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TELEPHONE MEN.

LVII.—JAMES SINCLAIR TERRAS.

JAMES SINCLAIR TERRAS was born in Glasgow in 1873, and educated at the Albany Academy in that city. He entered the Company's service as a Junior Clerk in 1889, being engaged by Mr. F. Douglas Watson, then assistant district secretary; and was afterwards made Engineer's Clerk under Mr. William Aitken. Subsequently he was transferred to the Instrument Department, and after spending some time there was promoted to be Local Manager at Paisley in 1892 under the district managership of the late Mr. J. W. F. Ashwin. At that time the Renfrew Exchange was fitted with a Williams' switchboard, which remained in use until about 1899—a late survival of an early type. In the beginning of 1892 Mr. Terras received further promotion, being appointed District Manager at Galashiels, under the supervision (until the reorganisation in May, 1893) of Mr. C. G. Wright, who was then district manager at Edinburgh. Although the period of association was short, Mr. Terras looks back upon it with pleasant recollections, and feels that he gained much valuable knowledge under Mr. Wright from the latter's long experience in telephone work. The staff at Galashiels was a small one in those days, and the district manager was his own engineer and bookkeeper.

In 1896, when Mr. Terras was appointed to the position of District Manager at Greenock, a canopy switchboard on the call-wire system had just been brought into use in the exchange in that town, and soon afterwards the laying of an underground system to replace the overhead earth circuits was begun. During the same period the exchange systems at Port Glasgow, Rothesay and other places were converted to metallic circuit working. An effort to

open an exchange in the remote Argyllshire town of Campbelltown, a few weeks before the passing of the Post Office Bill in 1899, was unsuccessful. In the latter year a new switchboard was installed in Paisley, and five years later, after protracted negotiations with the town council, the Company commenced laying an underground system there. All these activities combined to make Mr. Terras's term of office an eventful one. The year 1904 brought another promotion for Mr. Terras, for in July he was transferred to the District Managership of Reading. About that time a period of rapid development was beginning in different parts of the country, and eleven new exchanges were opened in the Thames Valley district during the first few years of his management. There was a spirited competition with a rival Post Office exchange in Newbury during the latter part of 1904, when the Company managed to secure a commanding lead which has since been maintained. In 1909 he was appointed Engineer to the important district of Birmingham, but after about a year's work in that position his services were required for the newly-formed Inventory Staff on which he was appointed a Divisional Officer. His principal indoor recreations are music and reading, whilst out of doors his pleasure is in walking and rowing. Mr. Terras is a good example of the shrewd Scotsman, and exhibits at the same time no inconsiderable measure of geniality and *bonhomie*. He

is a hard worker, and his record of progress in the Company's service shows conclusively how his work has been appreciated by those over him.



GENERAL SUPERVISION.*

BY FLORENCE MAY THOMAS, *Travelling Supervisor, Gloucester.*

IT was with a good deal of diffidence that I accepted an invitation to read a paper on "General Supervision," because I have long recognised that the operators in this district are among the most efficient. Consequently I have determined to deal with the question more from the general standpoint than any other. Although of comparatively recent date the telephone system has been proved to be of such incalculable value as a means of communication that there are very few business houses of any standing that have not adopted it, and in fact commercial men cannot now afford to do without it. The telephone has not only come to stay, but it is going to become an even more important feature of our everyday life in the near future. As an illustration of what an essential factor the telephone is in the conducting of business, even in our smaller towns, I may mention that two of the largest firms in the Stroud district, Messrs. Apperly, Curtis & Company, Limited, of Dudbridge, and Messrs. R. A. Lister & Company, Limited, of Dursley, have adopted the private branch exchange system at their works. These exchanges have been installed with every regard to efficient working, and no expense has been spared in equipping them with the most up-to-date apparatus, and incidentally I might add that, in my opinion, this system of private branch exchanges is capable of very considerable extension, and I have no doubt that we shall see it greatly extended before the transfer.

To an outsider the inner working of the telephone is wrapped in mystery. Only we who are actively engaged in the work can fully appreciate the intricacies of it. On the occasion of my visit to Bristol, for training as travelling supervisor, I was very much impressed with what the operating staff termed their "visiting day." I learned on making enquiry that invitations are sent out to selected subscribers, so that in the course of time each one is afforded an opportunity of visiting the switchroom. The subscribers are thus given some idea of the difficulties of the work, with the result that where formerly they may have shown some slight irritation, now some consideration is given if from uncontrollable circumstances, they are not answered as promptly as they would like to be. That it is marvellous none will gainsay, and although it is true that "familiarity breeds contempt," I think operators and electricians who are interested in their work never tire of their duty, and are ever ready to devise and carry out anything which will be likely to tend to any improvement in a service which is almost as perfect as anything can possibly be. I do not propose to give any elaborate description of the system by which we work; that is unnecessary, because, of course, you are all so fully acquainted with it. At the same time, I think it is always useful, no matter how old in experience we may be, to halt sometimes and discuss with each other anything which concerns our work. Of all the different departments that go to make up the service I do not think there will be many who will disagree with me when I say that the duties of the operator from many points of view are the most important, and at the same time most exacting. Anything that tends to lighten their work and at the same time improve it is worthy of every consideration.

The switchboard has in recent years undergone many changes, and those now in use are undoubtedly a vast improvement of those formerly in use at some of the older exchanges in the district. The present boards are so designed as to assist the intelligent operator in every way, and there can be no genuine excuse for inefficient service. Everything that electricians and engineers have been able to devise has been incorporated with the object of enabling operators to give prompt attention to the calls of subscribers. In all cases the staff is sufficiently large to deal with the traffic; at least records are taken to ensure this being so, and therefore any complaint as to erratic service can be only attributed to the indifference of the operator. In these days speed in answering is not only desirable, but absolutely essential, and an effort should be made to give uniform service. It is unsatisfactory to answer one call in two or three

seconds, and to allow in other cases twenty or thirty seconds to elapse before replying to a subscriber's ring. The aim of the operator should be to give an even service at all costs, and with up-to-date equipment this is beyond doubt possible, granting always that the operator has her mind concentrated on her work. Service of an even character is naturally appreciated by subscribers, and their interests have at all times to be recognised. While so much depends upon the operator, it must not be forgotten that considerable responsibility rests with the subscriber, and here the need of careful supervision comes in. Subscribers are, of course, composed of all classes, but in every instance it is possible by courtesy, patience and tact so to influence them that they will unite in bringing the service up to the highest standard of excellence. Without any departure from the standard operating expressions it is possible so to train subscribers that they will in the course of time become nearly, if not quite, as official in giving calls as the operators are in receiving them. The incorrigible office boy has the reputation of driving operators to distraction: but I think that for much of his boyish tricks the operators in some cases have themselves to thank, for, had they always treated him with strictly official courtesy, he would not have dared to take a liberty. The work of a clerk-in-charge has in recent years grown very considerably, and I think it has tended generally to an improvement in the service. On the clerk-in-charge depends the correct training of the operators, and any failure to comply fully with the service demands on the part of the operator reflects discreditably upon the instructress. These complaints are fortunately rare, as the Company takes special care in the selection of these officials. Only the most intelligent and conscientious operators can hope to attain to these positions; but there is every prospect of advancement to all who have the ability, and care to qualify. Enthusiasm, as you will all agree, is infectious, and unless a clerk-in-charge and supervisor has a wholehearted interest in the Company's work, such a feeling cannot prevail among the operating staff.

Now with regard to the qualifications that an operator should possess; these are many, and among the most important must be placed smartness and business ability. It is not sufficient to acquire a bright, cheerful voice. An operator should keep herself abreast of the times, and should be in possession of all information concerning her work by carefully perusing the Service Instructions that are issued from time to time, so that when a subscriber makes an enquiry, she is able to answer him promptly and correctly. This does not apply of course to exchanges where there is a clerk-in-charge, but in the smaller exchanges it is essentially applicable, because there the operator is her own supervisor, and naturally subscribers expect her to be fully acquainted with all matters regarding the service. She should be able to explain any break that may occur in his service, and to satisfy him that everything possible had been done to remedy the defect. I would like to emphasise the importance of operators learning as much as they can of the maintenance side. This I am sure will appeal to the inspectors, whose work would be greatly facilitated by operators reporting faults as fully as possible. Where due regard is paid to these qualifications, subscribers gain confidence in the operator, and while they find it a pleasure to be connected with the telephone, the work of the operator is very much lightened.

It is at sub-exchanges where the operator is most in need of instruction. Due allowance must of course be made for the fact that such an operator does not gain so much experience as an operator at a busy exchange. Perhaps one of the greatest difficulties that sub-exchange operators have to deal with is the operating of a call from a line fitted with an automatic box. Many of these lines are used by all sorts and conditions of men, and it is frequently quite a business to instruct them in the proper use of the telephone. Exasperating as this often is, it is by no means so troublesome as the effort involved in the duty of insisting on the placing of the necessary pennies in the box. Here it is that the operator requires to exercise patience and tact. She should never, even though the individual at the other end be most refractory, lose her head. The operator should recognise that the caller who so behaves is a novice. In this district, so far as my experience goes, it rarely, if ever, happens that a caller deliberately attempts to avoid payment. To an operator who deals chiefly with this class of work in larger exchanges, some concession should be made with regard

* Paper read before the Gloucester Telephone Society, session 1909-10.

to her load. It is not fair to expect her to get through so many calls as the other operators whose duty, comparatively speaking, is smooth and straightforward.

Although ticket diagrams and printed instructions have been issued to the attendants and operators in the various exchanges, ticket recording, more especially so at the sub-exchanges, is not yet up to the standard point. At these exchanges operators and attendants do not realise the fact that the fee clerk at the district office cannot ascertain whether the ticket recorded is a chargeable one or not, unless he is guided by a distinctive mark thereon, especially in the cases of delayed calls. Several attendants are under the impression that the "No call" ticket recently appended to the ticket diagrams is now intended to be made out for trunk enquiries. Although the service instruction reads that the ticket is to be made out in the event of an enquiry *re* a delayed call, of course the actual meaning is "No call made." In the event of a trunk enquiry, in most cases the subscriber is connected direct to the trunk exchange; if not, the enquiry is made by the operator herself on his behalf; therefore a call is made. Frequently operators complain that Service Instructions are revised too often, and that as soon as they have learned to do a thing in a particular way they are instructed to do it in another. I have pointed out that all these instructions are framed with the object of improving the service, and that the operators should not shirk any little extra trouble involved in the revision.

The work of a travelling supervisor is responsible and important, and to carry it out successfully one requires a good deal of confidence and an unlimited amount of tact. At first the operators, especially those in the smaller exchanges, look upon the travelling supervisor with a good deal of suspicion, but with time this feeling wears off, a mutual confidence is established, and the supervisor is enabled to render very considerable assistance to those whose operating was hitherto weak. When the supervisor has won the good graces of the operator she is able to bring the service up to a uniform standard of efficiency. One of the first duties of a travelling supervisor is to break down the hitherto isolated and independent working of some exchanges where formerly the operator was practically her own mistress, and knew that she was pretty safe from criticism, unless an especially exacting subscriber reported her. The travelling supervisor is in a position to check all irregularities, and to insist upon the best possible service being given in sub-exchanges.

I hope I have not wearied you by the reiteration of much that must have been common knowledge to many, if not all of you. I have endeavoured as far as possible to express a few personal experiences, and must ask you to excuse me if I have failed in my endeavour to interest you, as this is the first paper it has been my pleasure to prepare.

THE CLERK IN LITERATURE.

By W. H. GUNSTON.

THE admirable and thoughtful paper by Mr. J. F. Scott on the "Psychology of the Office," recently published in the JOURNAL, suggests some considerations of the duties, hopes and aims of the complex and ill-comprehended *genus clerk*. Possibly no word in the language contains a vaguer significance than the word "clerk," and no calling or occupation is more widely divergent equally in its nature, its essential duties and its social status than that of the clerk. Describe a man as a "clerk" and you no more "place" him than if you said he was an Imperialist, a Bimetallist, a Roman Catholic or a member of any other comprehensive family. He may be the equal and associate of men of rank or infinitely lower than the smallest petty shopkeeper. He may be a highly educated man, engaged in work demanding a specialised intelligence, or he may be ill-educated and shiftless, performing the humblest routine in the most inefficient way, without thought, without care, without outlook; and between these two extremes lie all the numberless grades, different in slight degrees each from other, which are usually found in all things human. Perhaps the plastic nature, the lack of definiteness in the clerk's profession, as a whole, gives it all the wider scope and all the greater possibilities. A

youth of ambition entering an office may be condemned eternally to make entries and cast up columns, or he may have the opportunity of exercising a keen intelligence, of mastering the details of the business and making himself so invaluable that the widest and most promising vistas open out. Perhaps also in the clerk's, like higher callings—literature for instance—it is just because the more particular excellencies of it cannot be taught and must be discovered that comparatively few achieve high success in it. Bookkeeping, shorthand, languages can be taught; method and punctuality can be inculcated; but that which lifts a man out of the ordinary rut must come from within himself. Of course, it may be inspired by example, stimulated by interest and aided by help and advice, for I do not pretend that clerks, like poets, are born and not made.

It is perhaps not too much to say that literature generally deals very unfairly with the clerk. You get the poor, but honest, overworked, subservient species; or the conceited, ill-bred, over-dressed specimen who considers himself "a perfect gent." Possibly that larger, intermediate and most representative class of clerk which lies between the more favoured Government official and the half-educated, unprogressive class from which the comedy examples are drawn, presents little attraction to the writer. Again, social and educational conditions have changed so greatly since the times of Dickens and Thackeray that it is difficult to say whether the types they draw were representative or capriciously selected and exaggerated.

Mr. Guppy, Dick Swiveller, Mr. Chuckster, Mr. Jackson (in Pickwick), Bob Cratchit, maintaining a large family with some semblance of decency on fifteen shillings a week, and the clerks in Thackeray's minor stories are all creatures of delight and wonder, but one does not somehow figure them, as a class, as helping to maintain the commercial or legal efficiency of England. I am aware that readers may confront me with quite numerous examples of more orthodox and less fantastic clerks drawn from writers of all calibres, but I think it will be admitted that the general tendency of literature is to present the clerk in a somewhat unfavourable light, endorsing perhaps a widely prevalent view of the clerical novice as one who without sufficient money to embark in trade or sufficient special training to enter a profession, chooses the livelihood of clerkship as "respectable," and who looks down on the often better equipped and better paid artisan. As regards better equipment, except in the limited field of his trade, the artisan is generally inferior to the average clerk, especially in that vague region known as culture, if I may use that much abused word to imply general education and reading. But in the "better paid" lies the sting, for that anyone should imagine he can look down on another who is better paid, or that general culture, however great, should look down on specialised money-earning knowledge, however small, is to the average man repugnant both to propriety and good sense. Hence in considering the clerk as a fair target for its shafts of humour, literature has the sympathy of the large majority.

The humourist will always find plenty of material amongst the clerks of to-day, as, indeed, amongst all classes of people. But an undoubted opportunity exists for an author to draw a "type" of clerk in the true sense of the word—one who is really *typical* and not exceptional.

NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY (LONDON).

The following grants were made during December:—

Case.	Department.	Amount.	Remarks.
325	Contract	£2 0 0	To widow of deceased member.
326	Maintenance	3 0 0	Illness of wife.
329	Construction	4 6 6	Illness of member and family.
328	Engineers	5 0 0	Personal illness.
330	Engineers	8 17 0	" "
331	Met. Stores	7 0 0	Illness of family.
332	Traffic	2 0 0	Personal illness and death of father.

£32 3 6

Total number of grants made since formation of society, 312; value, £974 os. 10d.

Amount of subscriptions received during December, £17 18s. 10d.

Donations received, £18 4s. 2d.

Membership: New, 29; ceased, 74; number of members at Dec. 31, 2,906.

G. BUCKERIDGE. A. H. DYER. P. J. MANTLE. J. E. COLLINS. G. H. WILKINSON. A. E. ABBOTT. J. TAYLER. R. M. TEEBOON.
 G. KNIGHTON. H. C. TOWNSEND. R. J. FERGUSON. S. CRAIDOCK. F. GROVE. J. A. JENKINS. A. WARE.



MISS F. J. MINTER. C. F. ARROWSMITH. W. B. BENHAM. MISS E. M. RALPH.
 H. F. E. DEANE. J. F. EDMONDS. H. G. CORNER. R. S. WARD

**LONDON AND ITS ORGANISATION.
 TRAFFIC DEPARTMENT.**

By J. STIRLING, *Metropolitan Chief Accountant*, AND
 J. F. EDMONDS, *Metropolitan Traffic Manager*.

In a general article dealing with so many ramifications as are to be found in traffic work, it is impossible to treat the subject adequately, as each branch of the work touched upon could without difficulty be made the theme of a separate article. It becomes necessary, therefore, to deal only with the main features of the organisation of the London Traffic Department, and, as far as space can be found, to include some facts of interest tending to show the growing importance of the work.

