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THE POST OFFICE AND THE TELEPHONES.

BY A P.O. OFFICIAL.

[Leading article in Sir Isaac Pitman & Son's monthly magazine *Business Organisation*. Reproduced by permission.]

THE remarkable press campaign which has followed the announcement that the Postmaster-General has adopted the revised scale of telephone charges recently agreed to by a Select Committee of the House of Commons is in striking contrast to the equanimity with which the report of the Department Committee, which framed these charges, was received on its publication in June of last year. Most newspapers then published a full announcement of the new rates proposed but the comments made were rather of an explanatory than an antagonistic nature. It is no secret that the administrators of the Post Office anticipated a good deal of public opposition to the proposals on their first announcement and are surprised that the storm has only burst, in unexampled fury, *after* these proposals have received the approval of a Parliamentary Committee appointed for the very purpose of assuring the public that the increased charges had not been arbitrarily imposed but had been carefully and reasonably framed to meet the financial needs of the situation.

THE ATTITUDE OF THE PRESS.

One cannot but sympathise with the harassed citizen who, after finding his expenses of all kinds soaring to the skies, looks upon the long deferred increase in the cost of his telephone as "the last straw." With the manner in which the subject has been treated by the Press one has less sympathy. It has been unreal, and it has been strongly swayed by ulterior motives. Plentiful space has been provided for the wildest exaggeration and the most obvious misrepresentation on the one side, while the few statements that have been made in defence of the Post Office have been very generally garbled or refused publication. It is easy to see that the supposed deficiencies of a Government Department, engaged in conducting a great national business, have been seized upon as a weapon by means of which the whole principle of the nationalisation of industry may be resisted. It is quite possible, however, to hold that support of a nationalised telephone system does not commit one to any general support of nationalisation as a theory. The telephone system naturally links itself with the other systems concerned in the transmission of intelligence—the telegraph system and the postal system. All three services have, in common, the feature that they must from their very nature be under a general co-ordinated control in order to reach maximum efficiency. They are natural, nation-wide, monopolies and, as such, they have a particular claim to be looked upon and conducted as a national property.

Discussion of the telephone charges has to a great extent centred itself around the question of the efficiency, or inefficiency, with which the Post Office is carrying on the business, but let us leave this important question aside for a moment, for the very cogent reason that even if it were proved that the telephone system requires complete re-organisation and can only be made efficient by handing it over to a commercial company it is manifestly impossible that such a company could carry out such a re-organisation and make it effective, at once. For the next few years, therefore, the service must either be carried on by means of a national subsidy or the necessary additional revenue must be raised by increasing the charges paid by its subscribers.

THE CASE FOR AN INCREASE IN RATES.

The policy of the Government is that the telephone system should be self-supporting; it should not be looked upon as a regular source of profit, contributing to the public revenue, neither should it be a financial burden upon the general tax-payer. Up to the time of the War it fulfilled these conditions. After meeting all charges, direct and indirect, and paying the standard rate of interest on the capital sunk in the undertaking, it contributed to the Exchequer a small annual balance, in the nature of a margin of safety. Revenue and expenditure were practically in equilibrium. It is obvious that this equilibrium has been rudely upset by the great increase in costs of all kinds that has followed the War, and it should be common ground that a substantial increase in the payment made for the service is necessary to restore the balance. Corresponding increases are being, or have been, made by telephone

administrations all over the world. In many cases the proportion of increase is much higher than has been found necessary in this country. In some other countries, such as America, where for various reasons the effective purchasing power of money has not depreciated to the same extent as in Great Britain, a smaller *proportionate* increase has sufficed.

METHOD OF REVISION.

The Postmaster-General, in agreement with the Government, deliberately abstained from proposing that an increase in telephone rates should closely follow the termination of hostilities. It was felt that those engaged in the reconstruction of business of all kinds had great financial difficulties to face and that, in the exceptional circumstances, the Exchequer might properly be called upon to bear some temporary loss in connexion with the public telephone service. The revision now announced has been the subject of investigation in great detail by a Departmental Committee of accounting, engineering, and commercial telephone experts, and, as already mentioned, the conclusions of this committee were concurred in, after careful consideration, by a Select Committee of the House of Commons, representing all political parties, and with full powers to call evidence from all quarters. On no previous occasion have proposals in connexion with telephone charges been submitted to the House of Commons or to any outside authority. The National Telephone Company and the other private companies in whose hands the telephone business of this country has at various times been placed, altered the rates at their pleasure. In many matters of much greater financial moment the public has to submit to the dictation of purely private interests. We are only too well accustomed to the idea that a few individuals may meet together in secret and settle, largely from the standpoint of their own personal profit, what the public shall pay for its wheat or its beef, or what industry shall pay for its steel or its copper, or cotton, or oil. Such operations are quietly approved in many quarters from which much bitter outcry on the subject of telephone rates is now proceeding. In view of the exceptional care which has, on this occasion, been taken to safeguard the telephone-using public from any arbitrary or irresponsible action, much of this outcry can only be classed as artificial or void of perspective.

AMOUNT OF AVERAGE INCREASE.

The new rates would bring in a revenue about 67 per cent. higher than that produced, *for the same amount of service*, by the existing rates, which already include an increase of about 8 per cent. made during the War. Compared with the strictly pre-war rates the total increase is therefore about 80 per cent. The Post Office anticipates that this increase will lead to a reduction of traffic, without appreciable inconvenience to subscribers, which will probably reduce the theoretical revenue to an actual figure about 57 per cent. in excess of the revenue at the old rates. These figures represent the *average* increases in the charges made to subscribers. Their accuracy can be demonstrated, and they are not invalidated by the production of selected cases in which the proportionate increase is much greater. The overall percentages compare favourably with the increases experienced generally in industry and business of all kinds since the War. The calculations on which they are based make full allowance for the fact that the pre-war portion of the telephone plant was built and installed at prices much lower than those now ruling. No attempt has been made to set up, at the cost of existing subscribers, a depreciation account which would be adequate to replace the pre-war plant at the present level of costs, when it becomes due for renewal, as it is hoped that present high prices will not be permanent.

ANOMALIES OF EXISTING TARIFFS.

The Post Office has *inherited* a system of tariffs which is full of inequalities and which, but for the War, it would have attempted to simplify and remodel at an earlier date. The existing diverse charges have been built up, largely as matters of expediency, during the chequered career of telephone services in this country, which has resulted from the want of a settled policy on the part of successive Governments. In the early days of telephony many private companies were licensed to carry on the business. Ultimately these fused into one company working under a licence limited as regards time, and interfered with, in its later years, by competing systems set up in various municipalities and in the Post Office itself. It was only two years before the War that the whole control was vested in the Post Office and the way was made clear for the shaping of a truly national system on uniform lines, a work which can only be carried out by several years of well planned and consistently directed effort. There is, therefore, great present disparity between the cost of providing the service and the charges made for it in different places and to different groups of subscribers. For example, some subscribers are making calls at a cost of less than $\frac{1}{8}$th of a penny each, while others are charged a penny per call; the cost, to the Post Office, of providing the service being exactly the same, per call, in each case. Similarly, there are many trunk circuits of only three or four miles in length, providing connexion between adjacent local areas set up in the days of the National Telephone Company, for which a charge of 5*d.* (4*d.* trunk, plus 1*d.* local) is now made, while in other cases communication over local junction circuits, twelve or fifteen miles in length within these areas, is provided at a cost of 1*d.* or 2*d.* per call. Such conditions call urgently for reform.

MAIN ALTERATIONS IN PRINCIPLE.

(1) *Abolition of the "flat rate."*—The flat rate is a single inclusive annual payment which covers the whole of the local telephone service required by a subscriber, *i.e.*, it includes the installation and maintenance of his telephone line and instrument, and the operating and connecting of all calls which he originates. Only about 20 per cent. of Post Office telephone subscribers are at present paying flat rates. This rate is a survival from the early days of telephony, when lines were few and calls infrequent. In its origin the flat rate was not a "tariff" at all. The mere survival of the word "subscriber" shows that it was regarded as a "subscription" for the possession of a privilege, in the same way as membership of a club, rather than as payment for the supply of service to a *consumer*. After telephones began to play an important part in business all telephone administrations wished to get rid of the flat rate, but many have been forced, by pressure of various kinds, to the alternative of juggling with it by trying to circumscribe its application and to adjust it to continuously higher averages of service. The history of such attempts is one long record of failure; it is obvious that no "subscription" system can stand permanently side by side with a "consumer" system. The apparent simplicity of the flat rate has made it fairly popular among business men who have not had occasion to study its results or to consider its equity. Its abolition is hotly opposed by certain subscribers who are large users of the system, and, in view of this, it is necessary to state emphatically that under present-day conditions the flat rate violates the first principles of commercial equity. The clientèle of the telephone system still includes great numbers of subscribers who do not use their telephones to anything like the maximum possible extent, and the extension of the service among such small users is one of the main objects of all telephone administrations. Under the flat rate the same payment is exacted from all users, independent of the amount of service rendered to them, with the inevitable result that the largest users obtain a great deal more service than they pay for, while the smaller users are charged for more service than they receive. Even among flat rate users themselves the amount of service taken varies enormously; the average for the whole country is 3,000 calls per annum, but some subscribers, who receive few incoming calls and whose places of business are open for many hours each day, are now making calls at the rate of 35,000 or more per line per annum. It is clearly impossible to establish a flat rate tariff to cover such cases as these, in which the cost to the Post Office, of giving the service, may exceed

£250 per line per annum. The movement against the flat rate, on the part of telephone administrations, has been world wide, and has been specially directed towards it abolition in large business communities; in this respect Great Britain has lagged behind the leading cities of America, where it was abolished several years ago. A great volume of testimony in support of the action now taken by the Post Office could be produced, and the false analogies frequently cited in support of the principle of the flat rate could easily be exposed, but it will be sufficient to quote here a recent summing-up of the subject by one of the leading telephone authorities in America who states that, "wherever and whenever the matter has been carefully and intelligently considered the flat rate has been condemned." Its abolition will produce an immediate and noticeable improvement in the service by reducing the troubles and delays due to overloaded lines.

(2) *Abolition of the "measured rate."*—The term "measured rate," as here used, means a fixed minimum charge for the provision of the telephone, together with the right to originate a specified number of calls, and the sale, in advance, of additional calls in blocks, at a rate decreasing as the number of calls contracted for increases. This type of tariff was originally devised to remedy the manifest inequalities of the flat rate, but its success, from that point of view, is only partial. The development of the technical art of telephony has introduced devices, and traffic handling methods, which make it possible to deal with all calls of similar character at a uniform speed, and in a uniform manner. It costs no more to handle an occasional call, from a small user, than it does to handle a call from a busy user whose line is heavily loaded with traffic. Actually the expense involved per call is liable to be greater in the case of the large user for two reasons, first, because the more continuous engagement of his line leads to a higher proportion of failures of incoming calls for his number, with consequent loss of revenue, and secondly, because large users are generally business men whose calls are concentrated in the business hours of the day and go to swell the "peak load" which is one of the main elements of expense in an exchange system. These considerations more than balance the slight economies in accounting, &c., introduced by dealing with large numbers of calls made by one subscriber.

Since, therefore, it costs just as much to deal with a call from a large user as from a small user, and since the charge per call is, in the Post Office system, the actual cost of the call, without any addition for profit, it follows that the usual business principle of making "a reduction on taking a quantity" is not applicable, and a sliding scale of message fees favouring large users would have no valid justification.

(3) *Adoption of the "message rate."*—By the term "message rate" is meant a uniform charge per originated call applying to all subscribers alike, and independent of any consideration of the total number of calls which each originates. It will have been gathered, from what has been said above, that this is considered to be the only system which can be equitably applied to the conditions in which the Post Office is carrying on the telephone business.

The main charges fall into three portions:—

(*a*) The "Installation Rental"—covering the provision and maintenance of a subscriber's line and apparatus. The sum charged annually is calculated to recoup the cost of supplying, maintaining, and when necessary, renewing the telephone instrument, the line to the exchange, and the small portion of the exchange equipment required for the connexion of the line. In order to lighten the cost as much as possible to the small user, whether in business premises or residences, the addition usually made in order to guarantee payment for a certain minimum number of calls, whether made or not, has been omitted. Payment of message fees (see under (*b*) will only be required in respect of calls actually made, however small their number may be.

(*b*) The "local message fee"—1½*d.* for each originated call. This covers the cost of operating, and the cost of providing and maintaining all the switching plant at the exchange and the junction circuits and equipment required for intercommunication with subscribers connected to other exchanges in the area covered by the local fee.

(*c*) "Trunk fees"—based upon mileage beyond the radius of local intercommunication. These fees cover the cost of the lines, exchanges, and operators, proper to the trunk system, and are charged additionally to the local fee for each call.

It should perhaps be mentioned that the shorter trunk circuits are operated in exactly the same manner as local area calls. It is only in the case of "long-distance" calls that a subscriber is requested, after making a call, to hang up his receiver and wait until the operator informs him that the trunk is at his disposal.

(4) *Mileage basis of charge.*—Before the year 1912, when the local telephone systems of the country were transferred from the National Telephone Company to the Post Office, it was necessary to have a system of local areas, within which the National Telephone Company operated, and to limit the function of the Post Office Trunk System to the provision of communication between exchanges in different areas. This, as already mentioned, necessarily led to considerable inequalities of charge, as many inter-area circuits, for which trunk fees were charged, were much shorter than some of the local junction circuits within the areas. The remedy of this anomaly was put in hand shortly after the transfer, but had to be suspended on account of the war. It has now been embodied in the new system of rates and all communications will be charged for on the simple mileage basis given in the schedule of charges. The local fee (1½*d.*) will cover all calls within a radius of 5 miles from the exchange, and in London the range of local fee communication will be further extended to give all exchanges, within 10 miles of the centre, local fee communication with the whole central area of the city. In Glasgow, Manchester, Liverpool and Birmingham a corresponding extension will be granted to all subscribers within 7 miles of the centre. For these extended facilities an additional charge is made of £1 per annum in London and 10*s.* per annum in the other cities mentioned.

