his hearers would be glad for someone to apply the theory to ascertain the probability of their banking accounts showing a credit balance at the end of the year!

The method of determining the relation between the number of switches and the traffic by means of artificial traffic was dealt with by Mr. O'Dell. For this purpose drawings are made from a bag of counters. Although this method may give results satisfactory to the theorist, it is feared that a subscriber who complained of inability to obtain connexion through the continued engagement of the switches would hardly be satisfied with an explanation that the adequacy of the number of switches had been tested by a method involving the drawing of counters from a bag!

Mr. O'Dell dealt with the several theories which have been advanced for the solution of these problems, and his paper constitutes a real contribution to the general knowledge of the subject of machine switching.

Mr. Pink's Paper.—The paper entitled "Automatic Telephony in Large Areas from a Traffic Point of View," which Mr. Pink read before the Telephone

Coil Winding.

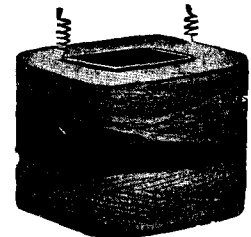
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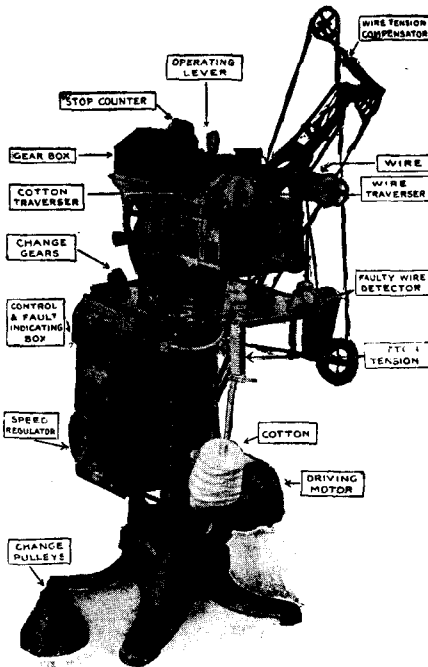
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and Telegraph Society on Nov. 15, attracted a large attendance of members and visitors. Contact with machine switching problems has been the privilege of a comparatively small number of those concerned with London telephones and the attendance at this meeting and at that held by the Institute of Post Office Electrical Engineers a week previously testifies to the desire of traffic officers and engineers to become acquainted with the subject. At the present time attention in London is concentrated largely on the Western Electric Panel system as a result of the decision to instal equipment of that description for the new Blackfriars Exchange in the G.P.O. (South) building.

After referring to a number of traffic problems generally associated with the adoption of machine switching in large areas, Mr. Pink dealt with the special features of the panel system. The subject was a difficult one to present in the short time available, and it was unfortunate that the aid of a lantern was not practicable. With the assistance of diagrams, however, Mr. Pink was successful in presenting his subject in a manner which enabled his hearers to follow him without undue difficulty. For the more complete assimilation of the information which the paper contained one speaker asked that the paper should be printed, and in so doing expressed the common wish. The predominant impression left on the minds of the audience was undoubtedly that a large volume of traffic and engineering problems of varying degrees of intricacy awaited consideration, and required immediate and close attention if the application of machine switching to London is to be a success. The problems are such as to demand an adequate and highly-trained staff, not only for executive work but for individual study. The measure of success which will be achieved in London during the difficult transition period when the manual and automatic systems will be running in parallel is largely dependent on the extent to which this demand is recognised and met.

Machine switching holds out possibilities of an improved service in several respects, but at the meeting emphasis was laid on the good work done under manual conditions in the past and the large part which the manual system must of necessity play in the telephone facilities of London for many years to come. The standard of service given before the War and the general improvement which was then in progress is a matter for congratulation, and it is gratifying to note the appreciable improvement which has and is taking place in recovering the ground lost during the War. Who is so bold as to assert that the machine switching system will rise to the requirements of all emergency conditions as did the manual system in War time? Can these dry bones live?

It will be extremely interesting to watch the attitude of the public towards the two systems while they are working side by side. There is little doubt that automatics, either as we now know it, or, what is more probable, in some form which will be evolved in the course of time, will be the system of the future, and it must be an object of the Administration to take such steps as are designed to secure the favour and co-operation of the telephone-using public for the automatic system. Nevertheless the manual system must not be neglected or despised. It has been one of the wonders of its day. Its accomplishment and its limitations are known, while those of the systems to which it will give place are yet to be proved. Progress demands, however, that we shall go forward wholeheartedly, but, as Mr. Lee counsels, without undue haste, securing the maximum advantages which the development of machine-switching systems afford.

Mr. Pink's paper is a valuable contribution to the subject and general appreciation was expressed at the meeting for the able manner in which it had been presented.

* * * *

At the Investiture held at Buckingham Palace on Nov. 4, the Controller was among those on whom the King bestowed the Insignia of Commander of the Most Excellent Order of the British Empire.

