

# THE National Telephone Journal

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## TELEPHONE MEN.

### L.—JOHN DUNLOP WATSON STEWART.

JOHN DUNLOP WATSON STEWART is a Scotsman, having been born in Glasgow on Feb. 3, 1872, and educated first at the public school at Rothesay, in Bute, and afterwards at St. John's Grammar School, Hamilton.

He entered the Company's service at Glasgow on July 25, 1886, when Mr. Dane Sinclair was engineer there, and spent three years in the workshop under Mr. Tom Donaldson, who was, and is, chief mechanic. Probably a larger number of boys have passed through Mr. Donaldson's hands than those of any other man in the service.

On Oct. 31, 1889, Mr. Stewart was appointed Test Clerk at Glasgow, and in March following Local Manager at Falkirk. In December, 1890, he was transferred in the same capacity to Kilmarnock, and two years later became Local Manager at Hamilton.

On the reorganisation under Mr. Gaine in May, 1893, Mr. Stewart was appointed District Manager for the Mid-Lanark district, and in the following year transferred to Greenock. At that time Greenock possessed a generator call-and-clear system, the board in use being of the Scribner multiple type. During Mr. Stewart's stay the exchange was shifted to other premises, a flat board installed, and a call wire system brought into use.

Early in 1896 he was appointed to the District Managership of Aberdeen, where he spent eight years. During that period the Aberdeen and Inverness districts were amalgamated to form the North of Scotland district, which, with its area of some 15,000 square miles, ranks as the most extensive in the kingdom. It is indicative of the ground which it covers that to reach the most distant exchange from the district office involves a journey of eight hours by land and eight hours by sea.

Mr. Stewart's tenure of office at Aberdeen was coincident with the large expansion of telephone facilities throughout the kingdom, and a number of exchanges was opened in the north. Not content with its work on the mainland, the Company sent Mr. Stewart on a canvassing mission to the Orkney and Shetland Islands, the latter of which are distant about a day's sail from Aberdeen. He found

the people there a mixture of the slow-going Scot and the frugal Scandinavian, a combination which proved too much for his efforts to obtain sufficient support for the Company's proposals. More especially in the Shetland Islands are there to be found traces of the Scandinavian influence in the names, features, and temperament of the islanders. These islands, it may be noted, were pledged as security for payment of the dowry of Margaret of Norway, who wedded James III of Scotland.

In June, 1904, Mr. Stewart was appointed to Edinburgh, and the five years which he spent there saw extensive additions to an already well-laid-out underground system, the conversion of the switchboard at Edinburgh Central, and the adoption of central battery working. In the neighbouring burgh of Leith a C.B. switchboard was installed in new premises which had already been taken. The earth circuit system was made metallic and the new system brought into use. The introduction of central battery working at the two largest exchanges in the district involved an extensive replacement of the subscribers' instruments in Edinburgh and Leith, and the equipment of the different sub-exchanges with special apparatus, in order that the full benefit of the improved working at the larger places should be obtained. The switchboard in the old exchange at Leith was one of the original multiple boards. It was installed about 1888, and was to the new board as the stage coach is to the motor car. When the private branch exchange tariff was introduced it was strongly pushed at Edinburgh. The ground was found to be very hard to break, but ultimately an opening was got, and the



new method was taken up enthusiastically by a number of firms, business and professional.

In August last Mr. Stewart was transferred to his present position at Belfast.

Mr. Stewart is pre-eminently a man of system, and takes a keen and sympathetic interest in all that concerns the prosperity of the Company's system, and the well-being of the staff.

His technical experience had the right beginning in the

mechanics' shop and, as above noted, he has had a most varied and useful succession of duties in several districts, subsequent to the usual apprentice period, where he, in common with several others who now hold high rank in the Company's service, was introduced to the several departments of the telephone business.

He is a typical Scot, with well-settled opinions on most things, opinions which are always thought out with care and intelligence.

In his recreations he is essentially an out-of-door man, and finds some of his greatest pleasures in walking, fishing, and hill-climbing. He dabbles in photography and, need we add, plays golf.

#### THE TELEPHONE MASONIC LODGE.

UPWARDS of 100 brethren attended the third installation ceremony which took place at the Gaiety Restaurant, London, on May 28. Previous to the installation, Messrs G. T. W. Salisbury, E. J. Whibley, H. J. Loney, G. E. Nicholls and J. W. Ullett passed through the ceremony of initiation. The Worshipful Master, Bro. P. P. Kipping, also presented a jewel to Bro. P. J. T. Kenney, on behalf of the officers and brethren, as a mark of their appreciation of his valuable services as first secretary of the lodge.

Bro. Stanley J. Goddard, S.W., was then installed as Worshipful Master for the ensuing year by W. Bro. P. P. Kipping in a most able manner, for which he was specially thanked. The newly installed Worshipful Master appointed his officers as follows:—Bros. F. A. B. Lord, S.W.; P. J. T. Kenney, J.W.; C. E. Tattersall, treas.; F. O. Harke, L.R., sec.; A. F. Paddon, S.D.; W. M. France, J.D.; C. E. Wetton, P.P.S.G.D., Middx., D.C.; W. J. Downes, A.D.C.; V. Baldwin, org.; J. E. Pullin, I.G.; F. E. Sims, R. H. R. Kenway and J. R. B. Gall, stewards. In presenting W. Bro. Kipping with a handsome P.M. jewel, on behalf of the lodge, the Worshipful Master said he hoped he would live many years to grace the lodge with his presence and give the benefit of his great experience. A sum of five guineas was voted for the relief of the sufferers in the Whitehaven Colliery disaster.

The brethren afterwards dined together under the presidency of the newly installed Worshipful Master, and amongst members and visitors present were V. W. Bro. Jas. Stephens, Pres. Bd. of Ben.; W. Bros. J. Taylor, P.G.D.; G. C. Kent, P.A.G.D.C.; J. Gordon Langton, P.D.G.D.C.; J. F. Roberts, P.G.Swd.Br.; Chas. H. Stone, P.A.G.P.; J. M. Bathgate, L.R.; A. Findlater, P.P.G.D., Middx.; W. W. Mansfield, P.P.G.D., Middx.; T. Caparn, P.P.G.D., Hants; J. C. Ozanne, P.G.S.B., Guernsey; R. McLean, P.G.S. of Works, Guernsey; E. Lockwood, L.R.; A. M. Barnard, L.R.; A. P. Crabb, L.R.; Thos. Fletcher, P.M.; W. Phelps, P.M.; and Bros. A. E. Bennett, S. D. White, F. E. Benest, W. Heilbuth, A. E. Ruddock, D. McIntosh, A. Pugh, H. Davis, W. V. Morten, C. H. Sibley, J. Scott, W. Noble, etc., etc.

Letters of regret were read from Rt. Wor. Bro. Lord Balfour of Burleigh, K.T., P.G.W.; W. Bros. J. M. McLeod, P.G.Swd.Br., secy. R. M. Inst. for Boys; R. Percy Simpson, secy. R. M. Inst. for Girls; and other brethren. During the evening W. Bro. Geo. Franklin, P.P.G.W., West Yorks, telegraphed to the Worshipful Master: "Hearty good wishes on your accession to the chair, together with happiness and prosperity to the brethren who will, I hope, excuse this antiquated method of communication."

In responding to the toast of the "Grand Officers," Bro. Jas. Stephens, Pres. Bd. of Ben., said it gave the grand officers the greatest delight to be present to witness the splendid prosperity of the lodge. He was particularly pleased to hear that Bro. Kipping was about to take up as a steward to the Girls' Institution the magnificent sum of £250 from the lodge, showing that he and others had not lived for themselves alone. Bro. J. Gordon Langton, replying on behalf of the visitors present, expressed his great pleasure at witnessing the installation of W. Bro. Stanley J. Goddard, whom he initiated only five years ago. W. Bro. E. A. Fisher also ably responded to the toast.

The Telephone Lodge of Instruction, which was recently formed, has adjourned its meetings till September.

**Telephone Men XLIX.**—In our notice of Mr. Gilmour last month we regret that "cautious" appeared by a printer's error for "courteous" in the last paragraph but one.

## THE OPERATING OF SUB-EXCHANGES AND OUT-CENTRES.\*

### TACT AND COURTESY.

BY MARGARET HARFORD FRYER, *Trowbridge.*

I BRACKET these two essentials as the subject of the first part of my paper, as they are of paramount importance, and the key to successful operating. Many are the times when sub-exchange operators find it necessary to exercise tact and courtesy, and I should like to give a few instances in every-day operating calling for the exercise of these qualities.

A subscriber frequently comes on the line in a great hurry, asks for a number in an agitated manner, but is informed that the number he requires is "temporarily out of service," or perhaps that the junctions are engaged. In some cases the subscriber fails to understand the expression used, and tact and courtesy are required in order that the delay shall be satisfactorily explained to him.

Co-operation naturally suggests itself, and this I am appealing for on behalf of the subscriber and the operator.

Subscribers seem generally to hold the opinion that the more furiously they ring the more expeditiously they will be answered. It is, indeed, a pity that this is so, and that some means cannot be found to illustrate to subscribers the fallacy of this theory, as it would save the operators many a headache during the course of a busy day.

### THE SUB-EXCHANGE FROM THE INSIDE.

BY MABEL LAWRENCE, *Brislington.*

I STRONGLY advocate the sending of central exchange operators to sub-exchanges with the idea of educating them in the peculiar difficulties of sub-exchange work.

A sub-exchange operator, to start with, must be her own clerk-in-charge to a certain extent, and in an emergency must decide what to do quickly, having nobody in authority to refer to. This in one way is an advantage, as it gives her confidence in herself.

A prevalent idea is that the operator at a sub-exchange is liable to get into the subscribers' ways; but this is not so, as she finds it to her—and to their—benefit to train them into her system.

The sub-exchanges are worked on a different system to the central exchange, and it is occasionally very difficult to get the user of a telephone to grasp the fact that the handle must be turned before taking off the hand set; also that there is a spring which it is necessary to press while speaking. We have to depend on the subscribers ringing off by turning the handle, and failure to carry out this is a great hindrance.

Has anyone else met the man who is most indignant on being asked for the usual penny, declining to pay on the ground that the sign stated "public call office"? Nothing would convince him that the Company were not wilfully misleading the public on the matter.

### SUB-EXCHANGE OPERATORS AND SUBSCRIBERS.

BY DAISY V. HAZELL, *Portishead.*

IN the case of many sub-exchanges the operator is known personally by some of her subscribers, but this should not cause any difference in her manner to them.

Continually dealing one with the other should result in mutual understanding and a feeling of interest between operator and subscriber, and where that result is obtained benefit all round is derived.

The operator knows how to treat her different subscribers according to their peculiarities and thus trust in the operator arises.

If, however, in the heat of the moment, subscribers abuse the operator, who is perhaps at her wits' end to get things right, a

\* Extracts from papers read before the Bristol Operators' Telephone Society.

feeling of righteous indignation is apt to fill the heart of the poor girl and a certain amount of friction naturally arises.

I should like to say that were all subscribers to visit their exchange they would see for themselves what an operator has to do, and this would probably cause them to be a little more patient in their manner, realising that the operator does her best for them in every possible way.

### TRAINING A SUBSCRIBER.

By MABEL BAIJENT, *Chippenhams*.

I EXPECT if some subscribers heard us say we were trying to train them they would feel a little annoyed.

But after all we have to train them, and very hard it is sometimes, as each subscriber has to be dealt with in a different way. Some you cannot train, no matter how you try, while others soon come into line, realising at once that you only wish to treat them in a business-like manner.

To an operator in a small town it is very much harder to adhere to the correct expressions, because she is generally personally known to her subscribers, who, consequently, do not treat her as "the exchange girl," but as a personal friend. As an instance of their method of giving calls one may receive in reply to the operator's "Number, please?" "Oh, is that you Miss A? Good morning! How are you? Would you mind putting me on to Mr. Brown? I'm sorry, I don't know his number!" Then, again, I have had subscribers ring up and say: "Is that you, Miss A? Are you busy for a moment? Here is my little boy. He wants to speak on the telephone. Do you mind speaking to him?" What can one do in a case like that?

I would like to say a word for the travelling supervisor, as I am sure every sub-exchange operator is grateful for her assistance. It is pleasant to be able to turn to her for instruction and advice, and much benefit is derived from her periodical visits.

### HAPHAZARDS.

By PHYLLIS MARY KINGSMITH, *Swindon*.

JUST over two years ago the telephone was to me, literally, an "unknown quantity," and my first impression of a switchboard was that it was "fearfully and wonderfully made," and the more I learn of telephony only intensifies that impression.

I think that patience and good temper are the most essential qualities an operator can possess, but they are often sorely tried by the careless and thoughtless way some subscribers use, or misuse, the telephone. In fact, some subscribers have not even the rudiments of common courtesy, judging by the way they address an operator. On the other hand, there are subscribers whom it is a pleasure to serve, as they are invariably courteous and considerate to the operator.

The commonest errors of subscribers, I find, are (1) not ringing off when their calls are completed and (2) asking for the subscribers they require by name instead of number.

As a method of curing them of the former irregularity the best way is, I think, to fetch them back to the telephone, probably after they have comfortably re-seated themselves in their armchairs, and politely inquire, "Have you finished?"

### THE USE OF STALLOY METAL IN TELEPHONY.

By R. M. CHAMNEY, B.Sc., *Engineer-in-Chief's Investigation Department.*

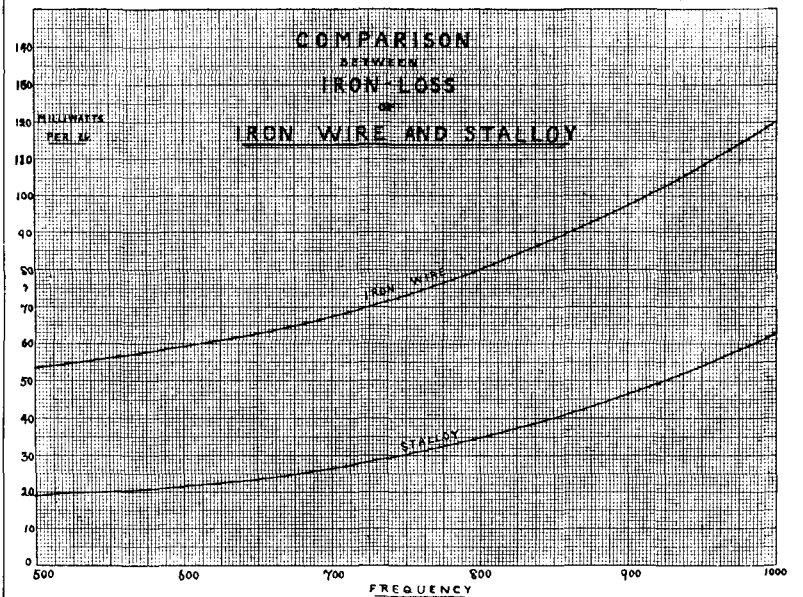
STALLOY metal is a steel alloy brought out by Sir Robert A. Hadfield a few years ago, its chief characteristic being the addition of 3 per cent. of silicon. This increases the resistivity of the alloy to about three and a half times that of ordinary transformer iron, so

that the eddy current loss, when it is used as part of an alternating current magnetic circuit, is greatly reduced, and this point seems to be the most important as regards telephony. The hysteresis loss is also very much less than with ordinary iron. The permeability of stalloy is larger than that of iron for the small values of B used in telephone work, and it reaches a maximum of 4,500 for a value of B of 5,500. For this reason smaller cores of stalloy can be used, thus still further reducing the loss.

A curve has been got out by Mr. G. M. Shepherd, of the Investigation Department, showing how the total iron loss of both iron wire and stalloy vary with the frequency. This curve was obtained by means of cores of the two metals being tested in a No. 23 induction coil. It is interesting to note that the loss with the latter is on the average about half that with the former over the range of frequency given.

In the actual test the induction coil was supplied with current from a small high-frequency alternator which gives as nearly as possible a pure sine-wave, and the secondary coil was on open circuit.

Induction coils with cores of stalloy were tried to see whether there was any improvement in transmission, but only a very slight difference was noticed.



A large number of tests have been carried out with diaphragms made of stalloy metal in both C.B. and L.B. H.M.T. receivers, and a very fair improvement was noticed in each case. The method of testing was as follows:—

A receiver was tested for its allowance with its ordinary diaphragm on the standard C.B. circuit; a stalloy diaphragm was then substituted for the ordinary one, and the allowance again taken. In order to eliminate any error due to the diaphragm being placed differently in the receiver, both of the two tests were repeated; the mean of the first and third tests being taken as the allowance with the ordinary diaphragm, and the mean of the second and fourth tests being taken as the allowance with the stalloy diaphragm. The difference of the two means for a large number of receivers gives the improvement.

A large number of these new diaphragms are being issued to Head Office and Salisbury House (C.B.) and the Bishop's Stortford and Cromer areas (L.B.) for durability tests. Half of the receivers in these areas are fitted with new stalloy diaphragms, and the other half are fitted with new ordinary diaphragms; and by noting how often faults occur due to these diaphragms and how often renewals are required, the relative durability will be obtained.

Another interesting point as regards stalloy is that its temperature co-efficient is only '001, whereas that of ordinary iron is about '006.

## PROMOTION.

By G. F. B. G.

THE interest taken by the staff in the subject of promotion and in the means by which advancement may be obtained is in itself a sufficient reason for bringing the subject into prominence by means of the JOURNAL.

Promotion should be made entirely on the basis of a man's fitness for increased responsibility; it is therefore best striven for by studying and cultivating the qualities necessary for the position aimed at. A great deal of hard work is sometimes done in the hope of promotion without any very definite idea of the goal to be reached. This is of little use; it is necessary to concentrate and specialise on the work most suitable for the position in view. But specialisation must not be carried too far. It must not be allowed to narrow a man's efforts to such an extent that he becomes fit for nothing else but one position, for openings often occur in directions other than that expected. Training should therefore be directed to the broadening and development of character as well as to the acquisition of the knowledge necessary for the class of work in which one is engaged. For promotion involves new and enhanced responsibilities, and it is the man who is best fitted and equipped to bear these who will be chosen. Fitness and equipment here mean the possession of character and ability suited to the position. Under these two main headings, character and ability, we may consider the whole of the qualifications for promotion to be grouped. Of the two, the former is of the higher importance for strength of character can create ability, but knowledge and skill, though they may assist, are incapable of remedying a weak and indecisive character.

The selection of men for promotion is one of the most important duties devolving upon those charged with the administration of a large undertaking. It involves a very heavy responsibility, for the men they select will exercise a great influence on the conduct of the business, and the methods they employ in making the selection will have important effects on the *morale* of the staff.

The problem of selection resolves itself into that of forming an accurate estimate of character and ability. Before discussing the methods of making the selection it will be well to consider briefly the requirements under these two headings.