COUNTING THE CALLS.

The favourite journalistic statement that a "horde of new officials" will be required to enumerate the calls made by former flat rate subscribers is based upon complete misapprehension. More than 80 per cent. of existing subscribers already pay in accordance with the number of calls they make. The electrical meters used for the purpose already exist on all the lines at large exchanges and as a matter of fact the calls made by flat rate subscribers are already counted in just the same way as the others. The operation, which consists in the mere pressing of a button at a certain stage in the connexion, is so simple that it is more economical to make the operator follow the same routine for all calls than to ask here to discriminate in the treatment of connexions asked for by different classes of subscribers. The cost of regularly reading the meters and rendering accounts on the basis of calls, to subscribers now on the flat rate, will be insignificant in comparison with the additional revenue derived from the equitable system of charging for the service given.

The statement that these subscribers will themselves be involved in great expense in making a counter check is also fallacious. Very few subscribers who now pay according to their calls take the trouble to do so. They trust in the accuracy of the record made at the exchange, and the Post Office is always ready to show them the details of the whole operation and to demonstrate the efficiency of its arrangements for enumeration. When one bears in mind the abundant opportunities which generally exist

for the use of a telephone outside the knowledge of the responsible subscriber, the number of complaints or disputes is remarkably small.

CONSIDERATION OF THE SMALL USER.

It is not easy to speak of the "encouragement of the small user" at a time when the costs of all kinds of services are at their present level, but it can at least be said that the Post Office fully realises that the future development of the Telephone Service is largely dependent upon the attraction of new subscribers whose initial use will be small, and that it has taken every possible step to reduce the payment by such subscribers to a minimum. The frequent statement that the Post Office has shown a callous disregard of the future of the telephones, by setting up a scale of charges prohibitive to small users, is quite devoid of foundation. The new tariff will help small users—

(1) by making the large user pay the fair charge for the service he obtains, thus enabling the small user to be served at cost price.

(2) By abolishing the minimum charge for calls, whether used or not. The Post Office is taking considerable business risk in this connexion but it trusts that sufficient calls will be made to cover the heavy cost of switching plant which has to be installed in readiness for service, and which the payments received as message fees have to cover.

(3) By the system of quarterly instead of annual advance payments, which will reduce the initial outlay and spread the charge more evenly over the year.

THE FALLACY OF EXTREME CASES.

The great anomalies in the existing rates make it particularly easy to make a public parade of selected cases in which the proportion of increase is far in excess of the averages already quoted. It is obvious from what has been said above, that the cases frequently cited to show increases of 300 or 400 per cent. are perfectly genuine. A subscriber who goes on making 30,000 calls per annum on one line will in future have to pay about £187 a year, which is more than 9 times the present London flat rate tariff of £20. But the meaning of this is simply that such an individual, after the first 2,000 calls, is now getting the whole of his service free, or, more correctly, he is getting it at the cost of his fellow subscribers and the general taxpayer.

Equally misleading and extravagant cases could be quoted on the other side. For example, a subscriber at Edgware at present pays 5*d*. to ring up Central London or even to ring up the adjacent localities of Harrow or Finchley, and *vice versa*; a subscriber in Glasgow pays 5*d*. to ring up Paisley, and a subscriber in Manchester pays 5*d*. to ring up Oldham or Ashton-under-Lyne. *All these charges will in future be* 1½*d*. The subscribers on no less than 30 exchanges outside the London County Council boundary, who now pay a fee of 2*d*. per call for all communications outside their own exchanges, will in future be charged only 1½*d*. for all calls to exchanges in Central London (10 miles diameter) as well as for calls to all exchanges within 5 miles of their own. It would be equally reasonable to attack the Post Office because, at a time when revenue is deficient, it is wasting money by making these reductions.

THE SUGGESTION OF AN EQUAL OVER-ALL INCREASE.

Large users are pressing upon the Postmaster-General the alternative of raising the necessary additional revenue by making a uniform percentage increase on all the present charges. Such a course would enable these large users to continue to receive service at the cost of other people who would pay more than their fair share. It will be recognised from what has already been said about the inequality of the present charges that such a course is impracticable. It would indeed be utterly unprincipled. It was perfectly obvious to the Post Office that, before the large additions necessary could be made to the rates, it was essential that their basis should first be made equitable, as between one part of its clientèle and another. Now that an equitable adjustment has been framed it will be easy and convenient to deal with future changes of tariff by a general percentage adjustment. Let us hope that the future trend of costs will permit such adjustments to be in the *downward* direction!

REDUCTION OF EXPENSE BY DEVELOPMENT.

An argument frequently encountered is that the Post Office should seek its additional revenue by development of the system and not by raising its charges. This argument is brought forward by business men who are applying the common principles of their own business to a business of quite a different character, the governing conditions of which they do not understand.

Development, which is of the nature of technical progress is, of course, a factor which has in the past operated powerfully in reducing the cost of telephone service and which will certainly continue to operate in the future. But the kind of development represented by mere increase in the number of subscribers does not reduce the cost per line or per call. It brings in certain economies which are always a feature of extended business and of mass production, but the savings introduced in this way are neutralised by the increased technical complexity of the switching plant and of the operating arrangements required to provide intercommunication among a large number of subscribers. The technical features of the service which bring about this result are too complex for description in a short general article, but the *fact* is demonstrated by the experience of all telephone administrations. For example, the accounts published by the late National Telephone Company show that the expense per telephone station remained practically constant through years which witnessed great expansion of the system. Another fact which the public can readily verify for itself is that in all countries telephone rates have hitherto been higher in large cities, where the number of subscribers is great, than those charged in less populous towns and rural areas where the amount of development is smaller.

THE INFERENCE OF INEFFICIENCY.

Space does not permit this question to be dealt with here. Much might be written to explain the task of the Post Office when a congested and largely obsolescent telephone system was placed in its hands in 1912; the steps taken to reconstruct and extend it; the inadequacy of the time between the transfer and the outbreak of war; the part taken by the Post Office staff in the war and its effect upon the telephone system; the extreme difficulties and delays associated with post-war reconstruction from which the Post Office, and the contractors upon whom it depends for the supply of relief plant, suffer in common with the general industry of the nation; the improvements effected since the early days of the Armistice; and the comprehensive and scientifically sound plans upon which the future development of the telephone system has been mapped out and is being energetically pressed forward. It could be shown that the proposed increases in rates compare favourably with those which other administrations abroad are being forced to adopt, and compare favourably with the great increase in expenses of all kinds which has fallen upon the telephone organisation. It can fairly be claimed that there is no evidence in all this of inefficiency and that on the contrary the Post Office staff represents an exceedingly efficient body of public servants who work much harder and more disinterestedly for the common good than do most of their critics and detractors. It may be that the mind of the public has been so far abused upon this subject that it can only be reassured by the appointment of a Royal Commission to investigate the whole conduct of the business. The Post Office telephone department would warmly welcome such an opportunity of submitting itself to fair and intelligent investigation, with the one reservation that much time and energy would thereby be deflected from its present and pressing labours in the work of reconstruction and progress.

THE BAUDOT—XVIII.

By J. J. T.

Upon the end of the axle X^1, which projects from the receiver casing is fitted, friction tight, a metal sleeve S (Fig. LIII, see also Fig. XLIX), and on to this sleeve is *fixed* the impression wheel V^1 (Figs. XLIX and LIII, &c.). The periphery of this wheel is equidistantly grooved to the extent of 31/40 by, 31 slots, corresponding to the number of slots upon the combiner discs T, T^1 (Fig. XLIV, &c.). The remaining 9/40 of its circumference presents an uncut edge. At the *back* of V^1 upon the axle X^1 (Figs. L and LIII), is firmly fixed a powerful catch E, by means of a binding screw *e* and to the back of V^1 is fitted a powerful steel spring-clutch C which engages with the slot cut in the catch E (Fig. L). This forms the mechanical union between X^1 and V^1 and by means of which the latter rotates. Should an obstruction to the movement of V^1 and its auxiliary mechanism present itself, damage to the apparatus would be prevented by the shock of sudden stoppage being absorbed by the clutch which would release E permitting the latter and the axle X^1 to rotate free of V^1 and its appurtenances.

Fitting easily upon the sleeve S (Fig. LIII) is another sleeve, B. To the extremities of this sleeve are fitted (*a*) at the outer end the typewheel W and (*b*) at the inner end a "spider" form of lever, known as the inversion lever A (Figs. LXIX and LIII). Thirty-one fortieths of the typewheel W are occupied with engraved letters and figures or letters and signs alternately placed thus, A 1 E 2 Y 3, &c. Each figure or letter, therefore, only occupies 1/80 of the circumference. There are actually 29 letters, and 29 figures or signs, the remaining space being occupied by two blanks respectively used as letter or figure spaces or shift keys. As with the impression wheel so with the typewheel, the remaining portion of its circumference presents an uncut edge affording sufficient space for the clearance of certain moving parts when actual printing is not taking place.

The typewheel W (Fig. LIII) is fixed to the shoulder *a*, *a*, of the sleeve, B, B, by means of three screws, two *y*, *y*, of which only are shown. A fourth screw, Y serves, together with its washer to maintain V^1, W, &c., in their position on the axle X^1. Ovoidal apertures through the face of W permit certain minute adjustments of W upon the shoulder *a*, *a*, according to whether movement to the right or left is needed to give more or less accentuation to one side or the other of the characters to be printed. This position obtained the screws *y*, *y*, are firmly screwed home.

When the typewheel W, and the lever A are fixed upon the sleeve B (Fig. LIII) they complete what may be considered as the typewheel combination. This as one solid piece may now slide over the first sleeve S, and when pressed into position against the *front* of the impression wheel V^1 the "spider" A should take up its position on V^1 in the following relation to the inversion plates *a* and *b* which are fixed upon it. The two short prongs of A fit easily between the claw-like openings of respectively *a* and *b*. These plates are capable of movement on the axes of the counter-sunk screws which bind them to V^1. At the same time the longer prong *c* of A fits in between the limiting studs 1 and 2. The limiting angle of movement permitted to *c* by these studs is $4\frac{1}{2}°$. The prong *c* is sloped on both of its sides to a hardened steel point and by reason of a small lever *f* pivoted on B, aided by a spiral spring the entire lever A is thus held in position either against stud 1 or 2. The lever *f*, its spring and holder B are also permanently fixed to the front of V^1, and the inversion plates *a* and *b* are so arranged that a portion of either one or the other must intrude itself upon respectively the 14th or 31st slot of the impression wheel V^1, thus partly

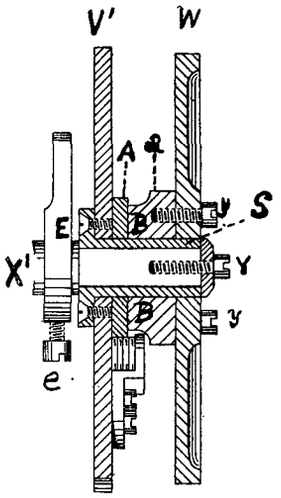


Fig. LIII.

closing the gap. If then the tooth of the impression cam be released in time to engage itself with the fourteenth slot—which should happen when the fourth electro-magnet of the receiver is energised—the inversion plate *a* would be thrust out of the tooth and given a twist in the direction of the arrow (Fig. XLIX) *c* being forced under *f* and thrown against stud 1. If the fifth electro-magnet were energised the impression cam would engage with the 31st slot when the inversion plate *b* would be forced back, the position of *c* reversed and the inversion plate *a* would again obstruct the 14th slot ready for the next letter-shift. The dotted lines at D show the angular movement of *c* which as already stated is $4\frac{1}{2}°$. This means that as the *typewheel* W *actually forms a solid part of the lever A*, both being fixed to the sleeve B, which slides *on to the sleeve S*, therefore when the angular displacement of the "spider" A by $4\frac{1}{2}°$ takes place the *typewheel* W itself has moved an equal distance in relation to the impression wheel V^1, *i.e.*, 1/80 of the periphery of the typewheel.

The wheel V^1 has, in turn, a definite and fixed position upon the axle of the receiver, which position having been determined by previous adjustment is finally fixed by means of the catch E and the binding screw *e*. The clutch C on the back of V^1 (Fig. L) continues the relationship and the engagement of the inversion-spider lever A (Fig. LXIX) carries on the mechanical harmony and conveys it to the impression wheel. The mechanical relationship desired and by this means attained is that Ca (Fig. LI) shall be released on the receipt of any given combination of signals, at just that particular fraction of a second of time at which the typewheel shall be in the correct position to print the equivalent letter or figure.

(*To be continued.*)

HOLIDAYS.

Mr. J. W. Fewtrell, of the Engineer-in-Chief's Office, is arranging a party to Switzerland, to leave London on June 3 and to arrive back on Sunday evening June 19. The cost from London to Meiringen and back, including hotel accommodation, will be £19 10*s*. Mr. Fewtrell will be happy to give further particulars.