Before the reorganisation of the Metropolitan staff in 1905, the management of the exchanges was in the hands of the various district managers, and the exchange managers then controlled the maintenance of the exchanges as well as the traffic. Under such circumstances it was not possible for the service to be adequately studied. It is an interesting fact, however, that some branches of traffic work, such as the engagement and training of the operating staff, additional staff and the provision of junctions had, for a considerable time prior to the reorganisation, been controlled from a

central point. Probably traffic work, in London at least, has always lent itself to functional organisation in a more pronounced manner than some other branches of the service, and the great strides which have been made during the past five years amply prove that the alteration carried out in 1905 has been more than justified.

All traffic studies have much in common, the extent and complexity naturally varying according to the size and nature of the business. If we compare the telephone with railway traffic, for example, many similarities can be seen, even without any inner knowledge of railway organisation—there is the same strong human interest, the fascination which invariably accompanies it, the varying demands of the client, due to seasonal needs, political changes, the rise and fall of markets, the weather, and a hundred other causes and caprices which afflict men and women wherever they follow their gregarious tendencies; there is also the knowledge that the aim of all effort is the perfecting of a system which has become necessary, not only to the business world, but to human society. As examples of the traffic fluctuations which have to be dealt with in London the following are not without interest:—

His late Majesty King Edward VII. died May 6, 1910.

Calls at London register exchanges—

For two weeks ending May 7	...	...	5,905,000
" " " " May 21	...	...	4,913,000
" " " " June 4	...	...	5,692,000

During Stock Exchange rubber boom—

Average calling rate on London Wall Exchange 87 per line, per week: as against 67 for same period of 1908 and 73 in 1909.

The real importance of traffic work can be better appreciated, however, when it is remembered that the design of the modern switchboard is largely the result of traffic studies. The rate of calling, the operator's load, the method of operating have all to be considered. The study of junction traffic and peg counts makes it possible for the work to be carried on in an increasingly efficient and economical manner, whilst the operator's work is made smoother and more straightforward than before.

The revolution in exchange organisation resulting from systematic and scientific study, and the increased care and attention bestowed upon the service, is accentuated when we remember some of the free-and-easy methods which prevailed in the early days of telephony, whilst its pioneers were groping towards the light. Many stories of those ancient days are still current, and it becomes increasingly difficult to decide whether the laugh which they invariably arouse springs from genuine amusement at the incidents or from delight that anyone should have the courage to retell tales which even our youths are beginning to regard as ancient. So quickly is telephone history made.

The London Traffic Department is unique in Europe because of the extent and variety of the territory which it provides for, and the consequent telephone problems of which it has to find the solutions. In the Metropolitan area the Company has 61 exchanges, thirteen of which are within the County of London. The largest are Gerrard and London Wall, both of which have over 8,500 lines; the smallest is Chigwell, with seventeen direct exchange lines. The area extends from Waltham Cross in the north to Reigate in the south, and from Tilbury in the east to Southall in the west. (See Fig. 1.) The Post Office has 23 exchanges, and, as the subscribers on either system are entitled to intercommunication with those on the other, the task of the Company's staff in dealing with and controlling the junction service is made still more complicated. The different classes of service too are fairly numerous, and some of them, provided for on old contracts, are not to be found in the current schedule of tariffs.

It has become almost a commonplace to say that the present-day uniformity and efficiency of operating procedure owe more to the introduction of the central battery system than to any other cause. Indeed, we have now got into the habit of treating the date of conversion from magneto to central battery working at any exchange as a sort of landmark, so outstanding has been the effect created. At the same time we have been able, by improved supervision and more adequate study of traffic conditions, to make the efficiency of service at magneto exchanges almost as great from the subscriber's point of view as that rendered under central battery conditions.

The following figures will serve as an indication of how the telephone habit has grown in London during the last five years:—

Exchange telephones in use on the Company's system in London increased from 70,546 to 120,588 in five years, while in the same period the number of originating calls per day has gone up from 469,049 to 743,621. This means that in the course of a single year over 180,000,000 messages are passed. The junction circuits have increased from 7,230 to 10,127 in order to meet the demands of this traffic, and whereas in 1905 the number of working "A" and "B" positions amounted to 991; in 1910 they numbered 1,186. Lastly, the total traffic staff has increased from 1,786 to 2,364.

The illustrative map (Fig. 1) shows the fifteen exchange managers' districts into which the area has been divided for traffic purposes. In the congested sections, such as in the City and at Gerrard, only one exchange is controlled, but in the less busy and more outlying parts a district consists of a group of exchanges controlled by an exchange manager situated at the most important of the group. The central control office is at Salisbury House, where the traffic manager and his three assistants are located, and from there emanate all general instructions, decisions on questions of policy, methods of administration, and the numerous other points on which responsible officers have to pass judgment or bestow guidance. Fig 2 shows the chief divisions of work and responsibility, but for convenience details of the staff controlled are given

only in two exchange districts, viz., Gerrard (a central battery, highly developed, one exchange district) and Dalston (a composite district in which are situated several exchanges of different types). It should also be noted that although the exchange managers are under the direct supervision of assistant No. 2, the other assistants obtain all data and reports dealing with the subjects under their jurisdiction direct from the exchange managers, and likewise issue direct instructions on such matters. A photograph of the principal traffic officers in London is reproduced at the top of this article.

A glance at the headings under which each assistant traffic manager's duties are defined will show very conclusively their varied and interesting nature. The senior officer, who is responsible for studies, development and costs, has an almost inexhaustible field for research: his very able article on "The Telephone Load Line" which recently appeared in these pages contained some

THE NATIONAL TELEPHONE CO., LTD.

DIAGRAM OF METROPOLITAN AREA, SHOWING

ARRANGEMENT OF EXCHANGE DISTRICTS.

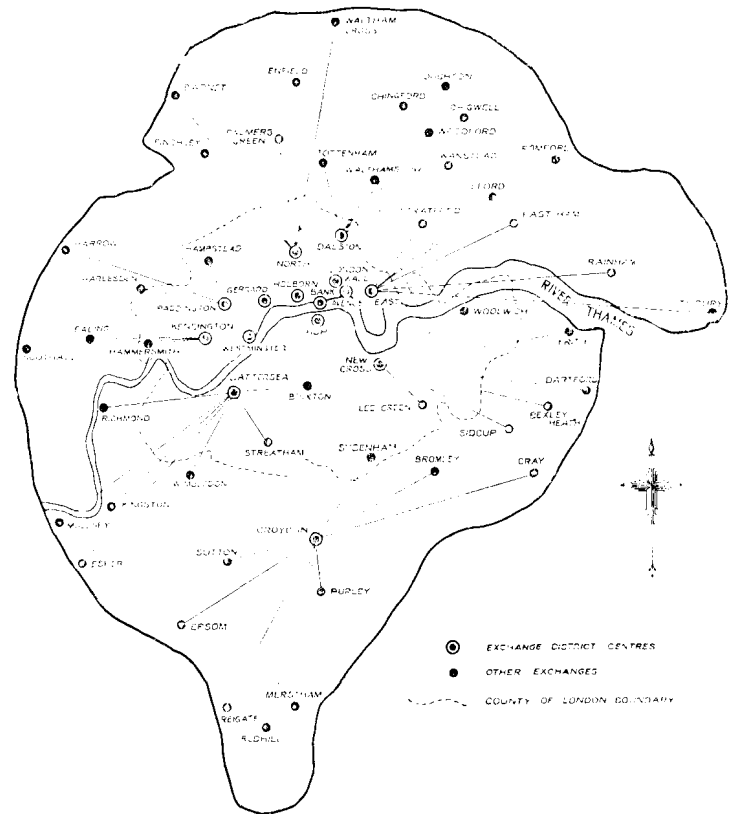


FIG. 1.

worthy specimens of the fruit produced, and render unnecessary any comments on the topics of which it treated.

A few of the matters coming under purview are the valuation of telephone calls, the efficiency of operators under varying conditions, operators' loads, estimating for operating staff in advance of the traffic, questions affecting the capacities of exchanges, number of cords required per position under varying traffic conditions, and operating expenditure in its relation to work done. Were it not that matters of a contentious character cannot well be dealt with in an article of this nature much might be said on the best method of arriving at operating costs for comparative purposes. The cost per 1,000 calls (reduced to local value) basis has been used for a considerable time by the Metropolitan Traffic Department. At exchanges where the calling rate increases, this basis has been found the most satisfactory for comparative purposes. It must of course be based on reliable statistics representing as nearly as possible the correct valuation of calls. We hope that the day may come when such a system may be universally adopted. Before this can take place, one or two points of a controversial nature must be settled, such as, what constitutes a unit call and some easy method of correcting differences due to higher or lower average salaries.

THE NATIONAL TELEPHONE CO., LTD.
METROPOLITAN AREA.
TRAFFIC STAFF ORGANISATION.

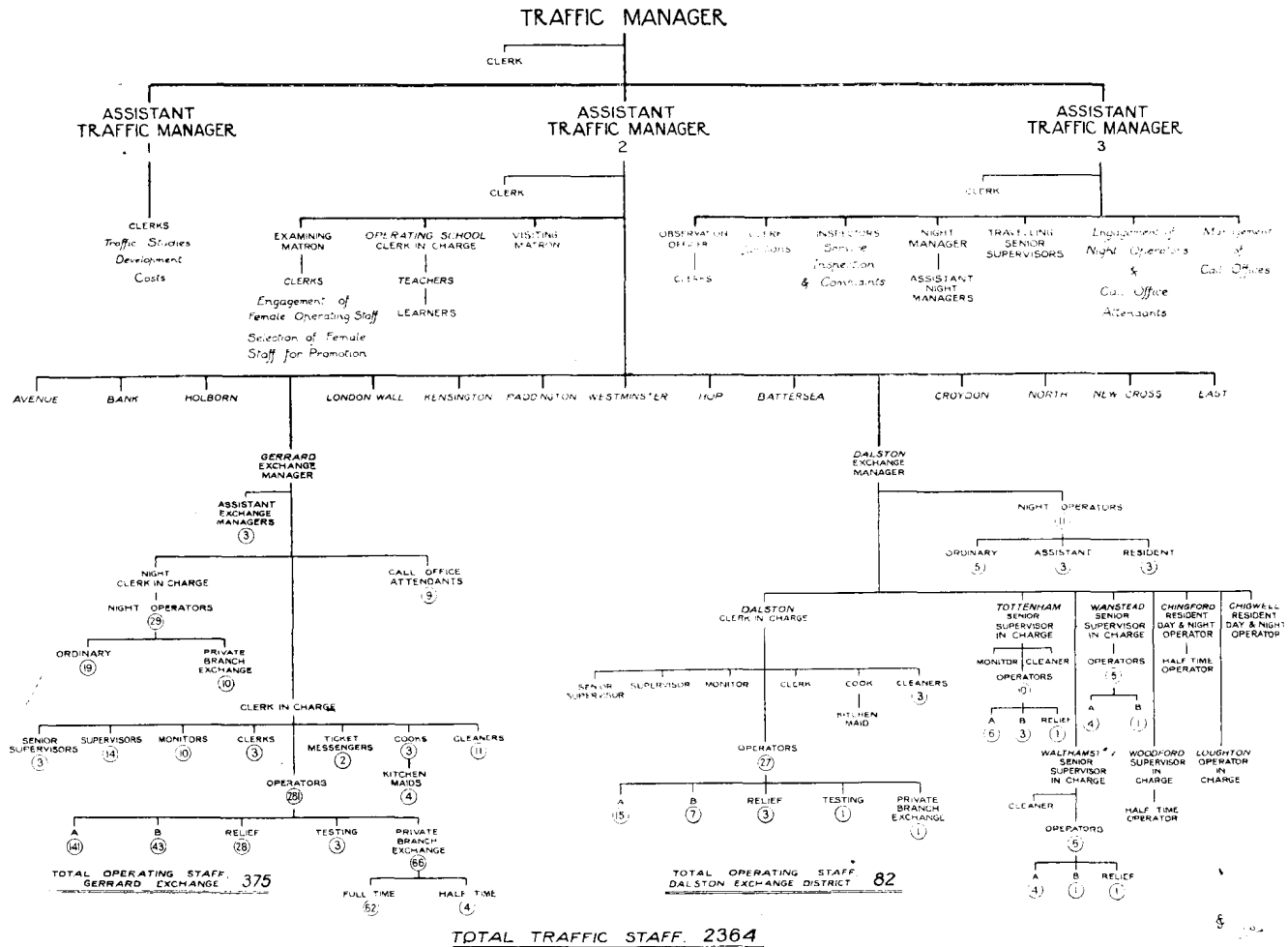


FIG. 2.

The second division of controlling officers' duties, comprises a section of traffic work the importance of which cannot be over-rated—the engagement and efficient training of the girls who are to fill operating vacancies.

As is well known, before candidates can be admitted into the Operating School, an Educational Examination has to be passed, and before this examination is attended a weeding-out process takes place. It will be agreed that it is no use trying to fit an obviously round peg into a square hole, and there need be no compunctions about rejecting the unfit. To do otherwise would be no kindness to an applicant, as she might then be prevented from entering a sphere for which she was better qualified; besides, in cases where illiteracy, untidy appearance, defective hearing, lack of education and similar shortcomings are apparent it would be sheer waste of time and money to do anything but reject. In the interests of the staff as well, a high standard of selection must be maintained, for nothing would be easier than to lower the tone of an exchange by the introduction of unsuitable operators; once lowered, great difficulty might be experienced in raising it. At the same time it would be equally a mistake to reject an applicant who seems likely to be susceptible to the energising effects of a little school discipline and training. The sifting of good from bad, promising from hopeless, is in the hands of the matron and her staff, and they carry out their important work with a discretion and acumen deserving of all praise. Sound health, ability to write clearly and do a few simple sums correctly, courtesy of manner and bearing, are the main requisites before any aspirant is taken on trial. It is not much to ask, but the figures of results show how necessary this process of elimination really is.

Year.	No. of applicants.	No. engaged for school.	Percentage.
1903	3,587	508	14.2
1904	5,013	579	11.5
1905	2,552	353	13.8
1906	4,246	381	9
1907	7,617	386	5.1
1908	4,493	311	6.9
1909	6,581	449	6.8
1910	5,875	393	6.7

It is, however, satisfactory to know that the right class of girl is being obtained, and that our exchanges to-day are manned by a staff thoroughly capable and loyal, entering into the spirit of their work, and displaying that eagerness to attain proficiency and promotion which is a sure sign of zeal.

The London Operating School is the oldest school of telephone operating in the world. A good deal has already been said and written about its work and methods, and an article has appeared in this JOURNAL giving particulars of the apparatus in use and a general idea of the curriculum. It has certainly accomplished much in bringing exchange staffs up to date in theory and method, and has exercised an immense influence for good on the many hundreds of girls who have passed through it, and heard for the first time in its class rooms those many terms and rules which so soon become familiar everyday expressions.

The period of tutelage is five weeks, during which the budding operator is taken through all the stages of actual exchange work, prior to being drafted on probation to a vacancy at one of the exchanges. The probationary period lasts, on the average, three

months, the actual time depending on the rapidity with which the operator attains proficiency; at the end of that period she is fully fledged, and is then placed on the exchange staff. The maximum number of girls in the school at one time is 60, and there are eleven teachers, all thoroughly qualified to instil into their pupils sound telephone principles and practice. Since the school was opened in 1899, 4,747 girls have passed through a course of training, and during the past five years, the number trained has been 2,025. About three years ago, it was decided that every member of the traffic staff then exercising controlling functions should pass through the school course of lectures. The total dealt with under that arrangement was 414, and as many availed themselves of the opportunity afforded of criticising the procedure and methods, many valuable points were obtained by the Company, and a progressive influence brought to bear on the staff themselves. As an example, one suggestion made by a critic was that learners should visit exchanges at an earlier period during their course of tuition, so that they might obtain a general idea of what practical exchange operating meant, and that they should be given more facility for acquiring the "telephone ear" than existed in the practice room; the latter part of this suggestion has since been carried out by means of a system of dictation by telephone. This is one of the ways in which the school has been rendered more efficient, for it must be remembered that these criticisms are made by senior members of the operating staff, under whom the learners are subsequently placed. All call office attendants and night operators are also required to undergo the period of school training. This training ground, with its appliances and special staff, does undoubtedly give the Traffic Department an immense advantage over other departments which have no such facility, and also shows the importance attached by the Company to the furnishing of that efficient service by which more than anything else the public appraise the value of the telephone. As far as operators are concerned the school training lasts about five weeks. It is difficult to say how long it took a learner in the old days, when she was placed under the care of an operator at the switchboard, to acquire that knowledge which is imparted to her in a scientific manner in a comparatively short time under present conditions.

(To be concluded.)

THE PRIVATE BRANCH EXCHANGE AT THE GRAND HOTEL, SHEFFIELD.

By F. BARR, *Sheffield.*

In the installation of this exchange it was decided, after due consideration, to adopt a dry-core lead-covered cable distribution throughout. This was both more economical and efficient.

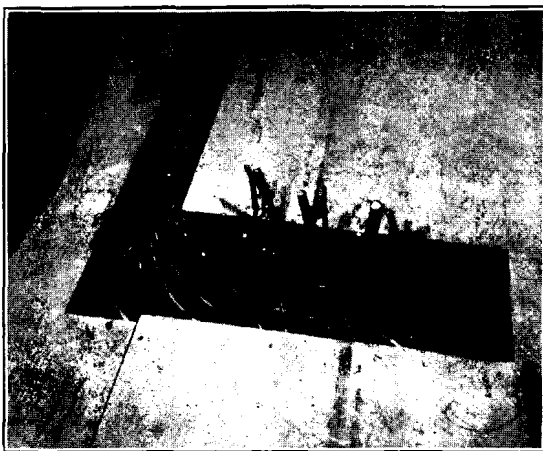


FIG. 1.—CABLES LAID READY FOR JOINTING (BOARDS REMOVED).