It has already been said that character embraces the more important qualifications. Many of the virtues which go to make up a first-class character will readily occur to everyone. Honesty, however, deserves special mention, because this virtue, above all others, is a most essential part of character. Whether exercised in the handling of property or in the use of time, or in dealings with other men, it carries with it the attendant virtues of reliability, truthfulness and zeal. Many other attainments, such as common sense, tact, courtesy, and others, some of which are natural and some the result of careful training, might be mentioned, but the list is a long one. Suffice it to say that the man to be promoted should have a character which has earned for him the confidence of his colleagues and employers. There is one trait which should be mentioned before leaving the subject of character. This is really a defect somewhat difficult to describe, and still more difficult to foresee. We refer to the cases in which the aspirant's enthusiasm and effort are induced only by hope of promotion, and vanish as soon as the position is attained. This is a failing which should be very carefully guarded against; many a disappointed candidate may find in it a reason why some rival, apparently making less strenuous efforts than himself, was selected.

Although ability cannot be considered of so great importance as character it is by no means to be dispensed with. Included in it are knowledge and skill, but both these are useless without that quality which enables a man to bring them into direct application to his work. This is the reason why experience is so valuable, for the knowledge and skill derived from experience have arisen from the work itself, and so are in a form fit for direct application. Ability admits of less general discussion than character, since the qualifications coming under the former head are entirely dependent on the class of work. The knowledge and skill to be looked for in

promoting a lineman are widely different from those to be looked for in a contract agent.

The essential qualifications necessary in an aspirant for promotion having been briefly considered, one or two of the methods adopted by different administrations in making the selection can now be dealt with.

The ancient and simple method of selection was by length of service; happily it is now almost extinct. Among primitive tribes it may have resulted in the best man being made chief, for with them the only road to knowledge was through experience, so that he who had lived longest was best equipped. But in civilisation, with its many opportunities for education and its devices for protecting the weaker members of the community, selection by length of service only cannot result in the promotion of the best men. Yet experience and practice are no little matters, and long service gives an authority which a younger man finds it difficult to exercise.

Modern conditions demand a less empirical and automatic means of estimating a man's capabilities. There are so many factors involved of such a varying importance that any arbitrary test is worse than useless. We each have our opinion, perhaps a little indefinite, of every other member of the staff with whom we have come in contact; this opinion is based on the sum of our observations of his behaviour and work. A good chief will seek to form as definite and accurate an opinion as possible by careful observation and study of his staff, so that his men will be selected for promotion, not arbitrarily or empirically, but on the basis of an estimate which sums up the multifarious items included under the terms character and ability. A man's work, carefully and sympathetically studied, is the best guide to his ability; it indicates not only whether he has knowledge, but, what is more important, whether he has the power to apply it. As for character, if character is a bundle of habits, what can be a better guide to it than a watchful study of the habits which make it up?

This principle of selection places the whole responsibility of making the choice on the head of the department, and exposes him to the charge of favouritism. There are two ways in which attempts have been made to avoid this. One is by means of a special independent test of the candidate's capabilities by examination either written or *viva voce*. This is the method recently adopted by the Post Office. If we judge it by the extent to which it enables one to form an accurate estimate of ability and character, it is undoubtedly bad. No one would suggest that a written examination is other than a useless and very misleading test of character; while men who meet the candidate for a week's *viva voce* examination cannot possibly form such a reliable opinion as the men for whom and with whom the candidate has worked for years. Nor can an artificial and special test give a proper insight into a man's ability; it can to some extent test his knowledge, but knowledge is of use only so far as it can be applied, and an examination is a poor test of a man's power of applying what he knows. No matter how much his knowledge may be, if he cannot make it evident by applying it to his daily work, it can fairly be assumed that it is useless. Of course, it is of purely technical knowledge that we speak; we are not concerned here with the broadening of character resulting from a good general education.

It cannot even be claimed that examinations test a man's real knowledge; it is extremely difficult, if not impossible, to devise an examination in which some advantage is not to be gained by "cramming." It has been urged that the ability to "cram" shows a quick and retentive memory, and should therefore quite rightly count to a candidate's benefit. Perhaps so, but is it right to allow a minor facility, such as the power of memorising, to have so great weight as to belittle the importance of all the qualities comprised in character?

The advocates of the examination system claim that it encourages a man to read up subjects relating to his work and to study it from the theoretical point of view. Such study is, of course, desirable and necessary, but to stimulate it by examinations only tends to distort a natural means of acquiring knowledge and to place a false value on mere academical proficiency.

A man's real knowledge is not the specially acquired text book knowledge on which most examination papers are set; it is the information on which he has as certain a grip as on his multiplica-

tion table. This is the knowledge which is of use to him and his employers, and until his text book knowledge has been digested and absorbed to this extent it will find little expression in his work.

Even for knowledge, then, the unwritten record of the candidate's daily life and work is the best test. By the side of this examinations are unnecessary, and worse than unnecessary, for they lead to a man's fitness being estimated on what is only a very small proportion of all that should be taken into account.

And what of the effect of the examination system on the staff? Apart from the irritation and discontent which inevitably accompany any examination, there is a very serious repressive effect on the energies of the staff. Everyone admits, of course, that competition for promotion is good, but when that competition is decided by an artificial and individual test of a man's knowledge, the stimulating effect of competition is replaced by a selfish and jealous attitude which refuses help to a colleague for fear that the knowledge imparted may mean the loss of a few points' headway in the examination. The man who is best capable of filling a superior position is obviously not a man who succeeds in keeping most of his knowledge to himself, but a man whose nature is to help, advise. Only his employer and his colleagues can estimate this quality; as proof is needed of the increased efficiency of a staff whose every member knows that the extent to which he helps his fellows is taken into account in his claims for promotion.

The other method by which the placing of the whole responsibility on the head of the department can be avoided is the simple and rational one of taking into account the opinion of others of the candidate's seniors who have had opportunities of studying him perhaps to a greater extent than his chief. The responsibility is no light one, nor is it fair to the employee that his promotion should rest with one man only. Apart from all suspicion of bias or favouritism an incorrect estimate of the man's fitness will mean loss to his employers in any case, and it may stand in the way of the advancement of a man who is thoroughly worthy of promotion.

It is not difficult to see what an improvement such a system creates in the staff. Each man strives to make himself as useful as possible to his chief and his fellows, knowing that on his chief's opinion depends his future advancement, yet fully aware that any false impression he may create on his chief will be dispelled by his colleagues. Knowledge he will get not because he is compelled to acquire it, but because he feels the need of it; ability in applying it will come from practice in working out his own problems and assisting his fellows in theirs; his character will be moulded by the continual desire to make himself useful, efficient and respected. Finally, the men selected will be those who have won the good opinion of their chief and colleagues not by some artificial and arbitrary test, but by proved ability and consistently loyal conduct.

REVIEW.

*The Practical Telephone Handbook.* By Joseph Poole, A.M.I.E.E. (Whitworth Scholar). Whitaker & Co. Cloth, 600 pp., 6s. net.—We have just received the fourth edition of the handbook from the publishers. Mr. Poole's book, which has been thoroughly revised, is a standard work on the subject of telephony and is too well known to call for detailed criticism. It covers all the main branches of telephone work from the first principles of electricity and magnetism down to the complicated apparatus of the automatic exchange. The new edition contains some 70 additional pages, including new chapters on Submarine Telephone Cables, on Later Post Office Exchange Practice, on Development Studies, and on Wireless Telephony, whilst the chapter on Automatic Exchanges has been considerably extended. The information in the Appendix has also been increased, and includes some very useful facts and figures. The book is well illustrated, the blocks having been increased in number from 473 to 530. The diagrams are very clear and exemplify the latest practice, but we think some of the larger half-tone blocks might have been better printed. We recommend the book most confidently to all our readers; it is a work no telephone man can afford to be without.

THE TELEPHONE LOAD LINE.

By H. DEANE, Assistant Traffic Manager, London.

(Continued from page 49.)

TABLE C.

JUNCTION VALUATIONS AT PRESENT ADOPTED BY THE METROPOLITAN TRAFFIC DEPARTMENT.

Exchanges with	1—10 outgoing junctions.	Junction valuation	— 2 2
.. ..	11—20 .. ..	.. ..	2 1
.. ..	21—30 .. ..	.. ..	2 0
.. ..	31—40 .. ..	.. ..	1 9
.. ..	41—50 .. ..	.. ..	1 8
.. ..	51—60 .. ..	.. ..	1 7
.. ..	61 and upwards .. ..	.. ..	1 6

As regards the value of incoming calls, I prefer to refer to this when I speak of "B" operators' loads.

One of the most controversial traffic problems is what should be regarded as an "A" operator's hour load when she works at her maximum efficiency. This load is usually referred to as being equivalent to so many local calls during the hour. There can be little doubt that the usual standard—namely, 100 local calls per half-hour or 200 local calls per hour—has to a great extent been accepted because these are figures which facilitate calculations. It has always been recognised that such a load is a fair load, and not necessarily what particular operators can handle or even what average operators can attain under certain conditions. Anyone can satisfy himself concerning the former point by comparing the position register readings at an exchange where the distribution is known to be on good lines. "A" operators vary considerably in efficiency, and considerable differences will be noticed in the loads dealt with by each when all the positions in an exchange are filled. When we speak of an average hour load of 200 local calls per operator, we should always bear in mind that some operators are doing considerably more work than others, and that even were "A" operators equally efficient such a load can in no way be regarded as a maximum load. It is a load which can be satisfactorily dealt with, with certain objects in view, and which can easily be exceeded on particular occasions.

Now, when we speak of an average hour load of 200 local calls per operator, we imply something which some lose sight of. We mean that if such a load is maintained, and if our supervision and exchange organisation are on a sound basis, a certain standard of service will result therefrom. In certain cases questions of policy arise that require "A" operators to deal with a higher load than the standard; but then we are perfectly prepared to see the service suffer to some extent. The standard of service which we expect from a C.B.1 exchange is that the average time of answering subscribers' calls shall be 4.5 seconds; that the average time of clearing connections when the clearing signal is given shall be 4.5 seconds; and that the percentage of operating irregularities shall not exceed 18 per cent. We are of the opinion that we can do this with the existing amount and system of supervision. Of course, were it desirable to increase that supervision, we could raise the standard of service, without in any way affecting the standard hour load of operators.

If we accept the average time valuations of calls at C.B.1 exchanges in table B as representative, it can easily be shown that an "A" operator is only actually operating during 60 per cent. of an hour when she is working at her maximum efficiency. We see, therefore, that a load of 200 local calls per hour affords her considerable margin. On the other hand, we must remember that an operator cannot be compared with a machine which can work continuously during a given period. Even if an operator had absolutely nothing else to do than to operate, we could not expect her to account for every second in the hour. An operator has, as a matter of fact, a good deal to do besides what may be termed productive operating. She makes ineffective attempts on her initiative to effect calls, she answers speed of answer tests, listens on the instruction circuit, has to answer false calls, to deal with permanent glows and with subscribers who complain of being rung in error. She has to refer certain ineffective calls to the monitor for completion, to report faults, junction delays, cases of

subscribers who are cut off and of wrong numbers connected by "B" operators. Inspectors also test lines with operators, and when it is necessary for operators to ring on lines and answer questions relative to the "hearing" considerable time is sometimes sacrificed. Traffic men who deal with operators' loads should consider these points very carefully.

I suppose it will never be possible under such conditions to calculate what an operator's hour load should amount to. In those cases where we are fairly confident of the junction call valuation experience shows that the present standard for C.B.1 exchanges is a fair one. I have up to the present referred to this standard as being equivalent to so many local calls during an hour or half-hour. If our junction valuations are correct, it should theoretically make no difference whether we speak of so many local calls or valued calls. In view of the fact, however, that certain exchanges with a small percentage of junction working are apparently able to deal with higher loads than the standard with comparative ease, some traffic men think that even if we have ascertained the exact relation between the local and junction call, there is something in addition at exchanges with a large percentage of junction working which has to be accounted for. They argue that at an exchange with, say, 95 per cent. of local working, operators have such simple straightforward work to carry out that it almost becomes mechanical; whereas, at exchanges with, say, 20 per cent. of local working and a complicated junction system, there is some factor that comes into operation which results in the operators more frequently being taken at a disadvantage.

One sometimes hears that because certain conditions have changed during a given period, the standard load at a C.B.1 exchange should be raised from 200 valued calls during the busy hour to 220 or 230. However convenient it may be to adopt this language it is wrong reasoning and implies an ignorance of junction valuations. It will be evident, I think, that if we at any time adopt a standard of 200 local calls per hour there can only be one thing which will cause this load to increase—namely, the time value of the local call decreasing. The tendency of this time value at large exchanges is rather to increase than to decrease, so that, in reality, at such exchanges, we should decrease the number of local calls representing the standard rather than increase it.

What really happens is that the average junction call valuation is falling. The figures in table B tend to confirm this. As a result, although the standard expressed in local calls remains the same, operators are able to deal with more actual calls than before on account of the time value of junction calls being lower.

Now if we say that an "A" operator at a C.B.1 exchange can operate during 2,284 seconds in the hour (that is, the average local call valuation 11.42 seconds multiplied by 200) we can also say that at such an exchange as Avenue, where the local call valuation is 12.14 seconds, "A" operators can only deal with 188 (or, say, 190) local calls per busy hour. In addition, we must be careful to adopt the correct "junction call valuation" for such an exchange. Table D shows the busy hour standards we at present adopt at different types of exchanges.

TABLE D.  
"A" OPERATORS' STANDARD "BUSY HOUR" LOADS.

Type of switchboard.	"Busy hour" load expressed in local calls.
C.B. (1) }	200
C.B. (10) }	
C.B. (9) }	
Magneto (self-restoring indicators) }	190
Magneto (hand-restoring indicators) }	
	160

In table E we have certain time valuations in connection with incoming calls at C.B. exchanges. Before I discuss whether there is any relation between these values and the load a "B" operator can take, I should like to draw attention to an important distinction that exists between an "A" and a "B" operator's work. As there is team work on "A" positions it is possible for an "A" operator to start with a small load and gradually attain proficiency. Now a "B" operator must take the load her position demands. She cannot be helped by others except to a very limited extent in disconnection. That is the reason why the "B" should always be a senior operator. If we expected a "B" to operate for the same number of seconds in the hour as we expect an "A" operator to

operate, we should find that very high loads would be taken when compared with the loads which are actually taken. It is important however, to distinguish between the nature of an "A" and a "B" operator's work. A "B" operator's operating is practically a repetition of the same kind of work, but it is work which requires considerably more physical exertion than that of an "A" operator. Also, it is work of such importance that unless it is extremely accurate, any inaccuracy will react upon the "A" operator. It is also necessary that "A" operators shall not be delayed in the use of an order wire. Consequently it is very desirable to safeguard against rushes on order wires. Every rush means delay to some operators. These are the chief reasons why we cannot expect "B" operators to actually operate during the same percentage of the hour as "A" operators do. A "B" operator is, to a great extent, dependent upon circumstances; she cannot occupy her time to the same advantage as an "A" operator.

TABLE E.

TIME VALUATIONS OF INCOMING CALLS AT C.B. EXCHANGES: FROM OBSERVATIONS TAKEN DURING MARCH, 1909.

Order wire calls:	Seconds.
From the moment a junction is allotted until the control is depressed .. .. .	2.24
From the moment a junction is allotted until connection has been made to engaged signal ..	3.38
From the moment the "B" operator commences to clear until cord is guided back to socket or junction is re-allotted .. .. .	1.04
Average value of incoming call (20 per cent. subscribers engaged) .. .. .	3.51
Signal junction calls:	
From the moment "B" operator enters circuit until control is depressed .. .. .	5.78
From the moment "B" operator enters circuit until connection has been made to engaged signal ..	5.64
From the moment "B" operator commences to clear until cord is guided back to socket .. .. .	1.14
Average value of incoming call (20 per cent. subscribers engaged) .. .. .	6.89

There is no theoretical connection between a "B" operator's load and the carrying capacity of the junctions connected to her position. Everyone is now familiar with the general principles that the number of calls a junction can carry during an hour is dependent upon the average length of junction connection; and that the more we increase a group of junctions, the greater is the carrying capacity of each junction in the group. Suppose now a group of junctions, fully worked during the busy hour, corresponds to a particular number of connections on the "B" operator's part, which work represents a fair busy hour load. For some reason, let it now be supposed, the average length of junction connection decreases. Each junction will, in consequence, be able to carry more calls per hour. The group of junctions need therefore not be increased until its carrying capacity is exceeded under the new conditions. Although, then, the number of junctions under the control of the "B" operator in question has not been increased, a greater load is demanded of her. If her previous load was considered a fair load, her new load will be an overload. She cannot, in consequence, maintain the same standard of service rendered to "A" operators. The correct procedure in this case is to decrease the number of junctions under her control. Suppose now the average length of junction connection remains constant and that in process of time the junction group increases so as to cover two "B" positions. The "B" operator attending to the first order wire will now be dealing with a higher load than before, because the carrying capacity of each junction has increased. The question arises whether this is a similar case to that I have mentioned above, and whether, in consequence, we should reduce the group of junctions under the "B" operator's control? Both reasoning and experience show that this is not a similar case, and that such a "B" operator can take a higher load than before. The explanation is that the "A" operators having now two order wires which they can use are carrying out something in the nature of team work which "B" operators cannot carry out between themselves. In a word, the "A" operators are making the "B" operators utilise their time to better advantage, which they cannot, by taking thought, do of their own accord.

Of course there must be a limit to a "B" operator's load,

When this is reached, we must decrease the junctions per position and restrict the number of "A" operators using the order wires that exist by bringing into use other order wire positions.

It is as well to bear in mind that the magnitude of a "B" operator's load is, until we reach her physical limit, dependent upon the service which we expect "A" operators to receive when they use an order wire. This explains the reason why we cannot expect "B" operators attending to split order wire positions to handle the same load as "B" operators attending to straight order wire positions. "B" operators attending to the former positions find it more difficult to assign junctions belonging to various groups; and, if we did not take into consideration the slight delays in the assignment of junctions on a split order wire position, we should only encourage the possibility of order wire rushes, reacting in their turn upon "A" operators, and consequently upon the service.

The study of "B" operators' loads, under different conditions, affords an enormous field to the traffic expert.

