

# THE National Telephone Journal

Vol. V.

NOVEMBER, 1910.

No. 56.

## TELEPHONE MEN.

### LIV.—CHARLES CUTHBERT WORTE.

CHARLES CUTHBERT WORTE was born in London in 1866, and educated at a private school near Uxbridge. After serving an apprenticeship with Messrs. Latimer, Clark, Muirhead & Company, electrical engineers and telegraph instrument makers, of Westminster, he entered the service of the South of England Telephone Company at Hastings, in 1885. In those days there was no organisation of methods or staff, and his duties were of a varied description, consisting of instrument fitting and inspecting, wayleave canvassing, supervision of gangs and storekeeping, and so forth.

Mr. Worté was transferred to Oxford in 1887, where the Company were endeavouring to introduce telephone service into the colleges. Although free service was offered, only one or two colleges availed themselves of it, the traditional conservatism of the University being strongly evidenced by their attitude towards the new invention.

Mr. Worté was next transferred to Dover as Local Manager, where he had his first experience of trunk lines, which were earth circuit ones, connecting Dover, Folkestone, Canterbury, Ramsgate and Margate. Whilst he was stationed there the South of England Company was absorbed by the National Telephone Company.

Subsequently he was transferred as Local Manager to Kings Lynn, and again on a re-arrangement of districts to Cambridge.

In December, 1893, Mr. Worté was transferred to Watford as Local Manager, and again in June, 1896, to Reading.

In 1897 he received promotion to the post of District Manager for the East Kent District under Mr. G. F. Preston, then Provincial Superintendent for the South of England. After remaining there for three years Mr. Worté was appointed District Manager to

the more important district of Hull. His first experience of that city was not particularly pleasant. The overhead plant had been wrecked by the severe snowstorm in February, 1900, and his first duty was to interview a number of discontented subscribers, who had refused to pay their subscriptions because they had been without their service for some time owing to the breakdown, and also because it had not been all that could be desired. In addition, there were rumours of Corporation competition. Matters were satisfactorily settled by promises of improved service on the completion of the new common battery exchange in course of construction, which was completed and opened in March, 1901.

The opening by the Hull Corporation of a system of their own in 1903 did not lighten Mr. Worté's task and the competition for business naturally became very keen. The Corporation, with all the advantage of intercommunication with the Company's system, might have been formidable rivals, but after reaching about two and a quarter thousand stations, they entered upon a period of stagnation, whilst the Company's system has increased to 8,500.

Mr. Worté has earned the respect not only of the staff under his charge, but of those under whom he works, by the calm, steady, but firm manner in which he treats his work, and many could with advantage take a

leaf from his book in this respect. He is able to keep an unruffled demeanour, which is a great asset to anyone who has frequently to face such exasperating circumstances as fall to the lot of telephone officials.

With regard to recreations, he has not yet caught the golf fever, but spends his available leisure in walking and reading.



## OBSERVATION RECORDS AND THEIR APPLICATION.

By T. M. OLDHAM, *Assistant Exchange Manager, Paddington.*

THE whole subject of service observation is a very extensive and, to my mind, a very important one, and it is entirely beyond the scope of an article such as this to deal with it at all comprehensively.

It is possible, however, that a few remarks on some of its applications may not be out of place, and it is with this idea that I have ventured to contribute the following brief article on the subject.

In considering the application of the observation returns the question naturally arises as to the necessity for observation as distinguished from supervision, both aural and visual, as exercised by the supervising and managerial staff. Since these latter have the operators continually under their personal surveillance it might be thought that they could of themselves determine whether the service being given was up to the required standard. It must, however, always be borne in mind that no matter how smoothly things may appear to the supervisory staff to be working they are in the exchange itself, and are also cognisant of all the details of the various operations which go to make up a telephone connection, and consequently everything appears quite straightforward to them.

It is, however, from the point of view of the subscriber, who is outside, and naturally ignorant of the internal working of an exchange, that this question of the service has to be considered. This is precisely where the observation officer and his local representatives step in, as they observe the service from the subscribers' standpoint to a degree which cannot be reached by mere visual supervision.

To a busy subscriber, possibly of an irascible disposition, seconds on the telephone seem minutes, if not hours, and judicious observation to ensure that no more delay is caused in completing a connection than is absolutely unavoidable, contributes to the improvement of the service and so to the satisfaction of subscribers. The attitude to be adopted should be in accordance with the old maxim to the effect that "Prevention is better than cure." This for two reasons.

Firstly, because to possess a number of subscribers who are satisfied and have no possible ground for complaint, is far better for the prestige of the Company than to be receiving multitudinous complaints and be very successful in finally quieting the complainants into a more or less dormant or apathetic state.

Secondly, merely from the point of view of the economical expenditure of energy, it is a far easier matter to give a subscriber a good service and keep him from ever acquiring the habit of grumbling than it is to satisfy him when once he finds the service really at fault and feels additionally self-righteous in consequence.

I have made no attempt to enumerate all the considerations which point to the advisability of observation of the service, as carried out, but I think the points I have mentioned are sufficient to show that it is desirable, and, if the service is to reach and maintain a high standard, not only desirable but necessary.

I will now, therefore, consider more particularly the application of the results of these observations, so that they shall be of the greatest utility. In this connection, the first thing I would mention is the important part which supervisors may take in leading their operators into taking a personal and intelligent interest in the results. I say "leading" advisedly, as the supervisor herself must first of all understand and be interested in the results before she can possibly make them intelligible, to say nothing of interesting, to the operators in her division. Until this individual interest and responsibility is appreciated by the operators the exchange manager's studies of the figures, however careful, and his efforts to improve matters, however well intended, must prove more or less fruitless.

The supervisor, then, comes into personal contact with her operators, and when the exchange manager points out to her, from the local observations, that her division has some particular weakness, she can tactfully take it up with the operators, showing them

how their own failings affect the results, and, as a natural consequence, improvement will follow. Serious irregularities, observed locally, should of course be taken up with the operator responsible at the time of the occurrence, and in this, as indeed in all dealings with operators respecting observation, the greatest care should be exercised to avoid any approach to *espionage*, or any semblance of it, and it should always be remembered, and realised by the operators, that it is *service* that is being observed and not the *servants*, the operating as distinguished from the operators.

We will now consider that section of the observations which deals more particularly with the speed of the service. Competition in this matter between the divisions may, if carefully regulated, prove a healthy stimulus. It must be supervised, however, and the ideal of the 4.5 seconds answer and clear must always be kept to the fore, as not only the average but the actual times of a large percentage of the calls handled. This means the attainment of an evenly good service, which is of far greater practical value than a service with the same average figure but composed of a number of long answers or clears, made up for, as regards average, by a number of, say, 1-second tests, which are, after all, practically useless.

Of course, in addition to the above considerations, competition must be tempered with discretion, or, in the anxiety to obtain low tests, hosts of irregularities will be introduced and the service will consequently suffer and not gain.

The application of the observation results by the supervisors has, I think, been sufficiently indicated in the foregoing, and we must now consider what study can be advantageously made of them by the exchange manager. By careful comparison each month of the observation figures (as regards traffic) with those of the corresponding month of the previous year exchange managers can see whether they are progressing in the right direction. Considerable emphasis should be laid upon the care with which these comparisons should be made, in order to obtain the necessary benefit from them. For instance, if two merely consecutive months are compared they may give an entirely erroneous idea as to whether improvement has been effected or not, as the traffic of the two months under consideration may differ so widely as to account in itself for the difference in the observation figures. Traffic is bound to affect both speeds and irregularities to some extent, and we cannot rightly estimate the success or otherwise of our attempts to improve the service without taking it into consideration.

I have, of course, only touched on the fringe of the subject of service observation, as to discuss anything but the generalities would fill a whole book, and require more able handling than mine. It will also be noticed that I have not made any reference to special observations of the operating on particular subscribers' lines. The uses of these observations are, I think, fairly obvious and, palpably, cannot be discussed in an article of this nature.

I would however, in concluding, make a few remarks as to the actual application of the results to the operators themselves. Irregularities must imply something of the nature of a fault, but nothing is to be gained by "fault finding" in the ordinary acceptance of the term. The particular failing of an operator, or division of operators, can be tactfully pointed out as one to be guarded against, and should on no account be preached about, or driven home as a terrible crime.

Much undoubtedly has been done, and much can yet be done as the result of the careful study of the results of observation, whether local or general, and their application to the particular requirements and local conditions of the exchange under consideration, and it should not be lost sight of that these figures can form occasions for encouragement quite as much as for complaint, and it is, I think, in the former direction that our effort is most usefully directed, and that will enable us to continually reach nearer to that high ideal of a perfect service which we all desire to attain.

**Electrical Engineering.**—We are asked to draw attention to errors in the advertisement of the above journal last month. The date of the issue containing the article of the new cable between England and France was March 17; that on the new Central Exchange at Glasgow, Aug. 18; and that describing the new Post Office Telephone Exchange at Willesden, Sept. 1.

## PAPERS.—THEIR WRITERS AND AUDIENCES.\*

BY EUSTACE HARE.

THE papers presented at the meetings of telephone societies, and, in fact, papers and lectures generally, may, I think, be divided broadly into three classes: the purely descriptive, the productive and the debateable; each serving its distinctive and useful purpose; each with its own characteristics, interests, and, perhaps, its own audience. The order I have placed them in is purely mechanical and is in no sense intended to suggest comparison, for it would be hard to say which, if any, of the three is entitled to priority in point of value or of importance. But it would not be difficult to allot to these three types of papers the characteristics, the bent of mind of their respective classes of author, of the men and women who set themselves deliberately to record on paper, for the interest or benefit of others, their knowledge and views of those things which particularly appeal to or attract themselves. Thus, for purely descriptive work we have the man with mastery of detail, the expert by long practice, with knowledge of facts which though not new may be fully known only to himself; then there is the inventor, the producer, for the setting forth of new facts created in his own brain and brought to an unquestionable conclusion; and thirdly, there is for distinctly debateable subjects the man of views and theories only, philosopher or dreamer, with ideas good, bad and indifferent, the fruit of which may or may not be worth the cultivation.

I have to confess to having, at one time, an inclination to rather undervalue the utility of papers of the purely descriptive or narrative type: my feeling being that to merely recount in detail the known facts of a particular branch of work was like preaching, on the one hand, to the converted, and on the other, to those who had neither the desire nor intention of being converted. I have since come to the conclusion that this view was altogether wrong. Among the hundred odd papers it has been my privilege to read or listen to, I was much much struck with one which appeared in the TELEPHONE JOURNAL for March, 1910, and which proved to me that the description of simple and, what may be to some, well-known facts, is capable of creating interest and of circulating knowledge far beyond the boundary contemplated by the author. The paper was short and tersely expressed, but alive with information, and the subject was "Screwdrivers." I had no particular interest in screwdrivers and had no expectation of gaining any material or personal advantage in reading about them, and yet the time I spent on that paper was by no means thrown away. Beyond its intrinsic value, it suggested to me new ideas of what men and women have to learn before they can claim proficiency even in work which, on the surface, seems ordinary and uninteresting; and it reminded me that much which appears straightforward or haphazard has not only cost the performer an arduous training, but has cost, too, considerable thought in the seeking for methods to achieve the best and most economical results. One effect of this brief essay on screwdrivers, then, was to present the subject to me in a new and higher light, to the broadening of my views and sympathies in regard to work and workers outside my own particular sphere, and this of itself was worth the gaining.

Incidentally, too, I noticed a remark in it too good to be passed over, almost epigrammatic, and wider in its application than perhaps the author foresaw. It was this: "It is surprising what a number of men you meet who . . . keep on using a square-ended blade for flat-headed screws."

Now, the very fact that I had learnt something in leaving for a moment my own beaten track suggests another fact very germane to my present subject—viz., that the writer of that paper when he delivered it, confronted, no doubt unconsciously, three distinct audiences mingled as one. First, those who were fully acquainted with the subject and were therefore competent critics; secondly, those who were there to gain knowledge in their particular work, and to whom therefore the paper peculiarly appealed; and thirdly, those who, like myself, would be there merely hoping, maybe, to be interested, modest and silent listeners.

which was absolutely new; his efforts were purely descriptive; but I took him to be a practical man well acquainted with his subject, competent to explain clearly useful facts acquired by observation and experience, and thereby worthy of appreciation. And, inferentially, I am led to believe that no matter what branch of our work forms the subject of a descriptive paper, there is no reason why it should not provide some interest and some profit to the critic, to those whom it instructs and to the merely curious.

But of all classes of paper, this, the descriptive or narrative, demands perhaps the greatest care in preparation, for the very simple reason that the writer being so abundantly supplied with facts allows them to follow too closely on each other's heels and thus bewilders and tires the listener. The fault here lies in an insufficiency of explanation and embellishment. The inventor is able to dazzle an audience by the novelty or ingenuity of a discovery, which of itself may be enough to provoke interest and hold the attention: the man with views or unproven theories must, of necessity, proceed slowly, reasoning out his *pros* and *cons*, if he wishes to be taken seriously; but he who sets out to narrate accepted facts and theories has become so accustomed to them himself that there is always a danger of taking too much for granted, of crediting his audience with a knowledge of terms or principles of which it is profoundly ignorant, leaving it depressed and irritated for want of a little more illumination.

For example, many papers have been written and read on the office or commercial side of the Company's work, on its book-keeping system and methods of recording its daily business routine. References are made to cash books, fee journals and stores ledgers: to the advantages of cards over the book form, and so forth; but I do not remember ever to have come across the plain definition of what a ledger or journal really is, or of such terms as "double entry," "personal" and "impersonal," "accounts," "debits" and "credits," etc. Much has been written and said of what should be or has to be done in varying circumstances, but scarcely enough, I think, of the reasons for doing it or of what would happen if it were left undone or were done badly.