The work had to be carried out during the construction of the building. I need hardly describe the difficulties in dealing with a

work of this description in a building lighted only by flare lamps during the greater part of the time, with plasterers, joiners, painters and so forth, knocking up against you at every turn, and, in addition, with a clerk of the works on your track to hurry you up. The building had to be completed in a given time, and naturally no time was lost by the staff in carrying out the work.



FIG. 2.—JOINER AT WORK.

The floor boards were grooved and tongued and pressed together by screw jacks, and it was therefore a case of splintering them up with a crowbar before the joists could be grooved and the cable laid. All the joiner's work in connection with the cable-laying was carried out by the contractor's men, placed at our disposal. At each joint hole a false floor was fitted between the joists and a cover made to fit the hole. All boards moved for our operations were, when replaced, screwed and not re-nailed down. The object of this will be apparent.

The first cables on the top floor was laid by a foreman and gang, but the remainder was mostly laid by a wireman, assisted by a lad.

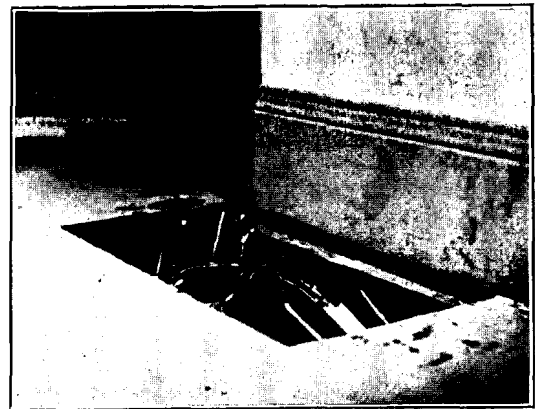


FIG. 3.—SHOWING METHOD OF BUILDING-UP CABLES.

The jointing was carried out by one joiner, and the method of jointing the one-pair cables to the main cables was suggested by him. A pothead was made wherever the one-pair cables left the main cable. Each single cable was tinned before jointing, and the cables built up and wiped in batches of three.

The illustrations will more fully explain the methods of running and jointing the cables.

The one-pair cables terminated on the bell boxes of each instrument, the ends being dipped in melted beeswax before fixing to the box. A distribution plan was drawn up before operations commenced, and a blue print of each floor given to the men running and jointing the cable. At the completion of the work floor plans were obtained from the architects (Messrs. Cannon & Chorley,

Leeds). These were mounted on linen, and a complete record, including the exact position of cable runs and joint boxes, was marked upon them for future reference.

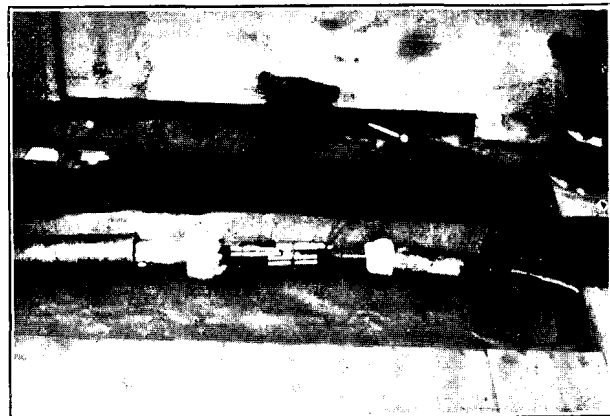


FIG. 4.—JOINT READY FOR SLEEVE.

The test frame and cabinet was designed and constructed locally, and the fitting up of the exchange was carried out entirely by the local staff.

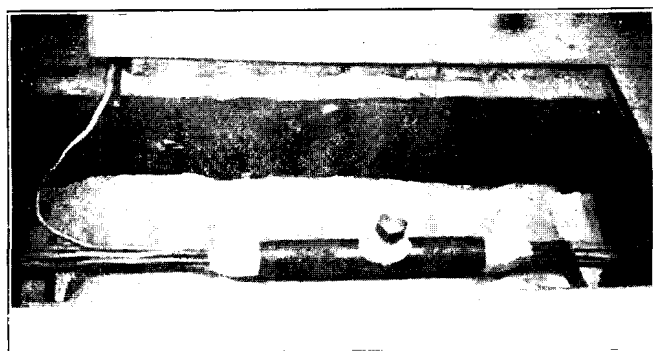


FIG. 5.—JOINT COMPLETED, WITH ONE-PAIR PASSING INTO BEDROOM.

The switchboards consist of two No. 2,501 sections, one 9-inch cable turning section and one end panel, and serves 250 stations fitted with five junctions. The current is supplied from the accumulators at the Central Exchange.

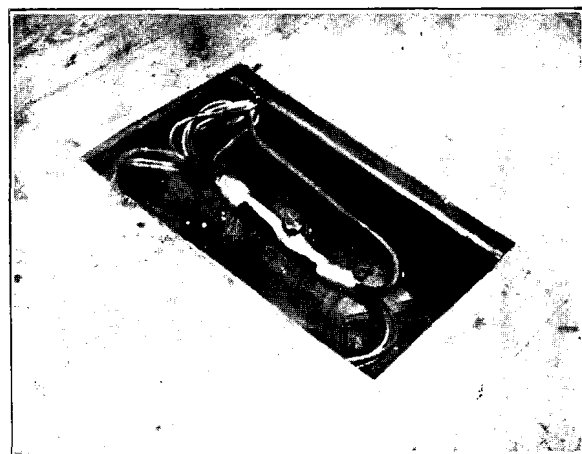


FIG. 6.—JOINT MADE AT RIGHT ANGLES TO LAY OF CABLE ON ACCOUNT OF POSITION OF JOINTS.

The hotel provide their own operators, the day operators working from 7 a.m. to 3 p.m., 3 p.m. to 9 p.m.; and night operator from 9 p.m. to 7 a.m.

ON THE EFFICIENCY OF INTER-URBAN TELEPHONE LINES.*

Translated and abridged by G. M. B. SHEPHERD.

REFERENCE is made to an article recently in *E.T.Z.*, 1910, page 20, describing recent improvements in loading. Experiments have shown that, using double coils, no troubles from the unbalancing of aerial lines, and consequently induction, now arise. The conductor resistance is the governing factor, and is considered in detail. Large diameter wires are affected by the Kelvin skin effect, in accordance with the laws of Maxwell and Rayleigh, and three cases are herein dealt with: viz.: (1) copper or bronze wires having $\mu = 1$, (2) iron wire $\mu > 1$, and (3) bi-metallic wire containing iron.

(1) *Copper or Bronze Conductors.*—The following are calculated figures at 900 ~ :—

Diam. of copper wire in mm.	1	2	3	4	5	6	8
Increase in resistance, per cent.	0	1	5	1.5	3.7	6.9	20

The following table gives a comparison between theory and actual experiment for different frequencies (copper wire):—

Frequency	Increase, per cent. Calculated.					Increase, per cent. Observed.				
	1 mm.	2 mm.	4 mm.	6 mm.	8 mm.	1 mm.	2 mm.	4 mm.	6 mm.	8 mm.
600	0	0	1.7	3.2	10.1	0	0	3	1.8	9
900	0	1	1.5	6.9	20	0	0	6	4.8	17.5
1,200	0	2	2.7	11.7	34	0	0	9	9.2	27
1,500	0	3	4.1	17.9	54.4	0	0	1.6	14.4	37

And for a 5 mm. aluminium conductor:—

Frequency	Per cent. increase. Calculated.					Per cent. increase. Measured.				
	1 mm.	2 mm.	4 mm.	6 mm.	8 mm.	1 mm.	2 mm.	4 mm.	6 mm.	8 mm.
600	1.5	...	...	...	3
900	1.0	...	...	...	6
1,200	1.8	...	...	...	10
1,500	2.8	...	...	...	16

As seen, calculation and experiment do not agree very well, but the author considers the results satisfactory enough. In all cases the observed percentage increases are lower than those calculated by Rayleigh's formula. Skin effect is therefore of small importance on even the largest wires at present commonly used for telephony. If, however, very large conductors over 5 mm. should be employed stranding becomes necessary. Ordinary stranding, however, appears to be inefficient; thus a core consisting of 48 1-mm. wires equivalent to 6.9 mm. solid had the same per cent. increase at 820 ~ as the solid core. An improved method of stranding was proposed by A. Franke. In this it is arranged that each wire changes in position from centre to surface of the core. How this is done is not stated, but the results are excellent. Thus, for example, a core of sixteen 1-mm. wires, equal to 4 mm. solid, gave no sensible increase up to 3,000 ~ while the solid wire showed an increase of 1.6 per cent. at 1,500 ~.

(2) *Iron Conductors.*

Diam	Per cent. increase in R. at 600 ~		Per cent. increase in R. at 1,500 ~	
	Calculated.	Observed.	Calculated.	Observed.
1 mm.	3	3	1.8	1.8
2 "	4.0	4.5	2.5	2.3
3 "	16	17	about 60	about 58

For large iron wires the following experimental figures are given. They were made on a single specimen of wire by drawing same down from a large gauge, step by step:—

Diam. in mm.	1	1.5	2	3	4	5	6	7
Increase per cent. for 1,000 ~	8	12	37	80	125	175
Increase per cent. for 2,000 ~	20	12	36	83	145	210
	280	294				

Simple subdivision of iron conductors affords a considerable improvement, thus a 48 1-mm. core increased 24 per cent. at

* Paper read by Dr. A. Ebeling before the Paris Conference.

1,000 γ , while the equivalent 6.9 mm. solid increased 190 per cent.

Steel wires whose μ is about two-thirds that of iron show the skin effect less. An example is given of a steel line which has given excellent results in Würtemberg. The wire is 2.2 mm. diam. At 1,000 γ the increase in resistance was only 4 per cent., and a cable composed of three of these strands, equivalent to 3.8 mm. solid, showed an increase of only 4.6 per cent. The author considers this result important, also doubts the practical advantage of specially stranding conductors of iron or steel in the manner proposed by Franke.

(3) *Bimetallic Wires*.—These are of two types, viz., copper over an iron or steel core, forming one homogeneous wire, and iron or steel wires wound over a central core of copper. Neither of these types have given really good results. The author's experiments go to show that aluminium and iron is a good combination, though higher in resistance than copper and iron, and the following electrical tests of composite aluminium and iron conductors are given:—

No.	No. of iron wires.	Diam. of iron wires.	No. of Al. wires.	Diam. of Al. wires.	Res. to direct currents per km. ω .	-	Increase per cent. in R.
1	3	1.5	1	1.5	10	900	6.4
2	2	1.5	1	1.5	21	—	6.0
3	2	1.5	2	1.5	15	—	5.5
4	2	2.0	1	2.0	15	—	10.1
5	2	2.0	2	2.0	10	—	11.4
6	1	2.0	9	1.0	75	1,000	19.2
7	1	2.0	6	2.0	31	1,000	20.2

Numbers 1 to 5 above were made up by simple twisting of the wires together, while in 6 to 7 the aluminium wires surround the iron wire. The latter construction should have the longest life, as the iron is protected. Tests using steel wire are not completed yet, but these are expected to show smaller resistance increases: and composite wires of 4 to 5 mm., having a core of steel corresponding in resistance to 2.7 to 4 mm. copper, should not show a skin effect greater than 5 or 6 per cent.

Conclusions from tests are:

(1) A specially stranded copper conductor enables the largest wires to be used for aerial lines in telephony.

(2) Large iron wires cannot be seriously considered for open lines, but iron or steel in cables show skin effect to a smaller degree.

(3) Aluminium and iron or steel composite wires have been constructed which show a very small per cent. increase of resistance, and yet have a good conductance. The author finishes up aerial lines with relative costs of loading and equivalent heavy wire.

1 km. double 3 mm. bronze, loaded	... = 270 marks
1 km. one 1.5 mm. steel and six 1.5 mm. aluminium wires, also loaded	... = 200 "
1 km. double 5 mm. bronze, unloaded	... = 610 "

CABLES.

The question of the material for telephone conductors is settled at once in the case of urban telephone systems; copper only can be contemplated. Continuous loading by iron wire leads to bulky cables difficult to lay and handle. The insertion of Pupin coils is the right method for urban lines or long inter-urban junctions. The attenuation formula for loaded cables is:

$$\beta = \frac{R_l + R_{sp}}{2} \sqrt{\frac{C_l}{L_{sp}} + \frac{A_l}{2}} \sqrt{\frac{L_{sp}}{C_l}}$$

Where R_l , C_l , A_l are the resistance capacity and leakance of the cable.

R_{sp} , L_{sp} , the resistance and inductance due to the coils. It is seen from this formula, that given a certain line resistance, there is little use diminishing the coil resistance below a certain point, also for cables of low resistance, loading beyond a certain point is of no value.

The author concludes with the remarks that with cables of normal construction and coils of the best type, 1,000 km., talking is feasible with copper conductors not exceeding 3 mm. βl may be 3.5 or 4 for cables, but should not exceed 2.5 for open wires because of the range of variation of insulation. Comparing loaded cables with unloaded open wire on this basis, it is found that for 3 mm. copper in cable loaded, $\beta = .0026$, and for 4 mm. copper (or bronze) open unloaded, $\beta = .0026$ also. Hence the efficiencies of the cable and the open wire are the same under the conditions stated.

THE CEASEMENT OFFICER AND HIS WORK.

By H. MORGAN, Northern District Contract Office, London.

THAT it is better to retain an old subscriber than to obtain a new one is an axiom with which every cessation officer will heartily concur, and it is because of the importance of ceasement work that I am endeavouring to supplement the London Contract Manager's interesting article in a recent issue of the JOURNAL with some suggestions as to how this branch of contract work can be more efficiently dealt with.

One very necessary requirement for ceasement work is a general knowledge, not only of the office routine, but of Service Instructions and apparatus. This will be readily understood when it is remembered that the ceasement officer is called upon to deal with all sorts of service difficulties in connection with notices to cease, and also with the issuing of disconnection orders, the passing through of change of rate agreements superseding contracts, and so forth. Each of these branches of ceasement work, too, can be dealt with along many different lines.

To take, for instance, an ordinary notice to cease. If the notice is in order a letter is sent acknowledging it and informing the subscriber that a representative will call in the course of a day or two regarding the matter.

Now this first call often decides whether or no the subscriber will eventually withdraw notice, so that it is of paramount importance that the officer deputed to call shall try and obtain from him an exact idea as to why notice has been given, as all subsequent dealings with the case are to a large extent influenced by the subscriber's attitude and the reason given for notice to cease.

Should the explanation be that removal is contemplated the ceasement officer should immediately inform subscriber that the Company is in a position to move his line, wayleaves and other circumstances permitting, at a fair charge, or in the event of a new tenant signing a new contract, removal can be undertaken free of charge.

This, of course, leads to new business and incidentally helps the chief ceasement officer to gain the sympathetic ear and hearty interest and co-operation of the new business men, but this I will mention again later. It may happen however that the notice to cease is given on account of alleged bad service, or overcharge for calls.

In either of these cases it will at once be seen how imperative it is that the ceasement officer should be *au fait* with and able to explain fairly lucidly the methods adopted by the exchange staff in dealing with calls both with regard to making connections and registration.

Let us now assume, however, that the subscriber has given notice to cease part of his installation only, and requires plug and jacks in place of an extension. Here the attitude taken by the ceasement officer must be an entirely different one, and by convincing argument he should endeavour to prove that, not only is it desirable and in the subscriber's best interests to retain the extension, but that the renting of plug and jacks beside would be a profitable acquisition to his telephone arrangements.

He probably scores twice here, *i.e.*, by the retention of the extension line and by new business to the extent of 10s. per annum.

It will be realised, therefore, to what an extent the intelligent and tactful ceasement officer can influence the weekly return, not only in the matter of retentions, but also the new business side, and it is scarcely necessary to add that it should be the chief ceasement

officer's constant endeavour to inculcate in those working under him the fact that knowledge in the directions previously mentioned—viz., Service Instructions, technicalities and apparatus—is a very necessary adjunct to, and a valuable asset in, all matters appertaining to his work.

In the event of every effort to retain the subscriber having proved futile, it will be necessary to issue a disconnection order at the due date, and here another important aspect of contract work comes under review.

Great care must be exercised in making out these disconnection orders, for upon the particulars given thereon the reading of the recovery works order depends.

Accuracy and clearness of detail should characterise the issuing of each one, and the folio number and class of service should be noted on the top of each, as this is a great help for reference, although no space is specifically allotted to these details on the form.

How necessary it is to give the fullest possible details will be seen when it is explained that should the fact that instruments have been previously temporarily recovered for safe custody not be mentioned, the fitter will be sent on a false errand, and, after spending two or three hours finding the house agents and obtaining the keys, will gain entrance to the building, only to find that the instruments are not there, but already safely reclining on a shelf in the stores.