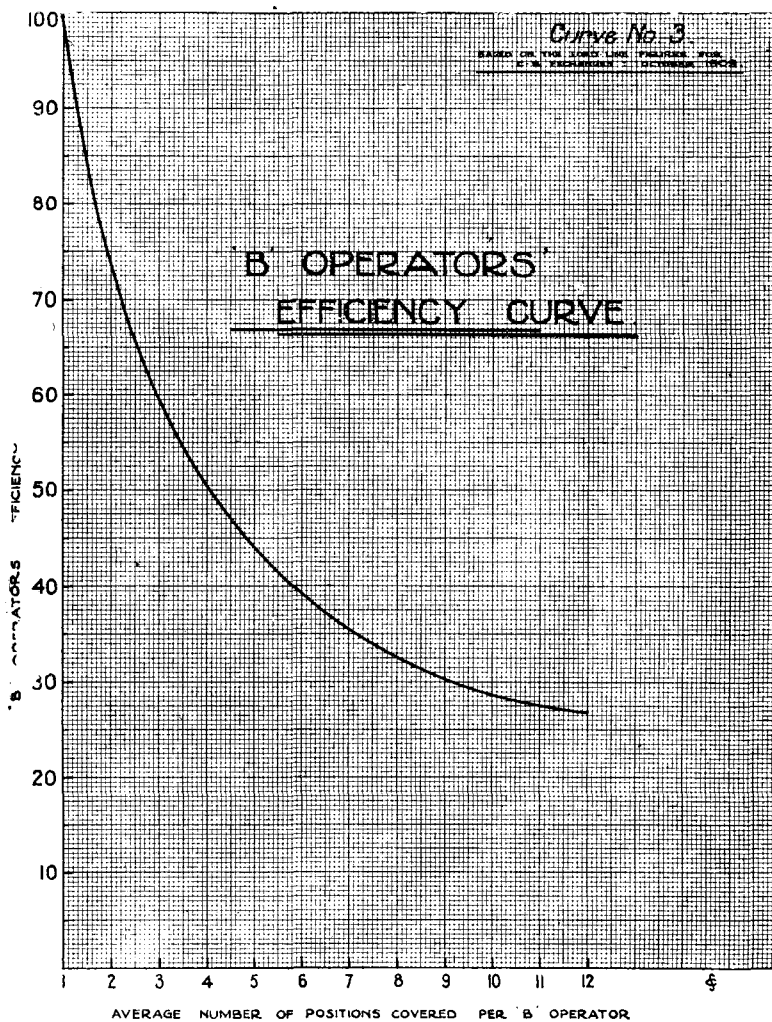
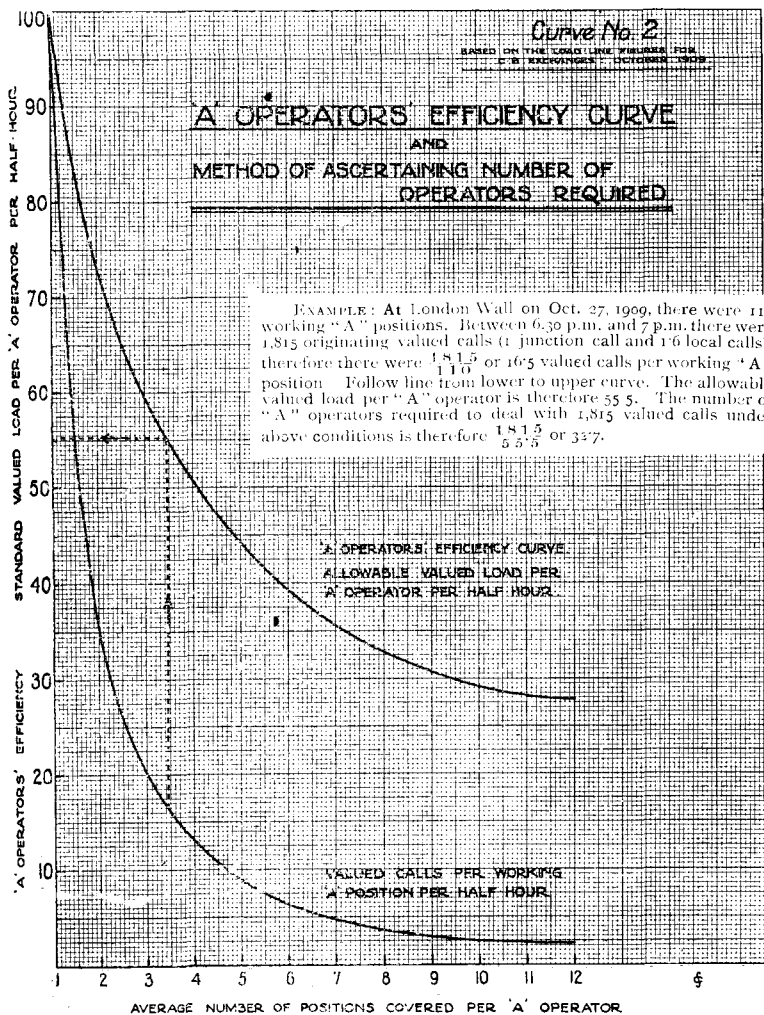
TABLE F.

"B" OPERATORS' "BUSY HOUR" LOADS: C.B. (1) EXCHANGES.

Number of order wires incoming from one exchange.	Number of exchanges connected to the same order wire.	"Busy hour" loads.
6 or more	—	490
5	—	475
4	—	460
3	—	440
2	—	410
1	1	350
—	2	340
—	3	325
—	4	300
Signal junction position	—	140

I should like to conclude this particular subject by saying that the actual setting up and taking down of connections does not constitute all the "B" operator's work. The connections she

establishes are not equivalent to the applications she deals with. She has sometimes to say "No lines," to ring on junctions, to change them, to deal with cases where "A" operators are obviously on the wrong order wire or have taken wrong junctions; and she is often forced to demand a repetition of the application.



With regard to the relation between an "A" operator's efficiency and the number of positions she has to cover, it has been recognised for some years that some connection exists between the two. Whether this relation can be worked out scientifically is a problem for the traffic expert. Such a problem would involve the determination of the amount of team work that an operator carries out when she covers one position, and how this is affected when she covers more than one position. The number of calls which an operator answers and which originate at her own position, when she is working at her maximum efficiency is, in London, lower than might be supposed.

We are forced, therefore, to ascertain what actually takes place in practice and to adopt this as our standard, in the absence of a scientific formula. This is, as a matter of fact, an excellent method, especially if we feel sure of the efficiency of our exchange organisation. An exchange official, to put the matter in plainer language, feels fairly certain whether, at a particular time, for example, six operators are sufficient or whether a seventh is required. Curve No. 2 is based upon this practical experience.

The upper curve, which is an "A" operator's efficiency curve, is based upon the load line records taken at the C.B. exchanges during the last week in October, 1909. The value of such a curve would naturally be increased if it could be based upon all the load line records taken at C.B. exchanges in the kingdom. For London, at any rate, it may be taken as a fairly safe guide. When the matter is considered correctly, this curve, after all, is only an illustration of the principle that each C.B. exchange should strive to do as well as the average if its efficiency falls below it,

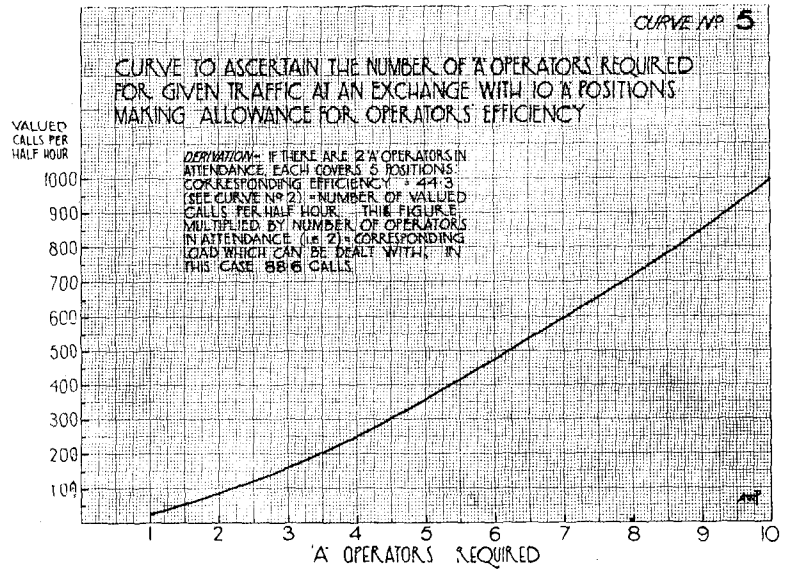
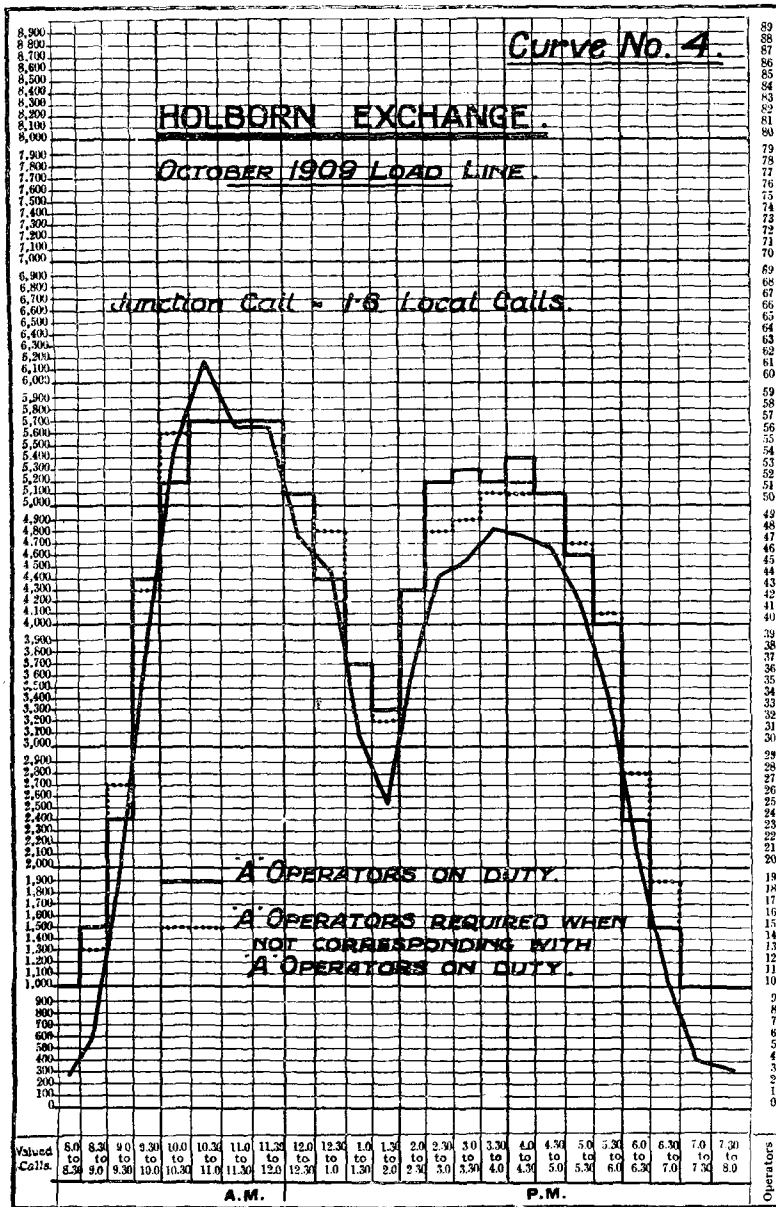
It will be seen that when an "A" operator covers one position only, she is at her maximum efficiency, and that this efficiency falls to about 28 per cent, if she covers twelve positions. It will also be noticed incidentally that the usual standard valued load expected of an "A" operator during half an hour when she is working at her maximum efficiency corresponds with the figure representing that maximum efficiency.

Curve No. 3 is an efficiency curve for "B" operators calculated for the same exchanges, and is wonderfully similar to curve No. 2.

We are now in a position to represent the load line record in graphic form, and to calculate what staff is necessary to deal with the traffic.

Everyone is familiar with the general aspect of a load line curve for a London exchange. It is plotted for each half-hour between 8 a.m. and 8 p.m., this being the usual time during which the day operating staff is on duty. The average number of "A" operators during each half-hour is also shown. So far, these two quantities—namely, the valued originating traffic and the operating staff—are actual facts; and if an operator's efficiency did not vary with the number of positions she covered, it would be a very easy matter to ascertain what staff was necessary to deal with the traffic half-hourly throughout the day. In fact, if we were not particular concerning the standard of service remaining constant, we might simply supply the operating staff which the load line curve showed was directly necessary. But this direct method is not sufficient for our purpose during the slacker times of the day,

if we wish to maintain our standard of service. The method we must adopt is clearly shown in curve No. 2. The lower curve is obtained from the upper curve by dividing the various points of the latter by the number of positions covered by an "A" operator.



It therefore represents the valued calls per position. I have given an example showing exactly how the number of "A" operators required is obtained in a particular half-hour and for a given traffic at an exchange with a particular number of "A" positions.

A simple method, devised by Mr. Jenkins, the Bank Exchange Manager, for ascertaining at a glance whether the correct staff is on duty during each half-hour of the day, is to show on a load line curve not only the staff on duty, but also the staff required as ascertained by the method already explained. Curve No. 4 is the October, 1909, load line for Holborn Exchange. The junction valuation at this exchange is taken as 1.6. It will at once be seen how easy it is to discover by this method if the correct staff is in attendance during each half-hour of the day. It will also be noticed that there is no visible connection between the load line curve and the number of "A" operators required. For instance, who could tell, without calculation, that 51 "A" operators were required between 4 p.m. and 4.30 p.m. at Holborn? I should like to impress this point upon those who may have to criticise the load line curve for any exchange.

The method I have described may be considered laborious, but the result, I think, justifies the trouble expended. If an exchange is not so rapidly growing that additional "A" positions are frequently being brought into use it is quite easy for any exchange manager to draw a curve for an exchange of definite size, by means of which he can ascertain at a glance the number of "A" operators required for any given traffic, the efficiency of the operator being taken into consideration. Curve No. 5 is such a curve for an exchange of ten working "A" positions. The example given is sufficient to explain how the curve is derived. Directly the exchange exceeds ten positions a fresh curve must be plotted.

These considerations apply equally to the number of "B" operators required during each half-hour of the day, except that the average load which a "B" operator should take when she is working at her maximum efficiency varies for each exchange, being dependent upon the various classes of "B" positions existing. There is not, therefore, that simple connection between the operator's efficiency and the corresponding load that exists in the case of originating traffic, and this fact complicates calculations to some extent.

I should like now to draw attention to this point. The number of operators which the traffic shows is required during each half-hour throughout the day should be, in Post Office language, the "Nirvana" (!) of the exchange manager, although possibly he may never attain it in the case of large exchanges. At such exchanges it is as impossible to predict the exact shape of the load line as it is to predict that a particular staff will be on duty. I think



everyone will admit in the case of a large exchange that if it were found that the operators on duty on a particular day exactly corresponded with the operators required, half-hour by half-hour, it would indeed be an extraordinary coincidence. It is of interest to know that curve No. 4 demonstrates an arrangement of duties which is efficient to the extent of 96.2 per cent. I have obtained this figure by considering, for example, that it is just as inefficient to have two operators more than required in a particular half-hour as it is to have two operators less. At Holborn, therefore, the arrangement of duties is highly efficient, and it would probably have been more efficient if the sanctioned staff had been exactly what was necessary.

(To be concluded.)

TELEPHONE DEVELOPMENT IN THE EARLY EIGHTIES.

By W. H. GUNSTON.

OLD records have a historical, if not a practical interest, and something more than an idle curiosity is aroused by a reference to the Company's earliest Press-cutting book, which covers a period extending from 1882 to 1885. The strangulating restrictions which the Post Office had placed on the development of the telephone were about this time (1884) to some extent removed by the granting of licenses whose scope was not confined to prescribed limited areas, and whilst some of the newspapers are loud in their praises of what they consider Mr. Fawcett's statesmanlike settlement of the problem, others deplore the creation of a private monopoly. It is strange to read as far back as 1882, when there were only about 5,000 telephones in the whole of England, allusions to the United Telephone Company as a huge monopoly! Many of the cuttings refer to infringements of patents and to the dispute between the United and the Globe Telephone Companies, which was ended by the acquisition of the latter by the former in 1884.

The *Pall Mall Gazette* of Dec. 6, 1883, contains a lively and instructive description of an exchange in those days:

"What, then, is a telephone exchange station? We will take the East India Avenue, in the City, as an average sample. From the lofty roof of one of the houses of that sombre court rises a derrick, a square structure of wrought-iron bars 30 or 40 feet high by 8 or 10 feet wide, and looking like the upper portion of a skeleton lighthouse, very rigid and very transparent. This edifice is surmounted by a lightning conductor; you ascend it by a perpendicular ladder, and, pausing on its upper story—for it is divided into two floors—you look round from your airy perch to find that what appear innumerable wires radiate from your transparent cage in every possible direction over the dirty housetops of the City. Most of these wires are bare and unenclosed; others are in cables containing each twenty wires. Each of them is lettered and numbered, and a cupboard on the derrick contains an apparatus for testing them. So much for what is above the roof. Below, in the attic, is a room occupied by eleven young ladies. The 271 wires, which represent the subscribers of the East India Avenue Exchange with 46 trunk and other direct wires, are guided down from the derrick above into neat mahogany cabinets or cases, in front of which the young ladies are seated. The alert dexterity with which at the signal given by the fall of a small lid about the size of a teaspoon the lady hitches on the applicant to the number with which he desires to talk is pleasant to watch. On the day of our visit there had been in this one office no less than 2,400 calls. Here, indeed, is an occupation to which no "heavy father" could object; and the result is that a higher class of young women can be obtained for the secluded career of a telephonist as compared with that which follows the more barmaid-like occupation of a telegraph clerk."

One is at a loss to understand why the telegraph clerk's occupation is classed as barmaid-like.

Time has brought about some remarkable changes in the relative telephone development of different parts of the world, although, of course, America has always maintained the leading place. According

to the *Globe* of Nov. 23, 1882, the number of subscribers in the principal countries then was:

United States ... ..	37,187
England ... ..	5,000
France ... ..	3,600
Italy ... ..	2,902
Germany ... ..	2,322

Sweden is not mentioned. The figures probably refer to the end of 1881. *The Times* remarks "It is in America, of course, where the telephone is freer than on this side that the development is greatest." Thus early were the cause and effect of Europe's backwardness demonstrable.

The *Pall Mall Gazette* in March, 1883, gives the total number of telephone lines in the world, presumably at the end of 1882, as 78,008, of which 41,569 were in the United States, 7,287 in Great Britain, 5,507 in Italy, 4,437 in France, and 3,613 in Germany. The high position of Italy is noticeable; they are second amongst European States in 1880, in 1809 they drop to fifth place, and at the present time they are as low as ninth. When we come to individual towns we find Paris in front of London, and Vienna in front of Berlin. *The Times* gives the following figures of subscribers' lines for October, 1882:—

New York ... ..	4,060
Chicago ... ..	2,726
Paris ... ..	2,422
London ... ..	1,600
Amsterdam ... ..	700
Stockholm ... ..	672
Vienna ... ..	600
Berlin ... ..	581

Cincinnati comes above London, and Boston and San Francisco above Amsterdam. The development of the United Telephone Company's system in London in the early eighties was as follows:—

Dec. 31, 1880 ... ..	89 subscribers.
" " 1881 ... ..	1,338 "
" " 1882 ... ..	2,386 "
" " 1883 ... ..	3,195 "

The National Telephone Company which then operated in most of the towns in Great Britain outside of London and Lancashire possessed the following subscribers at the end of 1882 and 1883:—

	1882.	1883.
Total system ... ..	2,350	3,487
Glasgow ... ..	694	742
Edinburgh ... ..	231	283
Bradford ... ..	223	283
Leeds ... ..	159	286

Great Britain maintained its position at the head of Europe until somewhere in the late eighties, when Germany got in front, and has remained there ever since. Its population, of course, is half as large again as that of this country.

In conclusion I give a table showing the vicissitudes in telephone development of seven of the great cities of the world at various intervals from 1882 to the present time. What is most remarkable is the way in which Berlin passes from last position in 1882 to first in 1888, far exceeding the development of New York, a position which it maintained until 1899. New York has now outdistanced all its rivals, and London is well ahead of Berlin.