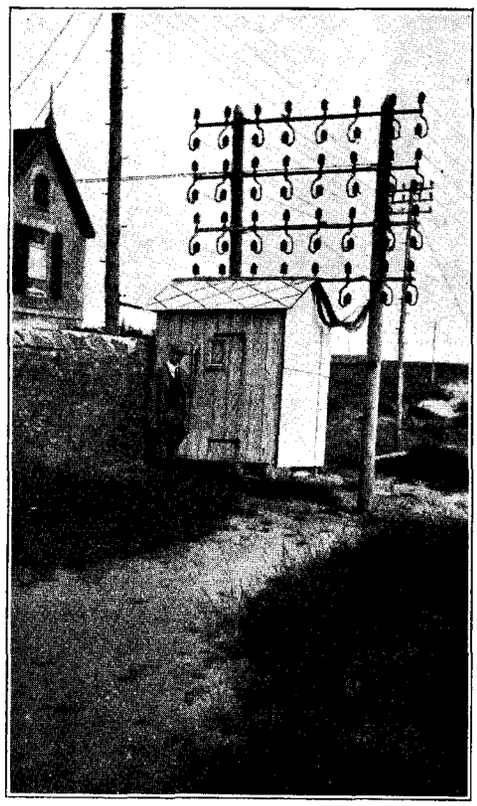
WHERE THE WIRES DIP INTO THE SEA.

THE place where the land lines step down from their poles to dip under the ocean must always excite the sentimental if not the technical attention of each one of us interested in the twin crafts of telegraphy and telephony, and especially those of us who are closely connected with long distance lines, including Anglo-Continental communications. To such it is thought the accompanying eight photographs will appeal, for here may be seen some typical submarine cable huts as erected (1 to 4), on the French coast, and (5 to 7) on the English coast.

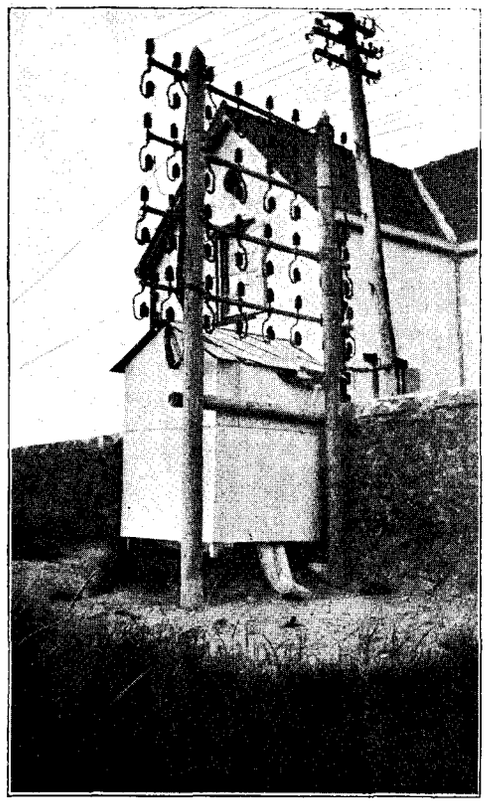
Nos. 1 and 2 show back and front views of the Audresselles cable hut, of comparatively recent construction, one which in fact became active during the late war period. It is probably the last constructed landing place of an Anglo-French submarine telegraph cable as in contrast with Gris Nez (3 and 4) to which spot the very first English Channel cable was laid from Dover in 1851 under the supervision of the brothers J. W. and Jacob Brett. It is not maintained by the writer that the present hut is the identical building of 1851 !

A cursory glance would at first sight rather impress one with the comparative frailty of this type of French cable hut, but the proof of the pudding is evidently in the eating thereof, for both buildings, to the writer's knowledge, have effectively withstood scores and scores of storms with proved success even though the overhead wires have at times utterly failed.

The English cable huts, Birling Gap (No. 5), St. Margaret's, Dover (No. 6), and Dumpton Gap, near Broadstairs (No. 7) have a look of greater stability and permanence, which is a feature of most of these buildings around the

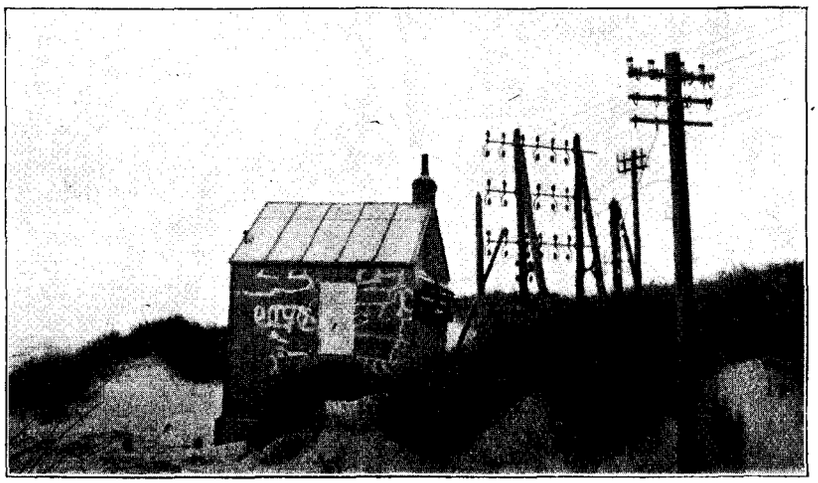


(1) AUDRESELLES (FRANCE) SUBMARINE CABLE HUT (FRONT VIEW).



(2) THE SAME (BACK VIEW) SHOWING EXIT OF CABLE TOWARDS SHORE.

(3) GRIS NEZ CABLE HUT.

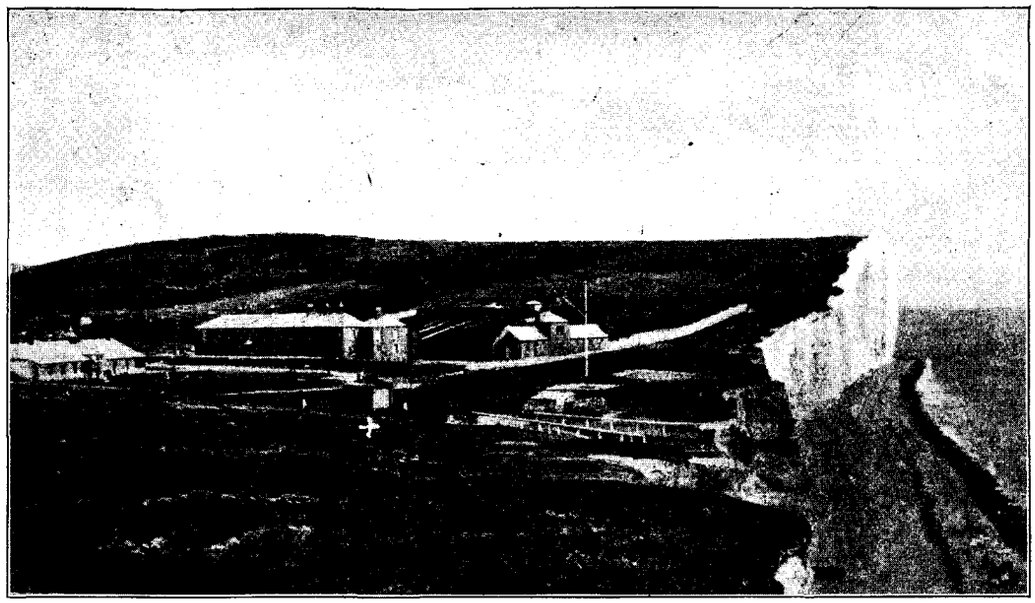


(4) ANOTHER VIEW OF GRIS NEZ HUT. NOTE THE DIFFERENT METHODS OF LEADING IN FROM OVERHEAD IN THE TWO FRENCH HUTS. AUDRESELLES IS THE MORE MODERN, AND THE LAYING OF THIS CABLE WAS A WAR-TIME MEASURE.

coast of the British Isles. The nature of the two coastlines, French and English, also offer pictures of contrasts, the sand dunes of the Audreselles district contrasting with the chalk of the Kent and Sussex cliffs.

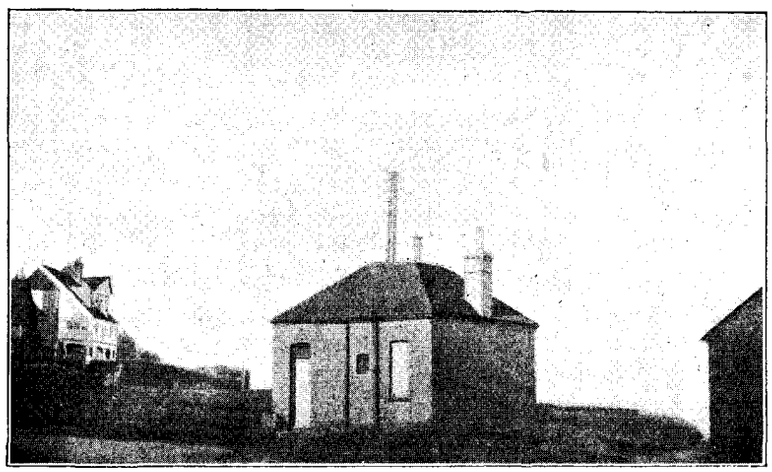
All the land wires led into the St. Margaret's cable hut on the English side are on the underground system. Only the war prevented the complete extension of this method of construction to other routes and even in the latter cases post-war construction is gradually recovering ground. It is confidently hoped that before very long all Anglo-Continental land lines in England will be of underground construction, and that, in addition to the higher efficiency thus obtained and the comparative immunity from weather faults, the aesthetic eye of public critics will be less and less offended by the sight of poles and wires across the landscape!

During hostilities it became necessary to have a watcher on duty day and night at one of these huts. It speaks volumes for the endurance and capacity of the lower ranks of the Engineer-in-Chief's Department that a telegraphist-lineman carried out the necessary duties with faultless courage, on stormy nights the waves sometimes washing completely over the hut; at calmer times enemy air-craft dropping numerous spherical objects in the near neighbourhood.



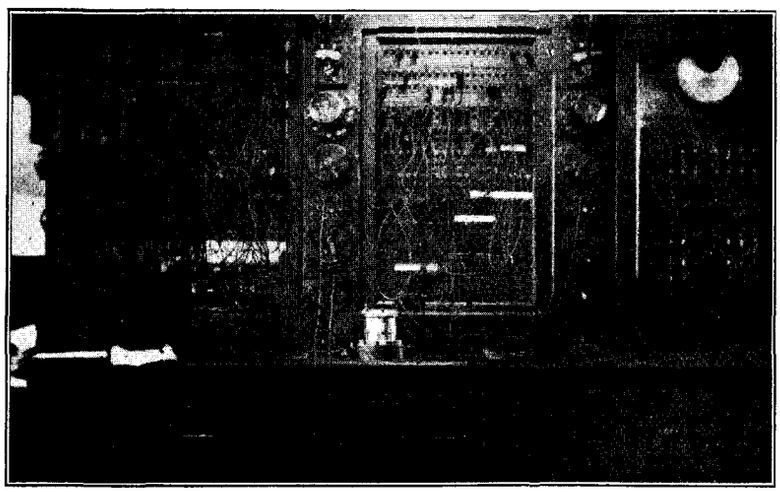
(5) BIRLING GAP SUBMARINE TELEGRAPH CABLE HUT (NEAR BEACHY HEAD).

(6) ST. MARGARET'S SUBMARINE TELEGRAPH AND TELEPHONE CABLE HUT, NEAR DOVER.



(7) DUMPTON GAP SUBMARINE TELEGRAPH CABLE HUT, NEAR RAMSGATE.

Fig. No. 8 shows the Cable Room test box through which so many of the war-time Anglo-Continental circuits passed and in which office many of them terminated. It was through this test box and by way of two of the submarine cable huts here shown that an emergency telegraph circuit between London and Malta, *via* France, Italy and Sardinia, was made up, at a time when the Mediterranean cables were "much disturbed by hostile action." J. J. T.



(8) THE ANGLO-FOREIGN (CABLE ROOM, LONDON) TEST BOX OF THE FOREGOING AND MANY OTHER FOREIGN CABLES, SHOWING THE MULTIPLICATION OF WAR-TIME EMERGENCY AND OTHER CROSS-CONNEXIONS.

REVIEW.

"*Sindri.*" (*Reykjavik, pp.* 48).—We have received the first number of an Icelandic magazine entitled *Sindri*, which we take to mean "Sparks." It is the organ of a technological society in Iceland, or rendered literally, work-knowledge-fellowship, and is edited by Otto B. Arnar, at one time editor of *Electron*, the Icelandic telegraph and telephone journal. Amongst the articles are a sketch of the life of Oersted, with an abridgement of his "*Experimenta circa effectum conflictus electrici in acum magneticum*," first published in 1820; a sketch of the history of Letters Patent from the Middle Ages to the present time, and papers on mining and gas lighting. The magazine is well got up and illustrated with photographs, and is altogether an enterprising and interesting production.

The
Telegraph and Telephone Journal.

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

Editing and Organising Committee - - - JOHN LEE. J. J. TYRRELL. W. A. VALENTINE. J. W. WISSENDEN.

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at 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. MARCH, 1921. No. 72

NO CHARITY REQUIRED.

WE imagine that any unsophisticated person who turned over the newspaper files of the last few months would carry away the impression that a very real and widespread indignation existed in this country on the subject of the new telephone rates. Not only would it appear to him that the great London and provincial daily papers and the journals published weekly in the chief country towns were almost unanimous in condemning those rates, but he would find even such papers as the *Grocers' Journal*, the *Sunday Sportsman*, the *Shoe and Leather Record*, the *Furniture Record*, and papers unheard-of by the lay reader, taking up the cudgels on behalf of an oppressed public. He might be excusably ignorant of the precise meaning of the expression "Telephone Ramp," but such captions as the Telephone Iniquity, the Telephone Scandal and Telephone Tyranny would leave little doubt in his mind that something in the nature of an injustice was about to be perpetrated on the telephone-using public.