* * * *

By the time these notes appear in circulation it is probable that the Christmas Fair, which Miss Heap is organising, will be over. Its success in attaining the end Miss Heap has in view is assured through the enthusiasm with which it has been supported by the staffs of all exchanges. It is very encouraging that the Queen has given the function her support by presenting a picture for sale at the Fair.

* * * *

Contract Branch.

The Contract Branch negotiated agreements for 5,679 stations during the five weeks ended Oct. 30. The number of stations recovered during the same period amounted to 1,836, leaving a net gain of 3,843 stations.

The esteem in which F. A. Peterson, the Boy Messenger, lately attached to the South-Eastern Contract Branch, was held was shown by the staff on his leaving to enter the Foreign Section of the London Postal Service as a Sorter, when an attache case was presented to him. This boy won the esteem and confidence of the entire staff by his courtesy and willing manner, and much regret was felt at his departure.

Lee Green Exchange.

A social evening was held on Oct. 30, 1920, in aid of the funds of the War Seal Foundation. Mr. W. J. Roberts (Secretary of the Foundation) attended and made a delightful speech. The sum of £18 was realised, which brings the total amount from socials and the buying of seals up to over £100. The Lee Green staff feel proud of their efforts considering their small numbers.

Victoria Exchange.

On Oct. 15 a very jolly social evening was held by Victoria Exchange in aid of the South London Hospital for Women. The Hat Trimming (for gentlemen only) and Bun Eating Competitions caused considerable amusement. An excellent musical programme was provided, and dancing also completed a happy evening. The sum realised for the Hospital was £23 13s. 6d.

The Willow Swimming Club have commenced their winter activities. Their first whist drive, supper, song and dance was held on Oct. 30, and was voted by all "A1," with the request for another as soon as possible.

The prizes were presented by Miss Nurse, and Mr. Pounds made a happy speech. Their presence was greatly appreciated by the staff. The duties of M.C. were ably carried out by Messrs. James and Henshilwood.

Western Exchange.

"Know how sublime a thing it is
To suffer and be strong."

One wonders whether when Longfellow penned these lines he had just attended a happy function, seen a number of men executing the artistic movements of the dance, their faces reflecting health and happiness, and, turning in expectation of seeing the whole reflected in the eyes, suddenly realised that they were sightless. Yet he knew nothing of the great War. He did not know that in the years to come gallant men would rush to face the foe in the most momentous period of England's history, and that many, after having risked all and lost the priceless gift of sight, would return to live in perpetual darkness in order that others might enjoy the light. In truth these men are heroes. In an endeavour to relieve the lot of these blinded men the Western Exchange staff organised a dance in aid of the funds of St. Dunstan's and at which the guests of the evening came from that Institution. It is gratifying to record that the evening was in every way a success and resulted in raising the sum of £10 10s.

The Great Silence has once more come and gone, and if memories of the horrors of the War are now receding, our sightless warriors live on, and a reminder of this, such as that afforded by Western's social function, is well, "Lest we forget." A good orchestra was in attendance and from the first bar to the last kick, fun and merriment were rampant. The scene presented at the height of the dancing was a dazzling one. The pretty dresses of the ladies, with the black coats of the gentlemen for a background, was as a peep into a kaleidoscope.

When half the programme had been completed the company adjourned to the buffet to partake of the many good things thoughtfully provided by the organisers, and thereafter time passed all too quickly, so that at the last it was an effort to break away from such happy surroundings.

The Western Exchange also contributed, by voluntary collections from the staff, £30 in aid of the War Seals Mansions.

PERSONALIA.

LONDON TELEPHONE SERVICE.

The following officers have resigned on account of marriage:—

Miss M. A. SIMS, Assistant Supervisor, Class II, of Gerrard.
Miss M. F. N. CROCKER, Assistant Supervisor, Class II, of Victoria.
Miss A. J. B. PENDER, Telephonist, of Avenue.
Miss P. GITTINGS, Telephonist, of Avenue.
Miss V. M. LADD, Telephonist, of Chiswick.
Miss G. E. RANNER, Telephonist, of Museum.
Miss R. DUNLOP, Telephonist, of Museum.
Miss A. R. A. FURLEY, Telephonist, of Museum.
Miss A. FIDLER, Telephonist, of Paddington.
Miss D. MCNEALE, Telephonist, of Paddington.
Mrs. F. E. GROVES, Telephonist, of Hammersmith.
Miss G. A. PRESTON, Telephonist, of Trunks.
Miss E. ELOE, Telephonist, of Trunks.
Miss M. A. HOBSON, Telephonist, of Victoria.
Miss G. DANIELS, Telephonist, of Victoria.

OBITUARY.

Mr. F. PRESTON, formerly Superintendent of the C.T.O., was unknown to the younger generation. Having entered the Telegraph Service in 1868 at Southampton, he was transferred to the Metropolis in 1873 and passing through the various grades, reached, in 1905, the rank above mentioned from which he retired on pension in 1911.

There is, however, still a very considerable number who were co-temporary with him through many years of his career, and who recall his penchant for verse-making and his aptitude for hitting off a subject with his clever pencil even as far back as the "Scudamore" period.