	1882.	1888.	1898.	1904.	1909.
	Lines.	Lines.	Stations.	Stations.	Stations.
New York	4,060	6,902	29,283	148,667	361,302
Chicago ...	2,726	4,694	...	78,703	207,719
Paris ...	2,422	5,300	19,351 (lines)	46,933	69,205
London...	1,600	6,978	20,561 (lines)	93,598	181,011
Stockholm	672	5,800	25,000 (approx.)	40,476	61,588
Vienna ...	600	1,600	10,573 (1897)	20,000 (approx.)	41,552
Berlin ...	581	9,199	36,650 (stations)	66,449	112,225

## TELEPHONE WOMEN.

## LXX.—FLORENCE KENNERLEY.

MISS KENNERLEY has completed seventeen years in the Company's service in Llandudno, having taken up duty on Sept. 19, 1892, as one of the two operators engaged when the exchange was first opened with 25 subscribers. The exchange premises were the two top rooms of an otherwise empty building in



FLORENCE KENNERLEY.

Sloddaeth Street (now part of the Clarence Hotel). The service given at the opening of the exchange was from 9 a.m. to 6 p.m., which was later extended to 8 a.m. to 8 p.m. When the building in which the exchange was situated was connected to the Clarence Hotel, arrangements were made with the manager of the hotel to give an all-night service, and Miss Kennerley remembers well on entering the switchroom one morning finding nearly all the subscribers' indicators plugged up with matches, and on asking for an explanation receiving the reply "Oh, those subscribers worry me too much." Needless to say complaints were numerous at this time. In April, 1894, the exchange was removed to the present building in Mostyn Street, where Miss Kennerley, with necessary assistants, now has charge of more than 300 subscribers' lines.

Miss Kennerley has served under two provincial superintendents, four district managers and four local managers, and such are her capabilities and unflinching courtesy that it is not too much to say she has pleased them all. She is of a retiring and unassuming disposition, and is very popular with all her colleagues on the staff.

## LXXI.—ELIZA MILLER.

MISS MILLER entered the Company's service in March, 1891, and took up duty in the South Side Exchange (now named the South Exchange), Glasgow. At that time the South Side Exchange was the only exchange in the Glasgow district situate on the south side of the River Clyde. To-day there are thirteen exchanges, four of which serve the districts originally served by the South Side Exchange.

The staff of the exchange in March, 1891, consisted of three operators and the system was magneto, the subscribers and junction

(incoming and outgoing) lines terminating on single cords in addition to jacks. The subscriber after signalling the exchange waited until the operator rang back before taking the receiver from the hook. The operator answered by saying "Well," and the subscriber after giving his call replaced the receiver on the hook and had to be called again by the operator when the attention of the number asked for had been secured. The only junction lines in existence were from and to the Royal Exchange over which all calls from and to other exchanges had to be effected.

The operator's equipment like the subscriber's equipment was somewhat primitive and the method of operation was in keeping with the equipment. To detail the many operations necessary in dealing with a connection, although interesting, would be too lengthy a process. Suffice it to say that the operators then, as always, carried out their duties in as efficient a manner as the equipment permitted. Co-operation between operators was not even then a latent virtue, it being quite customary for the operators to assist each other.

A few years later the call-wire system was introduced, but as this phase has been dwelt on in previous biographies of "Glasgow Telephone Women" it need not be gone into here.

In November, 1899, a new exchange on the "ring-through, lamp call and clear (relay call key)" system, the first of its kind in the Glasgow district, was opened in Govan to which exchange a considerable number of the subscribers connected to the South Side Exchange was transferred, and Miss Miller was appointed to take charge of it. The science of telephone traffic and large transfers of subscribers from one exchange to another had not then been so thoroughly mastered, and things did not go quite so smoothly as they do to-day. Unfortunately also, the fates were unkind, and within a few days of the opening the main underground dry-core cable, the first underground cable to be laid down in the district, broke down, and for two or three days only local calls between subscribers whose lines had been unaffected by the break-down could be effected.



ELIZA MILLER.

The defect was put right as speedily as possible, and shortly thereafter subscribers and staff alike becoming thoroughly conversant with the new method of working, a marked improvement in the service compared to that possible under the call-wire conditions was speedily effected, co-operation between the operators, not then but now known as "team work," assisting largely in bringing about this desirable result.

In June, 1905, Miss Miller was appointed Clerk-in-Charge of the South Exchange, which between the date of her leaving it and

her return to it had been wiped out by fire and rebuilt. The "call-wire" system had given place to the "lamp" system, and the switchboard was a keyless one. This type of switchboard, however, did not prove an unmixed blessing, and later, to overcome operating troubles incidental to its design, keys were fitted.

In July, 1909, Miss Miller saw another transfer of subscribers from South Side Exchange to a new exchange then opened in Pollokshields, and that part of the work devolving on her staff was very efficiently performed.

In February, 1908, Miss Miller was appointed to her present post, and as the female staff of the exchange numbers 125, it will be realised that her position is no sinecure. Her duties are many and important, and these she carries out in a most satisfactory manner. Throughout her length of service with the Company she has most ably filled the various positions of responsibility she has occupied.

Miss Miller takes a practical interest in the enjoyment and welfare of the staff over which she has control; she takes an active part in the management of the Operators' Society and Club, acting as sub-convenor of the syllabus sub-committee, and is treasurer of her exchange branch of the Savings Bank Society.

In her leisure time she finds pleasure in music and painting.

HIC ET UBIQUE.

It is interesting to learn on the authority of a telephonic contemporary quoting from another American paper, the *Monthly Bulletin*, that Oklahoma is still "wild and woolly." It publishes the photograph of two "A" operators and remarks:

These girls live on "nearby ranches and large farms. They are accustomed to outdoor sports of all kinds, they ride horses with a skill that would shame some cowboys, they shoot with a true eye," and they indulge in athletic stunts that would make a college football player resemble a mollycoddle.



It appears that most of the subscribers are Indians who cannot be taught to call by number. (We have the same trouble in some of our supposedly civilised exchanges!) When an Indian who hasn't a telephone is wanted, the operator shuts up shop, buckles on her trusty '44, jumps on her broncho and scours the plains to find the Indian and save the call. It keeps her pretty busy answering calls and finding Indians. You will notice that one of the operators has a lariat ready: if an Indian get obstinate about journeying fifteen or twenty miles back to central to listen to a lot of piffle from a fellow tribesman, why the operator probably just lassoes him and gallops back with him on the end of the rope. We wish we could use that method to get some people to answer the telephone in our exchanges.

We accept no responsibility for the veracity of our contemporary's contemporary, and merely observe for the enlightenment of our readers that the nearest equivalent of "stunt" in a civilised anguage that we can call to mind is "tour de force."

OUR Norwich correspondent informs us of a subscriber who failed to induce the incoming tenant of his residence to retain the telephone. The new tenant hailed from a country rectory and objected to "gas, telephone and all such things." Our correspondent remarks that the attitude is somewhat representative of the non-progressiveness of many of those who theoretically profess to "walk in the light."

THE fact that the circulation of the JOURNAL has recently extended to New Guinea, and Entebbe, Uganda, has moved a poetical correspondent to contribute the following verses:—

From Arctic to Antarctic  
Through every varying zone  
Wherever wends an engineer  
The JOURNAL holds it own.  
From where the rolling Andes  
Hold the secret of Manoa  
To where the Portugals still cling  
To the Indian port of Goa.  
Where the "golden sands" of Afric  
Blaze in the gorgeous noon  
And where old Nile takes its rise  
In the Mountains of the Moon.  
Through European cities  
Its conquering course has run  
Through the Golden Gate of Peking  
To the Land of Rising Sun.—(E. M. B.)

We do not vouch for Goa, and attribute the Mountains of the Moon to poetical licence, but otherwise the literal sense of the verses is absolutely correct.

GLASGOW NOTES.

*Bell Golf Club.*—The monthly medal competition for May was held at Carnyone on May 21. Ideal weather prevailed, and Mr. R. F. Gilchrist was returned the winner. The summer hole-and-hole tournament is now proceeding, several of the second round ties having been played off. Arrangements have been completed for the East v. West match, which will be played over Hamilton Palace course on July 2. There are fourteen players a side, Glasgow, Greenock and Kilmarnock being represented on the West side, and Edinburgh, Galashiels and Kirkcaldy on the East. Play will take place by singles in the afternoon, after which tea will be served and foursomes engaged in.

*Evening Cruise.*—An evening cruise took place on Tuesday, June 21, when a company of the staff, numbering about 200, journeyed by special train to Balloch, and thereafter had a most enjoyable cruise on Loch Lomond.

FROM time to time we have recorded changes in view of the approaching transfer of the Company's business to the Post Office, Post Office subscribers being connected to the National Exchanges and *vice versa*. Hitherto only comparatively small exchanges have been dealt with, but during this month (July) the Post Office undertake a more formidable task in the transfer of subscribers to the new Central Exchange in Waterloo Street. The Post Office subscribers will be joined up on the new exchange on July 15, and it is suggested that the transfer of the Company's subscribers from Royal may take place about Aug. 27.

THE results obtained by those members of the staff who attended the technical college during the past winter and presented themselves for examination have now been published, and on the whole these are very satisfactory. Forty-eight first-class and 63 second-class merit certificates, as well as several prizes, were secured, and we hope to give details of the more outstanding individual successes in next issue.

POST OFFICE INSTITUTION OF ELECTRICAL ENGINEERS.

THE following paper, read before the above institution, is now on sale at the price mentioned:—

"Depreciation," Major O'Meara, C.M.G. . . . . 1s.

Application for copies should be made with remittance to the Engineer-in-Chief, Head Office.

A NOVEL USE FOR THE "JOURNAL."

WHAT is, we think, a rather novel use for the NATIONAL TELEPHONE JOURNAL has just come to light. While cycling about six miles from Dublin, on Sunday, June 12, a young lady was knocked down by a horse and trap, sustaining a fracture of both bones of the left leg above the ankle. A member of the Company's staff living near by was appealed to and promptly set the broken bones, making an excellent inner support for the injured limb by rolling a few NATIONAL TELEPHONE JOURNALS round it and then fitting a temporary splint.

So well did the JOURNALS perform the duty imposed on them, that on reaching the hospital the doctors made very flattering remarks about the manner in which the "setting" was carried out.

This is the third person treated in this hospital within three weeks who has had "first aid" rendered to them from the same member of the Company's staff.

# The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

Published Monthly at

TELEPHONE HOUSE, VICTORIA EMBANKMENT, LONDON, E.C.

## NOTICES.

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Vol. V.]

JULY, 1910.

[No. 52.]

## GOVERNMENT DEPARTMENTS AND COMMERCIALISATION.

IN an article in *The Times* of May 6, entitled "The Lesson of the Telegraphs," the writer, after some severe strictures on the conduct of the national telegraph service by the Government in the past, institutes an unfavourable comparison between the cost of working the telephone systems of the Post Office and The National Telephone Company, and gives figures showing that the capital cost and working expenses per station of the former are considerably higher than those of the latter, whilst the Department's nett revenue per station is appreciably lower than that of the Company. In conclusion he says: "These figures indicate clearly that the approaching transfer of the telephone business from commercial to Government management ought, in the interests of economy as well as efficiency, to be made in the reverse direction." That the comparison of the moderate-sized system of the Post Office with the extensive one of the Company may prove fallacious, and that the future prospects of the service are more reassuring than the above-mentioned criticism would indicate will be the hope of the optimist. But it becomes outstandingly clear, the more the question is considered, that some far-reaching alterations and re-arrangements of the governmental machine will be necessary when it tackles the heavy work—the much under-estimated and uncomprehended work, as we believe—of running the national telephone service.

It is a singular coincidence that at this juncture a report is to hand made by M. COUYBA, reporter to the Finance Committee of the French Senate, on the Postal and Telegraph Budget for 1910. We have made several references recently to the condition of telephonic affairs in France, chiefly in respect to the effects of the governmental policy on development, for otherwise the state of the service in the two countries affords little scope for comparison. What interest us in the present report, however, are the paragraphs headed "Is it necessary to 'commercialise' the Post Office Department?" in which M. COUYBA (whose report throughout shows a masterly grip of the subject) refers to the administration as not being sufficiently in touch with its customers, as not

paying sufficient attention to the requirements of the public, and as putting itself in the unpractical situation of an industry which seeks to make profits, but which fears to increase the number of its customers. "Sometimes," he says, "it seems as if all possible efforts had been made to prevent a too rapid development of the traffic"; and he complains of lack of methodical study of public requirements, and neglect to extend the administration's field of action and to carry efficient reforms into effect. "It is absolutely necessary," he concludes, "that the great postal telephone and telegraphic industry should renounce the habits and methods of the past, and should become 'commercialised' as soon as possible. Such a change is essential to efficient service and the progress which is desirable."

The flinging of a vast national system entailing the maintenance and rapid extension of the service of over 500,000 subscribers to the care of any Government Department would tax its administrative resources to the utmost, and more especially a service so complex, so technical, so specialised, and so "commercial" (in its best sense) as that of the telephone. That an enterprise so commercial must needs be handled with the maximum of commercial expedition is self-evident, both in order that its efficiency to the public may not be diminished and that its value as a financial asset to the nation may not be destroyed. Will the Department still endeavour, if we may employ a metaphor, to haul this huge accretion to its train with one engine, or will the train be run in two sections? We think necessity will point to the wisdom of the latter choice.

The National Telephone Company has by slow and steady steps built up a great system. A specially qualified staff has been built up with it. Experience, training and diverse qualifications have fitted the latter to the former, with the result that a homogeneous whole has been created. This specialised staff, familiar with all the exigencies of the service, is working harmoniously in an established order, based on much experiment and long, well-tried experience. Should it become necessary to form a telephone separate department, as we believe it will, would it not be worth considering the possibility of retaining an organisation which is the mature result of slow and scientific development (merely making such slight alterations as may be necessary for governmental control) and obtaining for the State the advantages of the commercial efficiency with which it has worked, tempered by the experience in government work of the existing telephone employees of the Post Office.

## PROMOTION.

THE hope of promotion is common to the average man. The worthiest desire to attain it by merit; to many it is welcome from whatever source it comes; and a not inconsiderable number even prefer promotion by favour, for to certain souls the favour of the great is more precious than the consciousness of ability. The problem of promotion by merit is naturally the only one worthy of serious consideration, and it is hedged about with formidable difficulties. Worth is not always apparent, latent abilities are not always discernible, and character is often difficult to read. A man may find another with more showy and meretricious abilities preferred before him—not owing necessarily to defective judgment on the part of his chief, for the force of circumstance may have presented the inferior man in the more favourable light. True ability, no

doubt, tells in the end, but the thorny problem is to advance it to its due reward at all times.

The thoughtful article on this subject by our contributor will have a widespread interest for our readers. His suggested principles of selection have much to commend them, amounting as they do to the combined appreciation of a man's knowledge, character, and usefulness by both his chief and seniors. Whilst a great chief is generally a good judge of men and can divine almost intuitively the stuff a man is made of, there are many in whom this gift is not conspicuous, and the judgment of one man is at best a slender thread on which to hang a man's fate. We refer chiefly to the judgment of latent powers; but even the judgment of actual work and knowledge may be strengthened by the verdicts of second and third judges. Our contributor speaks truly when he says that examinations are no test of a man's knowledge, and we have before expressed our opinion of that kind of rivalry which promotes jealousy and disinclination to impart one's own knowledge to another or to assist him in difficulties. Whatever unfortunate effect such a spirit may have on the individual character, it has a ten times worse effect on the cumulative usefulness of a body of men serving any administration.

**THE BRITISH ANTARCTIC EXPEDITION.**

WHAT we believe to be the first attempt to use the telephone in connection with Polar discovery will be that made by Capt. ROBERT SCOTT in the expedition which has just set sail to make a further endeavour to reach the South Pole. We congratulate the staff on their gift to the exploration party of a telephonic outfit, which will doubtless facilitate communication between point and point on those desolate shores, and, it is hoped, afford some additional security to human life in this hazardous expedition. The proposed telephone system consists of lines from the winter quarter's hut to the observatory hut (about a quarter of a mile away), from a post in the open air near the observatory hut to another post in the open air about five miles away, and from the winter quarter's hut to Sir ERNEST SHACKLETON'S old quarters, 26 miles distant. The wires will be laid direct on the snow, a few feet apart; the low temperatures which are to be expected in these regions will, it has been calculated, improve the conductivity of the wire by some 30 per cent. The storage batteries belonging to the expedition will be employed to supply the current, as primary cells cannot be expected to work in polar latitudes.

Whether Captain SCOTT'S adventurous party are successful in their quest or not—and it will be the fervent wish of every telephone man that they may be—it seems tolerably certain that the news of the measure of success that has crowned the advanced party's efforts will reach the winter quarters over these lines and instruments, and the National staff, having presented the equipment, will have a personal and peculiar interest in the "Furthest South" telephone.

**NOTICES.**

PORTRAITS of Messrs. B. Waite, F. Cowley, E. J. Hidden, A. Martin and R. Gilmour on sunk art-plates, price 6d. each, are now ready. Those of Messrs. C. E. Fenton and J. D. W. Stewart are on order.

Binding cases for Volume IV are now ready, price 1s. 7d. each.

Back numbers of any year of the JOURNAL (except April, 1906) can be obtained, price 3d.; 4½d. post free.

Next month's issue will contain a full report of the speeches at the Annual Staff Dinner. Several interesting articles have been held over owing to pressure of space.

**TENSION AND SAG IN OPEN WIRES.**

By J. F. COOTE, A.M.I.E.E., *Engineer-in-Chief's Department.*

(Concluded from page 55.)

The curves obtained by plotting the values for the tension and sag given in the table are shown in Fig. 2, and on comparison with those given in Fig. 1 they will be found strikingly different. The tension curve is now practically a straight line, with none of the sudden rise near the minimum temperature. The variation over the whole range of temperature from 20° to 100° amounts to only 53 lbs. when elasticity is considered, as against 89 lbs. when it is ignored. The sag curve (see Fig. 2) is now convex to the temperature axis, with a more rapid variation at high temperatures, whereas that of Fig. 1 is concave with a more rapid variation at the low temperatures. The total variation between the same temperature limits as before is only 0.46 feet when elasticity is taken into account, as compared with 2.1 feet when it is neglected. The general effect of elasticity is to considerably increase the tension and diminish the sag at any given temperature.

This may be illustrated by the figures given in Table 3 for wires erected to a factor of safety 3 at 20° F.

TABLE 3.