If, however, our unsophisticated newspaper reader could be enlightened as to the true inwardness of all this seemingly white-hot indignation, he would perhaps be undecided whether to wonder most at the power of the Press or the marvellous unanimity with which that power can be employed in the interests of a limited section of the public. He would learn with surprise that the flat rate subscriber represented only one-fifth of the telephone users, and that to maintain that rate, loudly proclaimed to be indispensable to the interests of the "business man," either the other telephone subscriber must be overcharged or the burden must fall on the taxpayers—with what propriety may be easily calculated when it is remembered that probably not more than one-tenth of their number are telephone subscribers. He would learn also that the clamorous flat rate subscriber does not include in his numbers some of the largest users, who pay at the private branch exchange rate. But what we think would astonish him most would be the knowledge that the indignation of the small user was being successfully fomented to combat his own interests. This to our mind is where the disingenuousness of the Press campaign is most gross and palpable. It is obvious that telephone rates must be raised to cover the enormously increased cost of providing the service, which have resulted from the war and its sequelæ, and to do this the fair and logical principle has been adopted of making each subscriber pay strictly according to use. The small user will pay on the average about 50 per cent. above the present rate—an increase infinitely less than that he pays for almost every service or commodity with which he is supplied by private enterprise. And yet the champions of the flat rate subscriber in the Press have almost persuaded him to make common cause with them, and have contrived to stimulate in him an indignation at "monstrous charges" which as a reasonable man he would never have felt had he considered the increased rates purely on their merits. It is an ironic fact that the small user's interests are entirely unrepresented, except by an iniquitous Department. All those bodies which provide the mouthpieces of criticism, the Press, the Municipalities, the Chambers of Commerce and suchlike, are composed mainly of "large users." Those constituents who bring most pressure to bear on their Members of Parliament are again of the same class; even (or, should we say, of course) the "Middle Class Union" lends its aid to the same interest, although it is obvious that if the taxpayer is not to bear the burden of providing flat rate service below cost price—the small telephone user must do so.

At a representative meeting of the City Corporation on Feb. 14 it was said with acclamation that no charity was asked. Yet if the present rates were doubled and the business man was allowed to retain the inequitable flat rate on those terms, he would still be subsidised to the extent of something like £800,000 a year by the small user or by the taxpayer. He does not ask for charity, but he is not above accepting it. Cicero says somewhere: "*Caritate benevolentiaque sublata omnis est e vitâ sublata jucunditas,*" which we may translate: "When charity and benevolence are removed all the delights of the large-user's life disappear." For there is no third course.

HIC ET UBIQUE.

PARLIAMENT has promised to appoint a Select Committee "to enquire into the organisation and administration of the telephone service." To this was added, at Sir F. Banbury's suggestion: "and the method of making charges." On behalf of the Government, the Attorney-General agreed to this suggestion, which, he said, was implicit in the terms of the proposed reference. Some of the newspapers indulge in unusually chastened jubilation at what they term the "climb down" of the Government. They regard the offer of a Select Committee with suspicion, for while its recommendations are uncertain and unknown, the disappearance of the flat rate on April 1 is a certainty.

THE number of telephones in the United Kingdom at the end of 1920 reached a total of 985,600, *i.e.*, 970,093 on the Post Office system and about 13,000 and 2,500 on the municipal systems

of Hull and Guernsey respectively. Last year the total was 911,909. London had 339,804 (as compared with 311,350 in 1919); Glasgow 43,212; Manchester 41,746; Liverpool 40,791; Birmingham 26,188; Edinburgh 18,809; Sheffield 14,063; Leeds, Bradford and Newcastle-on-Tyne each over 13,800; Dublin over 12,000, and Bristol, Belfast and Nottingham each over 10,000. The last 3 are new accessions to the rank of towns with over 10,000 telephones, which now, including Hull, number 15.

THE *Saturday Review*, which moves in a narrow and select compartment of the great world, has the following paragraph :—

The telephone operators have squeezed out of the Government four and a quarter millions for war bonuses for the year 1920-21. Result, four millions sterling loss on the year's working. In order to prevent this loss falling on the general body of taxpayers the Government proposes to raise the telephone charges. Who are the wasters, the Government or the rapacious and inefficient telephonists ? Stop the war bonuses and this particular waste will stop. War bonuses of four and a quarter millions are the cause of the telephone ramp. Civil servants and miners are determined not to bear their fair share of the cost of the war.

Why only miners of all the industrial world are associated with civil servants we are left wondering. Of course " telephonists " includes assistant secretaries, engineers, surveyors, and everybody else in the Service in the catholic mind of our contemporary. We refrain from comment; a lively political excursus on post-war economics is out of our province.

THE financial press has been turning its attention to the German Telephone Service and the sorrows of the German business man. We learn that an additional charge of 80 marks (nominally £4) per subscriber has been made. We are without further official information on the subject than that which we published in our December issue, but it rather looks as though instead of a proper revision of the rates as there foreshadowed an all-round increase of 80 marks had been levied. This is the kind of remedy so many of our critics have advocated for the British deficit—and yet the German subscriber is not pleased. He is making an outcry against the new extortion. Of course all his ills are ascribed to the " Socialised " service—nothing is said of post-war troubles and 2,000 per cent. increases in the price of materials. The correspondent of the *Financial News* tells us that telegraphic rates have been increased a hundredfold ! We find it difficult to believe that a 6*d*. telegram costs £2 10*s*. in Germany. But perhaps a " hundredfold " in the financial world only means 100 per cent.

" WHEN Rowland Hill introduced penny postage into England," says the same oracle, " forthwith the Post Office receipts (not number of letters carried, mark, but the receipts) increased in stupendous proportions." We do not know how to express " forthwith " in terms of years, but as a matter of fact the first year actually involved a loss of revenue of over a million, and it took the receipts nearly 12 years to recover. Thus is history—of a kind—pressed into the service, and an instructive moral shyly pointed from an imaginative tale.

WHEN rates are high in Sweden, the lot of the newspaper telephone critic is to be commiserated. The *Star*, however, still lives in a pre-war world and talks of a £2 15*s*. rate. The case of the *Express* is harder. They sent a representative to the Swedish Chamber of Commerce who, it is reported, informed him that you could get unlimited calls for £7 in Stockholm. As a matter of fact the £7 1*s*. rate applies to private houses only, and includes a limited number of calls. The lowest rate for business premises (with a limited number of calls again) is £10 9*s*.

BUT, in the agitated mind of the newspaper world, the whole of Europe is devastated by telephone " ramps." The picture which we reproduce from the Viennese comic journal *Kikeriki* is accompanied by the legend : " The colossal increase in rates will make one section of the public happy." That section, of course, is the telephonists who, it will be seen, are reading, sipping coffee and jazzing. Yet, although according to comic journalists, telephonists were ever thus, the *Yorkshire Evening News* deduces from the picture that " Austria is also in the grip of a 'phone ramp."

The shortness of the young ladies' skirts in the picture seems to have some graphic relation to the lowness of the calling rate. Strangely enough, *London Opinion* has a picture to exactly the same effect as *Kikeriki*.

IT is evidently difficult to gauge the telephonic development of the new European states. Before the war there were about 45,000 telephones in Russian Poland, 50,000 in German Poland, and 6,000 in Austrian Poland, say 100,000 in all. Yet the official figure of the present development of Poland is 36,000. On the other hand the Czecho-Slovak provinces of Austria had about one-third of the pre-war total number of telephones in Austria, plus a few thousand in Hungary—about 60,000 at most. An estimate on these lines, slightly reduced to 54,000 to allow for war conditions, was given in the article which we published last month. Official figures are, however, now to hand which give the total number of telephones in Czecho-Slovakia as 138,843 !

THE following letter received by an Irish District Manager of Telephones has something in it of fluid as well as fluency. We refuse to commit ourselves to a characterisation of it as " typically Irish " :—

Dear Sir,—A friend of mine is Mr. ——, who is one of the largest merchants in W., and belongs to one of the oldest families. Having made not much money in business, he has made up his mind to go back to the land, that is, he has bought a farm at a place called Bally——, with a castle attached, if you please, and he is now working a farm of 250 acres. In addition to this he has also a coal yard, corn stores, and general business here in town. His life is spent not so much in making money as spending it, and he cannot conveniently do this without having the two places, but occasionally it would be very handy for him to remain in Bally—— on Mondays after the week end, although, strictly speaking, he is a teetotaller. In order to do this he cannot carry on without the telephone, and I am sure you will have a telephone installed in his house at Bally——, which is only three hundred yards from the wire running to K. He is, of course, prepared to pay the cost, which could not be very much. When you kindly put in the telephone and ring up Bally——on your visits down here, you will not be hungry, thirsty or without a bed, or anything you want, for the hospitality is the same as that of the Monks of Cappoquin, only it costs you nothing, and you need not pray, though we hardly ever do anything here except pray for poor Cork, and also that W. will never be as bad.—Yours truly,

WIRELESS COMMUNICATIONS.*

BY LIEUT.-COLONEL C. G. G. CRAWLEY, R.M.A., M.I.E.E.
(Deputy Inspector of Wireless Telegraphy.)

WIRELESS communications may be placed in two divisions: mobile and fixed. Mobile communications are those with ships and aircraft, fixed communications are those between fixed stations. It is fairly obvious that mobile communications are by far the more important so far as wireless is concerned, for as soon as the mobile craft is out of visual touch there is no other means of communication, whereas between fixed points there may be land lines or cables.

Communication with ships is governed internationally by a Convention dating from 1912. This Convention is naturally much out of date, and its revision has been considered provisionally during the last few months by an Inter-Allied Conference in Washington. The next Convention will probably be held this year. Ships' communications may be divided into those of the Navy and of the Mercantile Marine.

Naval.—In the Navy the chief point which requires consideration is Selectivity. The vital importance of this will have been noticed in the reports recently published of the Battle of Jutland, where, owing to the jamming of one particular signal the whole course of the battle was materially altered. Besides the elimination of jamming from enemy ships, special selectivity is required to prevent jamming from one's own ships; for instance, a battle fleet in close formation must be in wireless touch simultaneously with coast stations, cruisers, destroyers, submarines and aircraft, so that selectivity in the reception of messages from these various sources becomes absolutely essential. In the *Queen Elizabeth* at the present moment there are 10 complete wireless installations and 60 operators. This fact alone shows how necessary it is to have great selectivity in the design of naval sets. As a matter of interest it might be mentioned that submarines when just submerged can intercommunicate by wireless up to distances of about 10 miles, and if submerged 10 feet, up to distances of about 3 miles. On the surface of course the distance is largely increased up to, say 50 or 100 miles. The navy has at present 17 coast stations abroad for the purpose of communicating with Naval Ships and to a certain extent with ships of the Mercantile Marine. Of these stations, only two, those at Malta and Gibraltar, were in being before the War, and if the other 15 which are distributed over the Empire had been working at the commencement of the War, there is little doubt that many millions of pounds would have been saved by the speedy rounding up of German raiders. The naval stations at Ascension and Falkland Islands are 100 K.W. and 150 K.W. in power respectively; nearly all of the others are exactly similar to our station at Stonehaven, viz., 30 K.W. spark and 25 K.W. arc.

Mercantile Marine.—In the Mercantile Marine, selectivity is not of such great importance because of the arrangements made for receiving the Distress Signal. This signal is always sent on the 600 metres wave, so that all ships are compelled to keep watch normally on that particular wave, thus making the conditions quite different from those governing naval communications. Recently another wave-length has been arranged for clearing passenger traffic, and the Post Office has erected a station at Devizes for communicating with ships on this particular wave. The range between ships and Devizes is about 1,200 miles, and between ships similarly fitted the range is about 1,000 miles. The ranges obtained by ships on their nornal sets are a few hundred miles, with coast stations, according to the installation fitted. In this Country every passenger ship and every ship of 1,600 tons gross and upwards must now be fitted with wireless telegraphy, which means that at present about 3,200 British ships are fitted. These regulations apply equally to the foreign ships which visit British ports. The installations on ships are inspected by the Post Office. At present only 10 Inspectors are available, but it is hoped that this number will be shortly increased. The cost of a ship's set is about £400 or £750 with £30 per annum maintenance, according to the set. There are now a certain number of ships—about 20—fitted with Direction-Finding apparatus and the number so fitted will no doubt be largely increased as soon as the advantage of having such a set is realised generally. Under good conditions the error of direction obtained by this apparatus fitted in a ship should not be greater than 2 degrees. Duplex is not fitted in ships, as it is not yet a practical proposition to do so. High speed apparatus is not fitted because the traffic at present does not call for it, but there is no reason that such apparatus should not be fitted in ships just as at fixed stations. Wireless telephony is not yet fitted in any merchant ships, but is being fitted in both the United States and the Japanese Navy. Our own Admiralty is not at all inclined at present to fit wireless telephony generally in naval ships.