All these things are commonplaces to the initiated, but to a large section of the members of telephone societies they are utterly unknown, and unless attention is paid to such elementary you will get limited interest and attenuated audiences. True, you are specialising, and presumably on the subject on which you are best informed, but you are not lecturing to a special and selected audience, and therefore you must to some extent prepare your paper or lecture on what is commonly known as "popular" lines. Speaking generally, the larger the audience, the slower is the *average* intellect, and if it is your intention to appeal to the whole you must frame your subject in such a way as will make it possible for the whole to keep up with you. There is a by-motive in these meetings of ours which, to my mind, is one of their chief charms—namely, the opportunity given for the welding of departmental units and for the sympathetic recognition of each others' work; and to get this you must dig below the surface, below the dry ground of necessary business intercourse and Service Instructions, to trace and understand more of the complicated foundations of our business.

This is one of the great uses of descriptive papers, and I am convinced that already the benefit derived therefrom to the Company and to the individual is more far-reaching than is commonly imagined. And, beyond this, the dissemination of telephone knowledge week after week throughout the country by means of the voluntary labours of an enthusiastic staff must in the end react on the service to the great advantage of the telephone-using public, a public which would perhaps be astonished to learn how much indirectly it gets out of us for nothing!

In essence, though not necessarily in manner, the paper which begins and ends with pure description differs entirely from that which produces and deals with a new fact demonstrably decisive. The former represents the "I have acquired"; the latter, the "I have discovered." The success of the former depends altogether on its clear sequence of narrative, the latter on the importance, utility and ingenuity of the subject itself. Unless and until he chooses to part with it, the invention is the inventor's exclusive possession; he is the sole master of it. It rests with him absolutely to decide how far he will take his audience into his confidence: he

\* Paper read before the London Telephone Society, Oct. 3, 1910.

Bear in mind the writer propounded nothing, so far as I know, may be willing and even anxious to reveal all he knows of his own work, but on the other hand, he may find it hard to part with the creation of his brain, and to let go in one short hour the results of months of patient and persevering investigation.

But in either case he, too, has his audiences—the sympathetic, the incredulous, the antagonistic, and even the envious, and he is bound to reckon with them. They are there not only to be instructed but to be interested, and here again if the paper is to be successful as a *paper* it is the average intellect, not the expert, that is specially to be appealed to. And among every audience there is a class of intellect, a little difficult to define, but which, I believe, is not uncommon—viz., the mind which grasps quickly, but not thoroughly; that accepts half a truth for the whole, only to find on examination that it has missed a link here or there, to its ultimate mystification. This section has to be protected against itself by careful preparation on the writer's part, otherwise he will find himself in the subsequent discussion forced to reiterate what he imagined he had already clearly demonstrated.

The accustomed lecturer knows, moreover, that it is not always enough merely to state a fact; that, to say, for example, that having planted an acorn he has produced an oak is not, to the enquiring mind, the equivalent of saying that two and two make four—one of the few things, by the way, which in this world we are absolutely certain of—for the thinker, the man of science seeks acquaintance with the full chain of reasoning and circumstance by which definite conclusions are arrived at, and is satisfied with nothing less.

The inventor who has something to declare and who proposes to declare it to a mixed audience, that is to say, to the expert and non-expert, should, I suggest, take pains to address himself particularly to the non-expert. By which, please note, I do not mean the unintelligent; for to attempt to instruct the unintelligent, no matter how willing they may be to learn, through the medium of a short paper would be a difficult task. They must, for the time being, be left out of account, or the paper may lapse into tediousness. On the other hand, the writer need not worry himself unduly about the listening expert. Assuming sense and soundness in his subject, he is assured in any case of attention in that quarter, if not of approval; he expects criticism, and will get it, but will get also encouragement from those receptive minds which he carries along with him; the minds to which a mere word here and there will give a clue to his trend of reasoning; that to say "I tried this and it failed; I went back and tried that and succeeded," pictures to them the whole process which worked out accomplishment. By addressing himself specially to the intelligent amateur in the light of an intellectual, though not a technical equal, the lecturer need not fear that the interest of the expert will flag; the probable effect will be that his subject will gain in completeness without becoming tedious, and thus in appealing to the greater number he will include the less.

No one will deny that what I have called the "purely descriptive" and the "productive" types of paper are both "instructive," but it is well to note that they are instructive in a different sense. The object of the first is to explain and teach the Company's work, to make plain the why and the wherefore of this or that particular method; and the direct utility of it to the staff, as a staff, may therefore appear to be more pronounced than in the second. For, at the first blush, although every new invention in telephony is interesting to us, it is not in itself necessarily and literally instructive to each. It may never help you in your day's work, you may never see or hear of it again, but it would be a poor mind that in listening to an inventor's recital of the toil of his production failed to be impressed by, or to increase its store of knowledge from a carefully prepared description of the origin and planning of a new thing, and of all the time and care and patience bestowed upon it. If it learns nothing else, it learns how it is done.

To the writers of papers of the debateable and speculative type there are many and wide fields in which their imaginations may roam, or where their pet idiosyncrasies, healthy and otherwise, may take the air. There are two classes of writers here, the one who has something to say and the other who has nothing particular to say, but is particularly anxious to say it. The latter we can dismiss

from our thoughts, merely wondering, as Beatrice did of Benedick, why he will still be talking when nobody marks him, or we may argue, with Lord Chesterfield, that if a man has a mind to be thought cleverer than he is, it is only good nature to indulge him. The genuine writers on debateable subjects are those who not only have views, but are absolutely convinced by observation and study that those views are right, this being the safest and indeed the necessary weapon for persuading antagonists that they are wrong. On the other hand, as they are dealing mainly with theories, and not with proved facts, they must be prepared to accept defeat when contrary opinions are overwhelming.

Facts in themselves are indisputable: it is the manner of arriving at them and the use to be made of them which provoke question, interest or admiration. Abstract and abstruse ideas are wanting in this completeness, are frequently unsusceptible to direct proof, and thereby offer a broad front not only to discussion, but to attack. It is clear, therefore, that the essayist must be sure of his ground, every inch of it; must be armed at all points for the defence of his views, and must be confident that his arguments are sound, whatever his audience may think about them. It is not enough for him to feel instinctively he is right, because in all probability he will be confronted with others who instinctively feel he is wrong, and whose reasoning faculties are even quicker and clearer than his own. For instant action instinct is a useful guide to follow, but a poor thing to trust to when the result is to be subjected to the fierce light of criticism, be the same ever so friendly.

Further, it is unsafe to attempt to slur weak points in a chain of argument—weak in the sense that the writer has his private doubts about them—by brilliancy of diction. It is easy enough to hold the attention by elegance of expression, by the well-turned phrase or by mere charm of manner. Eloquence has a fascination for most of us, and, for the moment, may make the wildest schemes and veriest nonsense plausible; but its influence quickly evaporates unless backed by solid opinion. Far better to take your audience into your confidence and admit that here or there you have not positively satisfied yourself that your conclusions are absolutely sound. The chances are greatly in favour of finding one among your listeners whose mind—differently trained to yours—is able to grasp results and consequences with a directness and an accuracy that leaves you far behind; provided, of course, that you have led him step by step to your point of doubt, that up to that point you have been so clear in your arguments that he has been able to gather exactly what is in your mind. And it does not follow that his success in solving your difficulty reflects on your capabilities; the original idea is still yours, only he proves by mathematical demonstration and precision that it either will or will not hold water; possessing a quality which you do not possess or which by choice or accident is developed in you to a far less extent.

And what does it matter if you are proved to be wrong? You are expressing your views, not seeking to establish a law; and the value of your views is measured by the quality and amount of reasoning you have put into them, neither more nor less; and if you are sincere you will be the first to admit that the next best thing to establishing a theory is to explode a fallacy, even though it be your own. Perhaps the two things are equal.

(To be concluded.)

#### FUNERAL OF THE LATE MR. A. T. WALLER.

THE funeral of Arthur Till Waller, whose death we recorded last month, took place at Brompton Cemetery on Sept. 20. The Company was represented by Mr. Goddard (General Superintendent), Mr. Clay (Metropolitan Superintendent), Mr. Davis (Metropolitan Stores Manager), Mr. Stirling (Metropolitan Chief Accountant), and Mr. Leslie (Metropolitan Chief Cashier), and the Staff Benevolent Society by Mr. Hudson (the secretary). Wreaths were sent by the staff of the Company and by the Benevolent Society.

**Visitors.**—Mr. C. E. Scribner, Chief Engineer of the Western Electric Company, New York, and Mr. T. D. Lockwood, Manager of the Patent Department of the same company, were visitors to Telephone House during October.

## TELEPHONE WOMEN.

## LXXVIII.—NELLIE BRADSHAW.

AMONG the many fields of work open to women nowadays, that of telephone operating occupies an important place. In some districts suitable openings for women's activities are scarce, but it



NELLIE BRADSHAW.

is a proof of the attraction of the telephone service that in a city like Nottingham, where the openings for women are many and varied, the type of women to be found in the telephone exchanges is as high as it generally is throughout the country.

Nellie Bradshaw, the subject of this short notice, exemplified the truth of the statement made. She entered the Company's service in July, 1897, when there were three exchanges within the city of Nottingham.

For the first two years of her service she was in the Central Exchange, but afterwards for a year took duty at the sub-exchange at Basford in the morning, and at the Central in the afternoon. In June, 1901, when all the subscribers at Nottingham were centralised in the new exchange at George Street, and the system altered from magneto-generator call and clear to the automatic call and clear principle, Miss Bradshaw was in the first batch of operators transferred to the new exchange to learn the new system. Her service has been continuous at the Central Exchange since then, and in September, 1907, she was promoted to her present post of Supervisor. Like so many of her colleagues in the service, Miss Bradshaw is successful in carrying out her duties strictly and impartially and maintaining her popularity with the staff generally.

In summer she finds her recreation in cycling, while in winter hockey claims her attention.

## LXXIX.—AMY MONTAGUE SIMS.

Miss Sims entered the Company's service in August, 1895, as half-time operator under Miss Ralph at the old exchange in Queen Victoria Street, London, then familiarly known as "Queen Vic." She was transferred to the Central Exchange at Oxford Court,

where the Head Offices of the Company were then situated, in November of the same year as a full time operator. She was still under Miss Ralph, who had left "Queen Vic." shortly before. The first headgear receiver and breastplate transmitter were used here.

Miss Sims remained at the Central till May, 1899, during which period the trunk lines were taken over by the Post Office. It was during that time that the ticket system for dealing with all calls to the small exchanges in the London area was instituted, calls being passed to the ticket operator at Central in the same way as trunk calls are passed now—viz., "Avenue, 4786; Balham, 22." All calls were dealt with in turn by the operators in charge of the small exchange junctions.

In May, 1889, Miss Sims' parents removed to Hastings, causing her resignation from the Company's service pending a vacancy at the Hastings Exchange, which did not occur until May, 1900. At that time she was appointed senior of two operators, which then comprised the whole operating staff. The present number of operators is six, with Miss Sims as Clerk-in-Charge, to which position she was appointed in August, 1907.

During the time Miss Sims has been at Hastings the number of subscribers has grown from about 200 to nearly 800 at the present time. She has worked in the Sussex district under three district managers—viz., Mr. Madgen, Mr. Taylor and Mr. Moorhouse; and three local managers—viz., Mr. Stirling, Mr. Rhodes and Mr. Armstrong.

Miss Sims is most unassuming of manner. She has no particular hobby, but is a great reader and is fond of the standard authors.



AMY MONTAGUE SIMS.

During the time she has been Senior Operator and Clerk-in-Charge at Hastings Miss Sims has gained the confidence of the staff under her, with whom she is very popular, being always willing to give any assistance required. At the same time she has proved herself a most capable official, having been able to satisfy subscribers all round in reference to their difficulties and complaints.

## DISTRICT OFFICE STORES BOOKKEEPING.

By GEORGE THRUSH, *Stores Clerk, West Kent District.*

At a recent visit of an audit clerk the writer discussed the methods adopted in this district to reduce the figure for stores and tools per station, and also the district office stores work in general, when it was suggested that an article in the JOURNAL would be of interest and perhaps of some value to those of the staff who are engaged in this department.

In October, 1905 (the time at which the writer was promoted to the position of stores clerk), the figure for stores and tools was 18s. 5d. per station. Now it is 7s. 3d., a reduction of over 60 per cent. The greatest factor in this reduction has undoubtedly been a careful and systematic check of all stores requisitions.

Stores requisitions are sent into the district office once a week (special circumstances excepted) with the third or blank sheet (*i.e.*, the one retained at the district office) pinned at the top. Those for articles in everyday use are checked with the ledger cards, and "Quantity in Stock" is agreed. If this is correct, and the amount requisitioned does not exceed the maximum figure allowed, and the description, stock list number and address are in order, the requisition is passed forward.

Those for special articles or Head Office estimate jobs are checked with the estimate.

All requisitions are compared with "Lists of Material for Transfer," and where possible transferred locally, the remainder being then dated, numbered and sent to Head Office in the usual manner.

Where the "Quantity in Stock" does not agree, or some other detail is incorrect, a note of the discrepancy is made by the stores clerk on the blank sheet, which is then sent back to the local office for the error to be cleared up. All queries and answers relating to the requisition are written on the blank sheet, by which means unnecessary correspondence is avoided, stock is more carefully kept and all queries relative thereto are always to be found on the requisition when filed away afterwards, if required.