Many other directions in which failure to give the necessary details on a recovery order will entail loss of time and money, will be obvious to everyone who considers the question.

In my opinion, whenever a disconnection order is issued the new business officer for the district in which the line is to be thrown spare should be advised, and here the value of co-operation is seen, for often by judicious and careful canvassing in the immediate vicinity, a new order can be obtained, and the work carried out in conjunction with it, thus increasing revenue, decreasing expenditure, keeping plant from being thrown spare, and last, but by no means least, obtaining very early completion of the line, which enhances the Company's reputation for expediency in dealing with all matters appertaining to its business.

Much more might be said along these lines, but space forbids.

Let us now consider for a short time the question of change of rate agreements.

Upon receipt of a subscriber's letter expressing a desire to change the rate, say, from message to unlimited service, the first consideration should be how much does this subscriber pay the Company in fees during the year over and above his rental. A call through to the message rate fee department and this information is readily given.

Often it is found that the subscriber is making anything from 250 to 400 calls per month, thus making a total amount paid to the Company, for one line only, of from £17 to £25 per annum. What stronger argument is wanted by a canvasser than this, that the subscriber can have two lines with auxiliary working for £23 10s. per annum, or a private branch exchange consisting of two lines, two extensions and the privilege of making 3,000 calls for £23 per annum. Actual experience has proved that in many instances where a subscriber desires change of rate he can be persuaded to rent a new line if business acumen and tact are displayed by the representative who deals with the matter.

Care should be exercised to ascertain whether it is necessary to change subscriber's number in changing his service, as sometimes a flat rate subscriber will continue on that basis sooner than change his number.

A tab should also be attached to any change of rate agreement before it is passed through, stating that change of number is necessary, as otherwise trouble will be caused through its not being noted on the works order.

Change of name agreements also require to be made out carefully, and subscriber should in every case have his attention drawn to the fact that all alterations must be initialled, otherwise valuable

time will be lost, and maybe several futile journeys made before the additions to his signature are obtained.

A great deal of tact and diplomacy is needed too, in dealing with subscribers who have given notice which is out of order.

But when it is explained to them that only by dealing with each contract strictly on its merits, and in accordance with the terms and conditions therein contained, can such an intricate system be worked upon a commercial basis, the way is paved for obtaining a substantial sum in cancellation of liability, or the suggestion can be made that subscribers should endeavour to find someone willing to sign a new agreement, thus continuing the service and preventing any loss from accruing to the Company in respect of plant being suddenly thrown spare.

Then the card system.

Much has been written in this JOURNAL from time to time on the importance of intelligent tabulation on the cards.

In no branch of the Company's operations is it more essential that correct and up-to-date entries on the cards should be made than in ceasement work.

A card not cleared at the proper time, or an entry omitted when papers are despatched to another department, or filed, will undoubtedly cause trouble and annoyance to someone at some time or another.

Not only does this apply with respect to the staff immediately connected with the department, for the Contract Department is a centre of all sorts of enquiries from other offices, more especially does this apply to the Rental, Message Rate Fee, Statistical and Engineering Departments, and in the event of the cards being inefficiently kept, delay is caused in replying to queries, or annoyance engendered by long waits on the telephone.

The whole question of carding, in fact, resolves itself into this: if the cards are methodically dealt with, the system is an immense boon and a pleasure, but if not it is nothing less than a nuisance.

When it is remembered that the Contract Department deals with the agreement, both at its inception and finish, and that a huge number of the engineering and fitting staff depend almost for their livelihood on the efficiency of the officers engaged in contract work it will be readily agreed that immense importance attaches to all its various branches. In these circumstances tenacity of purpose should characterise the efforts of each and every man engaged in its operations, whether he be in a high or subordinate position; his purpose being—get subscribers, retain them, and get more subscribers.

CHEERFULNESS.*

BY PRISCILLA HAWKINGS, Bristol.

THERE is one thing which we have not heard much of in the papers given during the session, and one which every operator should cultivate. I refer to the necessary quality of "cheerfulness."

The operator's work becomes much easier when carried out in a cheerful spirit, and how much better it must be for the subscriber, when a pleasant, cheery voice answers his call. He may have been experiencing a trying time at the office, but if, on using the telephone, the operator's voice sounds pleasantly in his ear, he feels that she is taking a personal interest in him, and will do her best for him.

I think one of the best ways of educating subscribers is to make them feel that we are always doing our best for them, and they will be more likely to feel that, when they are answered in a pleasant tone, and their calls are efficiently dealt with.

Some subscribers are always ready to blame the operator for every difficulty experienced, greatly discouraging her, when she feels she has done her best. The average subscriber, however, is not unreasonable and if anything goes wrong, explanation in a nice manner will bring him to look at things in a less exacting way.

* One of a series of competitive papers read before the Bristol Operators' Telephone Society, March, 1910.

REVIEWS.

The Development of the Telephone in Europe. By Herbert Laws Webb. (78 pp., 1s. The Electrical Press, Limited, London.)—This is a comprehensive review of the rise and evolution of the telephone, and gives the history of its vicissitudes in Great Britain and the Continent. A comparison is instituted between American and English conditions, and the reasons why European communities are deprived of full benefit of the most rapid means of communication are clearly set out. Mr. Webb passes the telephonic condition of each European State in review, and as he speaks from personal experience his views carry exceptional weight. This very interesting book concludes as follows:—

To compute the loss which the peoples of Europe have suffered, and still daily suffer, through being deprived of the highest possible development of the most rapid means of communication, would be impossible; it is an immense, incalculable loss, just as the gain in saving of time and friction which the community blessed with an efficient and highly developed telephone service enjoys is immense and incalculable.

From the experience of America we know that an efficient telephone service, in which the greatest possible rapidity and certainty of communication over both short and long distances is made the governing principle, is capable of almost indefinite expansion—so deeply does this instantaneous means of communication enter into both business and social life. It may be asked—Why should not similar results, similar efficiency, and similar development be obtained under Government management? The best answer is the results of Government management in Europe during the past 30 years. The history of the telephone in Europe clearly shows that the “vested interest” of the Governments in the telegraphs has been allowed to check the natural advance of the telephone—the survival of the fittest has been artificially restrained.

Even if under Government ownership the management of the telephone were entirely separated from that of the telegraph, so as to eliminate this repressive influence, those who are familiar with the conduct of great Government departments, always necessarily subject to political control and political influence, would be the last to claim that a Government department can be an efficient substitute for private enterprise in the conduct of an industry where high efficiency, enterprising commercial policy, advanced technical policy, and sound and economical financial management are prime requisites for success. These are all the very antithesis of accepted Government methods; and, above all, the outstanding fact that under State management there is no man responsible for financial success or otherwise is sufficient always to prevent really successful and efficient working of a commercial enterprise by Government management. Financial soundness in the end governs the old thing—organisation, efficiency, commercial and technical policy—and the difference between the Government official and the business man is that the former need only produce accounts while the latter must produce the money. In the world of affairs, of iron and steel, brass and copper, steam and electricity, machinery, organisation and effort, it is not love that makes the world go round, but money.

The book is prefaced by an introduction by the well-known economist Mr. Harold Cox, lately M.P. for Preston, who, in criticising the handling of the telephone question by the Post Office, says drily, referring to the “exorbitant royalty of 10 per cent.”: “It is interesting to observe that down to the year before last the Postmaster-General in his published accounts treated his receipts from this royalty as part of the revenue earned by him on working the telegraphs.”

Electrical Engineering Abstracts. Jan.-Dec., 1910. (International Institute of Technical Bibliography, 57-58, Chancery Lane, London.)—This useful compilation constitutes Section II. of the journal of this institute, which has been founded and promoted to organise an international, registration of engineering knowledge, by publishing a fortnightly bibliography, abstract and index of all useful scientific and technical articles appearing in technical journals, proceedings of institutes, etc., all over the world, and by supplying its members with information in other ways. Members receive one section of the journal free of charge, while to non-members the subscription for one section is 24s. for the year. The work certainly forms a valuable and up-to-date record of what is being published in the scientific and technical world. It also comprises a summary of new patents. It should be mentioned that summaries of the English and American articles and patents are in English, the German in German, and so on.

Calculations in Telegraphy and Telephony. By H. P. Few. (Rentell & Co., 2s. net.)—This little book is a compendium of numerical questions set at the City and Guilds examinations on telegraphy and telephony during the past ten years. Apparently

the examiners have been complaining bitterly of the manner in which the majority of candidates deal with calculations, and accordingly the author sets forth the various algebraical and arithmetical steps of the 70 or 80 problems included in the book with painstaking fulness. We find most of the old inquisitions into weird combinations of cells and condensers, that examiners are so fond of, stated in many different shapes and forms. The filling of spools with wire to a specified resistance is also a popular torture, though very few honours men could afford time to answer a question of this kind in the elaborate and circuitous manner shown on pages 41, 42, 43 and 44. Only three hours is allowed for the whole paper, but the practical man will see that, having arrived at the diameter of his wire, there is no need to evolve another imposing formula to give the total length on the bobbin.

On page 32 appears one of the C. and G. pet questions on transmission. We think it is a pity that questions of this kind should still be persisted in. The general principle that a metallic circuit must be equal (even approximately) to the single wire with earth return is as fallacious as the K.R. fetish itself. It is perhaps hardly fair to blame a candidate for answering a fallacious question by a fallacious answer in order to gain desirable marks; but we think that the reply to a question such as that on page 32 might well be worded so that modern principles are upheld without unduly treading upon examiners' corns. The book, anyhow, fulfils the purpose for which it was written, and can be recommended to all preparing for the C. and G. examinations. It is neatly got up and of convenient shape and size.

The Journal of the Municipal School of Technology (Manchester, Volume III).—The third volume of this journal is in no way behind the previous numbers. Both in the subject matter and as an example of the publishers' art, it is a credit to the school which has produced it. It cannot be expected that all the papers reprinted will be of direct interest to every reader, dealing as they do with subjects varying from “Flash-over Voltages” to “The Colouring Matter of Mummy Cloths.” Messrs. Curcliffe's paper on “Vagabond Currents” is the one which comes nearest the sphere of the telephone man, though all the papers would repay examination as records of the progress for which the school is responsible in the application of technical science to practical problems. The republication of such records collected together under one cover is an enterprise on which the school is to be congratulated and one which should find ample reward in the increased estimation of the technical public for the school, and in the *esprit de corps* which it promotes among the students.

FROM AN INVENTORY STAFF
CORRESPONDENT.

LIFE on the Inventory staff is not without its compensations. This has no doubt been realised by the majority of those members of the Company's staff at present without any fixed place of abode, and did time permit, Mr. Editor, you would probably be inundated with many highly interesting contributions regarding the work itself, the places and the peoples visited, experiences with landlords and landladies, etc., etc. If circumstances allow these may be forthcoming later, but in the meantime the staff of the “G” division wish to express their appreciation of the arrangements kindly made for the profitable spending of their few leisure hours by the Oxford local staff.

Our stay in the University city was a comparatively short one, and there was so much of historical and general interest claiming attention that it was found expedient to organise our little tours, and this task was taken in hand and most successfully carried out by Mr. Ward, the Local Manager. An official guide was engaged and accompanied by the members of the Post Office checking staff, we inspected many of the colleges and important buildings on two successive Saturday afternoons. The outing was very much enjoyed, and will be a pleasant memory for a long time to come.

On the evening of Monday, Dec. 19, a smoking concert was organised, and a company numbering about 50 assembled and had a very pleasant evening. Mr. Alan Roberts, Divisional Officer, who presided, was supported by Mr. T. Harrison, Supervising Office of the Post Office staff, and a well-sustained and enjoyable programme was contributed to by the local staff, the Department's staff and the Inventory staff. Unfortunately, Mr. Maclean, District Manager, was unable to be present.

The meeting from a social point of view was also highly successful, and we are greatly indebted to Mr. Ward and his assistants for the kindly feeling which suggested the function and for the admirable manner in which the arrangements were made.

The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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VOL. V.]

FEBRUARY, 1911.

[No. 59.]

MUNICIPALISATION.

As some sort of agitation has been set on foot by one of the municipalities and some gentle stir been raised here and there in the Press as to the desirability or otherwise of allowing municipal bodies to work the telephone service within the limits of their boundaries, some brief consideration of the case may be not uninteresting. The Company, being under agreement with the Post Office to dispose of its plant to that Government Department at the end of the current year, is in a position to view the whole question dispassionately and to discuss it with academic calm. We, whose fate is also shaped by the Company's Agreement, can approach the matter in like mood.

What, then, are the advantages and disadvantages of municipal control of telephones? The friends of that system contend that the Corporations can work at a cheaper rate than the Government or the Company. But when they proceed to instance Hull as a proof of their contention, they show how ill-grounded are their deductions and how illusory their data. The capital cost per station at Hull has been widely advertised as £20 12s., while that of the Company is given as £31 10s., and of the Post Office as £52 8s. Closer consideration of these figures shows them to be worthless as bases of comparison. The Hull Corporation operates in a comparatively small, compact and homogeneous area; moreover it adopts the unusual procedure of debiting its telephone account with nothing for the valuable privilege of wayleave in its streets. How can this field of operations be compared with that of the National Telephone Company, which covers the whole United Kingdom, including such vast and complicated areas as London, South Lancashire and Glasgow, and more or less unproductive ones as those in remote rural districts. Moreover, Hull possesses the enormous advantage of intercommunication over the Company's vastly greater system and consequent free use of its plant, without which the success of the Corporation system

would be problematical. The Post Office figures not only include (like those of the National Company) a large amount of spare plant which has been laid down for future requirements, but also plant which is not spare but which has been leased to the Company.

A decided drawback to municipal control of telephones would be the heterogeneous collection of telephone systems which the various bodies would in their wisdom adopt. It is unnecessary here to labour this very obvious but important technical point. Another difficulty, which is no slight one, is that the amount of the capital embarked in the smaller systems would not be such as would justify or be able to command the advantage of the advice and services of well-paid experts. This is one of the many important difficulties which centralisation solves.

Again, an important point to be remembered is this. It is estimated that for the next five years an average capital expenditure of £5,000,000 per annum will be necessary by the State for telephonic development, and thereafter in ever-increasing volume. Are the Corporations, which already have some difficulty in obtaining loans for the already enormous requirements of existing municipal undertakings, willing to add another £25,000,000 to their indebtedness within the next five years? Capital, as we have always insisted, must flow freely if the telephone system is to be adequately developed, and in the national interest it is imperative that the future of the telephone should be in hands which have the power to raise and spend that capital.

A still broader question is that of the future telephonic development of the country. If we admit that the larger municipalities operating within their populous boundaries might give an efficient service with some sort of success, what becomes of their suburbs and what becomes of the numerous unprofitable areas covered by the boundaries of the smaller Corporations? Is it likely that the large boroughs will risk a deficit in order to extend the telephone to sparsely populated and distant environs? Is it likely that the small boroughs and there are hundreds of them—will embark in telephone administration at all? Is the State to have the privilege of telephoning all the unprofitable districts at the expense of the taxpayer? We think, in the event of municipal control of the telephone service, there is little doubt that the answer to the last question would be in the affirmative.

COMPETITION AND DEVELOPMENT.

THE American journal *Telephony* returns to its charge of about a year ago wherein it sought to prove that the astoundingly rapid development of the telephone in America was coincident with the beginning of the competition between the independent companies and the Bell undertakings. This contention we went to some pains to refute in our March issue.

By boldly seizing and reproducing the diagram showing the growth of Bell stations which is published in the annual report of the American Telephone and Telegraph Company, and holding it up as evidence in favour of its case, *Telephony* appears to think that it has turned the enemy's elephants against them very neatly. In the year when competition began (1894) a black arrow is inserted in the diagram professing to show where the tremendously increased growth of stations begins. But one glance at the diagram shows

that this growth made no abnormal leaps until 1899 (five years later), and in our opinion as previously expressed, the splendid development which has followed since that year is due to two quite different causes. The one is the measured rate which has had such phenomenal success in America, and which brought the telephone in the large cities within the reach of the moderate user—for, after all, it is the addition of hundreds of thousands of subscribers in places like New York, Chicago, Boston and Philadelphia which tells, rather than the establishment of small exchanges in George City, or James City, or Sarahsville. The other is the simple fact that in the closing years of the last century the civilised world generally seemed, as it were, to have finally made up its mind that the telephone was a business and social necessity, and the development of the system went up by leaps and bounds not only in the great American cities, in London and in Berlin, but even in Paris and St. Petersburg. Without burdening the reader with a mass of figures we may give a few examples. In New York during the decade 1898-1907 the number of stations increased nearly tenfold; in London during the same period the increase was more than sevenfold; and in Paris more than threefold, while in Berlin the already large development existing in 1899 was trebled in the ten succeeding years. In none of these examples, which could be multiplied almost indefinitely, was there competition, unless the rivalry at agreed rates between the Post Office and National Telephone Company in London can be so called.

HIC ET UBIQUE.