Mercantile Operators.—All operators for merchant ships are examined and given certificates of proficiency by the Post Office. At the present moment there are about 5,000 such operators employed. Last year we examined about 3,500, half of whom passed the examination. Altogether there are about 12,000 on our books. These operators are trained at 40 private schools scattered throughout the United Kingdom, and our examining staff consists of 5 Assistant Superintendents and 2 Overseers with two additional Assistant Superintendents at Headquarters. These latter two deal also with "Complaints." These "Compaints," of which we receive about 120 a month, are sent in by ships and shore stations on the matter of irregular working. It will be understood that any irregular operating in wireless telegraphy is far more serious than in line working because the unnecessary interference and waste of time caused by such irregularities are very great owing to the fact that nearly all signalling is carried out on the same wave-length In addition to operators we examine about 120 watchers a week and there are now about 600 on the books. The watcher is quite a new institution resulting from the Merchant Shipping Act of 1919. The Rules in connection with this Act laid down that First Class ships (200 persons or more) must carry 3 operators; Second Class ships (50 persons or more) must carry 1 operator who keeps watch at scheduled times and 2 watchers; Third Class ships must carry 1 operator, who keeps watch at scheduled times. The watcher is only required to be able to recognise the distress and the safety signals when received through interference, and to know when the receiving apparatus is functioning. Any member of the crew may, if qualified, carry out the duties of a watcher. As soon as automatic apparatus for registering the distress signal is invented, and approved by the Post Office and the Board of Trade, the necessity for carrying watchers will lapse. These new regulations for watch-keeping on board ship are an admission of the principle of the 8-hours day, as previously ships with 2 operators only carried out a continuous watch.

Coast Stations.—There are 12 coast stations distributed around the British Isles. These stations are Post Office stations used solely for communication with ships. In addition the Post Office has four point-to-point stations, namely, Stonehaven, Caister, Oxford and Northolt, the last two being under construction. There are also six emergency Post Office stations not normally manned, but used when cable breakdowns occur; and in addition the Engineer-in-Chief has three purely experimental stations. The coast station traffic is at present about 2¼ million words a year, two million being at the full rate and the remainder at a reduced rate. In addition, ships communicate their position, course, speed, &c., to the nearest coast station and this information is passed on to Lloyds'. The coast stations also broadcast warnings of mines, derelicts, ice and gales—about half a million words a year, which would bring in a revenue of about £15,000 if charged for at usual rates. In the last six months the full rate words were 1,000,000 compared with 700,000 in the previous six months, so that the coast station traffic is certainly increasing rapidly and in fact the service is now nearly paying its way, although no increase in charges has been made. There are elaborate arrangements at the coast stations for reporting to all proper authorities in the quickest possible time any distress signals received, and there has never been any serious complaint at the action, or want of action, of a coast station in this most important matter of dealing with distress signals.

At present if you want to send a message to a ship, you must state the coast station through which the message is to be sent. If you do not know the coast station and if the Counter Clerk does not wish to be helpful, the matter may probably end there. This is certainly unsatisfactory, and it is to be hoped that some day the public will be able to hand in a message for a ship at any Post Office in the United Kingdom without knowing or caring through what coast station the message will be sent. All this, of course, would saddle the Department instead of the public with the responsibility, but the resulting increased traffic should disarm any criticism from this point of view. The charges for messages are at the rate normally of 11*d.* a word, *i.e.*, 6*d.* for the station, 4*d.* for the ship and 1*d.* for the inland telegraph. The staff at a coast station consists of 1 overseer, 8 or 9 operators and 1 labourer. There are thus always 2 operators on watch, 1 on the wireless and 1 on the land line, &c. The cost of a station's staff at present rates is about £3,500 a year. The operators employed on this work must be expert wireless operators as the signals are nearly always jammed to a greater or less extent, and the senior operator on watch is in charge of the whole station and controls the traffic in the absence of the officer-in-charge. At present the Post Office wireless operators are recruited from the Department's land line staff. They are attached as probationers for 2 years to a coast station, after which if they pass in technology, French and German, they are accepted on the staff and are considered capable of taking charge of a station in the absence of the officer-in-charge. The capital cost for an average coast station is difficult to estimate at the present time, but as £3,500 might be taken as a pre-war figure, £10,000 might perhaps be given as an estimate at present costs.

Direction Finding Stations.—There are at present 9 D.F. stations in the British Isles, all under naval control. The number may very likely be reduced in the near future and it is possible that the Navy may wish to transfer the control of these stations to some other Department. The United States have about 50 of these stations working and 30 being erected. France has 16, 9 being on the North Coast and Germany has 4 on the North Sea. We are, therefore, rather behindhand in the number of D.F. stations in this Country, but we are well to the fore in charging 5*s.* for each bearing, whereas none of the other countries make any charge.

Aircraft.—There are only about 12 commercial aeroplanes at present fitted with wireless telegraphy and these are fitted with wireless telephony also. The ideal of course is for aircraft to communicate by wireless telephony with a land station where they can be directly connected to the telephone service of the country, and some fairly successful tests in this direction have already been carried out. All aircraft installations and operators are licensed by the Post Office on the recommendation of the Air Ministry.

WIRELESS TELEPHONY.

The advantages of wireless telephony are that the operator requires no knowledge of telegraphy and that much greater speed is attainable in communi-

* Summary of an Address given before the Telephone and Telegraph Society of London, Jan. 17, 1921

cation. In wireless telephony there is no distortion similar to that which occurs on land lines, a most important fact for long-distance working. These advantages, however, are at the moment outweighed by the disadvantages. The great disadvantage is non-selectivity; that is to say, that wireless telephony is more open to jamming and being jammed than wireless telegraphy. Also the power to obtain a certain range in wireless telephony is about twice as great as the power required to obtain the same range in wireless telegraphy. At present, also, simplex wireless telephony only is in use owing to technical difficulties in arranging for listening-in as in the case of line telephony. This last trouble is no doubt a temporary one, and the United States Navy is already fitting some sort of duplex wireless telephony in their ships.

As regards point to point telephony, the first long distance test of note was carried out in 1908 between Brant Rock in the United States and Machrihanish in Scotland. No great advances, however, were made in wireless telephony until the introduction of the thermionic tube as a transmitter in 1913. In 1915 Arlington station near Washington communicated by wireless telephony with Eiffel Tower, 2,300 miles, and the messages from Arlington were heard at times as far away as Honolulu, 4,000 miles. Many tests over long and short distances with wireless telephony have been carried out since then, but at the present moment there is no commercial wireless telephony system in operation, with the exception of a system recently installed between Avalon and California, a distance of about 30 miles. It is impor ant to notice that wireless telephony is not restricted for work across oceans compared with wireless telegraphy as is the case with submarine telephony as compared with telegraphy, and this is a point which must be carefully borne in mind when considering the future possibilities of long-distance wireless telephony.

Point to Point.—The Post Office point to point stations are Stonehaven for medium range Continental communications, Caister for short range Continental, Northolt for long range Continental, and Oxford for working to Egypt. In addition, at the moment, Devizes is being used for a six hours daily service to Rome. Tests are just being commenced between Stonehaven and Berlin, the messages from Berlin are to be received on an aerial at the Central Telegraph Office and a signalling key at the Central Telegraph Office is to work the sending instruments at Stonehaven for the transmission of messages. By this means duplex working will be carried out. At Oxford, duplex working is being arranged for by having the operating station at Banbury and the power station at Leafield. As regards high-speed working, wireless signals can, of course, be received on a relay system (Wheatstone or Creed) or a dictaphone; the former is naturally preferable when practicable, but the advantage of the latter is that the signals can be read by ear off the dictaphone through a certain amount of interference, whereas with a relay system no use can be made of the great selective quality of the human ear for differentiating between notes of different pitch. In 1913 the Marconi Company carried out fairly satisfactory tests up to 140 words a minute on the dictaphone system, and up to the present they have used that system almost entirely. Recently the Army have opened a military service between Aldershot and Cologne at about 100 words a minute on a relay system. In the Berlin service the dictaphone will be used as a start at this end of the line. but it seems pretty certain that before long the dictaphone will give way everywhere to the relay. The Marconi Company have two high-power stations, Carnarvon and Clifden, both these work normally across the Atlantic at hand-speed duplex, and are often able to use high speed. In Germany, the Government have started a network of wireless stations, working at about 60 words a minute to supplement the telegraph system, and at the moment about 15 of these stations are working.

Wireless v. *Cables.*—As regards the relative cost of wireless and cables, there is no doubt that for short distances, up to say 500 miles, a wireless service is cheaper than a cable service when the latter does not require more than one wire. As the wires in the cable increase, however, so does the relative advantage of wireless decrease. Wireless for short distances is certainly very suitable for reduced services, as an overflow for cables, and for emergencies, but at present a great network of wireless stations in this country, working say to the Continent, corresponding to the present cable communication is not a practical proposition. For long distances, wireless certainly has the advantage, as in long-distance cables only one wire is used and the cable has also as a rule to cover a much greater distance than the crow-fly distance between the two points which it connects. For long distances the capital cost for cables is somewhere about four times as much, and the annual cost is slightly more than for wireless, so that it seems fair to contemplate that wireless rates for long distances will be less, say one-third less, than the present cable rates. In making any comparison it must be of course remembered that wireless, at present, cannot provide a service up to anything like the standard provided by cables.

Imperial Chain.—The Imperial Wireless Telegraphy Committee which reported last June, suggested that the Empire should be linked together by wireless stations placed at distances apart of about 2,000 miles. A route Oxford-Cairo-Nairobi-Windhuk, and a route England-Cairo-Poona-Singapore-Hong Kong-Port Darwin or Perth were proposed, as well as a connexion between England and Canada. It was suggested that thermionic tube transmission should be used at all stations except those now being constructed at Oxford and Cairo, that the stations should be planned by a small Commission, and that the erection should be carried out by the Post Office and corresponding Authorities in India and the Dominions. The initial annual loss on the scheme was estimated to be £100,000, of which £63,000 would fall on the Imperial Government, and it was thought that this loss would decrease until a profit was shown in 10 years' time. This assumption is in line with what has occurred on the Pacific Cable, which now pays well, but which was run at a big loss for the first 10 years. The capital cost of the scheme was estimated at about 1¼ million pounds and the annual cost about half a million. The Imperial Government would pay rather less than one million as capital cost and rather more than a quarter of a million in annual charges. This does not include the England-Canada link, which would cost about quarter of a million pounds with annual charges of about £90,000, and which would no doubt be a most valuable adjunct to the Imperial cable.

High-Power Stations.—The following is a list of the principal high-power stations in Europe:—

British Isles	...	Carnarvon.
		Clifden.
		Oxford (under construction).
France...	...	Bordeaux.
		Lyons.
		Nantes.
		Eiffel Tower.
		Sainte Assise (*construction commenced last week*).
Italy ...	...	Rome.
		Coltano.
Germany	...	Nauen.
		Hanover.
		Königs Wusterhausen.
Norway	...	Stavanger.
		Falkenberg (projected).
Russia	...	Petrograd.
		Moscow.
Holland	...	Kootwijk (under construction).
Serbia ...	...	Belgrade (projected).
Poland	...	Warsaw.

In the United States there are about a dozen high-power stations, and in Canada two. In China four are projected, and in Japan there are two, *one of which was opened the day before yesterday.*

At the present moment, considering our needs, we are distinctly behindhand with regard to high-power stations in the Empire, but it is not the first time that we have been a slow starter in a competition where we eventually took a prominent part, and we must just hope that history will do what is expected of it, and do that quickly.

TELEGRAPHIC MEMORABILIA.

"2,000 years' leave owing!" That was the announcement which caught the eye upon opening the pages of a South African Post Office Service periodical. The brief sentence was not invented by the fertile brain of an editor out for copy. It appeared as part of the finding of a Commission on the South African Post Office and which issued its report in December last. It was a well studied report by a Commission which sat for 200 days and examined 948 witnesses. One of its findings was that concentrated in the above four words, and relates to the accumulated leave due to the S.A. P.O. staff of all grades owing to the war.

Reference was last month made to the excellent contribution to the Benenden Games Fund by members of the C.T.O. The same staff have since subscribed the sum of £46 to the Civil Service National Lifeboat cause.

The word "Benenden" reminds one of the many thousands of men and women of the Post Office Service who have not yet become members of the "Sanatorium." As an insurance alone the tiny subscription offers unexampled advantages, and as an aid for less fortunate colleagues who may fall by the wayside it offers a facile way for anonymous helpfulness which cannot easily be denied.

On Jan 17 Mr. Louis Desous retired from active Telegraph Service in the Cable Room, C.T.O., on the completion of 40 years' connexion with telegraphy. Of French nationality, naturalised many years ago, he yielded to no man in his loyalty to British interests and had secured a particularly warm corner in the heart of the staff and supervision. Bright, cheerful and with a ready wit all his own, he quitted the floor of the T.S. Foreign amid the heartiest good wishes of all.

Before me stands a photographic group of four old T.S.-ites, three of whom have recently retired and whose modesty will not permit the mention of their names. The fourth is that of Mr. Alfred A. Parish, now superintendent of the W/T of the River Plate, Pacific and European Telegraph Co., who was recently home on furlough, but will have sailed for duty again by the time these lines are set up in type. Mr. Parish, it may be remembered, severed his connexion with T.S. somewhere towards the end of the eighties.

Writing of retirements one is struck by the frequent lingering thoughts backward in the direction of the retired one's former vocation. It is sometimes stated that once away from the telegraph office, all thoughts anent the sphere of the retired one's late occupation are banned and banished. Personal experience of the many of those who have left the Service does not coincide with that view. The writer rather finds an echo to the sentiment, expressed in a recent number of the *Bookman's Journal*, which drew upon Kipling for full expression of that power which lures men back to—

"The things at which they used to earn their living
"Even when they were free."

Just as the sea-captain when—

> . . . "finished with the sea
> Still likes to feel it's there to use,
> If he should need it, as it used to be."