The benefit of the careful scrutiny of requisitions before passing is felt also at stocktaking, and the fact that this district has reduced its gross stocktaking difference from £490 to £50 and the net difference from £136 to £9 in the four years must be in part attributed to it.

Having dealt with the procedure in connection with stores requisitions, I should like to touch upon one or two other methods adopted here to effect saving.

*Material for Transfer.*—Requisitions for material for other districts are on receipt entered in a book kept for the purpose and sent to the centre from which the goods are to be supplied. There is a standing instruction that goods are to be despatched immediately on receipt of requisition. When the requisition has been dealt with it is returned to the district office with a debit slip, which is endorsed "Transfer Stock." This saves correspondence and enables the stores clerk to deal with the 124 Form at once. Any slips for material on the transfer list which is used locally are similarly endorsed, thus saving a separate advice to the district office.

*Stores Slips.*—A book is kept showing the last numbers of slips received, and entered up on Friday mornings. Missing slips are called for forthwith, and it is therefore impossible for any to be lost without the loss being discovered.

*Inwards and Outwards Books* are written up during the month as far as possible, and thus time is saved for a period at the month end when every effort is needed to cope with the monthly postings. (The figures for 149 and 296 Forms are always ready by the Wednesday following the last Thursday in the month.)

*Bicycle Accessories.*—A stock of these is kept in the district, and immediately any parts, such as tyre, chain, etc., are required they can be supplied at once, and the bicycle can thus be brought into use again some days earlier than it would be if the parts had to be requisitioned each time.

*Wire Return.*—A return of all wire, copper, bronze and scrap, copper jointing sleeves, and also all cables, is sent in from the centres monthly and checked against the ledger figure, any discrepancy being taken up and cleared at the time.

*Small Articles.*—A stock sufficient for three months of small articles, such as diaphragms, rings, cords, mouthpieces, press pieces, etc., is kept at the largest stores, and the whole of the district supplied from there from time to time as required. The number of requisitions is thus reduced and postages are saved. This method is also adopted in other cases where large quantities are supplied proportionately more cheaply than small ones. For instance,  $\frac{1}{2}$  cwt. voltoids cost 15s. and carriage, whereas 1 cwt. costs 26s. carriage paid.

*Stores and Tools for Transfer* (not in first-class condition).—A list of material which is not in good enough condition to be transferred elsewhere is kept, and this material is used up at every opportunity.

*Stores Postings* are checked monthly, which facilitates the arrival at the correct quarterly balance, and also helps to detect entries which may have been posted in wrong columns on ledger cards.

*Average Prices* for instruments and other expensive items are struck every few weeks, preventing any abnormal prices, and fresh average prices for all accounts are struck at the end of April, the result of which shows itself in an absence of credit accounts on the stock sheets.

*Adjusting Slips.*—In view of the difficulties which might arise through the issue of "adjusting slips" of any description, none are passed unless they are certified by the local manager and chief clerk and bear a reference to the slips which are adjusted.

*Outstanding Requisition Book, etc.*—In an article in the JOURNAL last year Mr. S. G. Hare referred to this book, which is, however, now obsolete. In this district the blank sheet counterfoils of the requisitions are kept in numerical order on a Shannon file until the debit note or invoice is received. They are then transferred to another file, to be placed away in batches of 1,000. This does away with the necessity for this book.

In the same article I see that the stores clerk makes out slips for articles purchased locally per No. 5 Return. Here the credit slips are made out at each centre for any tools or stores purchased locally, and forwarded in the usual manner.

It is also stated that material for sales works orders is charged at stock list price. Here material for R. C. and fire insurance works orders is debited at stock list price as well.

If any of my fellow stores clerks or other workers in this important department derive any benefit from the few remarks I am privileged to make in this number I shall be amply rewarded.

## THE PUPIN SYSTEM APPLIED TO AERIAL TELEPHONE LINES.

(From Dr. EBELING'S paper, continued from page 148.)

*Bi-metallic Line Berlin-Stralsund.*—After the good results obtained by the employment of coils on the Berlin-Frankfort line, the Imperial Administration decided to make a new trial by applying the coils to a bi-metallic line, *i.e.*, a line of iron wire covered with copper. The trial was made on the Berlin-Stralsund line (about 240 km. long) composed of this bi-metallic wire, about 4 mm. in diameter. The coils were inserted about every 4 km. and placed in pot-shaped receptacles (Fig. 9), whilst the form of lightning arrestor was as before. The new form of receptacle was adopted because the Berlin-Frankfort line was not faultless from the mechanical point of view, the ebonite sleeves often breaking during attachment to the ironwork. Fig. 10 shows the new form of apparatus mounted on the iron arms. A notable improvement in the volume was observed after the insertion of the coils.

*Bi-metallic Line Berlin-Hamburg.*—This line, which is about 920 km. long and composed of bi-metallic wire of 5 mm. diameter, was likewise equipped with coils of the same form as those employed on the Berlin-Stralsund line. Without coils this line might be considered as equivalent to a bronze line of 3 mm. With the exception of a few short sections it is run along the railway on the same posts as the telegraphs of the Post Office and State railways. Certain relatively loud noises arising from the parallel

telegraph lines were observed, and trials were made to see if these could not be diminished by systematic crossing of the wires every  $\frac{1}{2}$  km., with very good results. When the wires were crossed throughout their length the noises did not completely disappear; it was found that the solderings of the bi-metallic lines to the coil apparatus was not perfect at all points. When these defects were removed the noises diminished noticeably although not entirely.

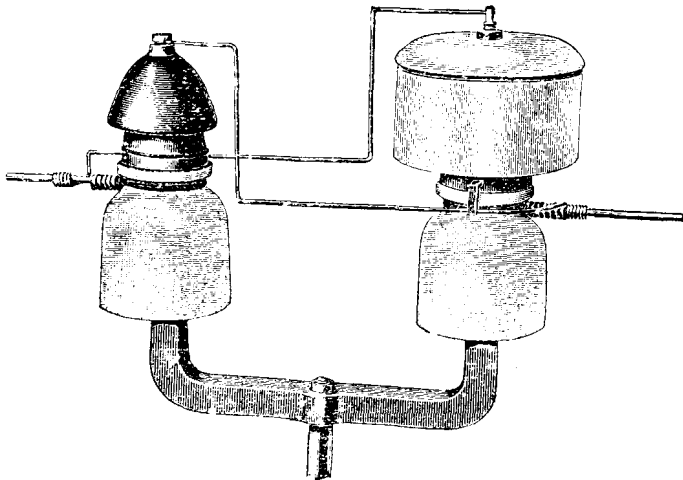


FIG. 9.

It was therefore necessary to ascertain which were the telegraph lines which did and did not occasion the disturbances, with the result that it was found that the Morse lines produced no appreciable disturbance, the Hughes lines a perceptible disturbance, whilst the most considerable troubles were produced by the Wheatstone lines. The Siemens telegraph also occasioned disturbance owing to its higher frequency. These disturbing noises

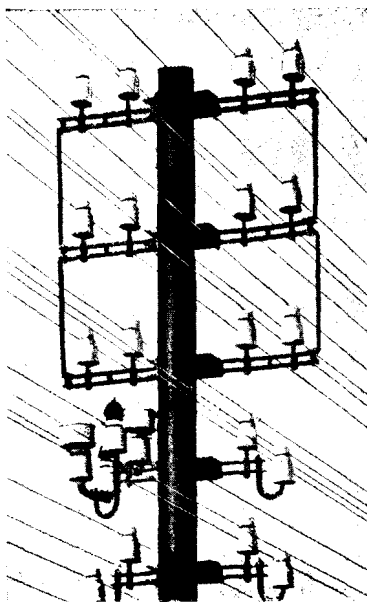


FIG. 10.

were minimised by inserting an appropriate self-induction in the telegraph line producing the disturbance.

When inserting such inductance apparatus on telegraph lines it was possible when the insulation of the telephone line was normal to lessen the disturbances produced even by the Wheatstone lines to such a point that it could not longer be determined, except when it was known that the Wheatstone line was actually working. As to the disturbance from the Hughes lines these were not perceptible after the insertion of the inductance coils, but when the coils were put out of circuit the noises were immediately perceptible anew. It was equally impossible to ascertain the

inductive effect of the Siemens rapid telegraph after the application of the inductance coils. The above-mentioned device does not give a perfect result when the telephone line is out of order owing to insulation and contact faults; then, however, similar noises would arise on ordinary telephone lines parallel to telegraph lines worked on the Hughes and Wheatstone principle.

It is not astonishing that a pupinised line should be more sensitive to induction than a non-pupinised line of the same diameter because the capacity of the line is increased by the employment of coils; but according to the observations made by the Austrian Ministry of Commerce on the sensitiveness of aerial lines with single coils on the Pupin system this is not the undoubted principal reason of the increase of sensitiveness, the reason being probably that telephone lines themselves are very sensitive to disturbances of symmetry. The single coils were well made in as uniform a manner as possible, but the modifications to which they were exposed by atmospheric discharges were liable to differ on the A and B circuits, thus disturbing the symmetry. It is very probable that such different disturbances are produced in the coils. . . . The Austrian Government, in using double coils, have apparently suppressed, or at least greatly weakened, the particular sensitiveness of

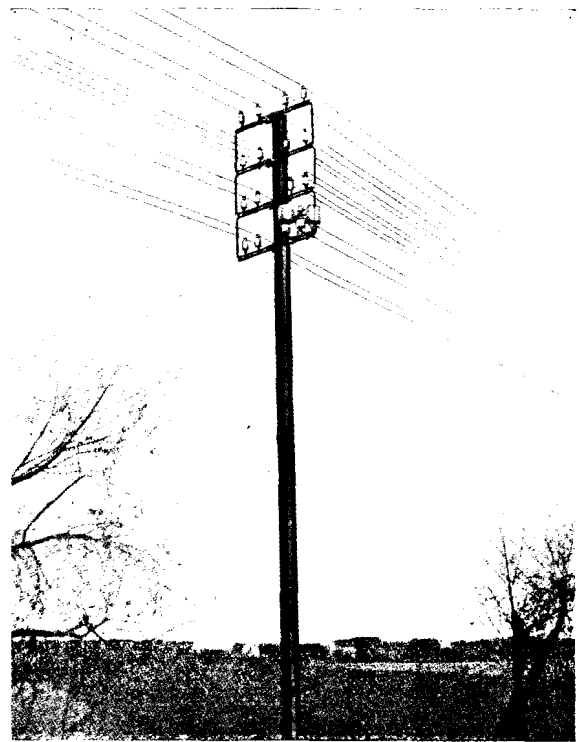


FIG. 11.

the line to telegraphic noises, but we cannot be sure if the bi-metallic line would not all the same give rise to difficulties, owing to the peculiarities of the metal, the more so as the number of disturbing Hughes and Wheatstone telegraph lines run on the same poles was very great, and as it was desired to avoid complicating the telegraph service by reactionary coils, it was decided to take out the coils without making further trials.

The volume was naturally greatly increased on the Hamburg-Königsberg line by the use of coils.

*Berlin-Frankfort-on-Main Line (Second Equipment).* — As the apparatus originally installed on this route was not sufficiently capable of withstanding wear, as we have already said (although the quality of the transmission had not yet suffered) the Siemens and Halske Company decided to replace the experimental coil apparatus with the more mechanically perfect pot-shaped apparatus.

As the line lent itself admirably to theoretic trial, owing to the existing comparable lines, it was decided at the same time to profit by the occasion to discover in a more exact manner to what point the theoretic values agreed with the practical values in the aerial Pupin lines. It was required to use appropriate coils to give the

bronze Pupin line of 2.5 mm. the capacity of an ordinary bronze line of 4 mm. From the first equipment it was merely possible to observe, judging by the volume, that the Pupin line ranked between the ordinary bronze lines of 4 mm. and 5 mm. respectively. As the capacity corresponds nearly to the section of the wire, this means that the trial line with a capacity of  $2.5^2 = 6.25$  can be raised by the employment of coils to a capacity of from  $4^2 = 16$  to  $5^2 = 25$ , but these limits are so wide that it was desirable to bring them nearer together.

The speaking trials which were made after the change of apparatus shows that the results were improved, as was expected. At the same time it was always observed that the line showed several disturbances, the causes of which were determined by careful research. It was found that the apparatus did not resist great changes of temperature. During different periods of great cold in the course of the winters of 1906 and 1907 a large proportion of the porcelain caps cracked, letting the damp penetrate and producing bad contacts.

**Protective Apparatus with Metallic Cap.**

*Berlin-Frankfort Line (Third Equipment).*—This line was equipped with apparatus fitted in such a way that its insulation would not suffer by the insertion of the coil apparatus and was carefully constructed in accordance with the results of experience acquired. Fig. 11 shows the type of apparatus employed, and Fig. 12 shows

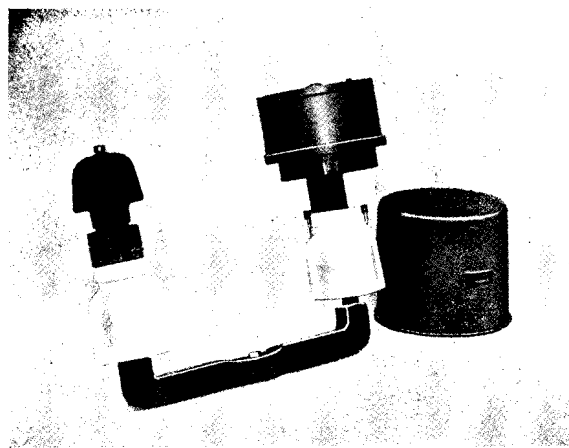


FIG. 12.

the details. The coil is enclosed in a metal cap completely soldered, from which the wires come out by means of porcelain insulators. It only remains to render the insulators watertight. This is very important, because it alone can give rise to disturbances. The protective metal cap prevents the rain from diminishing the insulation. Further, it may be said, there is nothing more to fear from deterioration due to mechanical causes. The coil apparatus is screwed on the insulator so that it can be conveniently changed at need. Here also the lightning arrester is independent of coil apparatus.