Wire.	Span. Feet.	Temp. F.	Tension in pounds.		Sag in feet.	
			Elasticity neglected.	Elasticity allowed for.	Elasticity neglected.	Elasticity allowed for.
100-lb. copper	150	30	52	103	1.02	0.52
"	"	90	22	62.5	2.42	0.85
"	300	30	81	104	2.64	2.05
"	"	90	43	71	5.12	3.00
40-lb. bronze	150	30	22.5	63.0	0.96	0.34
"	"	90	9	44.8	2.40	0.47
"	300	30	38.5	63.0	2.21	1.35
"	"	90	17.3	46.0	4.92	1.86

We will now examine the results of the experiments made on wires specially erected for the purpose of testing the theoretical calculations. They were made on 40-lb. bronze and 100-lb. copper wires in both long and short spans and at different factors of safety, and though only a few typical results can be given here, it will be seen that they demonstrate the serious inaccuracies which result

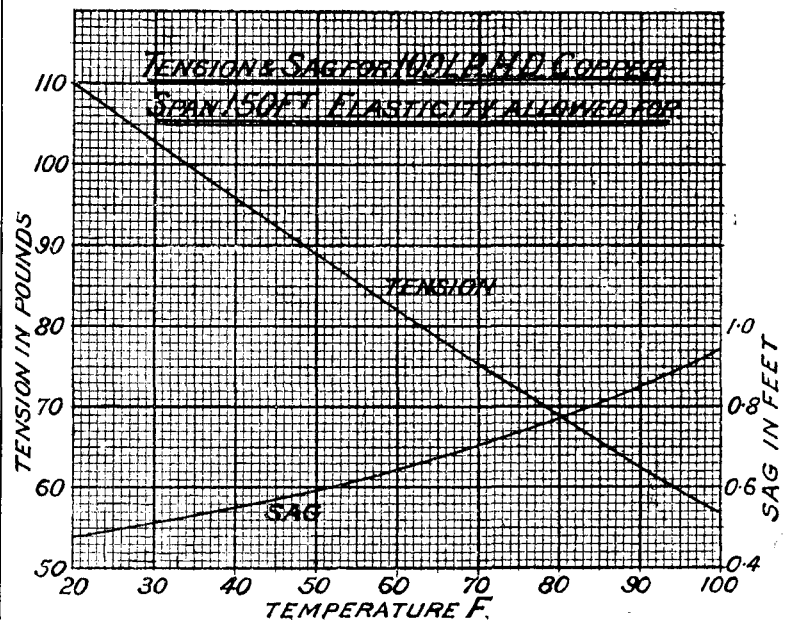


FIG. 2.

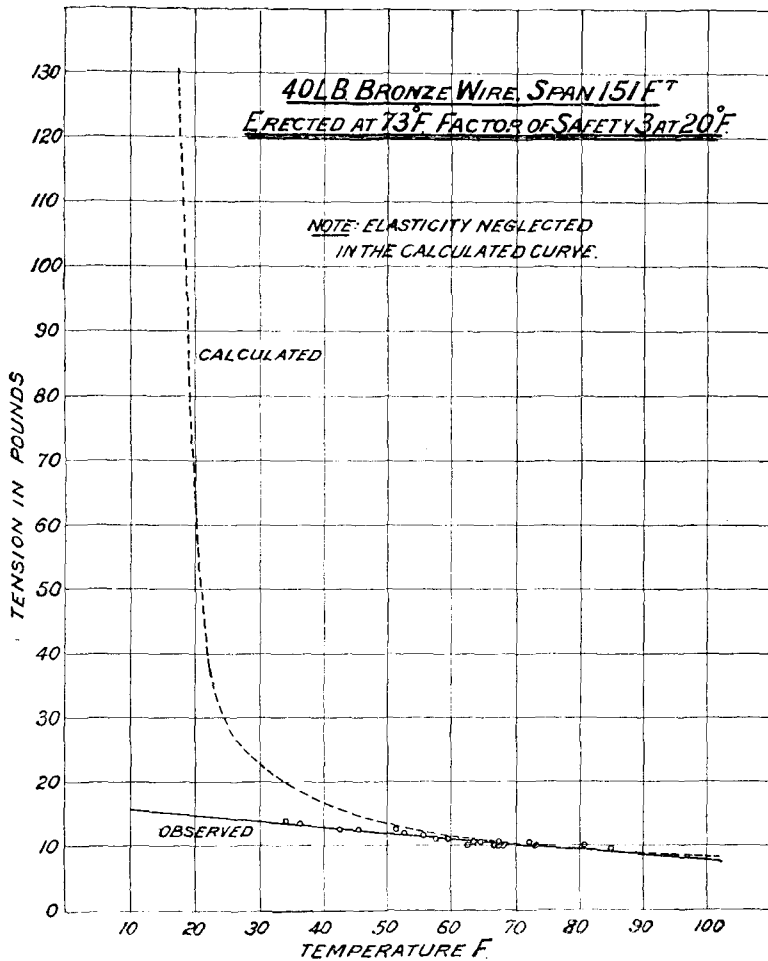


FIG. 3.

from a neglect of elasticity, and entirely confirm the calculations in which this factor is allowed for.

Fig. 3 shows the case of a 40-lb. bronze wire erected at 73° F. The observations were continued down to 34° F., the lowest temperature which was reached during the experiments, and the measured values of the tension all lie on a straight line, as they should do if the calculations based on elasticity are correct. This curve, if continued back, shows that the tension at 20° would be about 15 lbs. instead of 66 as the old tables stated. A still more striking fact is brought out by considering what happens when the temperature falls another 10°. The experimental curve shows that the tension only increases to 15.5 lbs.—a negligible amount—whereas according to the old tables the wire would break. This curve also brings out clearly another interesting point. In the case of wires erected in winter to the old tables, as the tension in reality follows a straight line curve it did not fall in summer to anything like the extent supposed, and the sag remained small so that the results, though far from what was expected, gave rise to no trouble; but, on the other hand, when wires were erected in summer with a large sag it was in the expectation that there would be a great increase of tension and corresponding diminution in sag when the temperature fell, but the present curve shows that nothing of the kind takes place, and on the occurrence of high winds, which are generally prevalent at lower temperatures, as the wires would still have a large sag, they would give continual trouble by swinging into contact, and this is what was actually found to happen in practice.

Fig. 4 shows the sags observed in the case of a 100-lb. copper wire erected at 68.5° F. and also those calculated on the old method. Here, again, the experimental values show that method to be entirely wrong. An interesting point may be noticed in the experimental curve. The dotted lines show the first four values in the order in which they were observed, and it will be seen that the wire during the interval, which was six days, acquired a

small increase of sag, probably due either to the straightening out of sinuosities in the wire or a slight permanent set under the load, after which it appeared to settle down. This was found to occur in all cases, and was greater in proportion to the tension at which the wire was erected.

In connection with this curve it may be pointed out that in Technical Instructions XIII issued by the Post Office, tables calculated on the old method are still inserted; a note, however, is added which states that "elasticity has been designedly neglected in these tables; the result of the omission is that new lines erected in summer will at low winter temperatures have somewhat greater sags than the tables indicate." The extent of the "somewhat" may be judged by the case here considered.

Fig. 5 shows a 100-lb. copper wire erected at 68.5° in a span of 151 feet and another at 69° in a span of 256 feet, together with the calculated sags when elasticity is taken into account. It will be seen that the observed curve follows the calculated one very well, though the sags are a little greater owing to the lengthening of the wire after erection as mentioned above.

It will, therefore, be seen that in all these cases the calculated values in which elasticity has been allowed for give results which are in accordance with what actually does take place in open wires

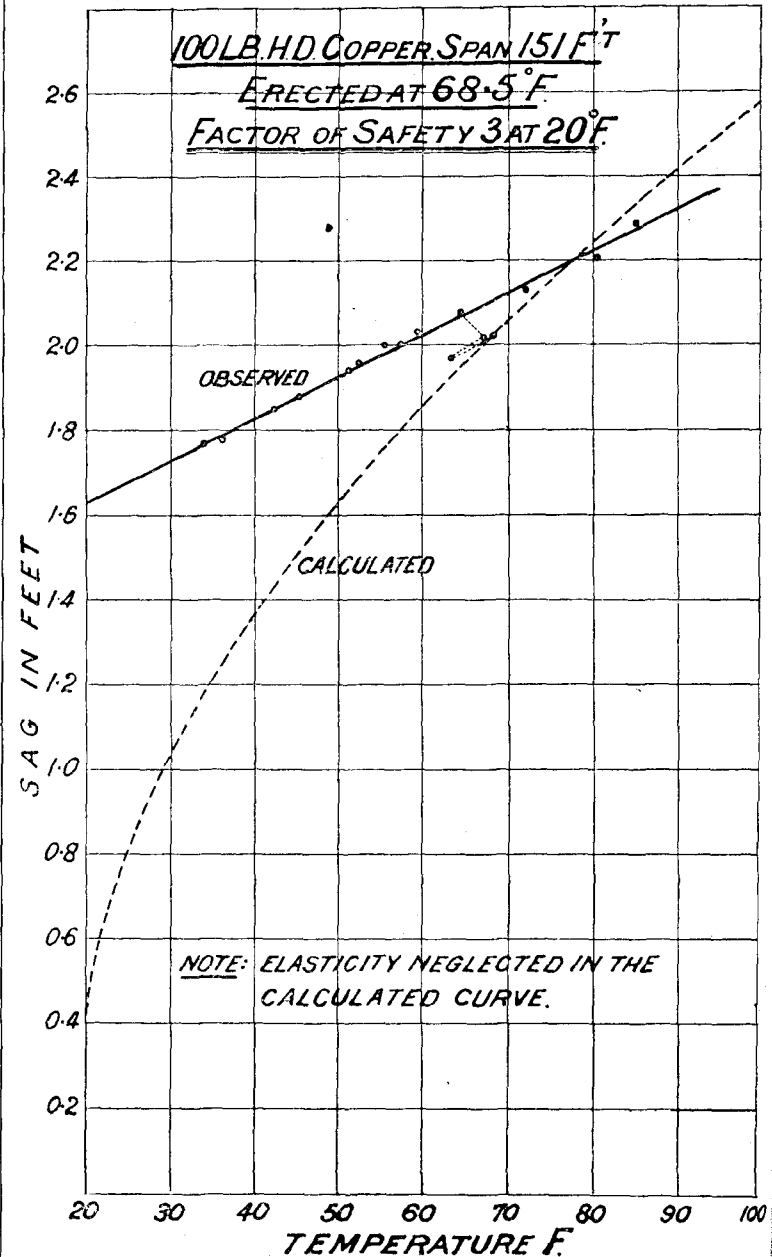


FIG. 4.

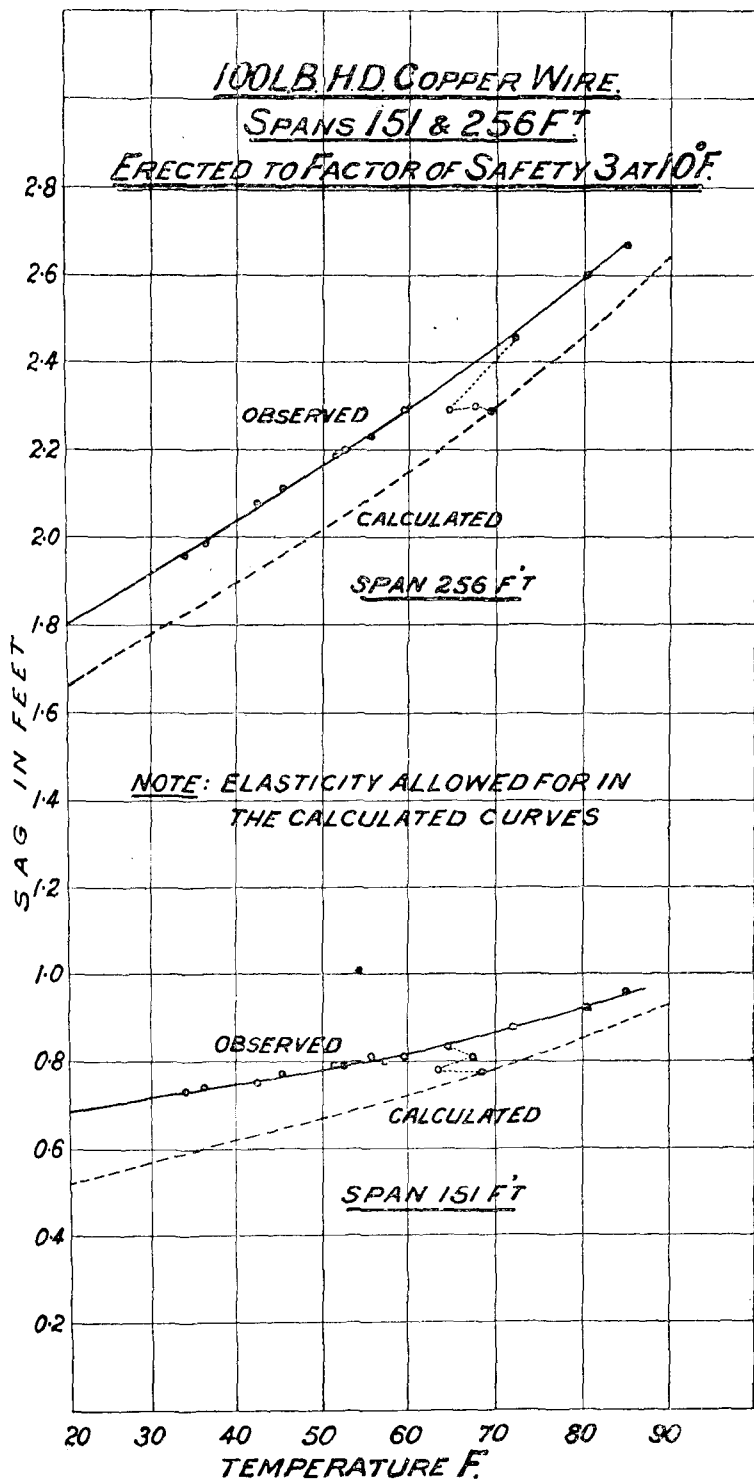


Fig. 5.

under variation of temperature, whilst if elasticity is ignored the results are very erroneous.

The great value of the effect of elasticity from a practical point of view is that it tends to keep the tension and sag much the same as when erected, whether this be done at high or low temperatures, and prevents those excessive changes which would occur if temperature alone came into play, and which at very low temperatures would cause the rupture of the wire.

Having ascertained that the new calculations could be relied upon to give true results the writer proceeded to work out complete tables for several factors of safety. Two of these are embodied in Fig. 6, which shows the tension and sags curves of 100-lb. copper and 40-lb. bronze wire for spans of 150 to 300 feet, calculated for a factor of safety of 3.0 at 10° F. In the old tables 20° F. had been taken as the minimum temperature, but in working out new ones it

was decided to alter this to 10° F. It will be seen that in the case of 40-lb. bronze wire there is scarcely any difference in tension for spans of 150 and 300 feet, while in the case of 100-lb. copper it only amounts to 10 lbs. at 90°. These curves at once showed that a mean tension curve for all spans over the given range might be adopted without any error of importance in practical work. This is a great advantage because a wireman no longer needs to know the length of span in which he is erecting wires, and thus one factor (which is dependent upon him) for accurate work is eliminated. The tensions for a span of 225 feet, may be taken as mean tensions, and Tables 4 and 5, which show the tensions and sags of copper and bronze wires for a factor of safety, 2.5 at 10° F, are based upon such mean curves. This factor of safety may be taken as representing very closely the common practice of the Company in open

TABLE 5.  
*Tension and Sag for Bronze Wire.*  
(Factor of safety 2.5 at 10° F. Elasticity allowed for.)

Temp. F.	Stress lbs. per square inch.	Tension in lbs. for weight per mile of		Sag in feet for span of						
		40-lb.	70-lb.	150 feet.	180 feet.	210 feet.	240 feet.	270 feet.	300 feet.	
10	40,740	80	140	0.26	0.38	0.52	0.68	0.87	1.07	
15	39,930	78.5	137	0.27	0.39	0.53	0.69	0.88	1.09	
20	39,130	77	134	0.28	0.40	0.54	0.71	0.90	1.11	
25	38,340	75	132	0.28	0.41	0.55	0.72	0.92	1.13	
30	37,550	73.5	129	0.29	0.42	0.56	0.74	0.94	1.15	
35	36,770	72	126	0.29	0.42	0.57	0.75	0.96	1.18	
40	35,980	70.5	124	0.30	0.43	0.59	0.77	0.98	1.21	
45	35,190	69	121	0.31	0.44	0.60	0.78	1.00	1.23	
50	34,410	67.5	118	0.32	0.45	0.62	0.80	1.02	1.26	
55	33,640	66	116	0.32	0.46	0.63	0.82	1.04	1.29	
60	32,870	64.5	113	0.33	0.47	0.64	0.84	1.06	1.32	
65	32,100	63	110	0.33	0.48	0.66	0.86	1.09	1.36	
70	31,330	61.5	108	0.34	0.50	0.67	0.88	1.12	1.38	
75	30,560	60	105	0.35	0.51	0.69	0.91	1.15	1.42	
80	29,800	58.5	102	0.36	0.52	0.71	0.93	1.18	1.46	
85	29,040	57	100	0.37	0.54	0.73	0.96	1.21	1.49	
90	28,290	55.5	97	0.38	0.55	0.75	0.98	1.24	1.53	
95	27,540	54	95	0.39	0.57	0.77	1.01	1.27	1.57	
100	26,800	52.5	92	0.40	0.58	0.79	1.03	1.31	1.61	

Modulus of elasticity,  $17.8 \times 10^6$  pounds per square inch.  
Co-efficient of linear expansion per 1° F.,  $8.87 \times 10^{-6}$ .

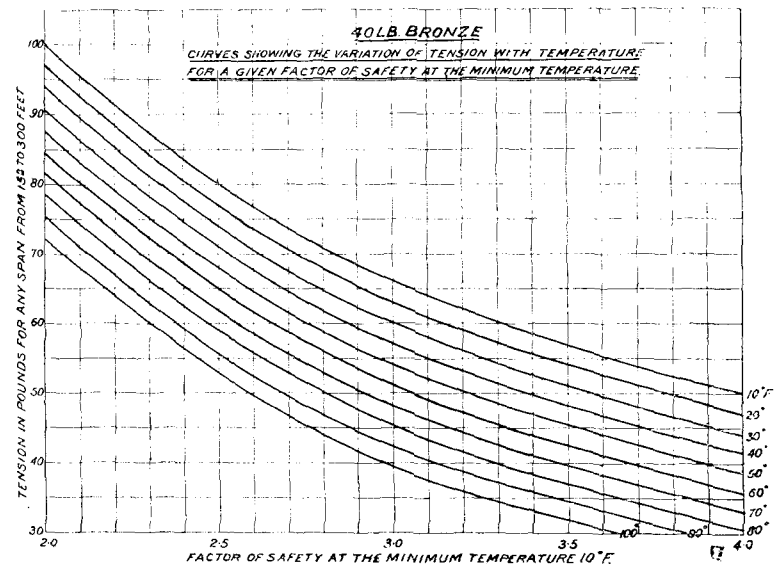


Fig. 7.