So also the telegrapher—deny it as we will. The pensioners, who came back to the Service during the war, themselves personified and proved this very principle.

Yes, love of the craft is still a fact, and you and I, gentle reader, have only to wait the time of our retirement to prove that :—

> "We've only one dear love to lose
> And when that's lost, it's there our hearts will be."

Mention of Mr. Garrood's retirement from the C.T.O. into the elysium of pensioned service was unfortunately crowded out together with several other items last issue. It is hoped that it is not too late to wish our well known friend a lengthy, happy enjoyment of his well-earned repose.

On Jan. 21 the London Office was placed in direct telegraphic communication with the town of Hanover, as a temporary expedient owing to breakdowns beyond that point. A very satisfactory service was given by the office just mentioned, an acknowledgment of which is readily placed on record in these columns.

The possibility of Baudot automatic transmission reliable information states, has become more and more promising, and it would be surprising to the writer if before long the system did not become an established fact. The French administration contemplates making a trial with an improvement on the old "Carpentier" *automatique* very shortly between Paris Bourse office and the London C.T.O. The new Baudot distributor, connexion box and pin-connexions which was sighted recently appears to be the last word in compact design.

It is mooted in quarters where information rarely fails to prove a true prophet that plans have been outlined for the production and publication of an Annual C T.O. Magazine entirely produced by C.T.O. talent, both as regards its literary and artistic features. The obviously rich store upon which the organisers should be able to draw for the production of so desirable a work will at one and the same time make the task an easy and a difficult one. The price suggested is somewhere about 2*s.* 6*d.*, while provision is likely to be made for any accruing profits to be devoted to the C.T.O. or some kindred benevolent fund.

By the way, certain Russian authorities in this country who have made full use of cable facilities offered by the British Government, with a kindly feeling and thought for followers of our craft recently presented the sum of £30 for the benefit of the C.T.O. staff. This sum has accordingly been handed over to one or two of the many useful organisations for the alleviation of special distress or need associated either with the C.T O. itself or with the Post Office Service generally.

Some of our readers have been surprised that Wheatstone transmission and reception should be possible with wireless telegraphy. There is, however, nothing very remarkable in this possibility as whether hand or machine be used the principle of the signals remains unchanged. As can be well imagined by those conversant with some of the developments of "wireless" the Creed printing system can easily be adapted in place of Wheatstone reception. Hughes has been proved practicable and there does not appear to be any serious obstacle to many types of high-speed telegraphy being employed. Indeed, Siemens automatic transmission by means of wireless is already a *fait accompli* between Berlin and Leipzig. The Baudot, Murray, and Western Electric systems should therefore lend themselves equally well to the new medium. "Atmospherics" and "jamming" have of course not yet been overcome but undoubtedly notable advances are being rapidly made. The clear-cut and well defined nature of the signals between Cologne and our own metropolitan centre, which signals the writer has had the opportunity of closely examining, gives every promise of excellent results if applied to machine telegraphy printing systems. The absence of capacity effects produces a practically distortionless tape during periods when "atmospherics" are at or near zero power. It would need no great shrewdness to guess that a Creed trial between London and the Rhine district will prove a natural sequel. It may be interesting to note that one of the first if not *the* first to adapt Wheatstone apparatus to wireless needs was the honoured name of Creed, under patent 19,125 Creed F.G., and Creed, Bille & Co., Aug. 22, 1913. In this provisional patent, specifications 1061/02, 5490/05, 23,834/08 and 3853/13 are also referred to. For this latter information together with certain sketches of the fluid-pressure motor utilised myself and our readers are once more indebted to one of our many younger men who are whole-heartedly interested in the most modern phase of our craft. Wheatstone slip of the most perfect type was recently received, practically at the door of the C.T.O. London, by means of "wireless" from one of the Rhine cities direct at a rate, during the most favourable atmospheric period of the twenty-four, of no less than 150 words per minute. Readers will be interested to know that Post Office civil telegraphists were at each terminal office. It is hoped that shortly, if not in the present number, then later in these pages, some interesting details may be published of these epoch-making experiments. One item it is not possible to keep back. The Wheatstone receiver used at the German end was one which was recovered by the British Military from the waters of the Rhine after a month or two of immersion!

The experiment reminds one of the words of Sir William Slingo at a meeting held in the hall of the Electrical Engineers' Institute when speaking of modern machine telegraphy, he said: "Morse will always be needed in telegraphy."

The developments in connexion with wireless become more and more amazing and yet there seems no need for the closing down of underground and submarine cable factories up to the present.

It is at present difficult to obtain reliable particulars of the capital costs and upkeep charges of long-distance wireless installations. Maybe one day the Accountant-General's Department will be able to reveal to us, when time and experience have supplied sufficient data, the capital cost, the maintenance charges and the relative life of wireless installations for a given distance as compared with submarine and underground cables, working over the same or similar distances. This, together with other interesting matter covering the reliability at all seasons and at all times of the day of the two systems should determine the relative suitability of one or the other for point to point communication *unlimited* in number. In this connexion *selectivity* may well be expected to play an important part as regards telegraphy without wires.

It was a matter of very earnest discussion at the International Conference for the Amelioration of postal, railway, telegraphic and telephonic communications in July last at Paris that Radio-telegraphy could not be maintained absolutely as secret as that by means of wires especially as modern developments had rendered it possible for anyone with the necessary knowledge to receive with antennae, signals transmitted by stations as far away as 8 to 10,000 kilometres. High-speed telegraphy having become an accomplished fact in connexion with "wireless," fears on this point may be promptly dismissed for ordinary commercial purposes. For naval and military aims the increased sensitiveness of modern receiving apparatus, to a degree at one time inconceivable has added a serious disadvantage as a counterbalance to the undoubted utility of this form of communication. The whole matter opens up a field of the most debatable and interesting ground for enquiry, investigation, the most careful research and the most ingenious of inventions.

Lieut.-Colonel C. G. G. Crawley's paper read before the T. and T. Society of London fortunately appears in the present number of our JOURNAL and gives some specially interesting views, information and side-lights on wireless developments. The Belgrade installation mentioned is now actually functioning and daily assists the London office with a certain amount of traffic destined for Serbia and Yugo-Slavia. So far as Belgrade is concerned, it only provides for Anglo-Serbian traffic during a very small portion of the twenty-four hours, the Serbian capital and the British high-power station both being occupied with traffic in other and various European directions during the remaining hours of the day. This arrangement is an awkward one and presents objectionable elements as regards availability.

J. J. T.

LONDON ENGINEERING DISTRICT NOTES.

Engineering Faults.—When the present district was formed immediately after the Transfer, a fault scheme was designed and introduced, providing for a daily record of engineering faults to be kept at the exchanges. Under this scheme separate totals for faults at exchanges, subscribers' stations, and on the lines, are submitted weekly to the Superintending Engineer's office, where they are carefully scrutinised and tabulated.

A monthly summary of the figures for the exchanges in each of the sections is prepared, and circulated to the members of the staff responsible for the maintenance. By publishing comparative results in this way an effective stimulus is produced towards improved results. The following figures for the past nine years show the steady progress which has been made in the direction of higher efficiency :—

Year.	Faults per station per annum.	Remarks.
1912	3.52	
1913	3.52	
1914	2.31	
1915	1.77	
1916	1.81	Great snowstorm March 1916.
1917	1.55	
1918	1.39	Stagnation in trade.
1919	1.54	
1920	1.51	

The improvement during the last nine years continues, and it is hoped that before very long the ideal standard of an average of one fault per station per annum will have been reached throughout the district. At several exchanges this high-water mark has already been reached.

Institution Meeting: Thermionic Valves for Wireless Purposes.—A few years ago a writer in a technical journal was lamenting the absence of literary skill on the part of inventors and investigators who attempted to put into writing the results of their work. There can be no doubt that with certain exceptions the criticism was justified, and it is a matter for regret that such should be the case, since few things in life are so full of romance as the discovery of natural laws and their application to the needs of man.

There is no doubt that many patient and skilful investigators have spent their whole lives in endeavouring to solve some of the problems that have baffled mankind, but have passed away without leaving on record the result of their discoveries. Probably they had no taste or aptitude for literary work, and considered the preparation of a scientific paper or treatise a task quite beyond their powers. Others have made the attempt but have been so singularly unsuccessful in describing their discoveries that their work has passed almost unnoticed.

In some cases a man with journalistic talents and some scientific knowledge has unearthed a paper which otherwise would have been condemned to obscurity and, by writing upon the subject, has drawn attention to the importance of the inventor's work.

It is refreshing, therefore, to record that at a meeting of the I.P.O.E.E. at the Society of Arts on Feb. 14, a paper of high literary merit was read by Mr. F. W. Davey, the subject being "The History of the Development of Thermionic Valves for Wireless Purposes." To those who were not present the title may not sound very alluring, but all those who were privileged to be present will testify that they have rarely listened to a paper on any subject which more engrossed the attention of an audience.

So much has been written on the subject of Thermionic Valves and the tremendous revolution wrought by them in the realms of Telegraphy and Telephony that the need for another paper may not have been widely felt. Mr. Davey, however, invested the subject with a new interest as he traced the path from the first accidental discovery to the present highly developed application of the valve to wireless working.

The use of the electric light bulb for illuminating purposes is now so common that the ordinary user looks upon it as nothing but a convenient means of obtaining light. To the scientist, however, this bulb has great potentialities. The investigation of what takes place in the apparently empty space between the hot filament and the bulb has led to discoveries which have widely extended the scope of wireless working and has made it possible to speak over great lengths of small gauge underground wire.

By suitable modifications this electric light bulb, which looks so innocent and commonplace, can be used as a generating unit for heterodyne working. It provides the easiest and most efficient method of continuous wave reception ; it can be made to serve as a magnifying and rectifying device, and it has made fast speed wireless communication possible.

Mr. Davey prophesied that by the use of this device it would be possible in the near future to have a commercial trans-Atlantic telephone service and that type-printing telegraphs will, at no distant date, be operated by wireless signals. He pointed out, however, that there are very real difficulties yet to be overcome, but, as the history of past achievements was unfolded, no one could doubt that there was every warrant for the speaker's optimism.

A responsive note was struck in the breasts of all present when Mr. Davey pleaded in his closing sentences that a greater measure of recognition should be given to the value of the pure research and experimental work carried out in the Department. As we have an enthusiastic Engineer-in-Chief and a sympathetic Secretary, it is confidently expected that the recognition will be accorded and the fullest facilities provided for carrying on this important work.

An interesting feature of the discussion which followed was the reading by the secretary of a letter from Professor Fleming who had been invited to be present, but who was unable to do so owing to a previous engagement. Prof. Fleming's main criticism of Mr. Davey's paper was that sufficient credit had not been given to the research work carried out by himself on the Edison effect, from 1884 onwards, or to his investigations which resulted in the invention of the two and three electrode valves.

Other speakers, however, realised the difficulty of compressing a history of so many years of work into the compass of a short paper and paid a well-deserved tribute to the author's clear summary he had given of the thermionic valve. Among those who took part in the discussion were Mr. E. H. Shaughnessy, O.B.E., of the Wireless Section, Engineer-in-Chief's Office, Mr. J. E. Taylor, Superintending Engineer, South Midland District and Mr. Burrows, of the Wireless Traffic Section of the Secretary's Office. The latter hoped it would be possible to supply copies of Mr. Davey's valuable paper to every wireless station in the country, where they would be of considerable utility.

Memories.—The Office of Works has in hand an extension of the North Telephone Exchange premises. The enlargement is not being made to enable the switchboard to be extended, but to provide much needed additional accommodation for the staff. It is interesting to recall that this building was once a meeting place of a religious sect known as the Sandemanians and that Faraday, who was an elder of the Church, used at times to preach there. This fact is recorded on a tablet affixed to the switchboard wall. The tablet was unveiled on Nov. 24, 1906 by Lord Kelvin. Lord Kelvin's interest in the telephone began in 1876 when he was present at a demonstration given by Graham Bell of apparatus enabling the transmission of spoken words by electric currents, through a telegraph wire. Lord Kelvin prophesied at the time that "with some more advanced plans and more powerful apparatus we may confidently expect that Mr. Bell will give us the means of making voice and spoken words audible through the electric wire to an ear hundreds of miles distant." Both Mr. Bell and Lord Kelvin lived to see the fulfilment of this prophesy. Members of the ex-N.T. Company will always treasure the memory of having been present at a staff dinner in 1906 at which Lord Kelvin as a guest made a vigorous speech.

Perhaps the most widely quoted saying of the great scientist and the one which appeals most to engineers is the following :—

> "I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it, but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind."

Exchange Extensions.—The extension of the Hornsey and Victoria Exchanges which were forecasted in the January issue have been completed. and in addition extensions at Barnet, East Ham and Avenue have been carried out. Extensions and alterations are in progress at Ealing, East, Enfield, Finchley, Gerrard, Hampstead, Hop, Kensington, Lee Green, New Cross, North, Park, Streatham, Tottenham, Walthamstow, Willesden, and Wanstead. The new exchange at Harrow is very near completion and will, it is hoped, be handed over for working by the time this issue is in the readers' hands. The first of the relief exchanges to be opened—Langham—will also be ready for opening early in March. The other relief exchanges—Chancery, Minories, and Grosvenor—are well advanced, as are also the new exchanges in course of construction at Clerkenwell and Toll.

A contract has been let for a new exchange at Barnet, but, owing to the large amount of work in the hands of the Contractors, operations are not likely to be commenced for some months.

The new buildings for the accommodation of exchanges at Stratford, Monument and Holborn are proceeding apace.