The coils are the same as those of the second equipment; some have been merely adjusted so that the change of apparatus may be made little by little without delay.

The values of the coils were tested during the change; it was found that they had remained constant or changed very little. The average value of the inductance of the coils was 0.105 henry and the greatest variations were, in general, 0.010 henry or 10 per cent., but all the coils returned to their original values when they were demagnetised. The mean resistance of the coils was about 5 ohms. We may deduce  $\beta = 0.00176$ , i.e., that the line is almost exactly equivalent to a line of 5 mm. diameter without coils. As the length of the line is about 580 km., we get  $\beta = 1.02$ , whilst for a line of 540 km. length and diameter of 5 mm. the values of  $\beta l$  is 0.95.

When the line was re-pupinised the same result was obtained (as was to be expected) as from the second equipment, that is, the Pupin line of 2.5 mm. was completely equivalent to the line of 5 mm. without coils. It was thus recognised that the two lines gave exactly the same results, not only as regards volume, but also as regards clearness of speech. The practical telephone engineer

estimates that the ordinary aerial line gives the best communication as regards articulation. It may be asked whether as regards clearness of speech, i.e., of the timbre of the voice, the aerial pupinised lines are behind the ordinary lines without coils. According to the preceding, this is not the case.

We have compared the lines according to a method for which we are indebted to Professor Breisig (relative to which information will probably shortly be published). The values of  $\beta l$  for a cable existing in his laboratory have been determined with great precision. We give, however, the results obtained in ordinary practice. The following table gives the values obtained for  $\beta l$  at two different dates for the 4 mm., 5 mm. and Pupin lines; the mean value observed is given in a special column, besides which is a column indicating the calculated values:—

Line.	$\beta l$		Mean.	$\beta l$ Calculated.
	Observations.			
5 mm. ... ..	1.4	1.2	1.3	1.0
4 mm. ... ..	1.9	1.9	1.9	1.5
Pupin line 2.5 mm. ...	1.4	1.2	1.3	1.0

It is seen that the relative calculated values accord very well with the observed values; but they are not absolute values, since the divergencies are considerable.

New speaking trials were then made after having joined up on each of the three lines a line of 200 km. bronze of 2 mm. diameter. The following tables indicate the observed and calculated values; for the last it is assumed that the value of attenuation of the additional 200 km. is  $\beta l = 1.8$ .

Line.		$\beta l$	$\beta l$
		Observed.	Calculated.
5 mm. + 200 km. 2 mm. ...	..	2.9	2.8
4 mm. + 200 km. 2 mm. ...	...	3.3	3.3
2.5 mm. Pupin + 200 km. 2 mm.		3.4	2.8

Making deduction of a variation of  $\beta l = 0.1$ , which was easily produced in the comparative speaking trials, observation and calculation were in exact accord on the non-pupinised lines. As regards the combination of the Pupin line and the 200 km. line of 2 mm. wire, observation accords with the trials of conversation, the result of which is that the capacity of that combination is equivalent to that of the line of 4 mm. combine with the 200 km. line of 2 mm. wire. The concordance noticed between observation and calculation in the case of the non-pupinised lines in this table may possibly be attributed only to chance. New experiments will show whether this is so. In any case the result of these tables is that the calculated values do not vary much from those obtained in practice.

The Berlin-Frankfort line has now been in regular service for almost a year with this new apparatus, without the least mischance happening to this apparatus or to the arrestors, although the line has been subject to the stormy period of last summer and the periods of cold of the previous winter.

The results described above, which were obtained from comparative speaking trials on the lines from Berlin to Frankfort, appear to be confirmed by the measurements recently made by the oscillograph.

(To be concluded.)

**THE REGISTER CLERK.**

By W. J. HOWE, London.

ALTHOUGH in various issues of the JOURNAL accounts have from time to time been published, describing the organisation of the Metropolitan Office, yet these accounts have been in general only and have not dealt with the actual work of a particular department. An attempt is therefore made to show in some detail the various duties allotted to those who fill the position of register clerks in the London offices. As already shown in these pages, the subscribers are divided alphabetically into seven sections, viz., A—B, C—E, F—H, I—L, M—P, Q—S, and T—Z. A little consideration will show that under this division some sections are naturally heavier than others. This year a further subsection has been made in the extraction of all accounts with boroughs, guardians and such corporations (which previously formed part of the A—B). These



are now dealt with separately by two clerks, who also take under their charge the rentals of such well-known firms as Whiteley's and Lyons and certain of the railway companies and docks, whose accounts are heavy and intricate and thus form the "Special" accounts. To gather some idea of the work, it would be best perhaps to consider a typical day's routine of a register clerk. On arrival he is confronted by eight piles of registers which are stacked on the office counter by the counter attendant, who is responsible for these books in their transit by trolley to and from the strong room in the basement. Having with great zest hurtled his books into their proper racks, attention is at once turned to some old friends, who generally figure largely in the writing of a TELEPHONE JOURNAL paper—namely, the works orders. The No. 3 clerk keeps a manifold book for each section in which is recorded all the numbers of the works orders which he passes on to the register clerks for attention. These works orders are dealt with each day and at its close they are handed over to a clerk who checks all entries and then the works orders are sent on to the Statistical Office to deal with. Of course, in time of stress it is not always possible for the day's works orders to be returned the same day, as the number constantly varies and its fluctuations are often considerable, it being possible to call to mind a day when only three were on the list and another when 64 were dropped on the unlucky register clerk. The term "unlucky" is used because by some peculiar concatenation of circumstances a heavy day or series of days usually occurs when a great deal of time is occupied by other matters contingent on the work.

Dealing with works orders, it is the object of the register clerk to debit all new lines first, so that the accounts may be collected without undue delay. If any special murmurs could be made on the question of completed works orders, it would doubtless be the illegibility of the writing on many of them. Of course, allowance has to be made for different circumstances, but if a fitter or other official concerned with the closing of a works order could see the troubled face of some unfortunate fellow trying to decipher lengths of wiring on the back of some slip, which has the appearance of a jig-saw puzzle promiscuously arranged, he would no doubt see that lucidity of detail facilitates bookkeeping to a greater degree than perhaps he had previously imagined. Moreover, a loss of time very often ensues, when, owing to doubts on the part of a register clerk the works order has to be returned for figures to be verified. These queries cannot very well be dealt with over the telephone, as it is necessary that the questioned one should have the works order before him. A pleasant failing that occasionally varies an otherwise dull works order, is when a note is made on the issue of the works order number H.S. 147 is allotted, the completed slips bear number H.S. 741. Merely inversion of numbers, you remark; but you cannot chance that solution being correct, nor indeed any sort of thing in the Company's work, so that time is again lost in discovering what has really been done. It would really be waste of the reader's time to recount the multiplicity of incidents of this kind, yet there is no doubt some humour in them all, as otherwise why are they met with so often in our JOURNAL. Of course, there is a time when one thinks that Artemus Ward is among us, as one reads how "a whol was bored in the wall."

Works orders dealing with recoveries and removals then follow, together with those known as "change of name." Owing to the alphabetical divisions of the registers, these latter constitute practically a recovery in one book and a new line in another. An alteration from "brown" to "black" is naturally appreciated for obvious reasons. Transfer works orders or changes of rate are preferably dealt with from the due date when merely an increase or decrease of rental is involved. Should the alteration occur later in the year and the subscriber is already on the message rate system, the full year's rental at the unlimited rate is debited to him, and allowance is made for the unused subscription under his old contract, that period being written off as an adjustment. Reference is made at the time to the local fee journals, the position of the subscriber's account is ascertained, and, if required, any debit is included in the statement, or he is credited with any unused deposit, as the case may be. In order to expedite the collection of these, which, when retrospective, are already much overdue before the works order reaches the register clerk, it has been arranged that immediately after the issue of the works order, when the contract

is taken by the Stamping Department to the message rate journal clerk to note, the position of the account is then learnt, details put on a slip, which is attached to the contract so that the register clerk (who is at once advised) can forward the necessary account without delay. Broken periods or entries for additional apparatus are debited for a full year direct to the main entry. On the top slip of the works order is noted the main register folio, and also the date to which the rental is to be charged, that is, the day prior to due date. Then when the batch of proportionate periods is completed in the main registers, their entry is merely a simple matter, as all necessary data are shown. A separate register is kept entirely for such *pro rata* charges.

Early in the morning the query book is received from the Cashiers' Department. Here are entered all those payments which do not agree with the accounts returned with them, and also those of subscribers who treasure the Company's statements too much to part with them. To clear the book without delay is the chief thing, for it may be that some subscriber who now pays is disconnected, and it is as well to join him up forthwith, as, although he may be slow in paying his account, he seems to be fairly active if the service is not at once restored.

In the event of any letter needing a reply coming in with the cash, it is handed to the officer in charge of the Correspondence Department concerned. His initials are obtained to the entry in the query book and a note therein made that the receipt is to be sent to that department. In cases, too, where short payment has been made by the subscriber, the Correspondence Department is again approached in the same manner. By this means the desired attention can be given to any request or complaint far earlier than if the letter had to wait until the receipt had been made out by the Cashiers' Department. Moreover, it is possible that in the future questions may arise as to whether the deduction made by the subscriber had been dealt with at the time, but reference to the query book will at once settle any doubt.

The query book is then passed on to the Trunk and Local Fees Department, leaving the register clerk to make further progress with works orders until the receipt of the cash book. Posting is at once done, and during the early part of the month this is no light matter, as a very heavy response is usually received to the renewal accounts sent out on the last day of the preceding month. Later on in the month the amount of cash becomes somewhat less, but then the notices are due, and all erring subscribers have their attention called to their omission once each week for a fortnight, and then, after a letter of explanation pointing out the position of affairs, the Company carry out an alteration to the subscriber's circuit which usually has the desired effect. It is hardly necessary to mention the care taken in posting, for an omission to post, which may lead to the subscriber receiving the treatment mentioned earlier, may cause a flutter in the registerial dovecot. When all rentals are posted, the cash book is handed to the outstanding clerks to deal with. It may be mentioned that all rentals paid which are more than a month overdue are referred to the outstanding clerks the first thing in the morning so that in the event of disconnection of the service, advice can at once be given to the exchange to reconnect.

In the afternoon, correspondence is usually tackled, as, until the day's cash is posted, enquiries as to payment of accounts cannot be answered. No papers are kept by the register clerks. In the event of accounts being required in connection with correspondence, these statements are always made out in triplicate; a piece of thin paper being used for the first copy. This enables a record to be kept with the papers themselves and one to be kept in the account book for reference. Correspondence which has held up an account temporarily is sent over to deal O.P., *i.e.*, ordinary procedure, and, if required, a notice is at once sent. By the bye, a new lad, in sorting out papers, seeing some conspicuously marked "O.P." was at a loss to find that department.

At four o'clock, the counter cash books are due. These contain cash which has come in over the counter and by post during the day. It may be mentioned that the cashiers are subdivided in a similar manner to the rental register clerks, there being a set of cash books to each section. These dealt with, notices are then marked off in the registers for overdues. Owing to the number of subscribers who do not see eye to eye with the Company as to

payment of accounts on the due date, those concerned in the preparation of these notices have their time fully occupied. The checking of these notices day by day is facilitated by the splitting up of the books into days, all accounts due on the first being on folio 1, *et seq.*, and so forth. Renewal accounts are prepared so as to be ready for checking at least two days before the end of the month.

In London there are six separate contract agents in various districts, and each agent sends in on the 28th of each month a list of subscribers due during the following month, with which he is dealing and for which he wishes the accounts kept back; also any rentals due in previous months which are still in hand. Note is duly made and when checking, these accounts are held back. However, should these names not appear on the list a month later, it is understood that all contract matters have been settled and the rental is then dealt with as usual. In the event of settlement by the contract agent during the month, the Chief Accountant is at once advised to render the account.

Some months ago details were given in the *JOURNAL* of the "particulars," or, to give the more familiar name, "pars" form. Before the contract agent can deal with any letter concerning notice to cease, etc., it is requisite that he should have all information regarding the agreement and rental. Request is made by telephone to the register clerk concerned who calls through the details after filling up the "pars" form, which is then sent on to the agent with the day's mail, as confirmation of the telephone message.

The accounts for the month despatched, the register clerk is at once involved in the job of the month—namely, the cash balance. Every item is checked from the cash books into the outstanding book and registers, and then the cast is made and the cash agreed. These last two very short words are sometimes productive of many very different ones before the desired result is attained. The agreement of the arrears for the year is a matter known to all concerned with register work, but at the present time transference of outstandings cannot be made in all the London registers as they are in the throes of being re-written, the registers commenced in 1905 now being full.

In so short an effort as this, it is not possible to give more than an outline of the routine carried on, or more than a cursory glance at the various tasks which come round at their allotted periods. For instance, many a register clerk has recollections of heated discussions, often very one-sided, in connection with the rentals in advance book. But, perhaps, some idea may be gathered as to the way in which the register clerk occupies himself, and any deficiencies in the description will perhaps be kindly overlooked by the indulgent reader.