THE Telephone Charges Bill now (Jan. 20) before the German Reichstag for discussion contains some important modifications of the original proposal. We learn from the *Zeitschrift für Schwachstromtechnik* that not only is the charge per call reduced from 5 pfenning (.05 of a shilling) to 4 pf. (as already announced), but a measured rate has been introduced as follows:—

Up to 2,000 calls	£3 15s. per annum.
2,000 „ 4,000 „	£7 os. „
4 000 „ 6,000 „	£10 os. „
6,000 „ 8,000 „	£12 10s. „
8,000 „ 10,000 „	£15 os. „

This, of course, is in addition to the annual payments varying from £2s. 10s. in the small places to £4 10s. and £5 in the great cities. The flat rate will be entirely abolished.

MAJOR W. A. J. O'MEARA read a very interesting and valuable paper before the Institution of Electrical Engineers on Dec. 15 last, entitled "Submarine Cables for Long-Distance Telephone Circuits," and describing the Anglo-French telephone cables. For reports of this paper and the full discussion which ensued we refer our readers to the weekly technical press.

As our paragraph last month regarding the recipients of awards for suggestions may give rise to misconceptions, we give a full list of the ladies who have been so honoured, in order of date. They are Miss Duggan (Dublin), Miss Minter (London), Miss B. Wood (London), Miss A. Chance (Dublin), Miss E. K. Reynolds (Bolton).

OLDHAM THRIFT CLUB.

A THRIFT club, which was inaugurated in September last in connection with the Oldham staff, has been taken up with some enthusiasm and interest. There are now nearly 40 members, and at the end of the first quarter there was a balance in the treasurer's hands of upwards of £50.

THE ADMINISTRATIVE GENIUS.

AUGUSTUS JONES was one of those
Right worthy small contractors,
Who in our country's greatness form
Indubitable factors.

And as successfuller he waxed
(To "worth" alone beholden),
The chain upon his waistcoat grew
More massive and more golden.

Duly elected, he assists
In the deliberations
Of one of those Town Councils,
The despair of other nations.

And, slowly in his massive mind
The public weal revolving,
At length the Telephonic knot
Seemed easy to his solving.

For as on Prophets in a flash
Is sudden wisdom showered,
On Jones to manage telephones
A special gift was dowered.

He was not quite an engineer
Nor an administrator,
But something whispered in his ear,
Than either he was greater.

He saw himself the Chairman of
A Telephone Committee.
Directing with all-powerful hand
The service of his city.

An engineer may be employed
(And also overridden):
A manager may "manage"—so
He do as he be bidden.

And should that service show success
Less actual than moral,
At least it can be hailed as Cheap,
And Jones will earn his laurel.

—W. H. GUNSTON.

AN UNUSUAL CAUSE OF FIRE.

By F. W. FRANCIS, *Engineer-in-Chief's Department.*

A CURIOUS case of damage to the mouthpiece of one of the Company's Ericsson table sets was brought to notice by the district manager, Kirkcaldy, in June of last year. It appears that the instrument in question was fitted in the study of Dr. MacTier, of St. Andrews, and one morning, about 10 a.m., Miss MacTier, upon entering the room with some visitors, noticed a column of smoke ascending from the instrument to the ceiling, and at the same time the mouthpiece of the instrument was found to be "sizzling and cracking." She at once removed the mouthpiece and took it out into the garden for the purpose of cooling it, when it was noticed that a large hole was burnt through it. After it had been thoroughly cooled, Miss MacTier took it back to the room and replaced it on the instrument, when to the astonishment of herself and visitors it immediately commenced to smoke and sizzle again. It was removed once more, and this time it was discreetly left in the garden.

The district manager, Mr. John Storrie, was asked to make a thorough investigation into the cause of the burning, which was assumed to be due to the sun's rays being in some way concentrated on the instrument, and the first thing which suggested itself was that there might be some peculiarity in the shape of one of the windows, or that a knot or blemish in the glass was causing it to act as a lens. Nothing abnormal, however, was found in this direction. Then the presence of a glass water bottle or anything of this nature likely to act as a burning glass was looked for, but there was only a vase (used for holding flowers) which was in any

way suspicious looking; but this was not sufficiently high to account for the position of the burning. During the investigation it was noticed by the district manager that the earpiece was scorched on the underside furthest away from the window. It was therefore concluded that the most likely cause of this was a reflected sunbeam, and upon the sun coming out shortly afterwards the culprit was discovered to be a brass inkstand which was on the table just in



FIG. 1.

front of the instrument, which reflected the sun's rays on to the ceiling, where a distinct outline of the instrument could be seen.

The inkstand was kindly lent and forwarded to Head Office for the purpose of making experiments to see whether the burning effect could be repeated, but after waiting many days for the appearance of the sun in London the attempt was abandoned and resource was had to an arc lamp. The results are shown in the accompanying photographs. Fig. 1 shows the inkstand, which is of an unusual

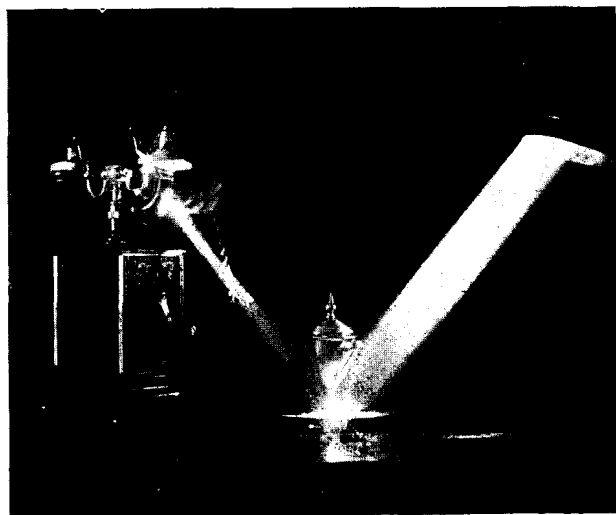


FIG. 2.

pattern, having a slightly concave circular base, which, being highly polished, acts as a parabolic reflector. Fig. 2 shows the beam of light from the arc lamp falling on the base and being reflected on to the mouthpiece, which was actually burning whilst the photograph was being taken. Fig. 3 shows the actual mouthpiece recovered from Dr. MacTier's instrument, and Fig. 4 the effect on several mouthpieces resulting from the experiment shown in Fig. 2.

The experiments are interesting as showing that celluloid will stand a great amount of heat without actually taking fire. A red-

hot soldering iron will cause dense fumes to arise, but will not cause the celluloid to burst into a flame; on the other hand, a lighted match will ignite it and cause it to burn fiercely, leaving very little residue. The experiments also show that fires may result from very simple and quite unexpected causes, as it is quite possible that had the sun's rays been concentrated on some inflammable fabric



FIG. 3.

instead of upon one of the Company's instruments a conflagration might have ensued, and possibly the instrument might have been looked upon with grave suspicion as the probable cause.

I am indebted to Mr. Cohen for arranging the experiments, and to Mr. Kingsbury for the photographs, which have been in

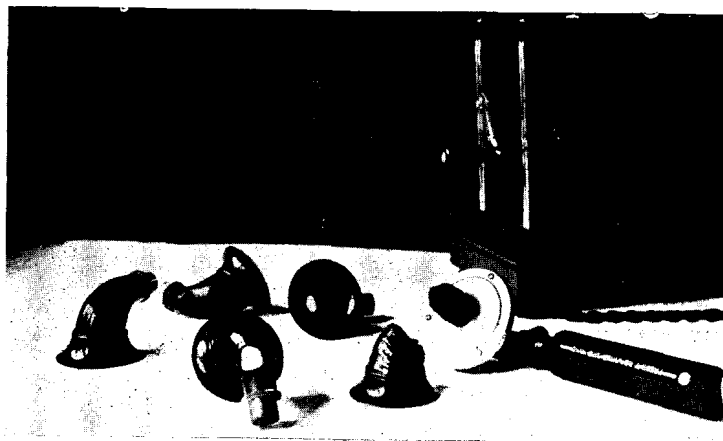


FIG. 4.

no way faked, except as regards the smoke from the mouthpiece in Fig. 2, which is pencilled in as it actually appeared, but which did not show clearly in the original negative, owing to the comparatively long time of exposure.

A SEASONABLE "FAULT."

DURING Christmas week a leading hospital in the West of England which has an auxiliary exchange line could not be got on the main line, and after a good deal of ringing by the exchange on the auxiliary instrument, the porter answered as follows:—"We cannot answer this telephone, Miss, it's decorated for Christmas."

NOTTINGHAM DISTRICT PROVIDENT SOCIETY.

THE annual general meeting of the Nottingham Provident Society was held on Jan. 6. The chair was taken by Mr. H. Saywell. Mr. E. FitzPatrick, the hon. secretary, read a report on the year's working, which showed a very satisfactory balance. It was decided that £15 should be distributed to various charities. The meeting then terminated with thanks to Mr. Saywell as chairman and to Mr. FitzPatrick for filling the position of hon. secretary for the past year.

TELEPHONE WOMEN.

LXXXIV.—ELINOR MARY JONES.

A BETTER example of the modern lady telephonist than Miss E. M. Jones, the Liverpool Matron, it would be difficult to find, even in a staff such as that of the National Telephone Company.



ELINOR MARY JONES.

The subject of these notes entered the Company's service on May 3, 1895, and worked in several exchanges as an operator until May 31, 1907, when, without filling any intermediate position, she was promoted to take charge of the then recently opened Operating School. In this capacity she successfully accomplished the very difficult task of teaching, not only the learners who entered the Company's service but, by means of a special post-graduate course, the whole of the Liverpool operating and supervising staffs, many of the latter being much her senior. Miss Jones, it is only right to say, was materially assisted at the time by the attitude of the senior clerks-in-charge of the district, who elected also to take the course, but the fact that much valuable instruction was received bears testimony to her tact and strength of character.

Upon the amalgamation of the Liverpool and Birkenhead districts in June, 1909, and the consequent formation of a Traffic Department, it became necessary to appoint a matron in order to deal with the engagement of new staff and to see to the operators' comforts during business hours. Miss Jones was selected for this position and has applied herself to the duties connected with it in her usual zealous manner.

A happy nature and a cheerful disposition make Miss Jones a genial and familiar figure with all branches of the staff, and these attributes are extremely valuable to one who has to undertake a large amount of sick visiting.

As president of the Liverpool Operators' Telephone Society (which last session maintained an average attendance per meeting of 133) she has shown herself to be a real enthusiast, and papers which she has read before that and other societies, indicate a

thorough knowledge of the business of operating. It is not surprising, therefore, that her presence in the chair ensures an enjoyable and instructive evening.

Miss Jones is an active member of the Liverpool District Swimming Club and confesses to a great love of books.

LXXXV.—FLORENCE MAY THOMAS.

FLORENCE MAY THOMAS, Travelling Supervisor, Gloucester district, was born at Gloucester, but soon removed to Stroud, her father, Sergt.-Major Edwin Thomas, being appointed instructor of a company of Volunteers, now, of course, merged in the Territorial Force. She did well at school, and when the National Telephone Company opened the Stroud Exchange on Nov. 18, 1895, shortly after her father's death, she was appointed Operator. Although young, she proved a quick and intelligent learner, and showed marked ability in her work.

When first established in Russell Street the exchange had only 25 subscribers, but business people were not slow to recognise the advantages of telephonic communication, and so rapidly did the service grow that some seven or eight years ago it was necessary to transfer the exchange to more commodious premises in London Road. The staff, too, was increased, and as Senior Operator Miss Thomas performed her responsible duties with efficiency, courtesy and tact, and when on April 26 last year she was appointed Travelling Supervisor for the Gloucester district the subscribers, now numbering 200, presented her with a gold watch, suitably inscribed, a gold brooch and a travelling bag. Devoted to her work, the conscientious manner in which she managed the service was appreciated by the three district managers and three local managers under whom she at different times served. Essentially a telephone woman, she has never lost an opportunity of making herself thoroughly acquainted with the details of the telephone service. As Travelling Supervisor she has gained the



FLORENCE MAY THOMAS.

confidence of the members of the staff, who now look forward to her visits and seek her advice, which they rapidly follow, with the result that the service over which she has control has greatly improved. Miss Thomas's recreations are reading and walking.

INCREASED HEAT—REDUCED EXPENDITURE.

By F. BARR.

The three sketches here shown are almost self-explanatory. The idea embodied in the sketches suggested itself to me to meet a difficulty that had arisen in two of the Company's sub-

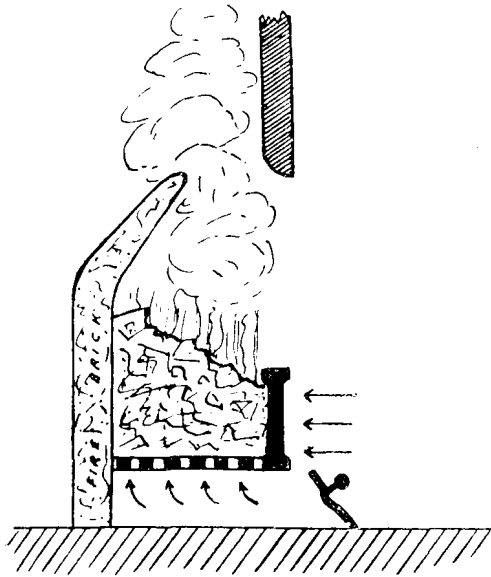


FIG. 1.—SECTION OF FIRE GRATE AS AT PRESENT.

exchanges, with regard to insufficient heating. The operators complained, and to obviate the necessity of changing the old pattern existing fire grates, I tried the plan of converting them into semi-slow combustion.

The difficulty has now been overcome, and it has proved satisfactory in two important directions—firstly, by giving increased

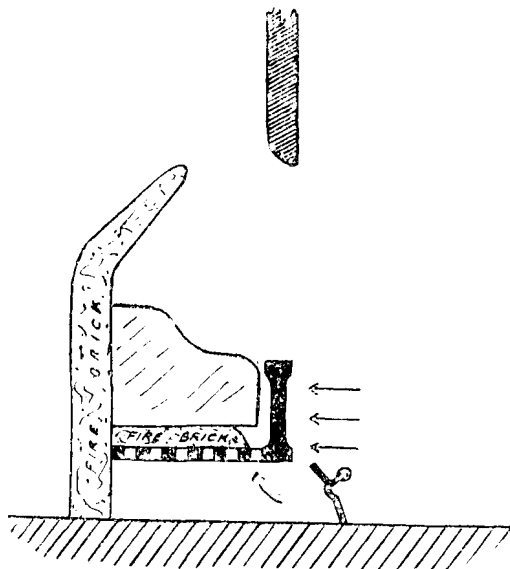


FIG. 2.—SECTION SHOWING FIRE GRATE CONVERTED TO SEMI-SLOW COMBUSTION.

heat, and secondly, in an appreciably decreasing consumption of coal, so that both the Company and the operators in different ways benefit by the change.

The writer has benefited personally by adopting the idea at his own private residence, and he can safely recommend it to the notice of other members of the staff.

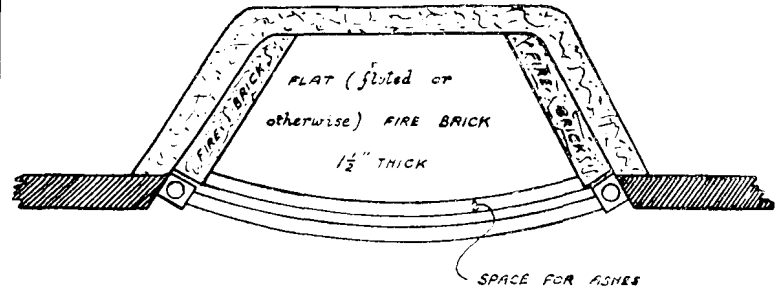
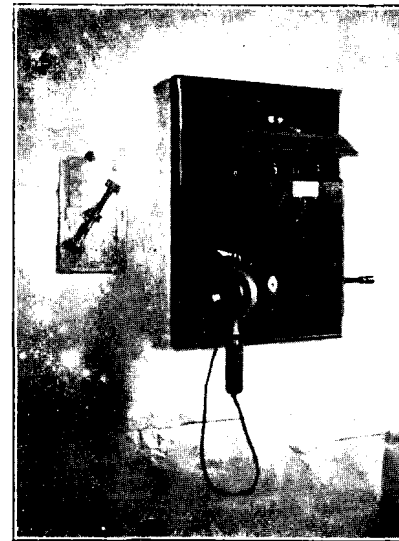


FIG. 3.—PLAN OF CONVERTED FIRE GRATE.

Incidentally a third point in favour of the idea might be mentioned, viz., the partial abolition of the hot and cold feeling one often experiences when sitting close to a good winter fire burning in an old pattern grate; front warm, back cold.

The idea can easily and cheaply be carried out by anyone at a small cost of a few shillings for each grate.



A MEMORY OF THE PAST.

The photograph here reproduced illustrates a type of instrument used in Sheffield some fifteen or sixteen years ago by the late Telephone Exchange and Electric Light Company, Limited. The microphone, designed by Mr. William Johnson, the manager and engineer of the Company, was very efficient for local service. It will be noticed a spoon receiver was used.

INVENTORY OF PLANT.