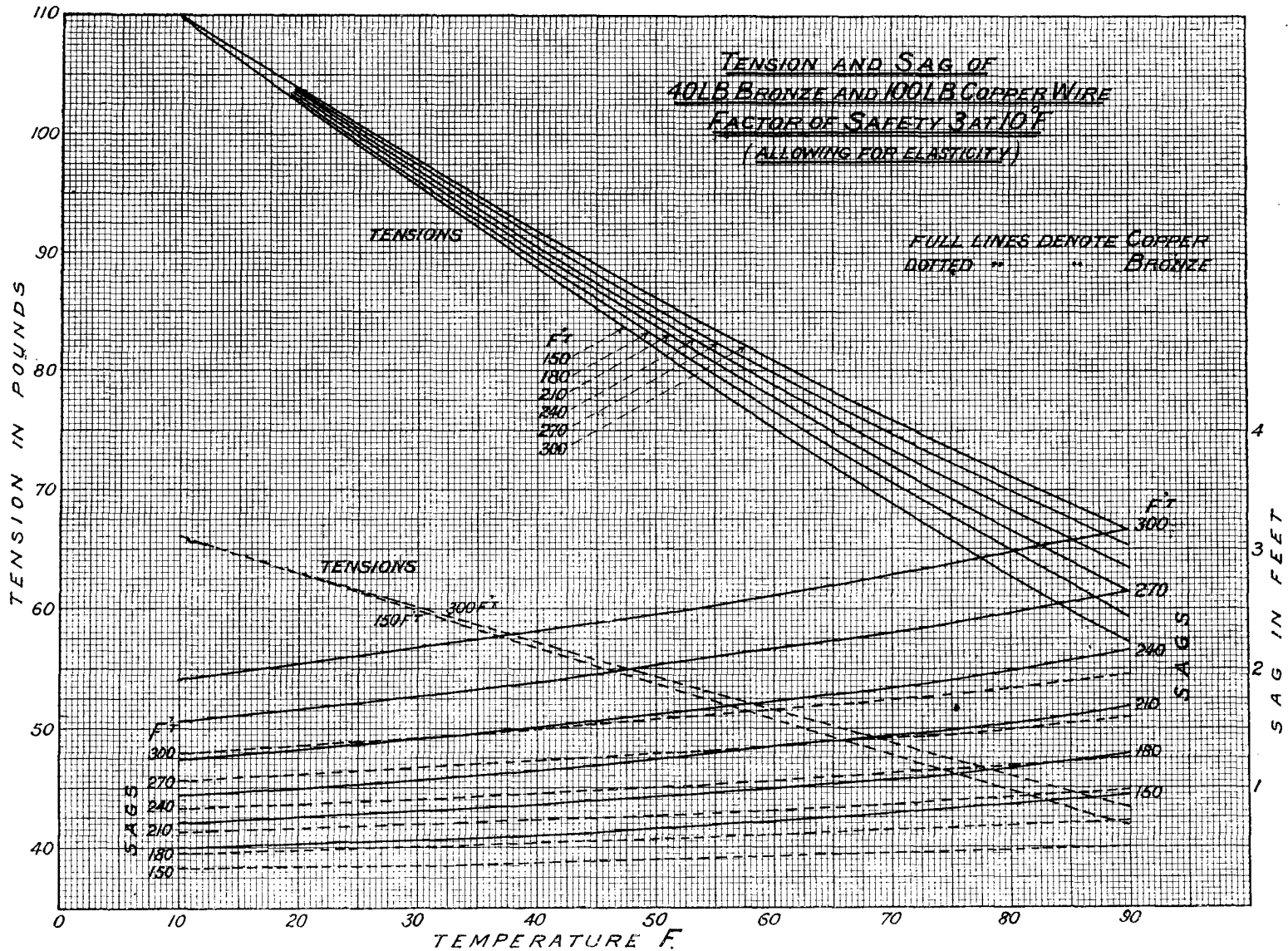


FIG. 6.

TABLE 4.  
Tension and Sag for hard-drawn Copper Wire. (Factor of safety 2.5 at 10° F. Elasticity allowed for.)

Temp. F.	Stress lbs. per square inch.	Tension in pounds for weight per mile of						Sag in feet for span of						
		100-lb.	150-lb.	200-lb.	300-lb.	400-lb.	600-lb.	800-lb.	150 feet.	180 feet.	210 feet.	240 feet.	270 feet.	300 feet.
10	26,900	132	198	264	396	528	792	1,056	0.40	0.58	0.79	1.03	1.31	1.61
15	26,170	128	193	257	385	514	771	1,028	0.42	0.60	0.82	1.06	1.34	1.66
20	25,450	125	188	250	375	500	750	1,000	0.43	0.61	0.84	1.09	1.38	1.71
25	24,730	122	182	243	365	486	729	972	0.44	0.63	0.86	1.12	1.42	1.75
30	24,040	118	177	236	355	473	709	945	0.45	0.65	0.88	1.15	1.46	1.80
35	23,380	115	172	229	344	459	688	918	0.46	0.67	0.91	1.19	1.50	1.86
40	22,700	111	167	223	334	445	668	891	0.48	0.69	0.94	1.23	1.55	1.92
45	22,030	108	162	216	324	432	648	864	0.49	0.71	0.97	1.26	1.60	1.98
50	21,350	105	157	209	314	419	628	838	0.50	0.73	1.00	1.30	1.64	2.03
55	20,690	102	152	203	304	406	609	812	0.52	0.75	1.03	1.34	1.70	2.09
60	20,030	98	147	196	295	393	589	786	0.54	0.78	1.07	1.39	1.76	2.17
65	19,370	95	142	190	285	380	570	760	0.56	0.80	1.10	1.44	1.82	2.25
70	18,700	91.5	138	184	275	367	551	734	0.58	0.83	1.14	1.49	1.88	2.33
75	18,070	88.5	133	177	266	355	532	709	0.60	0.86	1.18	1.54	1.95	2.41
80	17,440	85.5	129	171	257	342	513	684	0.62	0.89	1.22	1.60	2.02	2.49
85	16,800	82.5	124	165	247	330	494	659	0.65	0.93	1.27	1.66	2.09	2.58
90	16,160	79.5	119	158	238	317	475	634	0.67	0.97	1.32	1.72	2.17	2.68
95	15,570	76.5	115	152	229	305	458	610	0.70	1.00	1.37	1.78	2.26	2.79
100	14,990	73.5	111	147	221	294	442	588	0.72	1.04	1.42	1.85	2.35	2.90

Modulus of elasticity,  $17.8 \times 10^6$  pounds per square inch.

Co-efficient of linear expansion per 1 F.,  $8.5 \times 10^{-6}$ .



wire construction, at the present time. For the sake of making the tables generally useful, other gauges of wire than those used by the Company have been included, and the values of the stress for different temperatures are also given. The tension for any weight of wire not given in the tables can easily be obtained, for, assuming the same stress at the minimum temperature, the stress at any other temperature is the same for all weights of wire, and therefore the tension is proportional to the sectional area of the wire, *i.e.*, to its weight. The sags given for the different spans apply, of course, to any weight of the wire in question. This is seen at once from formula (1), for if, in any given span, both the weight per mile and the tension be increased in the same proportion, the sag remains the same.

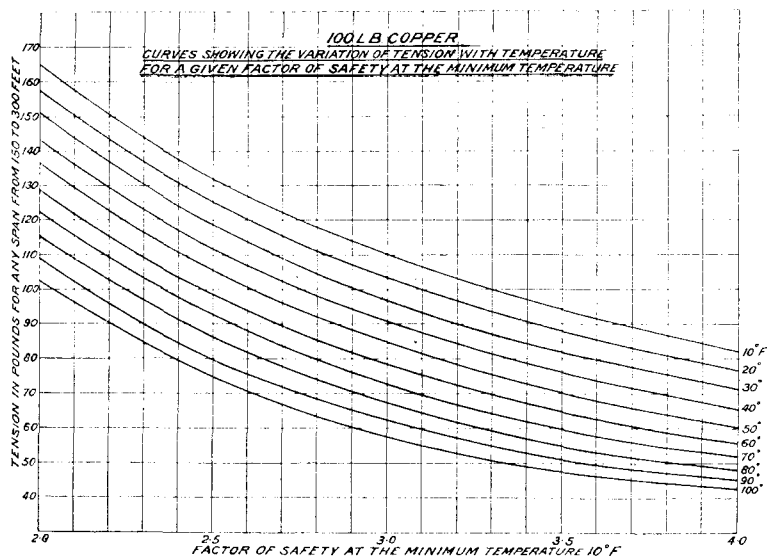


FIG. 8.

Figs. 7 and 8 show the relation between tension and temperature for 40-lb. bronze and 100-lb. hard-drawn copper wire for different factors of safety.

For further information upon this subject the following papers may be consulted:—

1. "Sag and Strain in Trolley Wires." B. Hopkinson. *The Electrician*. Jan. 25, 1901.
2. "Tension and Sag in Telephone and Telegraph Wires." C. E. Lawrence, *Telephone Magazine*, Chicago, September, 1901.
3. "Some Hints on Overhead Construction." O. Burne, *Journal of the Institution of Electrical Engineers*, April, 1901.
4. "The Construction of Overhead Electric Transmission Lines." A. P. Trotter, *Proc. Inst. Civil Engineers*. February, 1907.
5. "The Sag and Tension of Line Wire." C. T. Hutchinson, *Engineering News* (1899), Vol. 42, page 130.
6. "Conditions d'Equilibre d'un Fil de Bronze Phosphoreux Tendu Entre Deux Appuis." M. H. Cloeren, *Bulletin de la Société Belge d'Electriciens*, 1888.
7. "La Pose des Lignes en Bronze, Cuivre, et Aluminium." E. Pierard, *Proc. Soc. Belge d'Electriciens*, Feb. 23, 1904.

OLDHAM OUTING.

A PARTY of about 60 of the staff of the Oldham, Ashton and Stockport centres, with friends, had a very enjoyable outing at Rudyard Lake on June 4. The party travelled by special saloon, and reached the lake station about 3 p.m. Several of the members took advantage of the splendid boating facilities, while the more leisurely ones were content with the electric launches, which traverse the two-mile surface of the lake. A substantial dinner was provided at the "Hotel Rudyard," after which the party was photographed. Games and outdoor sports followed. The return journey was rendered very pleasant by an improvised saloon concert, in which Miss Partridge (Stockport) and Mr. Croasdale (Ashton) took active parts. The whole of the arrangements were undertaken by Mr. F. Cotchin, Contract Officer, to whom the thanks of the party are due for its complete success and their enjoyable time. They were, moreover, favoured by the weather, which was ideal.

A FEW ECONOMIC PHASES OF THE MEASURED RATE.

BY GEORGE HEY, Contract Manager, Oldham.

(Concluded from page 54.)

NEW SUBSCRIBERS' CALLS.

But the valued calls made by a large batch of *new subscribers* was also ascertained, and in analysing the figures and comparing them with the "traffic" results for different periods after they were joined up it was found that there was a *certain relationship or ratio between the growth of such subscribers' traffic, or valued calls, and the publication of the subscribers' names in the Telephone Directory.*

The traffic upon these new subscribers' lines was abstracted for two definite periods. No special selection was made of the subscribers, these being taken in the same sequence as they appear in the books.

*First Period.*—For the first four months during which the 100 subscribers were connected up and *before* their names were published in any telephone directory.

*Second Period.*—During the first four months *after* their names had appeared in the Telephone Directory.

Seventy-five of the subscribers were renters under the business tariff A, and 25 under the residential tariff B.

*First Period.*—Increase of calls during second month upon first month was 49.7 per cent.

Increase of calls during third month upon first month was 59.4 per cent.

Increase of calls during fourth month upon first month was 62.5 per cent.

The average monthly increased growth of calls upon the first month's traffic during the first period was 57.2 per cent.

*Second Period.*—(After names appeared in directory.)

Increase of calls during first month, upon first month (as above), 86.7 per cent.

Increase of calls during second month, upon first month (as above), 58.8 per cent.

Increase of calls during third month, upon first month (as above), 84.5 per cent.

Increase of calls during fourth month, upon first month (as above), 103.6 per cent.

The average monthly increased growth of calls during the second period upon the traffic for the first month connected up was 83.4 per cent.

There is a marked and definite increased growth during the second period. The lapse in the second month of the latter period is due to the August holiday month, when practically every business establishment is closed for at least one week in this district.

A subscriber's traffic during the early months after the line is brought into use should reasonably show some growth. He may be assumed to have taken means of informing his friends or customers that he is "on the telephone." And, as the figures indicate, there is a rise practically each month consistent with such an assumption, and with the fact that the new subscriber meets with the experience common to most subscribers of finding an increasing benefit in the service, and is thus encouraged to more active use.

But it is seen that there is a much larger growth of traffic during the first month of the second period, and, comparing the average monthly increase during the two periods, there is a very considerable margin in favour of the latter period.

It appears consistent with the facts that this is mainly due to the advertising value of the Telephone Directory, which has stimulated an inflow of calls to the 100 new subscribers, and that this reacts upon the new subscribers and results in creating a corresponding outflow of calls, as represented in the large difference of valued calls made as between the two periods. I submit that this is so, apart from the usual automatic growth of the new subscribers' calls.

The economic benefit which may be claimed as traceable largely to the publication of the directory is that, while the calls made during the first period were 13.3 below the number actually guaranteed, this leeway was made up during the second period, and,

in addition, there was 11.2 per cent. *actual gain* in excess of the calls guaranteed, representing an increased earning upon the 100 lines equivalent to its cash value.

There is another phase of this relationship as between the potentialities of the measured rate subscriber's line and the value of the Telephone Directory, which, however, is not indicated in the figures given. As before stated, it may be safely assumed that there would be an equal *inward* flow of "traffic" from other subscribers during the whole full period the 100 subscribers were connected up.

About 50 per cent. of our stations in this district are still on the flat rate, and the benefit of the equal inward traffic would therefore only be 50 per cent., as the calls made by flat rate subscribers are in this respect of no value.

I referred to the adoption of the measured rate as a new era. It was considered necessary to boom this new era by liberal advertisement and by the publication and circulation of a considerable amount of literature, booklets, pamphlets, cards, etc. These have been most useful, and have, in the hands of the Contract Departments and the staff of the Company, materially assisted in promoting the large growth of this class of subscriber.

The Company is deeply interested, as I have tried to show, in promoting the growth of traffic upon all measured rate stations. The larger the volume of traffic carried the greater the revenue earned, and its resultant proportionate increased percentage of profit.

I referred earlier to railway companies and railway traffic. Like railway companies, this Company would benefit, I believe, by a freer advertisement of the "stations" to which it is prepared to carry its "traffic" by publishing monthly supplemental lists for each district. Telephone users would thus be provided with the latest additions in telephone subscribers' stations, and would institute valued calls in numerous cases forthwith.

If there are from 12,000 to 15,000 new measured rate subscribers connected up each half-year, the traffic on these lines is adversely affected from the lack of such advertisement, and, calculated upon the basis of the results I have given of the 100 new subscribers, the majority of these lines are as a consequence not carrying the call actually guaranteed, and neither the Company nor the subscriber gains the full economic benefit upon their outlay.

Instead of the subscriber and the Company securing the advertising value due to the directory in the eighth, seventh, sixth, fifth, fourth and third months after being connected, the benefit would accrue in the second or third, as I believe it will be found that there is the biggest growth of traffic during the two first months of new subscribers' lines and names being shown in the directory.

At any rate, the "peak" of the subscribers' load of calls might be anticipated months earlier than under present conditions.

In some towns newspaper proprietors have given space in their papers for a list of new subscribers joined up, and where this has been done I believe benefit has accrued. This was so in a district in which I formerly served, viz., Swansea. But while some benefit is derived in this way, I believe a small monthly *brochure* in each district, issued under official authority, would be more appreciated, and best serve the purpose. Its cost might be more than covered by the value derived from advertisements. It would form an excellent advertising medium from the fact that its circulation covers all grades and classes of the business community, and the wealthier portion of the middle and upper classes. It would be equally useful in setting forth the praises of "Breezy Blackpool," "The holiday haunts between Tweed and Humber," "Sunny Devon," "The delights of the Trossachs," etc., etc., as it would be in the display of "Bass's label," "Dewar's whisky," "H. P. Sauce," or the various cocoas with the "one and only flavour," "Bournville," "Cadbury's" or "Fry's," and the numerous enterprising London and provincial firms whose "displays" in the press or the hoardings are so artistically and tastefully shown.

*The Lost Call.*—In discussing the economic phases of the measured rate line some consideration must be given to the "lost call."

Many subscribers are connected up some considerable time before their names are published in the directory. During this time the knowledge of these subscribers' connection was confined solely to the particular exchange or area to which they belonged.

This information would not be available at any of the other exchanges in adjacent areas, in the same centre, or the same district, nor to the exchanges in adjacent districts.

In some districts the Post Office trunk calls between adjacent centres are considerable. In this district during a given period the total Post Office calls at 3d., the minimum fee, represented 77 per cent. of the total trunk calls during that period.

During the months therefore that new subscribers' names are not published any inquiry for a new subscriber in a distant town *cannot be satisfied unless* the enquiring subscriber is disposed to take the risk of instituting an inquiry call, and paying the fee. There must be innumerable instances daily amongst the Company's 1,600 exchanges of such inquiries being made which, from lack of such information, cannot be satisfied. In every such case the Company is under the risk of losing a valued call and the Post Office the loss of the trunk fee, both infinitesimal as a unit, but, taken in the aggregate in connection with numerous large trunk centres, the ultimate economic loss to both the Company and the Post Office must be considerable.

*The Lost Enquiry.*—Another unfortunate phase of the "lost call" is that in the absence of cohesion as between centre and centre, and district and district, the benefit of the "enquiry" is also lost. This will be best understood by an illustration.

An Oldham subscriber puts in an inquiry for a certain firm at Manchester. The name is not in the current directory, and the enquiring subscriber declines to make an enquiry call. The matter drops. Possibly a Stockport subscriber makes a similar request for the same firm with the same result, and effect. The firm at Manchester, as a matter of fact, may *not* be subscribers. The firm may have been canvassed repeatedly by the Manchester Contract Department, but ineffectually.

If, however, the information that firms in other towns as well as in the immediate centre were enquiring for them was forthcoming to the Manchester Contract Department a most valuable lever would be available for that Department to apply. Such collective information would possibly carry conviction that the telephone service was necessary and the contract negotiated forthwith.

If all exchanges and trunk exchanges were provided with a book of enquiry forms to fill up in respect of all such enquiries which they were *unable to satisfy*, and these were forwarded to and distributed by a central bureau, located in each official *provincial centre*, to the various exchanges or Contract Departments concerned, the result would be a larger and earlier growth of new measured rate subscribers.

A monthly telephone supplement, published for distribution amongst subscribers, would secure an increased and earlier flow of telephone calls or traffic upon existing subscribers' lines.

On the other hand, a less expensive monthly supplement, printed by Head Office and circulated amongst the various exchanges and trunk centres, *for official use only*, would place the various centres in a position to complete numerous daily enquiries during those prolonged periods as before shown, when new subscribers' lines may now be considered as in a semi-passively inactive condition, awaiting the appearance of the half-yearly directory.

In conclusion, may I add that the statistics given are those covering a period of depressed trade in the cotton industry, which of course tended to keep down telephone calls.

They may or may not be fully representative of subscribers' traffic here or elsewhere. But taken as they are do they not show some very large *margins* capable of being filled up as between calls made and calls guaranteed?