## THE RELATION OF THE ENGINEER TO THE TELEPHONE INDUSTRY.

By FRANK F. FOWLE.

(Continued from page 141.)

### PART II.—THE ENGINEER'S FUNCTIONS.

The starting point in a telephone system is the development study. It comprises a careful study of the territory to be served, conducted for the purpose of ascertaining the amount of business which may be immediately developed, and what amount may be developed in the future. It determines the proper size and character of plant for the initial installation, and makes possible such a design of the plant as will permit of future extensions in the most economical manner. Results of such a study will decide the location of present and future exchanges; they will determine what portions of the distribution system should be in cable and in open wire; will show what amount of spare facilities ought to be provided for in the initial installation; will fix the proper amount of copper and iron to be used in toll, trunk and subscribers' lines; show what type of system should be employed in each exchange; and will be of vital importance in fixing the initial rate schedules for local and toll service. Above all, they will insure, so far as can ever be predicted in advance, that the plant will be adequate to give good service at the start and in the future, and at the same time no

more than adequate, while the cost will be at the lowest point consistent with the desired result.

Such a study should precede the construction of every plant, and it should be scientifically and carefully made. There are probably few more costly mistakes made than those which arise from a superficial study or no study at all. In a rapidly growing system, the development study should be extended and corrected, or brought up to date, every few years. There is no other way to make the plant extensions properly and economically. The penalty of making mistakes is almost unavoidably extra expense. When they come it is too late to mourn and say how wise it would have been to spend something to avoid them. Mistakes are but human, it is true, yet every mistake carries a lesson which, profitably applied, lessens the chance of a repetition. This leads to the general observation that the engineer's province is to guard against mistakes which otherwise would occur to the detriment of the business and the loss of profits.

The working out of a development study involves a careful study of the probable traffic to be cared for and the most economical methods of handling it. This portion of the work determines the size of central office installations, the number of trunk circuits and the number of toll lines. The methods of handling local or exchange traffic are largely standard, but in deciding upon toll traffic methods there are opportunities for the display of a good deal of careful judgment. Circuit loads, in toll service, are the measure of economy of operation, and have a vital bearing upon rates and earnings. The choice of methods which will secure the highest loads is an important feature.

Another feature of development studies is the question of transmission and the design of circuits with reference to the weight of copper and iron, especially the former. In cable design this is the all-important feature. The cost of cable circuits is largely dependent upon the weight of copper; the conditions are different for local service, trunk circuits and toll lines. The efficiency of toll lines is often seriously affected by the selection of improper cables for the terminal sections. For any toll circuit of given length and efficiency, comprised partly of cable and partly of open wire, there is always a particular choice of conductor sizes which will give the desired transmission at a lower cost than any other combination of sizes. This principle is of governing importance in designing terminal cables for toll lines. The design of common battery cable distribution systems is affected by the further consideration of supplying the necessary transmitter current to each telephone station from the central office battery: the choice of cable conductors here affects transmission both in the ordinary way and in the respect that it limits the volume of the transmitter currents.

The selection of equipment and apparatus is another feature of the greatest importance, which requires judgment and experience. The principal considerations are suitability of type, electrical or transmission efficiency, grade of materials and workmanship in manufacture, first cost, and annual charges for maintenance, depreciation, taxes, insurance and interest. The quality of equipment has probably as much bearing upon the character of the service as the design of the distribution system, the trunk circuits and the toll lines.

The problem of selecting the economic locations of central offices, as nearly as possible under the local conditions in each case, has been treated in articles and papers by several engineers, so that it need not be dwelt upon extensively. Broadly speaking the problem is to find the location which makes the cost of the distribution system a minimum. In the case of many small plants there is not a great deal of choice in this respect, but the question should never be passed over without any study whatever.

The preparation of plans, specification and estimates for construction is a phase of the engineer's work which is quite well understood. The difference between building a plant without them and building it properly is all the difference between guesswork and scientific method. In this connection it should be mentioned that one of the valuable features of engineering is supervision of the construction, from inception to completion. Here the engineer becomes the representative of the owner, to see that specifications and contracts are duly lived up to, that the materials are those called for, and that the workmanship is of the desired character. The engineer, having prepared the plans and specifications, is the person best qualified to perform this service, and it is worth all it

costs. Unless the owner does his own construction, which is not frequently the case, the work is let under contract, and the owner cannot then be assured that the work is properly done without some one to represent him in supervising and approving it, unless he gives it his own time and is qualified to pass on it.

It was stated before that the operating field offers one of the large opportunities for the engineer to prove the value of his services. This is true just to the extent that the engineer is experienced and has the confidence of the owners of the property. In some cases he is called upon to advise in regard to nearly all matters of operation, but in others, unfortunately, he is not. Every expert who has been called upon to examine telephone properties knows how true this is, and can point without doubt to at least several if not many instances where operating questions have been mishandled because proper advice was lacking.

A reference again to Fig. 1 will show, under the head of operation, the scope of operating matters upon which a fully qualified engineer is competent to advise. It must be patent to those who are closely familiar with telephone operating matters that questions arise almost daily which are at least partly technical in character, and many are wholly so. The traffic principles which enter into the design of a plant are no different from those which apply to its operation. Design is based in large part upon a preconception of the mode of operation, and hence the engineer who designs scientifically has, of necessity, given much consideration to operating questions.

The maintenance of a telephone system, when efficiently conducted, involves engineering questions on every hand. The effect of poor maintenance upon the quality of the service is probably second only to expedition in handling traffic; and indeed it may be so poor as to demoralise the service entirely. No plant, unless it be a very small one, can be efficiently maintained without proper records and maps, and without comparative trouble reports showing the causes, lengths and frequency of service interruptions. There are problems of organisation, methods, periodical tests and inspections, unit costs and relation of maintenance standards to service. The whole maintenance question resolves itself into two parts—one, the correction of those troubles which interrupt the service, and the other, the periodic inspection of the plant to anticipate those troubles which are developing and thus forestall their occurrence. Service interruptions lose revenue, or at least congest the service.

It is axiomatic in all forms of public service, that the higher its quality the more it costs. The patrons of every company expect good service, and as a matter of business policy good service pays better than poor service in the long run. One of the factors in such a policy is a high class of maintenance, which in turn depends upon scientific methods, or otherwise stated, upon the application of engineering principles.

The traffic department offers again a fertile field for the engineer to prove his value. The problems in traffic handling become of a complex order in large plants, and in some instances require an expert and a staff of assistants, constantly engaged with this question alone. The study of traffic forms the basis of determining the needed plant extensions from time to time, and is one of the principal features in a determination of rate schedules. In order to maintain a uniformly high grade of service, the traffic growth must be known, and future plant requirements must be sufficiently anticipated to give ample time for installing the needed extensions. The growth of traffic will permit occasional changes in operating methods, so as to secure higher loads and economise in plant.

The value of studying local traffic is two fold: it serves as a basis for adjusting the hours of assignment of the operating force to conform with the hourly loads and thus reduces the labour cost per call to a minimum; and it serves also to indicate beforehand the need of additional switchboard capacity and inter-office trunks. The study of toll traffic serves as a guide in the selection of operating methods, and provides the means of anticipating the need for additional circuit and switchboard facilities.

There is, of course, no absolute way to predetermine traffic, but a study of daily and hourly loads in any system reveals a remarkable regularity in traffic demands from day to day and week to week. This suggested to the minds of some engineers the possible use of the mathematical theory of probability, and

considerable success has followed their efforts to evolve formulae or laws in regard to the relation which exists between circuit loads and delays to service. Much of this investigation has been confined to local trunking systems between central offices; but it applies as well to toll circuits. It may seem remarkable to many that theory and practice have such a relation as has been worked out in this instance, but it illustrates in one more way the value of applying scientific methods to the industry.

The rate problem is ever with us in some form and it would have been a most happy event, in many instances, if the engineer had been called in to solve this question. It is fortunately coming to be recognised throughout the country that public utility rates should be based on a scientific analysis of cost, in every case. And it is further recognised that the rates which are remunerative in one locality are not necessarily so in other localities; or differently stated, the rates in any locality must depend upon local conditions.

Close to the rate question is the problem of depreciation and how to meet it. This is primarily an engineering question, rather than one for the accountant. The latter is concerned with the proper method of charging it on the books, but not with the problem of how much shall be charged. Many companies have operated for ten years, more or less, without making any provision out of their earnings to meet depreciation and the inevitable day of rebuilding the plant, in whole or piecemeal. If their rates were to be fixed to-day by a legislature or a city council, under the terms laid down in the decision of the Supreme Court in the Knoxville case, the folly of their course would immediately be apparent. That decision recognises no adequate excuse for failing to provide against depreciation and lays down the rule that a reasonable profit may be earned only on the present value—not on the actual cost or the reproduction value. The effect of this on a company earning 8 per cent. dividends, with a plant depreciated 25 per cent., would be to reduce the dividend rate to 6 per cent.; if the legislature or council fixed a reasonable remuneration as 6 per cent., the dividend rate could be only  $4\frac{1}{2}$  per cent. The useful life of a telephone property is properly a matter for the engineer to decide, and it is for him to decide, and it is for him to state the physical condition of the property at the end of each year, after which the yearly charge for depreciation may be fixed.

There are numerous other fields in plant operation which need the engineer's skill and advice: among these may be mentioned the prevention of damage to underground cables by electrolysis, the protection of overhead lines at high-tension crossings, the prevention of inductive interferences from foreign circuits of all kinds, and the investigation of new inventions and improvements in the art. All the operating features could not be taken up without making a treatise on the whole subject of telephone engineering, in great detail. There is not space to mention even all of the general topics under the head of Operation in Fig. 1, and something must be left to the imagination of the reader.

The manufacturing side is one in which the engineer finds an almost unlimited field for the display of his ability and inventive genius. A reference again to Fig. 1 will indicate the general scope of the engineer's activities in this line. A thorough knowledge of the needs of operating companies must be the starting point of successful design, and the best course of preparation for the designer is an operating experience. The manufacturing companies have been slow to recognise the importance of the transmission problem in equipment design. It is a fundamental principle in transmission that equipment must be proportioned in its electrical design with careful regard for the type of circuit and class of service for which it is intended. Maximum efficiency can be obtained in no other way. The full realisation of this result requires both careful theoretical study and careful work in the laboratory. A well-equipped laboratory for transmission testing and the study of transmission losses is really indispensable to every progressive manufacturer of equipment.

It would be unfair not to add here, however, that manufacturers have brought their equipment to the highest state of perfection in many respects, and have shown great progressiveness in breaking away from many of the poorer practices of the early days of the art. Competition has brought this about and will always be the predominant force in the progress of the art.

(To be concluded.)

# The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

Published Monthly at

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

## NOTICES.

All communications to be addressed—The Editing Committee, "NATIONAL TELEPHONE JOURNAL," 41, Telephone House, Victoria Embankment, London, E.C.

The Editor will not undertake to be responsible for any rejected MS. All photographs will be returned if the sender desires.

Subscription: To the general public, 4s. per annum, including postage to Great Britain or abroad.

To the Staff, 2s. 6d. per annum, with free delivery to the Offices of the Company. Single copies may be obtained, 3d. each, or 4½d. post free.

For rates for the insertion of Advertisements apply to H. SELL, 167-168, Fleet Street, E.C.

VOL. V.]

NOVEMBER, 1910.

[No. 56.]

## POLITICS AND TELEPHONE DEVELOPMENT.

FROM politics—party politics, that is, in the commonly accepted sense of the term—the JOURNAL has naturally always stood aloof. They are as foreign to its scope as to that of the Transactions of the Philosophical Society or the Buddhist Review. Alike to Free Traders and Tariff Reformers, to the votaries of Open and Closed Doors, to Food Taxers and Land Taxers, Devolutionists and Revolutionists, the telephone extends its beneficent service, even as the rain falls upon the just and unjust. But there is an aspect of politics which concerns telephone men very nearly—namely, their relation to the development of the service. Do party considerations make for the efficient development of the telephone in countries where it is controlled by the State? We think it is manifest that they do not.

If there is projected any reform, any inauguration of important policy with far-reaching results for the future of the service, it is before all things important that the consideration it receives shall be judicial and impartial, the ripe determination of experts and men of affairs. Now the last quality which is usually expected of or obtained from party politics is impartiality. The politician instinctively "takes sides," and his supporters follow; they hardly desire to know the merits and demerits of their case. The fact that the contrary view is upheld by the other side condemns it *ipso facto*, and arguments from that side are held to come from a poisoned source, and must be discounted.

The fact, too, that the policy of a telephone administration, which ought before all things to be stable and continuous, is at the mercy of shifting public opinion and all the hideous vote-catching expedients of general elections cannot be to the benefit of the service. It can easily be conceived how one party which believed in the great economic value of an efficient, widely extended

telephone service and laid down plans for a generous expenditure, making a far-sighted provision for future needs, could be turned out of office by another party which, making economy their cry, would starve and cripple the service in such a manner as to place their country in the rear of neighbouring nations in the march of progress for many years. Even a purely financial question such as the fixing of the basis of rates can be made a question of party, and that the telephone Progressive cannot rely on an enlightened attitude in any particular party has been curiously evidenced of late in Australia and Germany.