The following additions have been made to previous lists:—

HEAD OFFICE STAFF.			
Macleod, J. D. .. ..	.. ..	Engineer and Electrician	Hamilton.
Moody, S... ..	.. ..	Local Manager	Luton.
Elliott, T. .. ..	.. ..	Chief Clerk	Galashiels.
TRAVELLING STAFF.—Enumerators.			
Duce, J. R. .. ..	.. ..	Contract Dept. Clerk	Bradford.
Bell, B. A... ..	.. ..	Instrument Inspector	Manchester.
Scott, J. B. .. ..	.. ..	Clerk	Metropolitan.
Wilson, W. .. ..	.. ..	Electrician's Clerk	Edinburgh.
Gwyer, J. H. .. ..	.. ..	Local Manager	Southampton.
Hewitt, A. W. C. .. ..	.. ..	Clerk	Manchester.
Rushforth, J. A. .. ..	.. ..	Chief Inspector	Chester.
Scott, G. R. .. ..	.. ..	Contract Department Clerk	Edinburgh.
Newton, W. .. ..	.. ..	Clerk	Newcastle.
Williams, O. A. J. .. ..	.. ..	Clerk (Superintendent's Office)	Bristol.
Myers, W. H. .. ..	.. ..	Exchange Inspector	Manchester.

The following names should be deleted from the lists previously given:—

TRAVELLING STAFF.			
Charge R. .. ..	.. ..	.. ..	Clerk.
Hart, W. J. .. ..	.. ..	.. ..	Clerk.
Dalziel, J. C. .. ..	.. ..	.. ..	Clerk.

LONDON NOTES.

AN extensive scheme of reconstruction is at present being carried out at the Hotel Cecil. As part of the rearrangement, the hotel authorities have decided to bring their telephone equipment up to date. The Company has accordingly received an order for a private branch exchange with twenty lines to the exchange, and 532 extension stations. The work has to be completed by the beginning of March.

CONGRATULATIONS have been showered on Mr. G. H. Wilkinson, Exchange Manager, Hop, who was married recently. Mr. Wilkinson is well known to many of the staff, and has acted as M.C. at the Bank Exchange whist drives ever since these popular gatherings were instituted. The staff at Hop presented him with an *outré* dish in pewter, while several friends joined with the Metropolitan exchange managers in presenting him with a music-stool, pewter inkstand and ash tray.

THE police siege of the Sidney Street house in which the suspected Houndsditch murderers had taken refuge had its reflex action on the telephone records of the locality. At one call office in Sidney Street the day's takings equalled the amount ordinarily obtained in a week, while another in Mile End Road—close to the scene of operations—realised in the one day as much as it usually takes in three weeks. The traffic at the London Hospital private branch exchange was very heavy, and the call office at the hospital dealt with something like nine times the ordinary traffic. Avenue Exchange felt the strain most, and had to deal not only with numerous calls to the War Office, Scotland Yard, etc., but also a large number of enquiries from the public and distant exchanges. Between noon and 2 p.m. there was quite a slump in traffic at East Exchange, the usual callers no doubt finding the excitement outside more attractive than the routine of business.

IT was with very deep regret that the staff heard of the death of Mr. G. H. Welldon, formerly Assistant Exchange Manager, Holborn. Mr. Welldon only resigned from the service in December last to take up a position with the Marconi Wireless Telegraph Company. He was taken ill on Christmas Day with appendicitis and peritonitis, and died on the last day of the old year. Mr. Welldon was a young man of considerable promise, and his early death is much regretted by all who knew him. Holborn staff sent a wreath; one was also sent by Avenue, Hop and London Wall (at which exchanges he had worked), in conjunction with a few friends in the traffic office.

AT the London Telephone Society meeting on Jan. 4 Mr. Harvey Smith, of the Metropolitan Engineer's Department, read a very interesting and instructive paper on "Mechanical Problems in Aerial Line Construction" to an appreciative audience. A striking feature of the paper was the original matter of which it was largely composed. The greater part of the paper was given up to a consideration of the proper factor of safety to allow for wires, suspenders, poles, stays, etc., and all the factors governing this subject were fully considered. Mr. Smith said the "factor of safety" would be better named "the factor of ignorance," and explained that the greater the knowledge of the points affecting the subject the smaller the factor of ignorance need be. A simple method for determining the factor on existing cable spans was explained. Mr. Smith, in addition to being a keen and clear-thinking engineer, is a clever caricaturist, and some time ago, after hearing the Engineer-in-Chief deliver a paper dealing with the theoretical equipment of the engineer, perpetrated a clever sketch in which several engineers with markedly protruding foreheads, are engaged in making calculations and measurements in the field during the progress of the erection of a route. Various mathematical instruments are in evidence, and one man is on his knees engaged in drawing a vector diagram with the object of ascertaining the position and strength of the stays required. One of the speakers during the discussion referred to this sketch, and asked how it was that when he saw line work in progress he never detected any signs of calculations or references to tables or formulae. Mr. Smith explained in replying to the discussion that the modern telephone engineer is so well trained that he is able to apply his theoretical knowledge to his work without showing evidences of it. Several members took part in the discussion, and a hope was expressed that Mr. Smith would be as successful this session as last in carrying off a prize. As Mr. Poole remarked, the information contained in the paper is far too valuable to be confined solely to the archives of the society, and should in due course be published broadcast by means of insertion in the TELEPHONE JOURNAL.

THE Metropolitan Staff Dinner has been fixed to take place in Frascati's Restaurant on March 9. The committee desire to secure a bumper house on the occasion of what is almost sure to be one of the last united functions of the "National" staff in London. It is to be hoped that the staff will not fail in their response, and that all will help to make the dinner a memorable one.

ANOTHER preliminary announcement is that of the North-East District annual smoking concert to be held at the London Tavern, Fenchurch Street, on Feb. 24. This concert is always a success; the entertainment is sure to be good, and the good fellowship of those who attend is invariably unfailing.

THE Chess Club had rather "hard lines" before Christmas, as owing to their inability to get their strongest players together at any one match they lost in six fixtures. This year matters have improved, the two matches played having resulted in a draw and a win respectively—the former against Admiralty II, and the latter against Board of Agriculture by six to four. The team in these two matches was composed of Messrs. F. G. Margerson, T. K. V. Coburn, G. Bean, A. O. Tame, R. P. Lowe, J. A. Gordon, F. E. Waters, R. H. Carter, C. Wilson and R. Aitken.

THERE was an attendance of 175 at the Operators' Society meeting on Jan. 11. The first paper was by Miss E. Clarke, Operator, Avenue Exchange, on "How a Good Service can be Given by a Magneto Exchange." Miss Clarke has only been eighteen months in the service, and she certainly does great credit to those under whose supervision she has been trained. Her paper would have been a creditable production for one with a much longer operating experience, and showed a very thorough grasp not only of an operator's duties and the switchboard equipment, but of the main differences between magneto and central battery working. Indeed, if one were to venture a word of criticism at all, it would be that the comparison between the two systems was somewhat accentuated, and the case for the magneto exchange thus less strongly advocated than the author of the paper intended. The second paper was by Mr. O. Robinson, Inspector, Paddington, on "The Call Office Attendant." As Mr. Robinson was at one time an attendant he was able to speak with knowledge and authority. Not only did he do so, but showed a sense of humour and an amount of originality which were quite refreshing. At first glance the subject does not seem attractive, and it was therefore a distinct triumph for Mr. Robinson that he succeeded in arousing the interest and appreciation of his audience. Here also one word of criticism may be permissible—it was rather a mistake to insist so strongly on power being given to the attendant to collect the fee after instead of before conversation. Several speakers in the discussion gave good reasons why this should not be done, and there was no adequate reply possible to their arguments. The general discussion was on the lines of the paper itself—good-humoured, enjoyable and interesting.

THE Hospital Sunday Fund collections amongst the Head Office and Metropolitan staffs reached the gratifying total of £750 10s. 5d. for 1910. This is £35 better than the preceding year, and an advance of £76 on 1908. The money is well spent, and hundreds of the staff receive benefits of various kinds through the fund.

WHEN the Atherton Pit disaster in Lancashire became known at Christmas, Mr. E. F. Gray circulated a subscription list in Salisbury House. Small amounts only were asked for, and it is a pleasure to report that as a result £3 10s. was sent to the relief fund.

THE draw for the first round of the Clay Challenge Cup (football) took place a few weeks ago. Unfortunately, W. and N.W., who had been drawn against City and Head Office respectively, scratched, which left the only game to be played Salisbury House v. North-East. The match came off at Hackney Marshes on Jan. 7, North-East being vanquished by six to one. South-East having obtained a bye in the first round will now play Head Office in the second; City in the same round will tackle the victors of Jan. 7. The second round will probably be decided about the end of February.

GLASGOW NOTES.

THE arrangements for closing the Royal Exchange have started. On Dec. 31 last about 1,800 subscribers were transferred to the new Post Office City Exchange. To those who remember the installation of the Royal Exchange with its handsome canopy, the depletion of the exchange brings with it memories. It is a commentary on the progress of telephonic art that an exchange of this type which is giving such a satisfactory service should so shortly be relegated to the scrap heap. The remaining subscribers in Royal will later be transferred to the new Douglas and Bell Exchanges. The turnover of the 1,800 subscribers was satisfactorily accomplished, and the subscribers are settling down to the new conditions.

ANOTHER innovation on the part of the operating staff! The interest which accrued for the past year from the Operators' Saving Bank Fund has been expended to purchase toys for the Sick Children's Hospital and Eastpark Home for Infirm Children.

THE National Telephone Operators' Society and Club held its fourth meeting of the session on Jan. 9 in the Masonic Halls, when Mr. G. Edward, Hillhead Exchange Manager, read a most interesting paper entitled "Essentials of Proficiency." The subject was dealt with in a very instructive manner, and the reader was accorded a hearty vote of thanks.

The social part of the evening passed with music, songs and dancing, and was thoroughly enjoyed by all present.

The punctuality prizes for this evening were won by Miss I. Barrie and Miss C. McKellar of City Exchange.

YET another of the clerical staff has joined the ranks of happy benedicks, the latest being Mr. J. Paterson, of the cash office. On Dec. 30 last he was presented by the staff with a handsome oak clock and side ornaments. Mr. Scott, Cost Clerk, made the presentation. Mr. Paterson suitably replied.

THE installation of the apparatus for the new Douglas Exchange has already commenced in the new building which has been erected. The Western Electric Company, who are the installers, are now hard at work, and the exchange should be ready for opening during May.

The staff of the Charing Exchange and friends held their annual dance in the Prince of Wales Halls on Dec. 22. About 45 couples were present and a most enjoyable evening spent.

WORK in Glasgow is very brisk at the present time; the improvement in trade after the protracted lock-out in the shipbuilding industry has brought to

our Contract Department an increase of orders both for National and Post Office services. A considerable number of subscribers on both administrations are adopting the private branch exchange principle, with all the advantages which are so well known to telephone men.

THE fourth meeting of the National Telephone Society (Glasgow and West of Scotland Districts) was held in Professor Muir's lecture hall in the Technical College on Jan. 11. A full report of the meeting will be found in another column.

MR. J. F. MURRAY, Stores Department, has been promoted to the position of Directory Clerk in succession to Mr. J. M. Hay, who has decided to emigrate, and will shortly leave for Toronto.

THE Glasgow Corporation is again to the fore in telephone matters, the town council having convened a meeting of representatives of the various municipal bodies throughout the country with a view to bringing pressure to bear on the Post Office in connection with rates. The *f. s. d.* question unfortunately is receiving more consideration than that of improved service, and bearing in mind the large percentage of unremunerative work done by the Company, and inconvenience and delay caused to telephone subscribers through ineffective calls, the latter point is one which it must be the constant endeavour of telephone men to drive home.

A NEW No. 10 C.B. board is being installed at Clydebank, and it is expected will be ready for working by the end of February. As soon as this is accomplished the transfer of Post Office subscribers from the old Clydebank Exchange will proceed, and the new exchange will afterwards serve the district.

THE Traffic Department Benevolent Fund, which is a useful institution doing a great deal of good, have expended during the past year £30 5s. 4d., and carry forward a balance of £59 7s. 8d.

CORRESPONDENCE.

"THE PSYCHOLOGY OF THE OFFICE."—AN APPRECIATION. TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

REFERRING to Mr. J. F. Scott's paper, "The Psychology of the Office," which has appeared in your issues of December and January last, the Company having marked its approval of this paper by awarding it the first prize in the office section, any appreciation from myself may seem perhaps a little superfluous. Notwithstanding, I cannot refrain from saying that the paper has struck me as being so excellent in all ways, not only as regards the subject matter in itself, but from the literary point of view also, that it seems to me to rank amongst the very best contributions to the JOURNAL, and in saying this I feel I can only be expressing the view of very many other men particularly interested in office matters. Believing this to be the case, I think it may not be unwelcome to Mr. Scott to know the satisfaction which some of the ordinary staff have derived from the reading of his exceedingly interesting paper.

There is only one little point which struck me, on which I am inclined to slightly disagree with Mr. Scott, and that is the ideal attitude which he considers should be adopted by the employee when the question of additional duties has to be faced. I myself would never encourage too critical an attitude on the part of the subordinate, as within reason I think it so much better the latter should leave such matters as the scope of his duty, his suitability for it, etc., to the discretion of his chief. Any other attitude will, I think, be generally improper and almost always inexpedient.

This, however, is only a small point, and with the rest of the paper I am in cordial agreement, and I can but reiterate my admiration of it.

Head Office, Jan. 16.

P. H. C. PRENTICE.

METHODS OF LOCATING AND REPAIRING FAULTS IN UNDERGROUND CABLES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I BEG to thank Mr. Elliott and Mr. Warnock for so kindly giving me the benefit of their experience on the above subject. Their information has been most helpful to me.

I was also most interested in the description given by Mr. Preston, of Bristol, in this month's JOURNAL, on "The Erection of Large Poles in Difficult Places." Personally I think these descriptions and exchange of ideas on doing work is most interesting all round.

Douglas, Jan. 17.

G. GILLMORE, District Manager.

"THE TELEPHONE LOAD LINE."

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to the correspondence on the above subject in the December issue of the JOURNAL from Messrs. Noble and Coombs, and also to Mr. Toms' notes in the November issue, I have the following observations to make:—

Item 3.—It is my opinion that to take an elaborate record on a day which is not representative of the traffic is waste of time. I agree that it would be better to specify a particular week when the peg count should be taken, and to rely upon the exchange managers, who have local knowledge, to select a day in that week which is representative of the traffic. It is also agreed that it would never pay to take a peg count once a month at an exchange where there was no traffic development.

Item 4.—I agree that the peg count should be made as simple as possible, and that the operator's load figure should take into account what work is involved in dealing with, say, 100 valued calls in half an hour.

Item 6.—No intelligent person would adopt London figures and use them without investigation, especially when it was definitely stated that they were of a very general nature.

Item 7.—It is known in practice that a much higher load can be taken when the majority of calls are identical and when the time valuation (from an operating point of view) is small. The principle involved is well put in paragraph 4 of the Engineer-in-Chief's Circular No. T₄ on "Monitors." It is difficult to value the disadvantage an "A" operator experiences in consequence of this and to include it in the time valuation of calls.

Item 9.—Mr. Toms is quite right.

Item 16.—It is, as everyone connected with the practical work of a large exchange knows, sometimes more efficient to have uniformity than absolute efficiency.

Page 72, paragraph 2.—I agree that an operator will become more efficient in the course of time (until a certain limit is reached) and utilise more of her idle time. It is understood, of course, that the same standard of service is to be maintained.

With regard to the interesting point raised by Mr. Coombs, I am confident that the time valuation of calls quoted by me in table "B," p. 48, of the June issue of the JOURNAL, are as correct as it is possible to observe them as far as manual operating is concerned. The proper proportions of difficult and ineffective calls were included. Mr. Coombs compares London with Bristol and shows that whereas a London "A" operator only spends 70 per cent. of the hour in actual operating, a Bristol operator makes use of 87 per cent. of her time. In July last at Bristol the percentage of junction working was 6; at London Wall and Gerrard it was 75 and 72 respectively. The calls dealt with at Bristol were therefore, we will presume, of a fairly uniform character and of comparatively short duration. I think it is due to this that a Bristol operator can make use of a greater percentage of her time than a London operator can. A London operator is, in a sense, forced to be idle, so that she can render a certain standard of service on the calls she does deal with. This is due to the operating of calls which are not of uniform character and which vary considerably in duration. In addition, it is possible that an "A" operator in London may have to use a portion of her spare time in work not associated directly with actual operating to a greater extent than a Bristol operator has to do. When I said that "we must also know the actual time value of our unit, the local call," what I meant to convey was that the local call was not a uniform unit like, for example, a pound.

Dec. 31.

H. DEANE.

"MESSAGES CONVEYED BY LIGHT."

AT the fourth meeting of the Glasgow and West of Scotland Telephone Society on Jan. 11 Professor Muir delivered a lecture entitled "Messages Conveyed by Light." Mr. C. J. Millar presided over a good attendance of members. The meeting was a decidedly new departure on the part of the society, the subject being a popular science one.