There was, however, something pathetic, yet tinged with the heroism, of one who always looked life and all its ups and downs fairly and squarely, in the face, to find bequeathed to the present Deputy Controller a few farewell lines headed "Gone Aloft" and commencing:—

"Goodbye, dear friends I've drained the cup,
And put to sea to join the rest."

These I have before me. They are written clearly and boldly, as he ever wrote, the simple document being signed "F. Preston, Electric and International Telegraph Coy., and G.P.O., died.....," a space being left for the exact date, which fell on Nov. 11. How these dear old fellows loved their profession and were proud of it!

Owing to the inclement weather few of his old friends were able to be present at Abney Park Cemetery, but Mr. A. W. Edwards and Mr. Bullard were noted amongst the mourners.

J. J. T.

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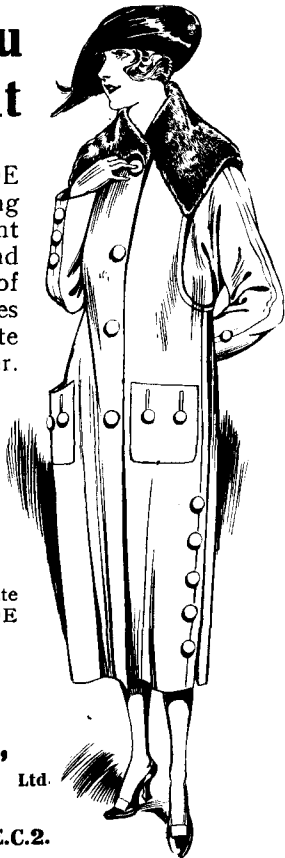
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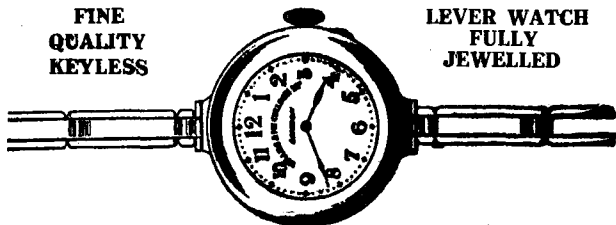
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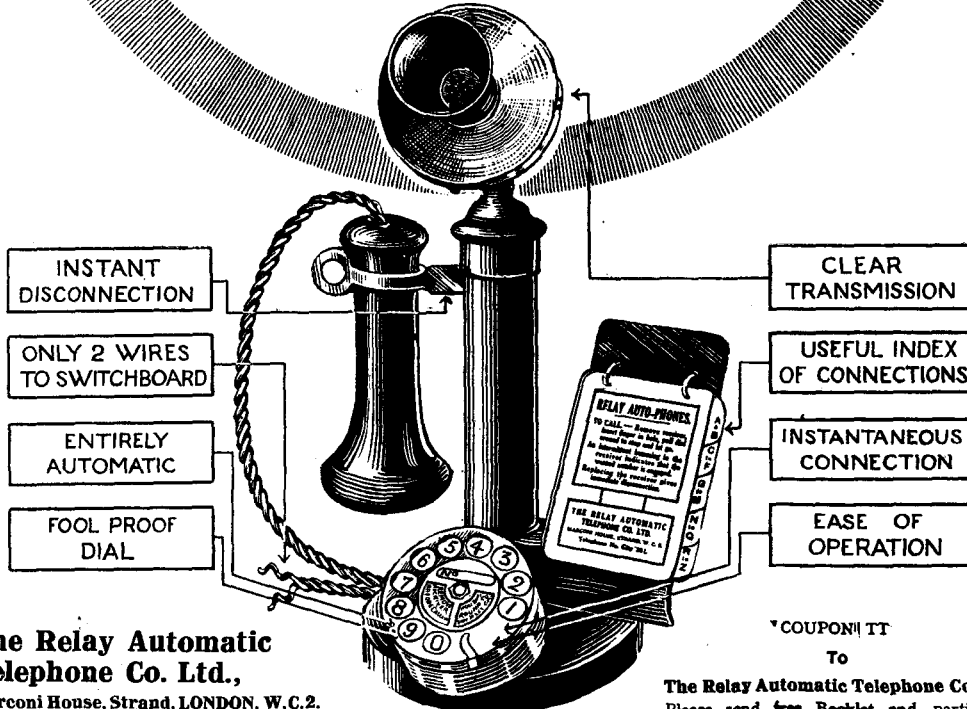
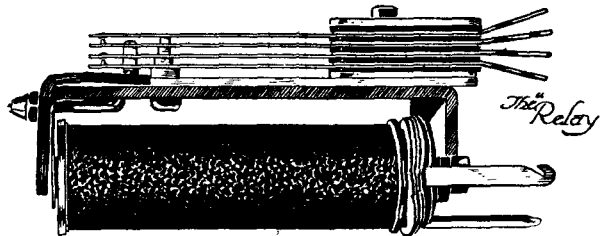
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