In the former country a much-needed rate reform, establishing the telephone on a sound financial basis and providing for fair payment in accordance with the amount of service received, has been tossing in the welter of party politics for some years, and is now being brought into force by a Labour Cabinet, presumably because it takes the view that the wealthy man does not pay his proper proportion of the cost of the telephone. In Germany, on the other hand, we have the strange spectacle of the Socialist party opposing the abolition of the flat rate (a rate by which the rich, large user gets unlimited use of the telephone at a low price unquestionably at the expense of the poor, small user) because the proposed new rates give some fancied preference to the Agrarian party, that is, to the country at the expense of the large towns. These new rates were drawn up by the German Post Office nearly three years ago and are not yet in force. They are the result of the mature deliberations of expert officials and are considered by them desirable both from the financial point of view and that of ensuring the best development of the telephone. If their adoption can be thus delayed in a country like Germany, where the Government is not dependent on the fluctuations of the electorate, it can be imagined what would be the fate of the cherished schemes of an administration in more democratic countries when once the dust of party conflict was stirred up.

## ATTENDANCES AT TELEPHONE SOCIETY MEETINGS.

IN the list of telephone societies, which we published in our September issue, we gave also some statistics of average attendances. These were seen to vary from 16 per cent. in the largest centre to 90 per cent. in one of the smaller ones. This apparent inverse proportion of the percentage of attendances to the size of the centre is, of course, not maintained throughout the series, but it holds good in a great number of cases, and provides a rough explanation of cause and effect, which, while it does not detract from the meritorious enthusiasm of the members of small telephone societies nor account satisfactorily for the disappointing attendances at the meetings of some of the larger ones, merits some consideration. Members of societies numbering about twenty and situated in small towns feel their presence necessary to the success of the meetings and their absence noticeable, while the place of meeting is naturally easily accessible. Societies of 100 members and upwards living around large towns in widely scattered homes, far distant perhaps from the society's headquarters, know that if they are indisposed, or find it inconvenient to attend, they will not individually be missed. To London, with its membership of over 1,000, this applies with increased force.

There is no disguising the fact that the attendance at the first meeting of the new session of the London Telephone Society was extremely disappointing, even when allowance is made for the manifold causes which militate against large attendances at Salisbury House. We are well aware that some members have some two hours to spare between the time of leaving the office and the opening hour of the meeting, whilst others have to journey in from Kensington, Dalston and other outlying centres; that instead of dining with their families they have the expense and discomfort of obtaining a meal elsewhere; that in the most favourable circumstances they do not get to their suburban homes until half-past nine, and, in the most unfavourable, at anything after eleven o'clock; and that, in addition, the wintry weather is often most conducive to staying indoors. In the more unfavourable cases, therefore, it doubtless requires the inducement of an exceptionally or personally interesting paper to ensure a member's presence. But it is precisely on this point that we invite the careful consideration of our readers. What constitutes an interesting paper, and how is one to be assured that a paper which one does not hear is uninteresting? One may be attracted by the subject of switchboards, another by traffic, a third by construction work, and so on; or with wider tastes one may be interested in anything technical, and eschew anything of a general or speculative nature. But we think that the member who attends only those meetings whose subjects "interest" him falls into the error of so many of the reading public. We are convinced that many readers imagine that only one class of book—fiction, for instance—will interest them; or, more limited still, a certain few authors of that certain class. They do not realise, and give themselves no chance of realising by judicious experiment, what vast fields of entertainment and instruction are embraced in the books outside their narrow circle of reading. Once let them make an incursion into these domains and they will pay them frequent and delighted visits. So also, we believe, that many papers which appear to present no feature of special interest to certain minds, would be found on acquaintance to contain food for thought and matter of advantage. Mr. HARE, in his interesting and carefully developed paper (which we re-print in this issue), gives a good illustration of this point in the benefit he obtained from a paper on so unpromising a subject as "Screwdrivers."

There is another point. We are sure that no writer of a paper desires members to attend out of courtesy or compliment, and that a handful of enthusiasts form a better audience than a crowd of the uninterested, but while a writer must take the same pains with the preparation of a paper whether it is read to 50 or 500 the effect of repeated small attendances upon the production of good, laboriously prepared papers must be unfavourable. Appreciation is a good stimulus; and without it the quality of telephone papers may not unnaturally be expected to suffer.

#### HIC ET UBIQUE.

WE had the pleasure of a short visit recently from Mr. G. W. Foster, assistant to the general manager of the South Western Telephone Company (Texas) and editor of the *South Western Telephone News*. In the last number of that journal he gives his impressions of his visit to Europe, saying amongst other things:

There is probably no better organised telephone system in the world than that of the National of England, an organisation resting upon merit and

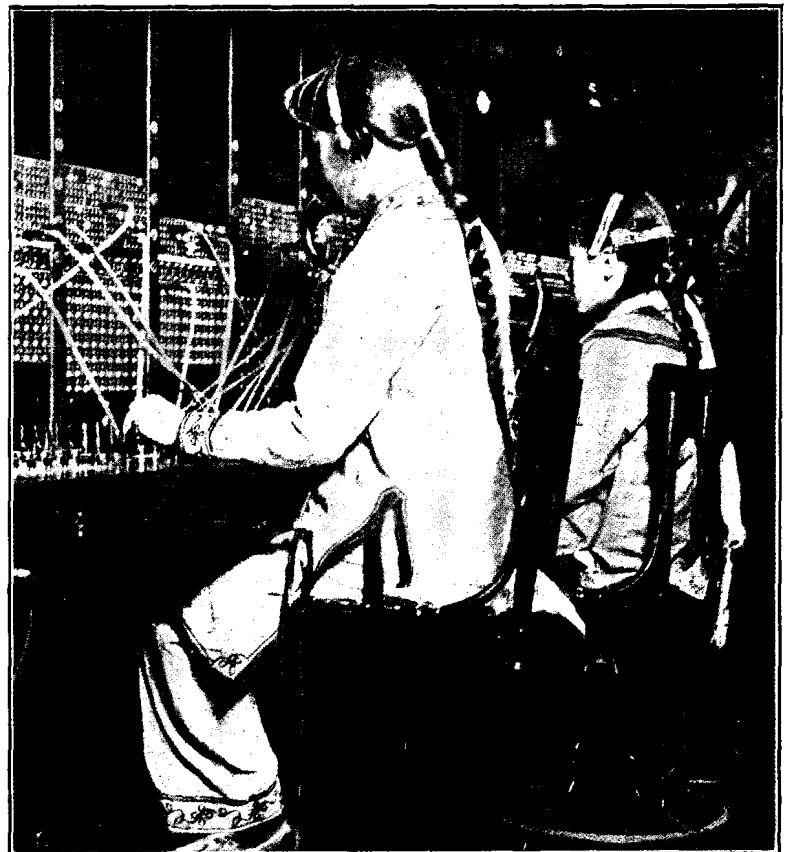
faithfulness to duty, upon courtesy and mutual helpfulness, and upon the most comprehensive and widespread system of societies within the staff existing anywhere. The care given to the comfort and health of the women employees is not exceeded, if equalled, in the United States, and their loyalty to the company is said to be beyond all praise. From my point of view it is a pity that this great organisation is to be absorbed by the British Post Office Department in 1912, and become a bone of contention and a means of punishment or reward in Parliament.

#### *Electrical Industries* says with regard to the Inventory-taking:

For some time past, and for an indefinite time to come, the best brains on both sides of the telephone business have been and will be occupied, not in arranging for the extension of telephone facilities, not in developing the efficiency of the telephone service, not in making the advantages of the telephone known to a wider and wider public, but simply in calculating the price at which an undertaking shall be transferred from an organisation which knows its business to one which, being under the thumb of politicians, knows no business. The transfer is, in fact, becoming a more and more overwhelming business the nearer it approaches; and if it is ever completed the Post Office will have to face the hardly less arduous task of making the financial arrangements for purchase, and of finding the many millions required to bring the telephone service up to the level which it ought to occupy.

THE *Michigan State Gazette*, under the complimentary headline, "Carrying Goodlookers to Newcastle," says of our portrait of the Newcastle Operators' Society: "If this group of 73 young women typifies the kind of girls they have in the service in the old country, there ought not to be very much complaint, for a brighter and more intelligent-looking lot of young ladies it would be hard to find outside of Detroit (the chief city of Michigan)." It also suggests that for any American operator to join the Novocastrians would be carrying coals to Newcastle. We are glad to be able to return the compliment with regard to one of the photographs of prize-winning supervisors' divisions.

THE same gazette publishes a racy *Operators' Supplement*, from which you may learn where every individual operator spent her



holidays, together with the most personal and intimate remarks about each. It contains also an interesting photograph (reproduced from the *San Francisco Call*), which we borrow, showing the

Chinese girl operators in the San Francisco Chinese Exchange. The Oriental is flowery in his language even with regard to the exchange girl. She is known as "The Lily of the Air" and "The Butterfly that Talks." She knows the 800 subscribers by name, and we understand that numbers are not used.

SOMETHING like a record in telephone booking seems to have been created on the occasion of Madame Sara Bernhardt's four weeks' engagement at the London Coliseum. We learn that in one day alone the telephone exchange were unable to connect over 2,000 with the box office, although it possesses two direct lines. Four extra lines had to be joined up in all haste to accommodate the heavy traffic.

WE record in the usual manner amongst the staff notes the marriage of Miss Lilla Patrick, operator, of Farnham. We are aware that a capable and obliging operator in a small exchange has an opportunity of earning the affection and respect of her subscribers in a way that is denied to a unit in the staff of a huge exchange. Miss Patrick seems, however, to have been exceptionally efficient and popular, and even affords the *Daily Mail* evidence of a "Telephone Girl Who Never Lost Her Temper."

WE have received the following cutting from the *Dublin Lepracaun*:—

#### A TELEPHONE TRAGEDY.

A correspondent has written to a Liverpool paper of an extraordinary experience. He says he was using the telephone when the connection was cut off, and on his complaining the operator apologised. And yet he survived the shocking civility of the "Hello, girl!" A study in marvellous vitality.

In our opinion the marvellous vitality is rather that exhibited by this hoary joke.

FOLLOWING the usual journalistic practice, we do not print letters from anonymous correspondents unless their card is enclosed for the editor's satisfaction. A Glasgow correspondent, calling himself "Curious," writes asking for a more precise explanation concerning the agreement signed in a somewhat "wriggley" manner by a lady whose head protuded from the aperture of a patent bath cabinet as described on page 114 of the JOURNAL. But we are not to be inveigled into filling the staid columns of the JOURNAL with the eloquent, ornate and often unnecessary precision of the *Thousand Nights and a Night*.

## AUTOMATIC *versus* MANUAL SWITCHBOARDS.

BY JOHN J. CARTY, *Chief Engineer American Telephone and Telegraph Company.*

(We are enabled by the courtesy of Mr. Carty to publish the full text of his contribution to the discussion on "Automatic *versus* Manual Switchboards" at the International Conference of European Telephone and Telegraph Administrations in Paris, to which we referred last month.)

MR. PRESIDENT AND GENTLEMEN,—In response to your request I shall speak upon the question under debate. I will tell of conditions in America with which I am personally familiar, and regarding which I have accumulated data covering a period of years. I do not presume to speak concerning conditions in Europe, so that I shall be obliged if you will regard what I have to say in this light. From your own expert knowledge of conditions in Europe, each of you will be able to judge how far the experience which we have obtained in America may be applicable to your own case.

The subject under discussion is sometimes stated as "The Manual Switchboard System *versus* the Automatic Switchboard System." It will be instructive to see what is meant by these two terms.

The term manual switchboard denotes a system whereby the operation of connecting two subscribers together is performed by hand, and without the employment of automatic machinery.

The term automatic switchboard, on the contrary, denotes a system whereby the two subscribers are connected together by automatic machinery and without the employment of manual labour.

I shall ask you to consider with me for a few moments these two systems.

Let us begin with the so-called manual switchboard, and make a brief analysis of its method of operation, and by so doing we shall find that it abounds in automatic features, and that in its operation automatic labour-saving machinery has been employed to an extent which is truly surprising to anyone who makes the analysis for the first time. You will find that the term manual does not correctly describe the system to which it is applied, and that the so-called manual switchboard system is partly manual and partly automatic, and you will find that the number of automatic operations which take place in making a connection form a large proportion of the total.

It would consume too much of your time if I should describe in detail each of these operations which is performed automatically, and each which is performed manually. I shall give a brief outline of them, and when once your attention has been drawn to this phase of the case you will have no difficulty in making the complete analysis at your own convenience.

The subscriber desiring to make a call first takes the telephone from its hook and places it to his ear. This is a manual act, but one which is necessary in every system. Removing the telephone automatically releases the hook which flies into contact with several springs, the result of which is to set in motion a train of automatic apparatus closing the subscriber's circuit at the sub-station, thereby automatically actuating a relay at the central office. This relay having been automatically set in operation lights a lamp before the operator, who thereupon performs a manual act, inserting the plug into the answering spring jack. This again automatically makes connections which accomplish a number of different operations, such as disconnecting the line relay, and so forth. The operator works her listening key and connects to the called-for subscriber. This causes a train of automatic operations to take place, and then the subscriber's bell is rung. He takes the telephone from the hook, and this automatically notifies the operator that he is at the telephone.

The reverse of all this takes place when the disconnection is made. The subscribers hanging the telephones on their respective hooks, thus set in motion a complex train of automatic operations, whereby the operator, without listening in upon the line or asking the subscribers if they are done talking, may determine at a glance that the conversation is finished, and by the simple operation of withdrawing the plugs and allowing them to fall automatically into their positions, mechanism is released which automatically restores the lines to their original condition.