The Chairman, after expressing the pleasure of the society in having Professor Muir with them on that evening, introduced the lecturer, who referred to the various theories as to the nature of light. He pointed out that it was stated light still remained one of the many mysteries by which we were surrounded. It was a mysterious form of wave motion in the mysterious ether of space. In the propagation of light, electric and magnetic forces were concerned. Messages were conveyed by light just as they were conveyed by wireless telegraphy. Wireless telegraphy waves resembled large Atlantic rollers; light waves a tiny ripple in the ether of space. An interesting experiment was shown in which water ripples spreading out from a vibrating pencil point were projected on a screen, and the ring of ripples compared with the ring of light observed spreading out from the new star or "nova" discovered in 1901; and as indicating the speed with which light travelled and the distance of this star from the earth, the lecturer remarked that, although the light was travelling at the rate of 190,000 miles per second, the star in question had burned itself out about 100 years before its light reached the earth.

The reflection and refraction of water ripples were also compared with the reflection and refraction of a beam of light shown passing through a tank of fluorescent water. The action of a prism was then explained, and a continuous spectrum, a bright line spectrum and a black line spectrum were shown on a screen. These latter demonstrations proved most interesting. The professor pointed out that light not only gave a convenient means of telling the constitution of various substances on the earth's surface, but enabled us to tell of what substance the sun was composed and also to judge of the nature of the stars. An explanation of colour was next given. Various colours were shown under ordinary electric light, and then by means of a mercury vapour lamp. In light, lacking red rays, the red colours became black, and on the blue rays being cut off by means of a screen the blue became black.

A most interesting account of the three-coloured theory of vision was then given, and it was shown by means of a spinning coloured top that red, green and blue produced the sensation white. The professor then dealt with colour photography, and projected a number of photographic slides on the screen showing that all colours could be produced by the suitable blending of red, green and blue. Finally, the condition known as "colour blindness" was referred to. By means of a green-blue screen the vision of a red-coloured blind eye was imitated, and it was shown how such an eye matched bright green with bright yellow, blue with pink and red with black.

On the conclusion of the lecture Professor Muir invited questions, to which he replied. On the call of the Chairman a very hearty vote of thanks was awarded the lecturer for his most able, instructive and interesting lecture.

NEWS OF THE STAFF.

Mr. C. C. WORTE, District Manager, Hull, on the occasion of his transfer to Edinburgh, was presented by the members of the Hull staff with a smoker's cabinet.

Mr. W. A. COSSAR of the district office staff, Belfast, on the occasion of his leaving the service to go abroad, was presented with a travelling bag and rug by Mr. J. D. W. Stewart on behalf of the staff.

Mr. J. HAMMOND, Storekeeper, Pontypridd, was presented by the staff with a Gladstone bag and pipe on the occasion of his transfer to Plymouth.

Mr. R. S. EVANS, Pontypridd, was the recipient of a silver cigarette case, suitably inscribed, from the staff on his transfer to Exeter as Storekeeper.

Mr. J. B. ROUSE has been transferred from Chatham to Portsmouth as Storekeeper.

Miss ELIZABETH PATON, Operator, Argyle Exchange, Glasgow, left on Dec. 22 to go abroad. The staff in her exchange presented her with a dressing case.

Miss ALICE DUNBAR, Operator, Ibrox Exchange, left on Dec. 1 on account of ill-health.

Miss FANNY FRASER, Operator, Shettleston Exchange, left on Dec. 1 on account of ill-health.

Miss DAISY ISABELLA MACLACHLAN, Clerk-in-Charge, Burnley, has left the Company's service to take up an appointment in the teaching profession. The staff subscribed for a watch, which was presented to her by Mr. H. J. Callis, Local Manager.

Mr. H. SMYTHE (Storekeeper) was presented by the Portsmouth staff with a case of pipes and other presents on the occasion of his leaving the Company's service to go to Australia, where he is about to engage in farming.

Mr. C. COWARD (Inspector, Portsmouth), who accompanied him, was presented with a dressing case. Both had a hearty send-off, and carried the best wishes of the Portsmouth staff with them.

Mr. T. ELLIOT, Chief Clerk, Galashiels, on leaving for Head Office Inventory staff, was presented by the members of the staff with a travelling trunk and rug.

METROPOLITAN STAFF CHANGES.

Mr. R. JOHNSTON, Foreman Joiner, Kensington, appointed Walking Foreman, Paddington.

Mr. A. FAULKNER, Clerk of Works, Engineer-in-Chief's staff, appointed Buildings Surveyor, Metropolitan district.

Mr. A. W. LEIGH, Call Office Attendant, Salisbury House, to be Engineer's Clerk, Battersea.

Mr. E. A. GILBERT, Clerk, divisional engineer's office, South-East, to be Local Engineer's Clerk, Streatham.

Mr. C. F. COWDRAY, Clerk in statistical office, Salisbury House, to be Clerk, divisional engineer's office, West.

Mr. J. B. SCOTT, Engineer's Clerk, Paddington, to Inventory staff.

Mr. H. OST, Assistant Engineer in Metropolitan engineer's office, to be Assistant Engineer, Paddington.

Mr. J. C. CREE, Engineer's Clerk, Streatham, to Metropolitan engineer's office, Salisbury House.

Mr. A. ANDREWS, Night Operator, North, to be Clerk in statistical office, Salisbury House.

Miss BERTHA JONES, Operator, Westminster, has been promoted to be Supervisor, Hammersmith. She was presented by her former colleagues on leaving Westminster with a gold brooch and silver hatpin.

On Miss ALICE CLEMENTS' transfer from Battersea to Gerrard she was presented with a gold signet ring by the Battersea operators.

Miss ELLEN POLLARD, on being transferred from Battersea to Gerrard Exchange, was presented with an oak and silver biscuit barrel.

Miss ADA FIELDER, who after ten years' service as an Operator at Battersea resigned to take up her residence abroad, was presented by her friends in the exchange with a gold signet ring and a portable writing case.

Miss ADA ROBERTS, Operator, East, on being promoted to be Supervisor at London Wall was presented by the staff with a gold pendant.

MARRIAGES.

Miss EDITH ANNIE EVANS, Operator, Farnworth, left to be married on Jan. 5. She had completed fourteen years' service, and was presented with a Sheraton clock by the Bolton staff.

Miss GERTRUDE MASSEY, Operator, Horwich, left to be married on Jan. 12. She was presented with a silver hair brush and comb by the Bolton staff.

Miss ALICE ALLAN, Operator, Argyle Exchange, left on Dec. 22 to be married. She was presented with a dinner service and flower pot by the operators in her exchange.

Miss MARY WATSON, Operator, Darlington, resigned after six and a half years' service on Dec. 24 to be married. She was presented with an eight-day Vienna clock by the staff, with their best wishes for her future happiness. Miss Watson was highly esteemed by her colleagues, and will be greatly missed.

Mr. ALBERT J. READ, Assistant Exchange Inspector, Nottingham, was, on the occasion of his marriage, presented with a dinner and tea service by the operating and electrical staffs, and with knives and spoons by the night operating staff.

Mr. W. GRIERSON, Outstandings Clerk, district office, Leeds, was presented by his colleagues on the occasion of his marriage with a handsome oak timepiece as a recognition of the good wishes of the staff.

Mr. H. WATTHEY, Instrument Fitter, Nottingham Factory, was presented by his fellow-workmen in the Table Set Department with a tea service on the occasion of his marriage.

Miss NELLIE SLAUGHTER, Operator, East Exchange (London), on resigning to be married, was presented by the staff with an electro-plated tea service. Miss Slaughter is sailing for New Zealand, where the wedding will take place.

OBITUARY.

We regret to announce the death, on Tuesday, Jan. 10, of Mr. JOSEPH WM. PRICE, Local Manager, Pontypridd, after a short illness.

Mr. Price, who was 38 years of age, joined the Company's service on April 23, 1900, as Wayleave Officer at Cardiff, and was appointed Local Manager, Pontypridd, on July 19, 1901, and further promoted to a similar position at Pontypridd on April 18, 1902.

He was very popular with his staff, a painstaking and zealous officer, and the Company has sustained a great loss by his death.

The funeral took place on Saturday, Jan. 14, at Cefn Cemetery, near Merthyr, all grades of the staff at both Pontypridd and Merthyr being present. Mr. James (Engineer) and Mr. Marsh (Traffic Manager) also attended on behalf of the District Manager and Cardiff staff, together with a representative from Newport centre. Wreaths were sent by the Cardiff, Newport and Pontypridd staffs. The deceased leaves a wife and child, with whom much sympathy is felt.

We regret also to report the death of Foreman CORNELIUS O'LEARY, Cork, who died on Jan. 15 in the North Infirmary, Cork. The deceased was a very satisfactory workman, and was very popular with the staff. The different departments were represented at the funeral on Jan. 18, and the staff sent a wreath and a cross. Mr. O'Leary had been in failing health for some time, and his death at the early age of 31 years is very much regretted. He leaves a widow and three children.

We have also to record the death of Mr. THOMAS HENRY HORROCKS, Chief Foreman, Rochdale, and Caretaker of the Littleborough Exchange. On Christmas Eve he fell down the cellar steps while carrying coal to the switch-room and fractured the base of his skull. He never regained consciousness and died the following Monday. The funeral took place on Dec. 28. Floral tributes were sent by the Company's staff, who were represented at the funeral. Mr. Horrocks had been in the Company's service about 27 years, and for the last ten years was Chief Foreman at Rochdale.

We regret to announce the death, which took place on Jan. 16, of Miss A. S. DEMSTER, who was for two years operator at Dalkeith Exchange. She had for a considerable time been in delicate health and resigned lately on that account.

LOCAL TELEPHONE SOCIETIES.

Bath.—At the fourth meeting of this society on Jan. 4, before a large attendance, Mr. W. S. Griffiths (Assistant Engineer) gave an interesting paper on "Line Faults," illustrated by slides. The subsequent animated debate was shared by Messrs. Challis, Cole, England, Harding, Owen, Parnell and Thorn.

Birmingham Operators.—The fourth monthly meeting was held on Jan. 12, when Mr. C. W. Piggott read a paper on "Double Lamp Clear in Birmingham," and Miss Smith, Supervisor (Central), very ably took the chair. A short discussion followed, after which Mr. E. Williamson presented the prize money to the successful competitors at the previous meeting, who were as follows:—First, Miss G. O. Cook, "Hints on 'B' Operating"; second, Mr. J. Carter, "Subscribers and their Sorrows"; third, Miss I. Adams, "Telephone Progress."

Birmingham.—The fourth meeting was held on Jan. 6, when a paper was read by Mr. A. H. Tilt on "Photo-Telegraphy," Mr. W. H. Cope being in the chair. The paper dealt fully with the subject, and was illustrated by a number of slides showing diagrams and sketches. A very interesting discussion followed.

Belfast.—The opening meeting was held on Nov. 21 when Mr. J. D. W. Stewart gave an interesting address on "Central Battery Working," illustrated by lantern slides. Some very instructive diagrams were exhibited, together with a number of photographs of exchanges where central battery equipment is installed, and explained by the speaker.

The second meeting of the session was held on Jan. 16, Mr. J. D. W. Stewart presiding. Mr. Pulford gave a very interesting address, illustrated by diagrams, on the subject of "Auto Clearing." In the discussion that followed the various questions raised were replied to by the speaker in an able manner.

Blackburn.—The sixth session was opened on Jan. 6 Mr. Remington, president, being in the chair, when Mr. Brown, Contract Manager, read a short paper on "Co-operation." The paper was of a most interesting nature and the author was awarded a hearty vote of thanks. The party which numbered 60 including several operators, then adjourned to another room when refreshments were served. Afterwards a lengthy programme of songs and recitations was gone through.

Bradford.—Mr. R. J. Skelton, Chief Inspector, of Keighley, occupied the evening at the telephone society's meeting on Jan. 11, when he gave a very interesting and comprehensive paper on "Accumulators." The chair was occupied by Mr. H. B. Sutcliffe, and the meeting closed, after some discussion, with a hearty vote of thanks to Mr. Skelton for his entertaining paper.

Brighton.—This society held a meeting on Jan. 2, when Mr. C. Hooper gave a lecture on "Power Plant," and dealt in a very interesting way with the various kinds of apparatus used in the power book. Messrs. Frost, Parsons, Hatton and Boardman took part in the subsequent discussion. Mr. F. J. Frost, Traffic Manager, presided.

A meeting of this society was held on Jan. 23, Mr. C. F. Moorhouse, District Manager, being in the chair. A very interesting lecture on "Telephony: Past and Present" was given by Mr. A. E. Cotterell, Assistant Provincial Superintendent. There was a good audience, and a considerable amount of interest was

shown in the subject. The lecture was illustrated with lantern slides, diagrams and blackboard drawings. A short discussion took place at the close.

Bristol.—At the fourth meeting of this society, Mr. T. C. Honeywell read his paper on "Stores and Storekeeping," dealing with the subject very comprehensively. Mr. E. L. Preston, the Engineer, presided, supported by the vice-president, Mr. J. T. Mayo-Smith, and there was a very large attendance of the members, and also some visitors from the operators' society.

Cardiff.—The third meeting of the society was held on Jan. 12. Mr. S. F. Whetton being in the chair. There was a good attendance. A debate on "Departmental Co-operation" was opened by Mr. W. J. Marsh in a very able manner, and was followed by a most interesting discussion, in which most of the members present took part. The debate was closed by the chairman, Mr. Whetton. At the close of the meeting a vote of condolence and sympathy was passed with Mrs. Price in her sad bereavement on the loss of her husband, who was Local Manager at Pontypridd and one of the most popular members of the society.

Cardiff Operators.—The second meeting of the session was held on Dec. 13, and took the form of a competitive night. There were 31 members (50 per cent.) present, with vice-presidents. The chair was taken by Mr. Williamson, Local Manager of Newport. Papers were given by six of the junior members, as follows:—"What I Think of the New Exchange," by Miss W. M. Davies; "How Enthusiasm Helps an Operator," by Miss M. Davies; "Are the Society Meetings Beneficial," by Miss D. F. Lyons; "Private Branch Exchanges," by Miss A. L. Kuhlke; "Importance of Tone and Manner," by Miss M. Smiles; "Advantages of C.B. over Magneto System," by Miss A. E. James. The vice-presidents, together with the clerk-in-charge and supervisors, adjudicated and awarded the first prize to Miss Lyons, the second prize to Miss Kuhlke, and the third prize to Miss James. All papers were exceptionally good, and a most pleasant and profitable evening was spent.

Douglas.—The seventh meeting was held on Dec. 23. The District Manager presided. A most interesting and instructive paper was read by Mr. Kelly, Chief Clerk, on "Points in Office Work." He showed most clearly the points in which the staff should be most careful in booking material and time, so as to bring all work under its proper heading.

The eighth meeting was held on Jan. 6, the District Manager presiding, and after giving some good advice for the new year, he introduced Instrument Inspector Cain, who by the aid of diagrams and some very instructive experiments gave a most interesting description of the action taking place in the various forms of batteries used in the service.

The ninth meeting was held on Jan. 20. The District Manager presided, and called attention to the great importance of the staff learning all possible about underground work, which was the coming system. A paper was read by Instrument Inspector E. Vick on "Jointing Underground Cables," which was most interesting, and illustrated by diagrams, specimens of joints and joint making.

Dover.—The fourth meeting for the session was held on Jan. 13. Mr. W. F. Taylor, Divisional Officer of the Inventory staff, kindly consented to occupy the chair. Mr. C. G. Barker, of the Engineer-in-Chief's Department, gave an excellent paper on "Economics of Transmission." His remarks, although of a very technical nature, were keenly followed, and various questions arising on the subject were dealt with at the close of the lecture.

Edinburgh.—The third meeting of session 1910-11 was held on Jan. 9. Mr. Wörte (District Manager), the newly elected president in succession to the late Mr. Gilmour, presided. Mr. J. S. Smith, A.I.E.E., of the Post Office, delivered a lecture entitled "Some Notable Inventions." The lecture dealt with the pioneers of telephony and the disputed claims of rival inventors. Reference was also made to the discovery of the electric clock, Edison phonograph and wireless telegraphy. Remarks were made and questions asked by several members, to which the lecturer replied.

Exeter.—A paper was given on Jan. 3 by Mr. J. Southwell, Contract Officer, entitled "From my Point of View." It was an interesting and original paper, well appreciated and brought forth a deal of discussion.

A paper was given on Jan. 17 by Mr. W. Robnett, Chief Inspector, Torquay, entitled "Testing Equipment." The exhibition and explanation of the different patterns of testing apparatus made the lecture an extremely interesting one, many points being raised regarding the advantages and disadvantages of the various apparatus.

Gloucester.—The third meeting of the session was held on Jan. 11, Mr. F. W. Sceats, Engineer, being in the chair. A very good paper was given by Mr. A. Berry, Inspector-in-Charge, Lydney, on "Maintenance and Faults," including several interesting features in connection with the Lydney area. Profitable discussion followed, in which Mr. J. L. de Medewe, Mr. Greenland, Mr. Savory and others took part.

Huddersfield.—The Local Manager, Mr. G. Wicker, on Jan. 12 gave an interesting address to about 50 members of his staff, the subject being "Switchboard Maintenance." By means of diagrams and apparatus excellent illustrations were given on both the theoretical and mechanical aspect of the telephone practice. The Contract Manager, Mr. T. W. Jowett (West Yorkshire district), presided.

Leeds.—At a meeting held on Jan. 11, Mr. J. H. Corlett read a paper designated "Contract." After the ensuing discussion Mr. T. Parker read his paper on "The Maintenance of Inside Plant." The discussion on this was an animated one, some thirteen members taking part. The attendance was below that of the previous meetings.