We must remember that the whole complexion of our business in regard to telephone traffic is changing. The old flat rate is gradually disappearing and the measured rate assuming huge proportions, as I have pointed out.

We are concerned with the telephone call now by reason of its individual and collective value.

In introducing these phases of the measured rate my object is to invite attention to and free discussion of these subjects in order to find out how, in this district, traffic returns, as well as "new business" returns, may be improved and how greater cohesion as between centre and centre and different telephone "trunk areas" in regard to "lost calls" as well as "lost enquiries" may be arrived at.

CORRESPONDENCE.

THEORY v. PRACTICE IN CONTRACT WORK.  
TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

OWING to similarity in names the authorship of the article appearing in your June number under the above heading is widely attributed to me.

I should therefore be glad if you will allow me space to correct this impression, especially as my ideas are quite in opposition to those expressed by the writer of the article.

I think I may also say that the opinions voiced by Mr. Livemore in his article are not shared by the Contract Department chiefs in London.

6 and 8, Marshalsea Road, GEO. W. LIVERMORE,  
Borough, S.E., June 15. Divisional Contract Agent.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THERE is occasionally a slight but noticeable tendency among some of your contributors to underrate the importance of the department to which they are attached, and the work which they may happen to be describing. This is undoubtedly due to a very becoming modesty, and it follows that this diffidence is chiefly to be observed in articles dealing with contract work.

These remarks are prompted by a contribution of Mr. C. S. Livemore's on "Theory v. Practice in Contract Work," in prefacing which he makes use of the following words:—

"Of what use is the Contract Department and its staffs? What a question! Where would all the other members of the Company be without such a department? Has it not built up the whole concern, and, as the last balance sheet shows, is still building. May it continue!"

If it be admitted that the first sentence is undoubtedly a question, surely the retort errs rather on the side of undue moderation. The effect of this is to leave a loophole enabling the questioner to maintain that all the other members of the Company would be where they were before Contract Departments, as such existed, barring promotions; that the whole concern had been built up, to some extent, previously also, and that the last balance sheets show that since the establishment of Contract Departments became general the rate of increase in subscribers' stations has been slower than when the Company was struggling along as best it might.

But perhaps after all it is better that such quibbles should be ignored, and the reputation of your contributors for unassuming modesty firmly established. May it continue!

Telephone House, June 11. H. C. GRAY.

Re SUBSCRIBERS' APPARATUS CARDS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to the letters that have appeared under the above headings in the JOURNAL, I should like to say that, while agreeing it is best to obtain the correct information in the first place, the records for East London's apparatus cards had to be obtained in the same way as at Nottingham—that is, from the information received from the inspectors as they made the inspections. The information was entered on the inspector's time sheet, and any queries were checked with the Rentals Department, and then, if necessary, altered on apparatus cards, and it is only this year that it has been ceased, it now being considered that the apparatus cards are correct.

The method of keeping the record shown in Mr. Randall's letter in your issue of June, 1910, is not such a simple matter as it appears to be, and it certainly requires a slight amendment, as no provision is made for the recording of sales, installations maintained free; also, in order to obtain the figure for column 4, it is necessary to multiply the call offices by two, and also to deduct the single C.B. instruments, which do not (at present) have to be inspected.

I enclose a sample ruling of the book that has been used in this section for keeping this record, which provides a comparatively simple method of making these additions and deductions.

Its great advantage over the method suggested by Mr. Randall is that all the additions are progressive, and down the page instead of across.

Also, I should like to know how he arrives at the conclusion, stated in the last paragraph of his letter, that information can be obtained by reference to the cards at less cost than is entailed by keeping perpetual record, if the record has never been kept and no figures relative to the cost are available.

West India Dock Road, Limehouse, June 6. J. L. SHERBURN.

STORAGE BATTERIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

ARTICLES on storage batteries which appear from time to time in the JOURNAL are naturally of great interest to us, and the excellent article by Mr. Milnes which appeared in the May issue, 1910, was especially so, on account of the carefully thought-out arguments and rational conclusions therefrom, which imparted real value to the matter.

STRATFORD EXCHANGE.

Column No.	Item No.	Form No. 574.	Total brought forward, Dec., 1909.		Total at quarter ending March, 1910.	Total at quarter ending
No. 1	1	Exchange lines on insts. .. .. .	526	5, 5, 1, 2, 3 3, 1, 1, 2, 1, 1	532	6, 1, 3, 3, 1, 3, 1
	2	Private " " " " " " " "	67		67	2 " " " " "
	3	Extension insts. " " " " " "	72	1, 2, 6, 6, 1 " " " "	86	2, 1, 2, 3, 1 " " "
	4	Party line insts. " " " " " "	—		—	
	5	Cab shelter lines " " " " " "	—		—	
	6	Interc. ms. on rental " " " " " "	—		—	
	7	Fire posts with trans. " " " " " "	—		—	
		Total stations .. .. .	665		685	
No. 3		No. 1 .. .. .	665		685	
	8	Ans. and emergency ans. insts. .. .	9	1, 2 " " " " " "	12	
	9	Sales insts. maintained " " " " " "	31		31	
	10	Switchboards " " " " " "	7	1, 1 " " " " " "	9	
	11	Hire purchase insts. " " " " " "	—		—	
	12	Fire alarm posts " " " " " "	—		—	
	13	Fireman's bells " " " " " "	—		—	
	14	Electrophone sets " " " " " "	3		3	
A	+ call offices " " " " " "	15	1, 1, 1, 2 " " " " " "	20		
B	Less C.B. insts. not to be inspected ..	—		—		
		Total stations to be inspected .. .	730		760	
No. 2		No. 3, less Col. 8 .. .. .	721		748	
	A	Less call offices " " " " " "	15	1, 1, 1, 2 " " " " " "	20	
	B	+ C.B. insts. not to be inspected .. .	—		—	
	16	All exch. lines on sbds. " " " " " "	12	1, 3 " " " " " "	16	1 " " " " "
	17	Sales insts. maintained free " " " " " "	—		—	
	18	Private lines on sboards. " " " " " "	6		6	
	19	External extension boards. " " " " " "	25	1, 3 " " " " " "	29	
20	Metaphones " " " " " "	—		—		
		Total official and unofficial stations ..	759		783	
No. 4		Total of Col. 3 .. .. .	730		760	
		Less Nos. 10, 13, 15 and A .. .. .	22	1, 1, 1, 1, 1, 2 " " " " " "	29	
		+ Nos. 17 and B .. .. .	—		—	
			708		731	

In the past it has been an unfortunate policy to apply the same working instructions to all storage batteries irrespective of type.

It should not be inferred that articles which outwardly resemble one another are similar in composition and construction. Even Mr. Milnes falls into this error when stating:

"Negative plates are made of the pasted type (and I include the 'box' plates in this category) without exception by all manufacturers, and in all cases outlast the positive plates, so that the determining factor becomes the life and properties of the positive plate."

There are good, indifferent and even bad negatives on the market, and the characteristics of the various types differ very materially, apart from quality.

In drawing up instructions for the successful operation of a telephone battery, just as much consideration has to be devoted to the care of the negatives as to that of the positives.

Negative plates are liable to sulphating quite as much as the positives, but the results—if the sulphate is not reduced—are different. A sulphated negative loses capacity in that condition, and will commence to gas freely early on charge.

This doubtless is the true explanation for the negative plates gassing first in the batteries alluded to by Mr. Milnes, and lays the "bogey" of increased local action due to the antimonial grid.

Our experience goes to show that there would be less trouble in maintaining the plates of a telephone battery in a healthy condition, when doing very light work, if the engineers would curb a prevailing tendency to calculate the amount of charge required to an exact number of ampere hours by means of a lethargic and irresponsible recording meter. It is advisable to take into consideration all the various factors, which conjointly indicate a full state of charge.

THE CHLORIDE ELECTRICAL STORAGE CO., LTD.,

E. C. MCKINNON, Chief Engineer.

Pendlebury, June 15.  
[We have shown this letter to our contributor, and subjoin his comments upon it.—ED., "N. T. J."]

When referring to the positive plate, owing to its shorter life, being the controlling factor in the consideration of economy in a battery, I must admit I rather took a good negative for granted, the Company's experience being that there is not nearly so much apparent difference between the lives of negatives of different types as of positives.

Regarding attention to negatives, I assume that the same care in maintenance which prevents the sulphating of positives automatically takes care of the negatives also. I feel I must venture a protest against Mr. McKinnon's assumption of the telephone engineer's implicit and childlike faith in recording ammeters. (As to their lethargy and irresponsibility, I must leave Mr. McKinnon to be dealt kindly with by the makers!) As a matter of fact, there are 58 C.B. exchanges now open, and four only have recorders fitted, it being considered a safer practice, for a variety of reasons, and particularly where current consumption is small, to take ten or fifteen minute readings of an indicating ammeter over 24 hours when a fairly accurate estimate of output is required.

I am inclined to think, however, that in the past too much attention has been paid to a regulation of the battery, based on the input and output, and involving the assumption of an 80 or 85 per cent. (amp. hour) efficiency and an approximate estimate of the current consumption, and possibly an insufficient attention to specific gravity.—J. R. M.

#### ECONOMIC PHASES OF THE MEASURED RATE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL

The intensely interesting article by Mr. George Hey under the above heading in the JOURNAL for June appears to culminate in the two following sentences:—First: "Every facility which can be put in the subscriber's way to encourage and induce his increased use of the telephone, whether for inward or outward calls, is to the Company's benefit." Second: "In increasing the growth of traffic, or the sale of additional calls, the staff generally can do little."

As contract officer I keenly appreciate the truth affirmed, fully realising that though we lead the horse to the water, we cannot make him drink.

These two sentences from Mr. Hey are a concise but pregnant exposition of the Company's commercial faculty, and deserve comprehensive attention.

If the staff can do little to encourage the use of the telephone, what suggestions can be made to the management which would improve the service and increase traffic at minimum cost?

My constantly reiterated panacea is: "Auxiliary lines," but £4 yearly additional rental to a subscriber, whose one instrument remains unused for hours in the slack part of the day, is often more than he can be persuaded to pay. Now, if two lines could be offered with a minimum of 1,300 calls for £11 yearly, thus reducing engaged calls to zero, the facility might be much appreciated by reason of the lesser annoyance and greater satisfaction to the subscribers.

The cost of this improvement, falling entirely upon traffic, would mean a revenue of £3 instead of £5 for 1,300 calls—supposing all double line subscribers used the full minimum number; but by obviating engaged calls much time and trouble would be saved by the operator, and many fewer spares remain for the contract office to find or create new customers for.

Contract Office, Leeds.

J. H. CORLETT.

#### LONDON NOTES.

THE Company's officers are so accustomed to receive letters of complaint when a hitch of any kind occurs in the service, that they may be pardoned for thinking sometimes that subscribers forget altogether the general efficiency, and mark down the service as bad, because of occasional and exceptional trouble. It is all the more gratifying, therefore, to receive spontaneous testimony to special efforts made by our operators to assist subscribers in cases of emergency. Two such occurred in the Metropolitan area last month, one being at Croydon, where, owing to an accident at an isolation hospital shortly after midnight, urgent telephone calls were necessary; the other was at Woodford, also about midnight, serious illness necessitating prompt communication. Both subscribers wrote in very laudatory terms of the attention shown by the night operators.

Two interesting weddings have recently taken place—Mr. T. Meech, Senior Clerk-in-Charge of the directory work at Salisbury House having married Miss Ethel Button, who has been associated with him on the London Directory staff for some years. The other marriage is that of Mr. F. J. Fagg, one of the Rental Register Clerks, to Miss Q. Budd, Message Rate Clerk. Such a "double" event in one office is somewhat unique, and there was consequently a large gathering of the staff when the Chief Accountant presented the two couples with wedding gitts subscribed for by their colleagues. That to Mr. Meech and Miss Button took the form of a handsome ornamental clock, with inscription: the one to Mr. Fagg and Miss Budd was also a clock, with pair of side ornaments.

Another wedding was that of Mr. P. Joncke, Exchange Inspector, Holborn, to whom his friends on the staff presented a handsome pair of bronzes.

OUR annual collection for the National Lifeboat Institution has just been handed in. The figures for each of the last three years are eloquent proof of continued interest by the staff:—

1908 .. .. .	£24 11 1
1909 .. .. .	£28 5 2
1910 .. .. .	£33 14 3

A very warm letter of thanks has been received from the organising secretary of the institution, and it is a great pleasure to pass his expression of gratitude on to the subscribers. Bank Exchange staff are especially to be congratulated on their contribution of £6 10s., including £3 10s. from a whist drive. The interest of one young lady whose father "earns his bread on the great waters" also helped very materially.

THE death of Exchange Inspector W. A. Coolbear, Ealing, is sincerely regretted by all who knew him. Mr. Coolbear was quite a young man, being only 24; he entered the service in 1905. The cause of death was pleurisy and pneumonia.

THE Company's delegates on the Hospital Saturday Fund have arranged an outing to Hampton Court for July 9. It will be a good opportunity for members of the staff meeting each other under enjoyable conditions, if the weather be fine, and it is hoped will also result in a little profit to the fund. Launch parties are to be made up, and many will also no doubt be glad of the opportunity to explore the old palace and grounds, and wander amongst the glades of Bushey Park. It has been suggested that the staff subscribe more than sufficient to the Hospital Fund already, but perhaps the critics who think so do not always remember the benefits received by hundreds of the staff every year in the shape of hospital and dental treatment, special medical advice, and admission tickets to convalescent homes and sanatoria.

THE cricket match at Brighton was a huge success from every point of view. Blue sky and smooth shimmering sea greeted the London visitors on arrival; indeed, the weather conditions were ideal. At the Sussex county ground, where the match was played, a large number of spectators gathered to cheer on the respective teams. On so hot a day one rather envied the cricketers their cool white flannels, but felt no desire to emulate them in their unwearied pursuit of the ball. The Sussex team were outplayed all through, London putting on the satisfactory total of 203 for six wickets, while Brighton replied with 68, all out. The finish was very exciting. H. Phillips, who captained the Metropolitans, declared at 4.40 p.m.; as stumps were to be drawn at 6 p.m., this left an hour and a quarter for play. The last Brighton wicket fell at 5.56 p.m. amidst general cheers from the supporters of both teams. For the home side Jenner did well, carrying out his bat for 21; the next highest scorer was Goddard, with seventeen. The best London scores were Crow, 72, and Spittle, not out, 89. Two of the London bowlers had remarkable analyses—H. Phillips bowling three maidens, and taking two wickets for four runs; C. H. Phillips taking seven wickets for thirteen runs. As the latter is a son of the Southern Provincial Superintendent, his success against the Southern team caused some merriment. After the match about 140 members of the two staffs had tea at the Aquarium, Mr. C. J. Phillips and Mr. Clay, the two Superintendents, also Mr. Cotterell and Mr. Lowe, the Assistant Superintendents, being of the party. At the conclusion of tea Mr. C. J. Phillips presented the London team with a special cup (not silver) as a memento of their victory. After one or two short speeches, Mr. Moorhouse, Sussex District Manager, expressed to the visitors the pleasure which it had been to himself and his staff to make all the arrangements and to act as hosts.

WHILST the cricket match was in progress at Brighton the Western Construction Department were having their annual outing at Chertsey. Sports, tea, and a concert at the "Cricketers' Arms Hotel," Chertsey Bridge, filled up the afternoon and evening. After a scant, hurried meal at midday, the fitters had good appetites, so that the substantial tea provided was appreciated to the full. To fill in the time between tea and the concert boating on the river was indulged in by a good number. Through the kindness of several contributors to the fund good prizes were available for the successful competitors in the sports. Thanks largely to the splendid weather, the outing was a complete success from start to finish.

#### NEWS OF THE STAFF.

MR. ALFRED PERKINS, District Manager, Bristol, completed 30 years' service with the Company on June 1 last. A detailed history of Mr. Perkins' career with the Company appeared in the January, 1908, issue of the JOURNAL, and it is sufficient to say here that Mr. Perkins was the recipient of many congratulations and good wishes from his various official and unofficial friends.

MR. A. LESLIE MAY, Exchange Manager, Leeds, was on his transfer to Bradford presented with a greenhouse as a token of respect from the operating staff at Leeds.

MR. H. C. MAY, Engineer-in-Chief's Office, has, in the City and Guilds'

examinations held at Finsbury Technical College, taken first place in advanced mechanics (strength of materials) and first place in advanced mathematics (calculus).

Mr. H. C. GRAY, Engineer-in-Chief's Department, has, also at Finsbury Technical College, taken third place in advanced mathematics. This success, together with other certificates which Mr. Gray already holds, entitles him to the full technological certificates in the honours grade of both telephony and telegraphy and these also qualify him to be registered under the City and Guilds of London as a teacher of those subjects.

Mr. H. LEGGE, Engineer, Portsmouth, was presented on June 15 with a gold chain by the staff on his leaving to take up an appointment in Para, Brazil. He joined the service at Canterbury in 1891 and served at Margate, Colchester and Brighton, thus completing nineteen years in the Company.

Mr. W. P. RICHARDS has been promoted from Exchange Manager-in-Training to Exchange Manager for Sub-Exchanges in the Manchester district. Mr. Richards entered the Company's service on Oct. 11, 1901, and has been successively Exchange Inspector and Exchange Manager-in-Training prior to his present appointment.

Mr. JOHN TUNN, Directory Department Glasgow, left the service on June 4 to go to Australia. Before his departure he was the recipient of a handsome gold Albert. Mr. Tunn carries with him the best wishes of his fellow workers.

Miss ANNIE MCKENZIE, Operator, Royal Exchange, Glasgow, who left on May 24 to go abroad, was presented with a gold bangle by the staff in her exchange.

Mr. J. N. LOWE was presented by the local and district office staffs with an oak smoking cabinet on April 19 as a mark of respect on his leaving Coventry for Leicester.

Mr. ALEX. ROXBURGH, Foreman, Paisley centre, has been promoted to be Assistant Engineer, Dumbarton. Before leaving, he was presented with a Gladstone bag, the presentation being made by Mr. Audsley, Local Manager.

Mr. JAS. LIVINGSTONE, Exchange Inspector, Paisley, has been promoted to be Chief Inspector, Dumbarton centre. Before leaving, he was presented with a silver cigarette case and a silver match box, the presentation being made by the Local Manager.

Mr. PERCY E. GRANT, who has been Local Office Clerk, Bath, for ten years, has been transferred to the Bristol district office as Stores Clerk. Prior to leaving Bath, Mr. W. C. Owen, Local Manager, on behalf of the Bath staff, presented him with a kit-bag and silver cigarette case as a mark of the high esteem and regard in which Mr. Grant was held by them.

Miss MARGARET E. EVANS, Operator, Cardiff, has been promoted to the position of Clerk-in-Charge, Penarth, vice Miss Baynham, resigned. Miss Evans joined the service in February, 1900, and was made Senior Operator in March, 1903.

Miss MABEL ROSE STRANGE, Operator, Barry, left the Company's service on May 12 owing to the removal of her parents to South Africa. Miss Strange joined the Company's service in April, 1904, and was a very efficient operator. On leaving, her colleagues presented her with a silver photograph frame and expressed best wishes for her future welfare.