In the handling of trunk calls—*i.e.*, calls between the "A" operator and "B" operator in the different offices—another extended series of automatic operations are intermingled with those which are performed manually. In fact, a complete analysis of all the operations involved will show that a very large proportion of them are performed automatically. Thus it will be seen that, notwithstanding what may be said by the partisans of the so-called manual system, they have, by their deeds, acknowledged that there are many advantages in automatic machinery; in fact, if we trace the evolution of the manual switchboard as exemplified in the modern common battery system, we shall find that its progress towards the present high state of efficiency is marked by the adoption of machinery to perform operations which, in the earlier systems, were done by hand.

In the old type of manual systems it was necessary for the subscriber, in order to signal the office, to turn a crank, thus operating the magneto-generator and throwing a drop at the central office. At first it was necessary for the operator to restore this drop by hand. Then a plan of automatically restoring the drop upon the insertion of the plug by the operator was adopted. Finally, the drop itself was removed and relays automatically controlled by the subscriber and bringing into play at the proper time electric lights, were substituted.

A study of the growth from the earliest systems to that at present in use shows in a very interesting way that the high efficiency now obtained from the common battery system is largely due to the adoption of automatic operations. As it will be easy for anyone to make this analysis for himself, I will not pursue it further, but enough has been said to make it clear that the so called manual

system is really one composed of both manual and automatic operations. It is partly manual and partly automatic. It is, indeed, a form of semi-automatic.

Turning now to the so-called automatic system and making but a brief analysis of its operation, we find that, properly speaking, it is not an automatic system, but only partly so, and that without the aid of human intelligence at the central office and without the employment of operators, it has not been possible to operate it on any substantial practical scale. While this is true even in a telephonic network with a single central office, the full force of the statement is not appreciated until we contemplate the so-called automatic system as being applied to a comprehensive telephone system, such as sooner or later must grow up in every country and in every city.

Let us consider the operations of the automatic system in the elementary case of a single central office. The subscriber desiring to send a call must take his telephone from the hook and perform a number of manual operations, depending upon the character of the call he wishes to send. Then he must press a button, which, if all goes well, rings the subscriber desired.

It has been found in practice, however, that this automatic machinery at the central office can be made to give service only by the aid of mechanics constantly in attendance there. The duty of these mechanics is not simply to make repairs and remove faults in the ordinary sense of the term, for they do more than this. They actually assist the machinery to work. By the most careful training some of them become exceedingly expert, so that with a supersensitive ear they are able to detect when the machinery is going wrong. They are equipped with portable telephones and transmitters, and when they have reason to suspect that the call is not going right, they listen in upon the subscriber's line, and if the machinery has gone wrong they ascertain from him the number desired, and operate the machinery by hand, so as to produce the desired connection.

The assistance which they give requires them to listen frequently to the conversation of the subscribers, and to give constant surveillance to the connections. This supervision is as varied as the character of the faults encountered.

These men, whose presence is essential to the working of the system, are, in fact, "mechanician operators." In addition to these, operators must be employed for toll and long distance work, for answering subscribers who call for numbers which have been changed, and for performing those large classes of service requiring human intelligence.

In America, wherever you go into an automatic exchange, so-called, there you will find operators employed for these various classes of service which I have mentioned, and for more which I might give in detail if time permitted. In all of these exchanges comfortable operators' quarters are to be found, together with the usual provisions of lavatories, retiring rooms, and other conveniences which are to be found in the so-called manual exchanges.

But it is not in the system in its undeveloped state employing only one central office that the manual features of the automatic system are to be most clearly discerned. In order to see how thoroughly misleading is the term automatic switchboard as applied to these systems, it is necessary to contemplate a telephone system more or less highly developed.

To do this we must consider the telephone system as a whole, taking into account all of the circumstances of the case, not simply one, or two, or three of them, but the whole multitude of factors which enter into such a complex problem.

We must give rigorous attention to a vast amount of data and requirements pertaining to the traffic upon which the design of the system is based, and we must take carefully into account all of those important commercial circumstances which have such a profound, though often unsuspected, effect in broadly shaping the results.

It is only after we have done all of these things that we are prepared to begin to design the plant of the telephone company or administration. This word plant which in the English language is applied to the structure constituting the physical property of the telephone company, is happily suggestive in connection with the point I wish to illustrate, for it brings to mind the idea of growth, and that in a problem such as ours, in order to attain successful results, we must contemplate a plant or system as it must exist at

its different stages of development. We are not building something which, as it leaves our hands to-day, is in its final form. Each day, each month, each year our plant is growing, and we must so shape it and so add to it that as this growth proceeds it will have the highest efficiency which may be expected of it at each period of time. And above all we must take care that the principles upon which this growth is planned will be such that when the system is fully developed it will be working at its highest efficiency.

Our view is not comprehensive if it is confined to the central office switchboard alone. We must always have in mind that while this is a vital part of the system it is by no means all, and that considering the telephone investment as a whole the money invested in central office switchboards is a relatively small part of the total.

In our American practice we have for years endeavoured—and I may say with substantial success—to take this view of the situation. In my office there is a large sub-department devoted to the study of the question from the standpoint of subways and cables; another for buildings; another for all telephone apparatus, including central office switchboards; another and very large department working upon the traffic parts of the problem; one devoted to development studies relating to growth of population and stations and kindred subjects; and still another whose sole duty it is to make fundamental plans based upon all of these data put together and co-ordinated.

These fundamental plans being based upon all of the factors in the case provide in outline for the location and number of the underground ducts and cables, the location and size of the central offices, and the size of the central office switchboards.

It is obvious that if to serve the needs of a given locality, it is necessary at the present time to put underground a single duct, it would be a mistake to limit our construction to the immediate needs of to-day, provided, as is nearly always the case, further growth is to be expected. Some provision for the future must be made. How many ducts, therefore, we should put down in advance of the immediate needs is a very important engineering and economic problem. If but one duct is put down now, and another one is needed the following year, manifestly a waste of money will be incurred, due to removing the pavements and making a new excavation the following year. To provide for the future, therefore, by adding duct by duct and digging up the streets each time a new duct is needed, would cause a great waste of money.

On the other hand, to take an extreme case, if a sufficient number of ducts were put down to provide for the needs of 100 years in the future (even assuming we could forecast correctly for such a long period), another waste of money would take place, for the interest and other annual charges upon the construction which must remain unproductive for so many years would more than offset the saving which would be made by avoiding the repeated excavations.

We must choose, therefore, in our construction, some point between these two extremes.

In the plans which we have made for New York and for the other cities in America, it has been found, all things considered, most economical when building new subways to plan for a period somewhere between fifteen and twenty years ahead. Such considerations as these have guided us in making fundamental plans for New York City, which so far as buildings and subways are concerned, are intended to form a general guide for our construction work which is to take place each year for the next twenty years. These plans are not speculative or paper plans, but we express our confidence in them by following them in the construction which we do each year, putting down not only that which is needed for to-day, but that which after most careful studies, represents our best judgment of what will be required during a period of twenty years.

It should not be understood, however, that we can forecast with precision the requirements for so long a period ahead, but we have worked with these fundamental plans now for so many years that we know that they form a trustworthy guide, provided that they are continually kept under review and modified each year as the exigencies of growth demand.

If it would not take me too far away from the subject under debate, I could show to you in many interesting ways the vast sums

of money which we have saved because of these fundamental plans and how absolutely essential they are in enabling us to expend most economically the enormous sums of money which we annually put into our plant. For example, our expenditure for new construction during the first six months of 1910 is more than \$21,000,000.

With such plans before us for a given city, we are able to study the probable conditions of the plant at each period of its growth, and with such a guide we are deterred from installing a switchboard or other system, however suitable it might seem to be at the moment, that would not be capable of growing into that form and to that magnitude which would be required of it by the conditions which it must encounter before its life has expired.

Some idea of these conditions at New York, so far as they are affected by magnitude, may be obtained from the following data:—The fundamental plans for that city, not including the vast suburban region outside of the municipal limits of Greater New York, provided in 1900 for a system of 51,398 telephone stations, served from 43 central offices, the population of the city being 3,437,000. In 1910 the plans provide for 376,000 stations, served from 52 central offices, with an estimated population of 4,800,000. In 1930 the plans provide for 2,142,000 stations to be served from 109 central offices, with an estimated population of 8,800,000.

Without any commentary whatever these figures at once put us on our guard against the grave danger of assuming, even if the so-called automatic system was suitable for a small number of subscribers, that it would be a proper thing to employ in New York or any other city where it is expected that a proper development of the telephone will take place. This feeling of caution is strengthened when we consider that in the neighbourhood of New York City there is a vast suburban region intimately connected with it telephonically, and served by a very great number of central offices connected by a plexus of trunk lines. But there is more than this which we must take into account when we are studying this automatic system as applied to America. It is the grand ideal of Mr. Theodore N. Vail, the founder of the telephone enterprise in America, and still its active head, that we shall provide universal service. That is, that each person, firm or company in the United States that ought to have a telephone shall be provided with one, and that any person so provided wherever he may be located, can within a reasonable time be connected to the telephone of any other subscriber and talk satisfactorily.

This is not a mere dream. We have done solid continuous work upon it for more than 30 years, and now with rapid strides it is proceeding to fulfilment. At the present time an enormous amount of toll line business takes place between New York City and the territory tributary to it for 30 miles around. In 90 per cent. of this business the connection is made in an average of 38 seconds, and in the remaining 10 per cent. the average is about 80 seconds. In all of these cases the transmission conditions are so planned that the subscriber may converse with ease. A local call is accomplished in less time, requiring only 22 seconds where but one office is involved, and slightly more between two offices.

These figures which I have given include the elapsed time from the receipt at the central office of the subscriber's signal on the lamp until he is connected with and is talking to the called-for subscriber. But to establish a universal service requires working over much greater distances than this.

*(To be concluded.)*

#### OPENING OF THE GLASGOW POST OFFICE CENTRAL EXCHANGE.

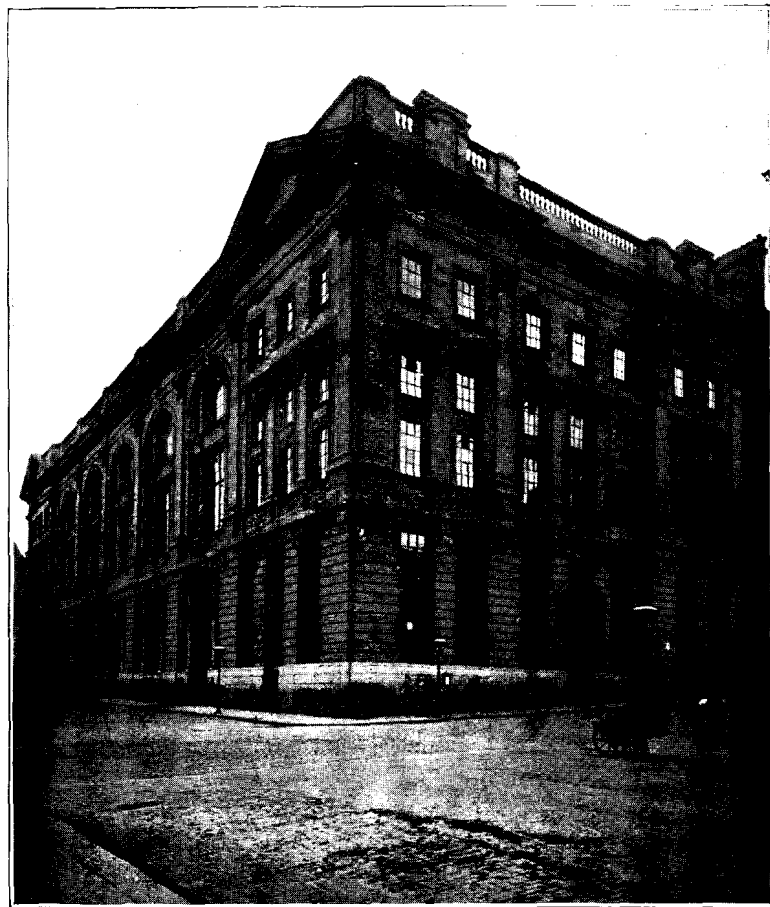
THE opening of the Central Exchange in Glasgow by the Post Office is an instalment of a general scheme agreed to by the Post Office and the Company for the proper telephoning of the city. The Company has already built premises at Hillhead and opened an exchange with a capacity of 10,000 lines, and is further engaged in the erection of a building in the centre of the city, north of the new Central Exchange, to be called the Douglas Exchange, which will give accommodation for 7,000 lines. The Post Office on its part is erecting new exchanges in the east end of the city, which will be called Bell and Bridgeton, and the subscribers' and junction lines, both Post Office and National, will be transferred from the existing four exchanges covering the same area. As soon as these

are completed the whole of central Glasgow on the north side of the Clyde will be supplied with up-to-date equipment.

The Central Exchange was successfully opened, as already recorded in the JOURNAL, on Aug. 13 with about 5,000 working lines, and it is anticipated that on Jan. 1 next the Company's lines at present joined to the Royal Exchange and situate in the central area will be transferred to that exchange. The underground work in connection with this is at present proceeding, and the apparatus in the Central Exchange is ready.

An interesting inspection of the Central Exchange took place on Sept. 19, and by the courtesy of the Post Office the Company's local directors and chief officials were present. Previous to the inspection, lunch was provided by the Peel-Conner Telephone Works, Limited, the manufacturers of the switchboard, and a representative body of gentlemen from this and other countries was present. Mr. Hirst, the chairman of that company, in proposing the toast, "The Engineers of the Post Office," read a letter from the Postmaster-General expressing regret at his enforced absence, and Mr. Hirst then proceeded to emphasise the fact that the installation had been manufactured entirely in this country.