Leicester.—A meeting of the society was held on Jan. 12 at the Foresters' Institute, Mr. M. Marsden occupied the chair, and the speakers for the evening were Messrs. H. Flint and E. Rendell. Mr. Flint read a very interesting paper on "Sound in its Relation and Speech," and by the aid of diagrams clearly expounded the theories of the subject. Mr. E. Rendell's paper on "Spare Plant" was well received.

Liverpool and Birkenhead Operators. The third meeting of the session was held on Dec. 13. Mr. H. A. Hincks occupying the chair. Two papers on the subject of "Mixed Rates" were read by Miss G. Martin and Mr. T. W. Wickham respectively. Miss G. Martin took a broad view of the matter, chiefly from an operator's standpoint. In Mr. Wickham's paper the arguments for mixing the services and the purposes of distribution were clearly set out, to which Mr. Francis (Traffic Manager) added some remarks explaining the position by reference to curves based on the traffic through the Liverpool Central Exchange. As usual the meeting was very agreeably concluded with a short musical programme.

The fourth meeting of the session was held on Jan. 10, Mr. Francis, Traffic Manager, presiding, when Mr. R. J. Edwards, Exchange Manager, read a paper entitled "The Evolution of a Telephone Operator." The paper described in a very interesting manner the various stages of an operator's training and career leading to the positions of supervisor and monitor, and, by reference to the duties of each, the unity of the *personnel* of a telephone exchange was carefully worked out. An interesting discussion ensued, in which Mr. Shepherd, Provincial Superintendent, contributed some very interesting information regarding "primeval" telephony and the operators of the period. The meeting was concluded with a very enjoyable musical programme, kindly provided by Mr. Woodward (solo pianist) and the Bohemian Quartette.

Luton.—Miss A. Stone, Travelling Supervisor, read on Dec. 12 a paper on "Operating." Miss Stone dealt with the subject very ably, and the operators, of whom there was a good number present, were able on this occasion to hold their own in the matter of questioning the lecturer.

On Jan. 16 Mr. J. S. Best, Acting Local Manager at Bedford, gave a paper entitled "Underground Work." Some very good lantern slides were shown, illustrating the construction of underground in several parts of the country. A notable feature in this, as well as in the three previous meetings held this session, was the remarkable good attendance.

Manchester.—The fourth meeting of the session was held on Jan. 6, when a paper was read by Mr. A. Chapman on "Notes from a Service Inspector's Note Book." Mr. Chapman dealt with the troubles experienced by subscribers owing to their not using the instruments in a proper manner. Mr. Chapman quoted a number of anecdotes from actual experience during the course of a paper which was very interesting and of a very humorous nature, and which was followed by a very interesting discussion.

Newcastle.—The third meeting of the session was held on Dec. 19 before a moderate attendance. A paper on "Phases of the Measured Rate Service" was read by Mr. J. P. Urwin giving a thorough explanation of the different rates in force in the district. The paper was much discussed, Mr. Urwin answering the various points raised to the satisfaction of those present. A second paper on "Wireless Telephony," which was to be read by Mr. M. T. Byrne, was unable to be given owing to that gentleman's indisposition.

The fourth meeting was held on Jan. 9 before a good attendance, the hon. president (Mr. A. Drummond) occupying the chair. An excellent paper on "Telephone Investigation Work" was read by Mr. B. S. Cohen, of the Engineer-in-Chief's staff, dealing with various phases of the Company's work, including transmission, testing of telephone apparatus, loadings of circuits, etc. The paper was thoroughly enjoyed, the points covered by the paper being fully discussed and the numerous questions asked answered by Mr. Cohen in a manner satisfactory to all.

North-Eastern (London).—A meeting was held on Jan. 4, Mr. G. J. Gadsby being in the chair. Mr. H. S. Peck, the president, travelled up specially from Birmingham to read a paper entitled "Inventory Work," in the course of which he explained the constitution and methods of the inventory staff, the various forms and books used, and how the information concerning the plant is collected and tabulated by the various staffs. After the paper a number of splendid slides of Bristol, Bath, etc., were shown (kindly lent by Mr. Perkins, District Manager, Bristol, and Mr. Barr, of the Inventory staff), to whom the thanks of the society are due.

Nottingham.—The second meeting of the session was held on Dec. 30. The chair was taken by Mr. C. H. Sibley, vice-president, and the minutes read and confirmed. An interesting letter was read from a former inspector on the Nottingham staff, Mr. D. S. Clayson, who is now engaged in telephone work at Calcutta. Papers were read by Misses Green and Brooke on "Operating." Miss Green's remarks were principally relative to order wire working, and Miss Brooke's paper to call offices. A number of slides, which had been obtained from Head Office, were shown, giving views of various switchrooms, boards, etc. Subsequent discussion was general, seventeen members taking part. Mr. Sibley offered a prize for the better paper, and awarded it to Miss Brooke. It will be presented at next meeting.

Oldham.—On Nov. 24 a very interesting paper was read by the District Manager, Mr. A. Pugh, on the subject of "Expenditure," with special regard to wastage charges. The paper created a large amount of interesting discussion, and many points raised during the same were ably explained by the lecturer. In the absence of the president, Mr. A. Spargo (employed on the Inventory staff) the chair was taken by Mr. George Hey (Contract Manager).

Portsmouth.—On Jan. 11 a paper was read before the telephone society by Mr. S. J. Pharo, Traffic Manager, on "Sub-Exchange Traffic." The lecture was well attended in spite of inclement weather, and a good discussion ensued afterwards, in which Mr. Morice, Mr. Lockwood, Mr. Yates and Mr. Parsons took part. The chair was taken by Mr. L. F. Morice, Engineer.

Plymouth.—On Dec. 22 two very good papers were given as follows:—"Storekeeping," by Mr. S. G. Tregillus; and "Faults," by Mr. J. Hammond. Useful hints were made in both these papers, which were followed by a discussion. The president, Mr. R. A. Dalzell, was in the chair on this occasion.

On Jan. 4 two papers were given as follows:—"Some Phases of Operating and Supervision," by Miss E. D. Davis; "The Telephone Inspector and his Relation to Commerce," by Mr. F. Knight. These papers were very interesting

and brought out some useful discussion. The chair was occupied by Mr. D. J. Meikleham.

Sheffield.—The third meeting was held on Dec. 23, the chair being taken by Mr. C. Marsden (Assistant Engineer). A paper was read by Mr. E. S. Byng (London), entitled, "Economics of Line Construction." The paper was divided up under various heads, each of which was dealt with in a clear and direct manner. A discussion took place at the close of the meeting, in which members of the Inventory staff, stationed in Sheffield, took part. Mr. Watts (Head Office) was also present and took part in the discussion.

Southampton.—An operators' society has been formed here, the first meeting of the session taking place at the Grosvenor Café on Nov. 28, when an interesting and valuable paper on the "Manipulation of Telephone Traffic" was given by Mr. Sydney O. Allen, the Traffic Manager. The chair was taken by Mr. W. Howe, the District Manager. The meeting was an open one, and was attended by all sections of the staff, and an animated discussion followed. The close of the business meeting was followed by an enjoyable social evening, the attendance of which included some 70 members of the staff.

The second meeting of the session was held on Dec. 15, three papers being given by Misses Smith, Haynes and Starkey, Supervisors, Southampton, the subjects covering operating, team work, ticket recording, junction working and sub-exchange supervising. Over 70 per cent. of the members of the society were present, and over 60 per cent. entered into the debate. The chair was taken by Mr. S. O. Allen, the Traffic Manager.

Southern (London).—A meeting of the above took place on Jan. 9, when Mr. F. Grove occupied the chair, and a paper was read by Mr. J. H. Pattman, entitled, "The Electrophone of To-day." The paper deserved much better support than a small audience, which included as visitors Miss Newman (Hop), Messrs. G. F. Greenham and F. G. C. Baldwin, and several members of the operating staff, to which an invitation had been extended. Messrs. Greenham and Baldwin both criticised the paper, but Mr. Pattman had, by his lucid and full description of the methods in vogue, apparently answered the majority of the questions before they were put.

Swansea.—The third sessional meeting was held on Dec. 21, Mr. W. E. Gauntlett (District Manager) occupying the chair, when a general debate on various questions relative to the telephone service constituted the evening's programme. Mr. A. L. Stanton (Acting Electrician) took a prominent part in the discussion, considerable information being given by him on the points raised in connection with the technical branches. All departments were represented by the speakers, amongst whom were also included Messrs. W. J. Hodgetts (Engineer), W. Bevan and E. Harris (Linemen Inspectors).

The fourth sessional meeting took place on Jan. 18, when an excellent paper was given by Mr. W. Caine (Foreman Faultsman), entitled "Faults and their Causes." The subject was dealt with in a very able manner, some valuable points in connection with line maintenance and the steps necessary to reduce the number and duration of faults being emphasised. A good general discussion followed, in which a large number of those present participated.

Swansea Operators.—The fourth sessional meeting was held on Jan. 11, Mr. W. E. Gauntlett (District Manager) occupying the chair, when excellent papers were contributed by Misses E. J. Davies, N. Thomas and W. Rowland (Operators, Swansea). The papers, which dealt with various questions pertaining to operating, were extremely well written, and a good general discussion followed each. Mr. W. E. Gauntlett afterwards provided an enjoyable half-hour with a description of some of "Picturesque Italy's Scenery" illustrated by lantern slides.

Western (London).—The third ordinary meeting of the session was held at Gerrard Exchange on Jan. 4, when Mr. C. Huttleston read a paper entitled "Sound Physics," and illustrated it with lantern slides and practical experiments. The lecture proved very interesting, and a hearty vote of thanks was accorded Mr. Huttleston at the conclusion of the reading.

Weymouth.—The first meeting of the session was held on Nov. 24, the lecturer being Mr. Hunt, a prominent local electrician; the chair was taken by the Local Manager, Mr. J. A. Attwooll. Mr. Hunt gave an instructive address, supplementing it by various electrical experiments with actual models, including wireless telegraph apparatus.

Wolverhampton.—The North Midland Telephone Society have had promises of papers towards the present session's syllabus as follows:—Mr. W. Bentley, "Curve Plotting and the Slide Rule"; Mr. W. Dalton, "Transmitters and Transmission"; Mr. R. W. Lloyd, "Radio-Telegraphy"; Mr. C. W. Piggott, "Past and Present" (lantern lecture); Mr. G. Taylor, "Combustion Engines" (lantern lecture); Mr. H. G. Watkin, "Wireless Telegraphy and X Rays."

CHRISTMAS TREATS TO POOR CHILDREN BY OPERATORS.

Manchester.—The operating staff at the Central Exchange held their sixth annual doll show on Dec. 20 and 21 last, and their efforts were most successful. Some 200 dolls, together with a similar number of toys, both mechanical and instructive and suitable for children ranging in age from twelve years to one year, were on exhibition.

It is worthy of note that the dressing of the dolls was done by the operators themselves, and the artistic taste displayed reflects great credit on the artists in addition to proving that operating alone is not their sole education.

The patronage given by the male staff to this annual event was most generous, thus making it the most attractive yet held.

The show was visited by the Provincial Superintendent and the District Manager and a large number of the relatives and friends of the staff.

The dolls and toys were afterwards sent to the Charter Street Ragged School and Pendlebury Hospital for distribution. *Ex fide Hercules.*



MANCHESTER CENTRAL EXCHANGE DOLL SHOW.

The Manchester City Exchange have inaugurated a doll show on similar lines to the Central Exchange and with the same objects. Our illustration depicts the show which was held at the City Exchange, and it may be mentioned in passing that the female staff of the Manchester district office also joined with the City Exchange operators, in the provision and dressing of the dolls.



MANCHESTER CITY EXCHANGE DOLL SHOW.

Sheffield.—It is usually the busiest people in this world who find most time to spare to help others who are not so well provided for as themselves, and to whom the nature of a treat of whatever form it may take is practically a great rarity.

This is exemplified by the Sheffield operators who, supported by the rest of the staff, some months prior to Christmas employed their spare time during relief and in the evenings dressing dolls with which they intended to decorate a Christmas tree for the most needy children in the city.

When their operations were completed they found from Mr. Holmes (the Police Court Missionary) that St. Simon's children, numbering 200, ages from three to seven, would not only be grateful for the gifts, but also that a Christmas tree had never before come their way.

The tree stood over 9 feet high and, symbolical of the season, on the gift was poised a fairy with silver wand on the top. There were over 120 dolls in about 120 styles of dress, every one of them up to date even to some in hobble skirts, besides hosts of toys, which gladdened the hearts of the youngsters.

The concert arranged by the operators and the distribution of the gifts was, as may be supposed, a great success, and the occasion will long remain in the memory of those who took part, the operators feeling that their toil had been well repaid by the delight and jubilation of the recipients.

All arrangements in connection with the tree and concert were supervised by the Chief Operator, Miss Ibbotson, who dealt with the matter in her usual whole-hearted fashion, and also occupied the unique position of acting as Father Christmas, each child receiving a toy, a bag of sweets and a bun.

STAFF GATHERINGS AND SPORTS.

Paisley.—The second meeting of the telephone society was devoted to social entertainment, which took the form of a whist drive. The game was thoroughly enjoyed by a large turn-out of members.

Greenock.—A successful whist drive was held on Dec. 29 in connection with the telephone society, and a party of 32 spent a most enjoyable evening. The prizes were presented by Mrs. A. Ramsay Lamb to the winners. Miss Haig, Operator, won the first prize for ladies, and Mr. A. Ramsay Lamb, District Manager, won the first prize for gentlemen.

Oldham.—A football match, under Association rules, was played on Jan. 14 between the members of the Oldham staff and of the Manchester staff. The match was contested at Oldham before an interested number of spectators, and resulted in a close victory for the Oldham team by one goal to *nil*. One or two members of the Oldham team were conspicuous in their efforts, and the game was controlled by Mr. W. B. Cheerham, Oldham, who acted in the capacity of referee. Both teams were well kept in hand. After the match the Oldham staff entertained the visitors to a substantial tea and concert at the Oriental Café, which was thoroughly enjoyed by all who took part. Arrangements for the whole gathering were carried out by Mr. Higson.

Swansea.—On Jan. 14, at the Mackworth Hotel, Swansea, a large number of the Swansea district staff were present as guests at a dinner and smoking concert given by the Swansea section of the Engineering Department of the Post Office. The company numbered about 120, and included, in addition to Mr. W. Pennington (Sectional Engineer, P.O.) and Mr. L. Jones (Postmaster, Swansea), Mr. W. E. Gauntlett (District Manager) and Mr. W. J. Hodgetts (Engineer) of the Company's staff. As was to be expected, reference was made by almost all the speakers to the fast approaching transfer, and Mr. Gauntlett, in responding to the toast of "The Visitors," expressed the hope that the staff of the Post Office would, on Jan. 1, 1912, receive as comrades the National Telephone Company's staff, who could be relied upon to serve the State as loyally as the Company had hitherto been served. The musical items which followed were rendered in excellent style, and the function was voted by the Swansea staff a signal success both from a social and from an *entente* point of view.

Edinburgh.—The second whist drive of the season was held on Jan. 13, the company numbering 48. The prizes, consisting of a trinket-box and whist-markers, were presented by Mrs. Robertson, wife of the Chief Electrician, the winners being Miss M. Ross, Supervisor, and Mr. W. Chandler, Sub-Engineer. It is worthy of note that Mr. C. C. Worte, District Manager, tied with Mr. Chandler, and it was only after an extra hand had been played that the latter was declared winner. Mr. D. C. Heggie, Stores, was awarded the booby prize.

Plymouth.—On Dec. 23 a social evening was spent by the Plymouth operating staff in their dining room, which was decorated for the occasion. Numerous games were arranged, and gramophone selections added to the enjoyment of the evening. The gathering was very successful. The arrangements were made by Miss E. Westlake, Clerk-in-Charge, assisted by Miss D. Davy, Supervisor.

Manchester.—Under the auspices of the Manchester National Telephone Swimming Club a very successful whist drive was held on Jan. 16 at the Warehousemen and Clerks' Café, Manchester. In all 160 were present, principally members of the staff. The prize winners were as follows:—Ladies: First (gold pendant), Miss Peacock; second (dressing case), Miss E. Robinson; hidden table prize (scent spray), Miss Frost. Gentlemen: First (silver cigarette case), Mr. Knowles; second (umbrella), Mr. Brooks; hidden

table prize (box of cigars), Mr. Deaville. Mr. A. C. Godfrey acted as M.C., and altogether a very enjoyable evening was spent.

Leicester.—Mr. J. N. Lowe, Local Manager, is to be congratulated on his success in the golf handicap recently held at Leicester for the "Corah" cup. The final was unfortunately contested in very bad weather, and although Mr. Lowe did not win the cup he made a very deserving attempt, and was awarded the second prize.



OVERHEAD AND UNDERGROUND ENUMERATORS,
A AND C DIVISIONS.

THE INVENTORY STAFF.



DIVISIONAL AND SECTIONAL OFFICERS OF THE A AND C DIVISIONS AT
BRISTOL.



INVENTORY STAFF: A AND C DIVISIONS, BRISTOL.