The preliminary arrangements in connexion with the Panel Automatic Exchange at Blackfriars are making good progress, and much midnight oil is being burned by some of the engineers closely concerned.

Wireless Installations.—The amount of interest taken in wireless communications nowaday is very considerable, as is evidenced by the number of applications received by the Postmaster-General for licences, both for reception and transmission.

The present number of licences in the London District is close on 1,000, and applications are being received at the rate of about 15 per week. The installation and use of wireless apparatus without a licence is prohibited under the terms of the Wireless Telegraphy Act of 1904. The possession of wireless apparatus without a licence is prohibited under Section 22 of the Defence of the Realm Regulations. This section is still operative.

The majority of licences issued are in respect of receiving stations. Apart from personal guarantees the conditions are that the extreme height of the aerial above ground shall not exceed 100 ft., and the total length of wire including the lead in shall not exceed 100 ft., for a single wire aerial or 140 ft. of wire where two or more wires are used, *e.g.*, total length for a two-wire aerial would be 70 ft. A receiving licence costs 10*s.* per annum. A thermionic valve may not be used without the written authority of the Post Office authorities. Transmitting licences, which cost 20*s.* per annum, are only issued to persons who can give definite proof of research work of commercial public or scientific utility. Before a licence is granted the names of not more than 5 persons with receiving stations, willing to co-operate with the would-be sender must be submitted with evidence of their consent. The power of sending stations is limited to 10 watts, or less, and the period of use is restricted.

The specified wave lengths are generally 180 metres for spark transmission, and 1,000 metres for fixed transmission. Permits from the Postmaster-General are necessary for the sale of wireless telegraph apparatus under the Defence of the Realm Regulations, and sales may only be effected with persons in possession of an operation licence.

The present instruction is that every wireless station is to be inspected once per annum and this work, with certain exceptions, falls upon the District Engineering Staff. In order that the officers selected for this duty shall not be at a disadvantage when making inspections arrangements are being made to give them a course of instruction at the District Apparatus School, at Denman Street, which will shortly include a wireless section. An aerial is being erected for reception. Transmission will be limited to practice with frame aerials within the schools.

Quite a number of officers of the department are already enthusiastic amateurs, and some have joined one of the numerous wireless societies which exist for the purpose of fostering interest in this subject.

Classes in Wireless Telegraphy are now held at most of the Polytechnics and Technical Colleges.

Abbreviations.—The tendency of the time is to make use of abbreviations both in speech and writing. Under certain circumstances abbreviations are permissible and advantageous, for example, the use of F.O.K. to indicate briefly that a circuit is found to be free from fault, represents a considerable saving in human effort when the enormous number of times it has to be employed is taken into account.

The clipping of words in conversation however, is indefensible. Such as expression as—under the circs—is an offence to the ear. It is regrettable that it is becoming a habit with the public to shorten the word telephone to 'phone. It is still more regrettable that some who are engaged in the telephone business are addicted to this vice. It is to be hoped that now attention has been drawn to the matter the offenders will mend their ways and set a good example to the public at large.

Special Constabulary.—A Bohemian concert, organised by the Southern (Engineering) Group of the Post Office Special Constabulary, was held at St. Matthew's Hall, Brixton, on Tuesday, Jan. 25.

A splendid programme was presented to a large and appreciative audience and the entertainment committee has to be congratulated on its success.

Among the artistes were ladies of the London Telephone Service and members of the Engineering Department. The "turns" included songs at the piano, an exhibition of ventriloquism, concertina duets, and also the usual ballad and humorous songs, all of the items being well applauded and proving very enjoyable.

At the interval, during which refreshments were provided, the Commandant of the Post Office Division, who was present, made a short speech dealing with the growth of the Post Office Special Constabulary.

It was afterwards announced that it is the intention to hold a series of social functions during the winter season, the next event will probably take the form of a whist drive and dance.

Denman Chess Club.—On Jan. 9, Mr. J. Kniager, of the Woolwich Chess Club, gave a simultaneous display against 12 members. Playing brilliant chess he won all 12 games in less than two hours. It is hoped to arrange a second visit.

A return match with the London Telephone Service was played on Feb. 9 and resulted in a win for the Club by 7 games to 4.

Full score :—

DENMAN.		L.T.S.	
Mr. Cornwell	1	Capt. Rathbone ...	0
„ Frewin	½	Mr. Margettson ...	½
„ Slattery	½	„ Bryson	½
„ Petchey	1	„ Barnes	0
„ Wenman	1	„ Wiles	0
„ Barrett	1	„ Kirchhoff	0
„ Gardiner	½	„ Larkins	½
„ Eastop	1	„ Gray	0
„ Nevill	½	„ Nicoll	½
„ H. W. Gardener ...	9	„ Oldham	1
„ Williams	0	„ Gregory	1
	7		4

LONDON TELEPHONE SERVICE NOTES.

THE Annual General Meeting in connexion with the Telephone Staff Hospital Collections took place at G.P.O. South on Wednesday, Feb. 2. The meeting was well attended, and Mr. Preston, the Chairman of the Committee, presided.

The report for the year 1920 was a very satisfactory one, the collections amounting to £1,451 4*s.* 2*d.*, which is £228 in excess of the previous year. The staffs of the Controller's Office, the Exchanges, the Contract Branch, the Engineering Department, and the Electrophone Department, all contributed towards this result. 841 benefits by way of letters were issued to members of the staff during the year.

Mr. Preston in proposing the adoption of the report, complimented the staff on their efforts in aid of the Hospitals, and expressed the hope that during the ensuing year it might be possible for the collections to reach the sum of £2,000. Miss Heap and Mr. Stirling were amongst the speakers, also Mr. Inman, the Secretary of the Hospital Saturday Fund, who spoke of the urgent need of our hospitals, and the good work done by the Telephone Staff.

Mr. Preston was unanimously re-elected Chairman for the ensuing year. Mr. J. Leslie was re-elected Hon. Treasurer, and the Misses A. Reekie and H. Wormald, Hon. Secretaries.

* * * *

We hear that Mr. G. W. J. Praat who was Exchange Manager, Croydon, from 1910 to 1913 has been appointed Assistant Postmaster-General, Ceylon. After leaving the London Telephone Service he went to the Provinces as an Assistant Traffic Superintendent and in 1916 accepted the post of Superintendent of Telephones and Telegraphs in Ceylon. He has the congratulations of his former colleagues.

* * * *

Unfortunately, the compliments received by the Telephone Service do not achieve such prominence as the complaints. Here is a recent one, however :—

The Controller,
London Telephone Service.

Sir,—I enclose 10*s.* as a deposit for Trunk Calls. At the same time I desire to pay a very warm tribute to the Supervisors and operators of the ————Exchange for the excellent service they are rendering. There is certainly a vast improvement in the service, and as we are only too ready to grumble when the service is bad it is only right to appreciate when the service is good.

Please convey my thanks to the Exchange staff.

Yours faithfully,

* * * *

London Telephonists' Society.—The sixth meeting of this Society this session was held on Wednesday, Feb. 2, when two of the successful competition papers were read.

The subject of this year's competition was "Suggestions towards the improvement of the service." Some express the view that an invitation to compete should have been extended to newspaper "experts." Strangely enough, the comments of those experts found no place in the competitors' papers and there is no reason to believe that the newspapers would have secured a prize.

The Papers' Committee found the task of singling out one paper as the best beyond their power and they judged three to be of equal merit, viz., those submitted by Miss D. M. H. Bott of Park Exchange, Miss J. R. Dalley of Western Exchange, and Miss J. M. McMillan of the Headquarters' Traffic Branch.

Miss Bott and Miss McMillan read their papers at this meeting to the evident enjoyment of those present.

Miss Bott's paper was full of suggestions on points of detail gleaned during some years of experience in telephone switchrooms and was delivered in a refreshing and vigorous style.

Miss McMillan's paper was an excellent foil to the paper that went before and dealt with the subject on the broader lines of principle. The writer's lyrical touch was once more enjoyed.

The last meeting of the session will be held on March 2 at the usual venue. Miss Dalley's paper will be read and an Elocution Competition will be decided.

* * * *

City Exchange.—A peep into the stately Hall of the Stationers' Company on the evening of Feb. 12 would have revealed a scene brim full of colour and sparkling with the delight and enthusiasm of the City staff and their friends as they revelled in the dance. A more enjoyable evening of the kind they have not held and so pressing have been the requests for a repetition that arrangements are in hand to hold a "flannel" dance on April 23.

Clerkenwell Exchange.—On Feb. 12, 120 children from Wenlock Street School were entertained at the Leysian Mission Hall by the staff of the Clerkenwell Exchange. While tea was in progress Mr. Delahaye gave an impersonation of one of the children's favourite film actors "Charlie Chaplin," which caused a great deal of fun, and later in the evening a few little friends of the Misses Bloodworth and Dawkins delighted the children with songs and dances. This was followed by the old-fashioned but very popular item, a Punch and Judy show. The singing of choruses and the playing of games occupied the remainder of the evening and finally on leaving each child received two parcels and two oranges.

In these days when adverse criticism is so prominent, it is gratifying to hear a remark passed by the Headmaster of the school to the effect that he had been told by one of his colleagues that *anything undertaken by the Telephone staff was sure to be a success.* The children's happy faces certainly justified the remark on this occasion.

East Ham Exchange.—The staff entertained 200 children of the unemployed of the district to tea on Saturday, Feb. 12. The tea was followed by an entertainment which included Bert Mino's Marionettes, for which item thanks are due to "Broadway." Competitions were arranged and prizes given ; the sweet tooth was not forgotten and fruit and cakes formed a parting gift. The evident enjoyment of the youngsters was abundant satisfaction for all who contributed to the success of the occasion.

Finchley Exchange.—The annual tea party given by the Traffic and Engineering Staffs of the Finchley Exchange to the children of the Wright-Kingsford Home, Finchley, was held on Saturday, Jan. 22. After tea a Christmas tree afforded great delight to each small recipient of a gift, which included sweets and bon-bons. The remainder of the evening was spent in games and competitions enjoyed by both the entertainers and the entertained.

Gerrard Exchange.—On Jan. 29, the staff entertained once again the soldiers at the Queen's Hospital, Sidcup, to a tea, whist-drive and dance. Great appreciation was shown by the patients and members of the Hospital staff who thanked the Committee again and again for organising entertainments on such a generous scale. During 1920 the Gerrard staff contributed over £100 towards these functions, and it is the general opinion that the money could not have been put to a better object.

Kensington Exchange.—From the proceeds of a dance held on Jan. 14, the staff of the Kensington Exchange have sent a donation of £10 to the St. Dunstan's Blinded Soldiers and Sailors' Fund.

Stratford Exchange evidently has a very energetic though comparatively small staff. They set out to raise a sum for the War Seals Foundation by means of a concert and the result was that the receipts totalled £54 10*s.* 0*d.* or an average exceeding £2 per head of the staff. The comment "highly successful" is hardly adequate.

Streatham Exchange.—A very pleasant and jolly evening was spent by the staff at a dance which was held at Madeira Hall, Streatham, on Jan. 27. The function was well attended by members of the staff and their friends. Popular music rendered by the orchestra added greatly to the full enjoyment of the evening. It is a great satisfaction to the staff to know that there is a balance of over £10 from the sale of tickets, which it has been decided to forward to St. Dunstan's Home.

Paddington Exchange.—On Feb. 12 a very successful entertainment and tea was provided for over 300 poor children at the L.C.C. School, Cosway

WHERE TO STAY.

The attention of our Readers is directed to the following list of Boarding and Apartment Houses.

SWANAGE.—The Highcliffe Private Hotel and Pension. Unrivalled position on sea-front. Near Golf Links. Excellent cuisine. Inclusive terms. Enlarged 1911-1912. 'Phone: 47 Swanage. Mrs. Hooke.

DEAN FOREST.—Severn-Wye Valleys. Beautiful Holiday Home (600 ft. up) 55 rooms, extensive grounds, motors, golf. Boarders 47*s.* 6*d.* to 63*s.* Prospectus—Littledean House, Littledean, Glos.

EASTBOURNE.—"The Polytechnic," 109-111, Tideswell Road. Recommended by Polytechnic, Regent Street. Comfortable holiday home. Seven minutes station. Five minutes pier. Liberal table. Piano. Terms, board residence 5*s.* deposit and 2 guineas at end of week.

ILKLEY, YORKS.—Marlborough House Boarding Establishment. Tennis Court. Billiards. Excellent cuisine. Near Moors. Stamp for tariff. Mr. and Mrs. J. T, Robson, Resident Proprietors.

Street, Paddington, by the staff of the Paddington Exchange. The tables presented a very animated appearance when the children sat down. Each child had a bon-bon and on every plate was a small jelly. After Grace, the children fell to and soon the air was resounding with the cracking of bon-bons. Caps of bright hues were soon in evidence on the children's heads, and with startling rapidity bread and butter, cakes and jellies disappeared. The hall was cleared for the entertainment and strains of music preceded the arrival of ten pretty Pierrettes, who danced on to the stage singing their opening chorus. For the next hour and a half the fun was fast and furious, the children joining heartily in singing the choruses. As the little heads began to nod the entertainment was brought to a close, but the children were not too tired to give three rousing cheers for their entertainers. On passing out each was given a bag of fruit and a bright penny. Several letters were received subsequently from the children saying how much they had enjoyed the party.

Our very best thanks are due to all who assisted in any way to make the afternoon such a complete success, for as the Headmistress says in her letter, "it will be a bright spot in their lives for a long time to come." This is our reward.

Photo by Messrs. Barratt's Photo Press, Ltd.