Mr. F. JOHNSON, Local Office Clerk, Southport, was presented with a handsome dressing case and travelling rug by his colleagues on resigning his post to go to Canada. The presentation was made by the District Manager.

Mr. W. A. TAYLOR, Stores Clerk, Bristol, has been promoted to the charge of the Bath office (26 exchanges).

Miss CHRISTIANA STRACHAN, Perth, was presented with a travelling rug on leaving the service to go abroad.

Miss HENRIETTA SLIM, Operator at the Barrow Exchange, left the Company's service on June 2 to go to Canada. She had been in the service five and a half years. She was presented on behalf of the staff in the Barrow centre with a travelling rug and an ebony-backed hairbrush as a mark of esteem. The District Manager, Mr. W. Taylor, made the presentation, and conveyed the good wishes of the staff to Miss Slim for her future welfare.

Mr. C. BLAKEY, Assistant Rentals Clerk, Sheffield, has been transferred to Hanley as Rentals Clerk. Prior to his removal he was presented with a port-manteau subscribed for by the members of the staff. In making the presentation, the Chief Clerk (Mr. Thyne) expressed the hope that every success would attend Mr. Blakey in his new position.

Miss ELSIE BUTTERWORTH, Operator, Rochdale, was on June 17 transferred to Southport. Prior to her departure she was the recipient of suitable gifts from the staff, who gave her a hearty send off.

Mr. B. B. BARCHAM, District Office Clerk, Norwich, has resigned his connection with the Company to take up farming in Canada. Prior to his departure he was the recipient of a travelling rug as a token of kindly regard and best wishes from his friends on the staff. The presentation was made by Mr. T. J. Clark, Chief Clerk, on June 16.

Miss E. G. ETHEL NELSON, Monitor, Nottingham, has been appointed Travelling Supervisor.

Miss FLORENCE DIXON, Supervisor, has been transferred to the position of Monitor.

Miss ADA STEVENSON, Operator, has been promoted to be Supervisor. Miss EDITH FLEET, Travelling Supervisor, Nottingham, has resigned the Company's service in order to take an active part in her parents' business.

Fitter A. JONES, Nottingham, on resigning the Company's service was presented with a case of pipes by his colleagues.

#### Metropolitan Staff Changes.

##### Promotions and Transfers:

Mr. F. ELLIS, Apprentice, to be Assistant Engineer, Hop.

Mr. N. LAYTON, Inspector, Birmingham, to be Inspector, North.

Mr. R. A. COLLETT, Engineer's Clerk, Hop, to the Metropolitan Engineer's office, Salisbury House.

Mr. R. GILL, Clerk, Traffic Department, Salisbury House, to be Inspector, Avenue.

Mr. A. M. B. NEWITT, Inspector, Gerrard, to be Clerk in Traffic Manager's office, Salisbury House.

Miss D. R. STREATFIELD, Operator, North, to be Clerk, Rentals Department, Salisbury House.

Mr. P. J. BARNES, Fault Clerk, Holborn, to be Call Office Collector. Mr. J. A. LEE, Engineer's Clerk, City, to be Daughtsman, Metropolitan Engineer's office.

Mr. P. SARD, Fault Clerk, Battersea, to be Inspector, Streatham.

Mr. H. C. DAVIS, Test Clerk, Sydenham, to be Assistant Engineer, Kensington.

#### Metropolitan Traffic Department.

##### Promotions and Transfers:

Miss ANNIE LIDDELL, Supervisor, Operating School, to be Senior Supervisor, New Cross.

Miss JEAN MITCHELL, Supervisor, London Wall, to be Senior Supervisor, Sydenham.

Miss CONSTANCE BOLTON, Supervisor, North, to be Senior Supervisor, Brixton.

Miss AMY BEAN, Supervisor, Gerrard, to be Senior Supervisor, Streatham.

Miss ALICE SCARFE, Supervisor, Avenue, to be Senior Supervisor, Bromley.

Miss ETHEL SNELL, Supervisor, Gerrard, to be Senior Supervisor, Gerrard.

Miss CLARA FRENCH, Supervisor, Holborn, to be Senior Supervisor, Holborn.

Miss CHRISTABEL THOMAS, Supervisor, Kensington, to be Senior Supervisor, Kensington.

Miss ALICE BOWLEY, Supervisor, Hop, to be Senior Supervisor, Hop.

Miss MARGARET WELLS, Supervisor, London Wall, to be Senior Supervisor, London Wall.

Miss THERESA CASEY, Supervisor, London Wall, to be Senior Supervisor, London Wall.

Miss MAUD DREWE, Supervisor, Avenue, to be Senior Supervisor, Avenue.

Miss EDITH TRINGHAM, Supervisor, Operating School, to be Senior Supervisor, Paddington.

Miss ETHEL SOWERBY, Supervisor, Streatham, to be Supervisor, Operating School.

Miss KATHERINE HOWARD, Supervisor, Paddington, to be Supervisor, Operating School.

Miss LILY ROBINSON, Supervisor, London Wall, to be Supervisor, North.

Miss ANNIE FAZAKERLEY, Supervisor, Kensington, to be Supervisor, London Wall.

Miss BESSIE CHARLTON, Supervisor, Battersea, to be Supervisor, Kensington.

Miss FLORENCE CHESTERMAN, Supervisor, New Cross, to be Supervisor, Hop.

Miss JESSIE COOPER, Supervisor, Bromley, to be Supervisor, London Wall.

Miss CLARA CLARKE, Supervisor, Sutton, to be Supervisor, Avenue.

Miss LILIAN GOULD, Supervisor, Sydenham, to be Supervisor-in-Charge, Sutton.

Miss JANET BOOTH, Supervisor, Hop, to be Supervisor, Gerrard.

Miss ADA WINGFIELD, Operator, Gerrard, made Supervisor, Paddington.

Miss SYBIL MINNS, Operator, London Wall, made Supervisor, North.

Miss LETITIA BARKER, Supervisor-in-Charge, Sidcup, transferred to the East Kent district and promoted to be Clerk-in-Charge, Folkestone.

Miss MABEL SHEARING, Operator, East, was presented with a gold pendant on her promotion to Avenue as Supervisor by the staff at the former exchange.

Miss BERTHA BROTHERWOOD, Operator at the same exchange, was presented with a gold locket on her promotion to Holborn as Supervisor.

Miss RUTH BRIGGS, Operator, Dalston, on her promotion to London Wall as Supervisor, was presented by her late colleagues with an ebony hair brush and mirror.

Miss ELIZABETH CLANFIELD, Supervisor, Brixton, on her transfer to Battersea in a similar position, was presented with an umbrella by the Brixton staff.

#### MARRIAGES.

Mr. J. T. TATTERSALL, Engineer, Hull, on the occasion of his marriage, was presented by the staff with a useful case of cutlery containing 84 pieces.

Mr. C. C. WORTE, East Yorkshire District Manager, on the occasion of his marriage, was presented by the members of the staff with a handsome ottoman.

Miss BEATRICE S. CLIFFORD, Supervisor, Bristol Exchange, has resigned to be married. Prior to leaving on May 26 the Traffic Manager, on behalf of the staff, presented her with a handsome marble clock as a token of esteem and regard. The supervising staff also presented, through the Clerk-in-Charge, a flower pot and pedestal. Several members of the operating staff also gave individual presents to Miss Clifford and she left with the best of wishes for her future prosperity. Miss Clifford had been in the Company's service fourteen years.

Miss ROSE PAYTON, Chief Typist, Birmingham, on leaving the Company's service to be married, was presented with a case of silver fruit knives and forks on May 21. The nature of Miss Payton's work brought her into contact with every department in the building, and the capable and tactful way she carried out her duties, coupled with a bright and charming personality, made her a great favourite with all the members of the staff. Good wishes for her future happiness and welfare, heartily endorsed by the whole of the staff, were nicely expressed by the Chief Clerk, Mr. Tucker, on making the presentation.

Miss CHRISTINA STEWART, Operator, Royal Exchange, Glasgow, resigned on June 1 to be married. The staff in her exchange presented her with a case of cutlery.

Miss AGNES O'REGAN, Operator, Central Exchange, Cork, on resigning to be married was presented with a dinner service subscribed for by the staff in Cork centre. The District Manager (Mr. Kidd) made the presentation.

Mr. L. A. FOX, of the Engineer-in-Chief's Department, Nottingham Factory, was recently the recipient of a set of cutlery from the joint Engineer-

in-Chief's and Factory staffs on the occasion of his wedding, Mr. J. W. Briggs making the presentation.

Mr. W. H. CLAYTON, Cabinet Maker, Nottingham Factory, was presented by Mr. T. H. Wallace, on behalf of the Cabinet Department, with a handsome curb on the occasion of his marriage.

Mr. H. TOPLIS, Labour Cost Clerk, Nottingham Factory, was presented by Mr. C. E. Fenton, Factory Manager, on behalf of the Factory and Engineer-in-Chief's staffs, with a roll-top desk and a "Thermos" flask on the occasion of his wedding.

Miss BARBARA N. BAYNHAM, Clerk-in-Charge, Penarth, left the Company's service on May 26 in view of her approaching marriage. The operating staff in the centre presented her with an electro-plated rose bowl as a mark of esteem and with best wishes for her future welfare.

Miss WINIFRED ALICE MORRIS, Portsmouth, was presented by the operating staff with a salad bowl and servers on her leaving to get married. The recipient, who was a favourite among the staff, also received many private presents. The presentation was made by Mr. S. J. Smith, District Manager.

Miss ALICE SENIOR, Operator, Sheffield, on leaving the Company's service to get married, was presented by the operating staff with a set of cutlery, as a token of their good wishes.

Miss HANNAH McLEAN, Operator, Dundee, was presented with a handsome dinner set on the occasion of her leaving the service to be married.

Mr. JAMES BROWN, Dundee, was presented with a timepiece on the occasion of his marriage on June 2.

Miss MARY A. TICEHURST was presented by the Walsall staff with a cruet stand and butter dish on the occasion of her marriage, the presentation being made by Mr. Dalton, Local Manager, Walsall.

Miss AMY TOMKINSON, Operator, Dalston, on leaving to be married was presented by the staff with a tea service and fruit bowl.

#### London Traffic Staff.

Miss CAROLINE COCKS, Operator, Avenue, on leaving to be married was presented by her colleagues with a dinner service and other presents from personal friends among the staff.

Miss BERTHA STAPLES, Operator, East, on leaving to be married was presented with a copper kettle and stand, also table mats.

Miss BEATRICE BARKIE, Testing Operator, on resigning from the East Exchange to be married, was presented with a tea service from the operating staff and a salad bowl from the maintenance staff. Numerous other gifts were received from individual members of the staff.

#### OBITUARY.

Apprentice E. G. NICOLI passed away, after a brief illness, on June 15. He entered the service of the Company May 8, 1907, and passed through the various departments. He was a favourite with the staff, and an all-round sportsman. As an outward token of respect a wreath was forwarded by the members of the Sheffield staff.

We regret to announce the death, from consumption, of Miss ADA WELSH, the Senior Operator at the Whitehaven Exchange, which took place on April 14. Miss Welsh had upwards of twenty years' service with the Company, the whole of which had been spent in the Whitehaven Exchange. A large wreath was subscribed for by the staff in the district as a token of respect. The Company was represented at the funeral by the Local Manager, Mr. J. M. Conway.

Miss ELIZABETH MATHERS PATERSON, Operator at Edinburgh central, died on June 17. Miss Paterson entered the service two years ago, and was an unobtrusive attentive worker. Much sympathy is felt for her family. All departments contributed for a wreath.

### LOCAL TELEPHONE SOCIETIES.

**Dundee.**—The last meeting of the session was held on June 17, when a paper was read by Mr. Brown, District Manager, on "The Telephone Exchange Service."

**North-East London.**—The last meeting of the session was held at East Exchange on May 25, Mr. F. Morley Ward presiding. Papers were read by Messrs. W. Tuffnell and W. W. Gibson, entitled "Faultfinders' Duties" and "Instrument Inspectors' Duties" respectively. Both papers were followed by a good discussion on the part of the members, and afterwards the officers for the ensuing session were elected as follows:—President, Mr. H. S. Peck; vice-presidents, Mr. F. Morley Ward and Mr. R. P. Lowe; hon. secretary and treasurer, Mr. F. L. Sherburn; committee, Messrs. V. C. Crouch, G. J. Gadsby, J. Gardiner, W. W. Gibson, R. Ferguson, and H. Sharman.

**Sunderland and Shields.**—The seventh and last monthly meeting of the session was held on April 29, at Sunderland. Mr. E. Spink presided. The society agreed that the following books be obtained for the use of the members during the summer months, viz.:—*Telephony*, *Post Office Electrical Engineers' Journal*, and *Pool's Telephone Handbook and Guide to the Telephone Exchange*. A paper upon "Underground Work" was given by Mr. Robert Guthrie. The speaker dwelt upon the undermentioned items:—Laying of concrete blocks and three-inch pipes, splits and bends, laying of cables, testing and jointing of cables, pot-heads and cable heads, leading up to distributing poles. An interesting and instructive discussion took place on these items, the following members taking part:—Messrs. E. Spink, W. J. Douglass, J. G. Dixon, A. Livingstone, A. E. Tinwell, B. McNipp, W. McDermott, G. Heath, J. Smith, and J. Martin.

**Warrington.**—The members were treated to an exceptionally interesting lecture on April 20, when Mr. T. A. Prout, of Liverpool, president of the Society and Assistant Provincial Superintendent, wound up the second year's successful series of meetings with a paper, illustrated by lantern slides, on "A Telephone Retrospect and Prospect." He summed up the events of the last 90 years, more particularly since 1880.

**Weymouth.**—The sixth meeting was held on May 19, when a paper was read by Mr. E. Fletcher on "Stores Work," the chair being taken by Mr. J. A. Attwooll (Local Manager). The paper dealt with the processes of the debiting

and crediting of stores in detail, and outlined the duties appertaining to a store-keeper's position. It explained the use of the "stores transfer list," and stock queries were also touched upon. After the paper had been read a brisk discussion took place.

At the seventh and last meeting of the session, which was held on May 26, the vice-president being in the chair, a paper was given by Miss Hayman, Clerk-in-Charge of the Weymouth Exchange. The speaker detailed the various duties of an operator—the recording of calls and code marking. A useful discussion followed.

**Wolverhampton.**—A meeting was held on April 22, when Mr. C. H. Johnston, of Wolverhampton, read a paper on "Translators," in which, after describing the details of function and winding, he dealt with past and present practice and the possibilities of multiplex superimposing, illustrating his remarks by diagrams. The paper was followed by a keen and interesting debate. After this paper there were three competing ten minutes' papers read by the following:—Miss Knowles (Walsall), "Operating Practices"; Miss Stanton (Wolverhampton), "Call Offices, from the Public User's and the Attendant's Points of View"; Miss G. Veale (Willenhall), "A Resident Operator's Duties." The prize was adjudged by the committee to Miss Stanton. The proceedings closed with a ticket-sorting competition for ladies only, in which eighteen members of the staff entered. The first prize was won by Miss L. Robinson, of Wolverhampton. Time for 300 tickets 20 minutes 28 seconds, which includes a penalty of 30 seconds for two errors, being fifteen seconds for each error. Several competitors showing better time lost by the rule disqualifying competitors making over three errors. The second prize was won by Miss G. Veale, and third by Miss E. Mather. This novel competition was very keenly followed and generally voted a most interesting success both on the part of the competitors and the lookers-on. Mr. W. S. Kay, Chief Clerk, Wolverhampton, took the chair. The prizes were in all cases adjudicated by the members of the committee present, and at the end of the evening were distributed by the District Manager, Mr. A. W. Smith. The arrangements for this competition were ably carried out by Mr. T. Reed of the Measured Rate Fee Department in the district office.

### STAFF GATHERINGS AND SPORTS.

**Edinburgh.**—*Bowling Match at Currie.*—A most enjoyable outing was spent on June 18, when three rinks of players representing the Edinburgh staff were opposed by a similar number of their fellow-workers from Glasgow. The weather was in keeping with the occasion, and the green—kindly granted for the event by the Currie B.C.—was in splendid condition. Twenty-one ends were played and the result was as follows:—Edinburgh, 63 shots (Mr. Miller 19, Mr. Bryce 14, Mr. Wilson 30); Glasgow, 61 shots (Mr. Paterson 17, Mr. Anderson 32, Mr. Curr 12); majority for Edinburgh, 2 shots. After the game those participating sat down to tea. The arrangements were carried out by Mr. Wm. Wilson, who has been entrusted to make arrangements for a return match at Glasgow.

*Amfere Golf Club.*—The Stewart medal competition was played at Musselburgh on May 21. Twenty-two members played and the medal fell to Mr. P. Veitch (Operator, Central). Messrs. D. Mathieson, W. Black, and A. Robson were the other prize winners. At the second ramble of the season a company of 71 were present. Steamer was taken from Leith to South Queensferry, and the company then walked through the Dalmeny Woods to Cramond, where tea was served and a varied musical programme carried through. Most of the party then walked into Edinburgh. The route taken and the fine afternoon ensured the success of the outing.

**Guildford.**—A successful outing which took the form of a river trip was held on June 11, a party of about 60 proceeding in small boats from Guildford up the River Wey to Bower's Lock, where a picnic tea was enjoyed. Sculling matches and inter-centre boat races, in addition to the usual running and walking races, added variety to the amusements. The chief events were the ladies' sculling race, won by Miss Hunt (Aldershot); inter-centre boat race, winners Aldershot centre; ladies' running race, won by Miss Crosby; and the gentlemen's running race, won by Mr. W. Hole. The prizes were distributed by Miss Loxton (district office), when a few fitting remarks were made by Mr. C. G. Kansley, the District Manager, who contributed much to the promotion and success of the outing, which was very ably managed by Mr. L. G. Cosh.

**Liverpool.**—*National Telephone Swimming Club.*—An interesting squadron race between Messrs. Elder, Dempster's Swimming Club and the National Telephone Swimming Club was held at Cornwallis Street (Liverpool) Baths, June 16. Six members swam for each side, and the result over twelve lengths was in favour of the National Telephone team, which finished eleven seconds in front of the time taken by its opponents.

**London.**—The Pelican (Night Operators) Cricket Club played their first match on May 23, at Battersea Park, against Whites and St. James' Club. A good and close game resulted in a win for the Pelicans by ten runs. Two previous matches had been arranged, but had to be abandoned on account of the wet weather. The club is very fortunate in having secured the support of Messrs. S. Craddock (president), J. F. Edmonds, C. T. Arrowsmith, and E. Flower (vice-presidents); and a large number of the night staff have joined both as honorary and playing members. It is hoped the season will end as well as it has begun.

**Manchester.**—A swimming club has been started by the district office staff, and has met with such satisfactory support that it has now been thrown open to the whole of the staff in the Manchester district. A number of lady members of the staff have joined the club, and there is every indication of the membership being greatly augmented in the near future. The club have not yet so many good swimmers as their neighbours at Liverpool, but it is hoped that in the course of time they will be able to send their Liverpool colleagues a challenge. Mr. F. W. Taylor, the District Manager, was unanimously elected president of the club, and the secretary is Mr. A. W. Hewitt, district office, Manchester.