HOLBORN EXCHANGE NOTES.

A real live Father Christmas ! The spirit of Christmas found a material form on Jan. 26 when one hundred and fifty of the poorest children in the vicinity of King's Cross were invited by the Staff of the Holborn Telephone Exchange to a Tea and Christmas Party. The first thing they saw as they gave up their tickets and entered the beautifully decorated schoolroom was Father Christmas himself, who welcomed them with a handshake. You should have seen the faces of those little urchins as they beheld him ! When they had done justice to their palates and pockets with the good things which had been provided, Father Christmas told them that all the people who worked in the Holborn Telephone Exchange had given or collected over £70 in order to give expression to their Christmas sentiments of goodwill and charity to some poor children and that they were the lucky children. Conjuring, Punch and Judy and a Fairies'Concert Party were the principal items of the programme which followed the tea. Mr. Marks also directed the children in singing some well-known songs in which they justified their little "King's Cross Linnets." As they took their departure each one was given a suitable present, an article of clothing and an orange. The Minister of the Church, who very kindly lent the schoolroom, proposed a vote of thanks to the Holborn Telephone Exchange for giving his "terribles" such a treat, and Mr. Ballard suitably responded.

Among the changes in the London Telephone Service, in the first eek of the New Year, the transfer of Miss Butler to London Wall Exchange was an event of significance, not only to Miss Butler herself, but to the staff at Holborn where she has been stationed since 1914. The esteem in which she was held by all the staff, and an appreciation of the manner in which she has filled the rôle of Chief Supervisor of an important Exchange during the difficult years of the War were expressed by Mr. Ballard when, on behalf of the Supervisors and Staff, he presented her with a diamond ring. Miss Butler had, he said, attached herself to all the staff, and he was sure that the regret which he knew she felt at parting was shared by all with whom she had been associated. They one and all wished her equally happy associations and even greater prosperity in her future spheres. Miss Butler suitably responded.

DISCIPLINE: IS IT NECESSARY ?

BY AN ASSISTANT SUPERVISOR.

DISCIPLINE—awful word—how we all kick against it ! Yet someone has said that we are only really happy when disciplined. Apparently a contradiction, for we all desire happiness.

Apart from the question of law and order, which must always be, there are some interesting points which could have more light. Discipline makes independence. There is no doubt of that, and, if we always act according to instructions, we naturally get a free and happy independence—an independence that no one can touch.

I often remind telephonists with whom I work that if they carry out instructions, they make themselves almost independent of supervisors We should then all be happy, and, of course, there would be less work to do. What a pleasing prospect ! Moreover, independence is the spirit of the age, so we should be quite up to date in that way.

Again, in working according to authority—a law of nature—no one is dependent on individual caprice. I shall not attempt to calculate the number of instructions that have been issued, but we know and understand all the governing principles. Both in our own world and in the world outside, the disciplined individual is easily recognised; in fact, he or she is the only comfortable person with whom to work or live. Undisciplined people usually claim to be temperamental—poor dears !

Consider an actress; she says the same words day after day as we do, and her success depends on the impression she creates by her manner of delivery. Our work is alive—it is teeming with interest, and we must "act" and "act" with our voices. A film actress is seen but not heard; a telephonist is heard but not seen.

We are expected to convey by "expression" all that subscribers must understand, and they do understand. How often we hear: "It was not what he said, but how he said it." Speech is only right and pleasing when distinct, and this depends on the mobility of the lips or the flexibility of the muscles of the lips. If this were given full play we should not hear of voice strain so often. In fact, to speak expressively, which is most fascinating, all the muscles of the face up to the eyes should be in play.

Now consider the daily effect on the London public of 5,000 well-produced and modulated voices helping to smooth the general friction of the work-a-day world. The modern girl can be congratulated on keeping all their prickles out of sight; in fact, there are not many left in these days.

It is not so long ago that we were very prone to take personally everything those around did or said. This is indeed a much more sensible age, in spite of all that has been said of the modern girl. During the day all sorts of things crop up, and we should take each as it comes as part of our work, without going off the deep end !

We have realised our mistakes and learned that life is impossible unless we give and take, or carry out team work all the time. This surely is the *esprit de corps*, not that kind of brotherhood business which consists mainly of shaking hands in an enervating atmosphere.

Humour is another quality—it is the great antiseptic, so we smile when we feel inclined. It may sound unbusinesslike—I don't know—but we smile if it feels right. It is not always necessary to have the capable business woman written all over one to be successful, and that just proves in another way that our work developes our personality.

It is all so interesting dealing with human beings like ourselves. Fancy living only among books and papers !

Stevenson says something to the effect that books are anaemic things compared with real life. The subscribers we talk with are the same as those remarkable people we read of in novels. We all have crises at some period of our life, which would sound thrilling in a book, only in a book the uneventful years are left out.

We need imagination; we should always endeavour to see things from the subscribers' point of view, and then lead on to our own; where the two meet is the correct stopping place. And we must meet even if we have to build a bridge. If we are right, and we always are, take things easily; some people are in too much of a hurry to be right.

We must not get discouraged when it is thought that there is no progress. Anything worth doing is not as a rule done quickly. Conditions are improving, but it appears, oh ! so slowly, at times. The country parson once said of his Church, "we do not jerry-build, neither do we seek to deceive by building the back parts shabbily."

When in doubt as to any course of action, we should do what we think to be right (everything is either right or wrong), but at any rate we do something —we act. So that the accusation of being wanting in initiative cannot be charged against us.

All the training or discipline we receive in the Service is an asset which should last our lifetime. I think a good telephonist is a charming person to meet; she has my sincerest admiration. And I think I am right in saying

that she is popular everywhere. I know this is true of those who went to France.

I wonder if we all realise how much our first years in the Service mean to us. It is then our reputation is made, and once made it always sticks. We all love a reputation, whether it is that of Ellen Terry or Beecham's pills! And in the world of telephones the telephonist must take the lead—it is her work; the public will follow.

It has been contended that a woman's reasoning powers are sometimes missing. This, of course, is pure heresy, but perhaps the difference is just this—a man thinks step by step 2+2+2=6 and it is so. A woman sees that 2+2+2 looks like 6, and she also is right, but if she be wise she will prove it before saying so.

I would recommend telephone operating to the pessimist. We get a complaint full of the most serious accusations; we investigate, invariably to find that nothing is as bad as it is painted, which proves that pessimists, who mostly judge by appearances, are wrong.

The enforcement of punctuality is a pet grievance with many of us. Yet we must admit that this is necessary when we relieve or are relieved by others. And we never have to suffer at the other end of the day. We are free to make our arrangements undisturbed, and we have thus freedom because the rules of punctuality are so strictly enforced. Discipline again!

In these ways and in many others, we help to make the new world by the effects of our work. Is it a good one? It must be; there is no excuse for indifference in these exciting times.

"Every day a fresh beginning,
Every morn is the world made new."

E. PYNE.

PRESENTATION TO MR. C. L. PARSONS.

An enjoyable New Year Social gathering of the Brighton Telephone staff at the Pavilion Creamery, on Thursday evening, was the occasion of an interesting presentation to Mr. C. L. Parsons, Chief Clerk of Telephones, who has just retired after 33 years' service. The Staff's gift was a gold watch suitably inscribed, together with an umbrella for Mrs. Parsons.

Mr. P. F. Currall, District Manager, in making the presentation on behalf of the staff, spoke in appreciative terms of Mr. Parsons' long and efficient service. The whole of Mr. Parsons' Telephone career had been spent in the Brighton District, and during his association with the service it had grown from exceedingly small proportions until the telephones in the District now numbered over 12,000. He desired to record his appreciation of Mr. Parsons' business ability, tact and geniality in dealing with the general conduct of the Telephone Service, and he took this opportunity of thanking him officially for the loyal support and untiring work which he had always placed at the disposal of the Department. He was sure he was voicing the feelings of the staff when he said that it would not be possible to find a more loyal, kindly and considerate chief, and in bidding Mr. Parsons an official farewell he hoped that both he and his wife would be spared for many years to enjoy their well earned retirement.

Mr. Currall's remarks, which were cordially endorsed by Mr. F. W. George, Contract Manager, and Mr. A. Lumsden, Traffic Superintendent, were received with acclamation by the staff.

Mr. Parsons, who spoke with considerable feeling, said he was unable to sufficiently thank Mr. Currall and the staff for their kindly appreciation in presenting him with such a handsome memento of a long and happy association with the Telephone Service. He had always endeavoured to carry out his duties by combining business efficiency with consideration for the welfare of the staff, holding the view that a contented staff was usually an efficient one. He was proud to know that on his retirement he was taking with him the kindliest thoughts and best wishes of the whole of the staff.

LLANDUDNO AND DISTRICT TELEPHONE STAFF SOCIAL.

The engineers and telephonists of the above district held a very successful social evening on Jan. 12 at Payne's Café, Llandudno.

The Postmaster, supervising officers and staff of the Head Post Office were the guests of the evening, and members of the staff and friends attended from Colwyn Bay, Conway, Old Colwyn, Deganny, Llanrwst, Penmaenmawr and Bangor.

Mr. J. A. Robinson, Inspector, occupied the chair, and in a few well chosen words welcomed the guests, the Postmaster, Mr. W. W. Young, responding suitably.

Mr. J. Parsons (Engineers) and Miss Kennerley (Travelling Supervisor) acted as host and hostess, while the M.C.'s were Miss Rich (Telephones) and Mr. E. Williams (Engineers), assisted by Miss Gwen Jones (Telephones) and Mr. Willett (Engineers).

An attractive programme of games, competitions and musical items had been arranged and the fun was fast and furious from 7.30 p.m. until after midnight. Full justice was done to the excellent supper provided and all agreed that a most enjoyable evening had been spent.

CORRESPONDENCE.

CAUSE AND EFFECT.

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

SIR,—In your article under this heading in your current issue, you say "The cost of its goods to the public is artificially inflated by the newspaper ramp." This is a misconception, as a matter of fact, the cost of goods is reduced by using the Press as a medium for advertising. Sales costs have always been a heavy addition to the manufacturing costs as travellers and travelling expenses must be paid, and the manufacturer is naturally obliged to take this into consideration before arriving at the price to be charged to the wholesale trade, and the wholesale traders are equally obliged to do the same before fixing their price to the retail trade.

The public appealed to direct and made acquainted with the merits of the article through Press advertisements, now ask the retailers for the goods advertised. The saving in selling costs brought about by Press advertising is enormous, as I will endeavour to show in this letter.

I do not know the evening paper which charged the price of £1,200 for one insertion of an advertisement, certainly no evening paper has such a rate on its published scale, but that is by the way.

No article can be sold without publicity in one form or another. The primary method is by travellers calling upon retailers, and the salesman in the retail establishment recommending to calling customers. The secondary method is by circularising the possible consumers. The third method is to inform the public by means of advertisements in the Press (bill-posting is merely auxiliary).

May I set forth the comparative costs of these methods, in the reverse order in which they are given above.

PRESS ADVERTISING.

A full page advertisement in a daily paper, say the *Daily Mail*, with a circulation of *over* a million. The current scale rate for front page is £1,000, or an average cost per thousand of £1. (You may take it there are many readers of the paper who are not the original purchaser, but that is all to the good).

CIRCULARISING.	£	s.	d.
One million stamps at ½d.	2,083	0	0
Printing one million circulars at 10s. ...	500	0	0
*Envelopes, one million at 5s.	250	0	0
*Addressing at 5s.	250	0	0
	£3,083	0	0

* These are below present prices.

PERSONAL CALLS BY CANVASSERS.

To visit one million in one day, say at the outside 50 calls per man, would demand an army of 20,000 men. These at the lowest estimated cost for wages and travelling expenses could not be less than 15s. per man for the day. Total £15,000. We do not think any reasonable man would advocate a reversion to the old-fashioned method of personal canvas after comparing these figures.

SELLS, LTD.

[We think Messrs. Sells takes our contributor's quip rather seriously. We fully appreciate the valuable publicity of newspaper advertisement and agree with Messrs. Sells that it is probably a very cheap and effective form of canvassing, but we think they miss our contributor's point, viz., that the Press which is attacking the new telephone rates so vigorously and so unanimously, raise their own charges far more promptly and in a far greater ratio. The consumer does in fact pay the extra cost of advertising, although he may gain from newspaper publicity when that method of bringing goods to the public notice is adopted in place of a more expensive method. The telephone tariff was designed on the commercial plan of asking the consumer to pay for the quantity he consumes, just as he would pay more for the whole front page of the *Daily Mail* than for an inch of it.—ED., "*T. & T.J.*"]

NORWICH TELEPHONE DISTRICT NOTES.

The second annual dinner of the District Manager's staff was held at the Royal Hotel, Norwich, on Jan. 6, 1921. The chair was taken by Mr. C. F. Ashby, District Manager, and the visitors present were Mr. F. C. Luke, Surveyor of the Eastern District, Col. Treble, C.M.G., Postmaster of Norwich, and Mr. T. Lakey, Sectional Engineer, Norwich. The dinner was followed by a concert and the whole of the proceedings were of an exceedingly pleasant nature.

On Thursday evening, Dec. 30, the District Staff, Post Office Telephones, Norwich, met to pay tribute to the memory of Lieut. W. H. Parish, one of their colleagues who fell in the Great War. The memorial took the form of an enlarged portrait suitably inscribed and was unveiled by Mr. C. F. Ashby, the District Manager. The dedication service was conducted by the Rev. A. R. Barnes, who in a few well chosen words, emphasised the great spirit of brotherhood and self-sacrifice.