The new switchroom is housed in a portion of the new Parcels Post Office building, in Waterico Street, the entire second flat being used for switchroom, apparatus room, operators' dining-room etc. There are 28 equipped local sections and twelve equipped junction sections, and these are formed in the ordinary horseshoe



*[By permission of the POST OFFICE ELECTRICAL ENGINEERS JOURNAL.]*

fashion. The room is a spacious one, and the service given is of a very satisfactory character.

After the inspection of the Central Exchange, the company visited the trunk exchange at the General Post Office, in George Square, and the system of working the trunk lines was fully explained by a number of the Post Office officials. Subsequently the Postmaster and Surveyor for the Glasgow district entertained the company to afternoon tea in his private room. The trunk exchange, which is a comparatively new one, is housed in a most compact room, specially built for the purpose, and is one of the largest trunk exchanges in the country.



## OPENING OF NEW TELEPHONE EXCHANGE AT PARK STREET, CARDIFF.

In the absence of the Lord Mayor (Alderman John Chappell), who was detained in North Wales, Mr. H. Fedden, Bristol, chairman of the local board of directors, welcomed the guests,



and formally declared the exchange open. Mr. S. J. Goddard, General Superintendent, and Mr. R. A. Dalzell, Provincial Superintendent, both wired their inability to attend. The other local



directors present were Messrs. Richard Cory, T. Pole, and F. H. Glynn Price, whilst the leading officials in attendance were Messrs. B. Waite (District Manager), J. James (District Engineer), W. J. Marsh (Traffic Manager), S. F. Whetton (Chief

Electrician), R. Williamson (Manager at Newport) and J. D. Duncan (Contract Manager).

The new exchange, which is leased by the Company from the Post Office, is situated in part of the Head Post Office building, which was enlarged for the purpose. The equipment was installed by the British Insulated & Helsby Cables, Limited, and is of central battery type.

The present equipment is designed for 4,200 lines, and with an ultimate capacity for 10,000 lines. The subscribers' lines formerly served by the New Street, Roath, Canton, and Cathays Exchanges now terminate in the Park Street Exchange.

## LONDON NOTES.

CONGRATULATIONS to Mr. F. J. Bunce, Chief Clerk, Southern Contract Office; Mr. W. G. Claxton, Clerk, Statistical Office; and Mr. A. L. Howse, Clerk, Wages Office, all of whom have been recently married. Presentations were in each case made, and good wishes expressed by their colleagues.

THE number of entries amongst the staff for technical classes at the various London institutes is 369, being 22 more than last year. This increase, although slight, is gratifying as evidence of greater keenness and interest in technical knowledge. It is to be hoped that none of the entrants will allow that interest to flag throughout the session.

IN the City and Guilds Examinations for 1909-10 Mr. G. Smith, Maintenance Department, Gerrard, obtained first-class honours in telephony, and Mr. T. M. Inman, Exchange Electrician, Battersea, first-class honours in telegraphy. Mr. W. A. K. Ward, Apprentice, in addition to second class honours, also obtained a bronze medal in first-class ordinary telephony. Fourteen other members of the London staff secured second-class honours. The results are certainly encouraging, but a much larger honours list is possible, and will doubtless be forthcoming next year.

MR. HARE's presidential address to the London Telephone Society on Oct. 3 abounded in lucid and cogent reasoning, illustrated with a wealth of quotation and aphorism, and all bearing the unmistakable literary flavour which comes from wide and observant reading. The subject, "Papers: Their Writers and Audiences," was one peculiarly adapted for an opening meeting, and afforded a medium for much excellent advice, not only as to what to do, and how to do it, but also what is quite as important—the things to avoid and guard against. Mr. Hare's analysis of papers into three classes—(a) descriptive; (b) deductive; (c) debateable—seemed very comprehensive; but there were naturally differences of opinion as to which of the three would be most beneficial to a general audience. With nearly all of Mr. Hare's reasoning and conclusions his hearers were in perfect agreement, but this unanimity unfortunately tended to shorten the subsequent discussion. Mr. Gill's remarks as to the benefits of full and unrestrained discussion at all the society's meetings were to the point, and it is to be hoped that more of the younger members particularly will come prepared to say something.

THE Operators' Society started well on Oct. 10, 236 members being present to hear Mr. Corner, Assistant Traffic Manager, open the session with a paper on "Our Ideals." Mr. Corner has the knack of making himself interesting on any subject, and if, as he himself admitted, he had nothing new to tell us, he nevertheless told us some of the old things in an original way. Certainly he was chaffed a little later over his numerous literary allusions and quotations, but succeeded in turning the tables very neatly on his critic. The discussion was a little disappointing, because so few of the speakers gave their personal experience on the outstanding practical points dealt with in the paper. The question as to whether operating is monotonous work arose incidentally; the subject is one on which a very piquant debate might well be anticipated, and the committee would do well to bear it in mind for a future meeting. The membership of the society is now over 500.

IN addition to the list of staff given in last month's JOURNAL, the Inventory work is also causing London to lose temporarily the services of Mr. H. Davis, Metropolitan Stores Manager. Mr. Davis has been appointed to act as District Manager at Cardiff during Mr. Waite's absence, and he carries with him to Wales the good wishes of his Metropolitan colleagues, who will all miss his genial and cheery presence.

THE next meeting of the London Telephone Society will be on Nov. 9, when a paper on "Inside Engineering" will be read. The paper will probably deal with several contentious points, regarding which there is considerable difference of opinion. A wide field for friendly discussion is therefore likely to be thrown open, and this ought to insure a large attendance, particularly of those interested in our engineering problems. The Operators' Society meets on Nov. 16, when two papers, one by Miss E. Godden on "Exchange Catering," and the other by Mr. J. Webb on "Distribution," will be read.

THE local committee of the Staff Transfer Association held its first meeting after the holidays on Oct. 12. There was a full agenda, the principal subjects under discussion being dismissals of staff; the position, after the transfer, of

fault clerks and of members of the staff who have gone through the apprenticeship course; and the recent formation of a joint board with the A. S. T. E.

MISS J. McMILLAN, of the Correspondence Department, Salisbury House, has been achieving honours at the annual Business Exhibition at Olympia. In the commercial letter-writing competition, six ladies and seventeen gentlemen entered; Miss McMillan obtained first place, receiving as her reward a gold medal and a purse containing two and a half guineas.

### GLASGOW NOTES.

*The Telephone Society.*—The opening meeting for the session was held in the Technical College on the evening of Wednesday, Oct. 12, when there was a good turnout of members. A most interesting lecture, illustrated by many slides and diagrams, was delivered by Professor Magnus Maclean, his subject being "Kelvin: Investigations and Apparatus for Electric Signalling."

The lecturer for a considerable period was associated with Lord Kelvin in some of his investigations, and while this personal aspect was not directly touched upon in the lecture, its influence was apparent. Professor Maclean dealt at some length with the laying of the Atlantic cables and with Lord Kelvin's services in this connection. The story is a fascinating one, and it was to a very attentive audience that the lecturer described the various difficulties which had to be surmounted, the many disappointments which had to be endured, and the successive failures which had to be accounted for. Through it all, however, Lord Kelvin's dominant optimism prevailed, and the satisfactory completion of the undertaking may be taken as a tribute to his characteristic courage and resource.

The circumstances which called forth the syphon recorder were dealt with and the actual mirror galvanometer used by Lord Kelvin on board the *Agamemnon* was laid on the lecture table for inspection.

Professor Maclean also touched interestingly upon Kelvin's interest in the introduction and on the development of the telephone, and read a report submitted by him on Graham Bell's first instrument at the time of its introduction in America.

*The National Telephone Operators' Society and Club.*—The first meeting of the session was held in the Masonic Hall, West Regent Street, on Monday evening, Oct. 10, when the proceedings were opened with the reading of a most interesting paper on "Early Telephony," written by Dr. Alexander Graham Bell, the inventor of the telephone. Mr. Rodger read the paper which dealt with many events in Dr. Bell's life and the experiments leading up to one of the greatest and most useful inventions of the age. The paper was very much appreciated by the audience. The club part of the programme, consisting of music and song interspersed with dances, was entered into with much zest and concluded an evening greatly enjoyed by all.

FURTHER additions to the ranks of benedicks! On the evening of Thursday, Oct. 6, Mr. J. W. Macdonald, Cashier, was the recipient of a handsome case of cutlery with the staff's hearty congratulations on the occasion of his marriage to Miss Janet Drennan, Clerk-in-Charge of Bridgeton Exchange. The presentation was made by Mr. Valentine, who claimed to be expert at tasks of this kind as a result of the extent and variety of the experience afforded him. He bore tribute to the good work done by Mr. Macdonald in various positions of responsibility and wished for him and for Miss Drennan a long life of wedded happiness. As a token of their appreciation and good wishes the chief officers of the Traffic Department and the operators in the Bridgeton Exchange respectively presented Miss Drennan with a silver tea service and a cake basket.

It having become known that Mr. R. P. Buckeridge, Cost Clerk, Engineer's Department, also intended to take unto himself a wife, the staff met in the Engineer's Office on the evening of Tuesday, Oct. 18. Mr. Thyne presided and after presenting a suitable gift to Mr. Buckeridge as a token of the esteem and good comradeship of the staff, he wished for Mr. and Mrs. Buckeridge a long and happy married life. Mr. Buckeridge suitably replied.

MR. J. W. BENNET, Contract Officer, Glasgow, has been transferred to a similar position in Hamilton and his transfer was made the occasion for a presentation by his colleagues in the Contract Department as a token of the esteem in which he is held by his fellow-workers.

*Bell Golf Club.*—The final of the monthly medal competition was held at Carnryte on Saturday, Oct. 1, when the prize winners were:

1. W. Lang .. .. .	88	-	2	=	86
2. H. Thomson .. .. .	102	-	14	=	88
3. R. Brough .. .. .	101	-	10	=	91
4. D. B. Heberton .. .. .	95	-	4	=	91

### CORRESPONDENCE.

#### "THE TELEPHONE LOAD LINE."

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

(1) As the paper by Mr. Deane on the above subject which appeared in the June, July and August issues of the JOURNAL must have proved of considerable interest to all engaged on traffic work, it is thought that the following notes may be of use:—

(2) *Page 47, par. 1.*—As Mr. Deane points out, where the fluctuations in traffic are small the average is the best figure to work on. Where the fluctuations are considerable, however, the mere fact that holidays are taken as far as possible while the traffic is slack makes it wrong to assume that slack times and busy times balance each other as regards their effect on loads and service.

(3) A better scheme is to take the peg count on a fixed day, say, the 10th of the month, or the nearest working day if the 10th is a Saturday, a Sunday or an abnormal day. In order to allow for the fact that some of these peg counts would occur during holiday seasons, when the conditions cannot be regarded as normal, it would probably be advisable not to include the figures obtained during, say, three slack months when considering such questions as calling rates and loads. This, of course, involves a greater number of peg counts, but the increased usefulness, as regards staffing and future design, would justify the additional trouble.

(4) *Page 47, col. 2, par. 3.*—Should the aim be to credit the "A" and "B" operators with the operating they do? This does not seem to be the best plan; for example, a "B" operator failing to ring on her connections would get "credit" for requests to ring again or to change junction. In the case of "A" operating there does not seem to be any easy way of recording "supervision." The best plan is to look upon the peg count as an uncontroversial count of unit calls to be taken as simply as possible, and in such a way as to be, as far as possible, independent of the personality of the operators.

(5) *Table B, page 48*—"Seconds" has been printed in error after the third column of figures, and it may not be clear that this column shows the ratio between the figures in the first and second columns.

(6) *Table C, page 71.*—The junction valuations are for average London conditions, and cannot, of course, be adopted by other districts without due discrimination. This table has already been discussed in the September and October issues of the JOURNAL; a further point is that a small London exchange having 25 outgoing junctions would have small groups of junctions and comparatively little order wire working, while an appreciable amount of traffic would pass through one or two intermediate exchanges, accounting for the apparently high average junction valuation of 2.0. In a provincial town with few exchanges, however, a similar exchange might have a considerable proportion of order wire working and little through working, giving a value of, say, 1.5.

(7) *Page 72, par. 1.*—There is a reference to the disadvantageous effect of a high percentage of junction working on the load that can be taken at an exchange. It is possible to over-estimate the importance of this. A single operator having 100 per cent. local working and a single operator having 100 per cent. outgoing junction working, loaded according to the correct time values, are equally likely to have a given number of accumulated calls. The chief difference lies in the fact that there is more worry in the latter case, due to the accumulated calls waiting, say, 50 per cent. longer for an answer and taking 50 per cent. more time to be operated. When there are a number of operators, however, there is team work, and the better the team work the less is the number of accumulated calls, so that the above point tends to be negligible when the supervisors and operators are keen on the correct principles of team work. In the case of a London exchange having 80 per cent. junction working at a junction value = 1.6, busy hour load = 220, speed of answer during the busy hour = 5 secs., the average number of calling signals waiting to be answered, during the busy hour, works out to 1 per 4.8 positions (unvalued calls  $\times$  5 secs. = aver. no. of call sigs.  $\times$  3,600 secs.). This figure suggests that the worry due to accumulated calls should be negligible with sound team work.

(8) *Page 73, Table D.*—It is thought that these loads are local standards only. The figures suggest that the normal magneto load has been adopted for central battery exchanges, and the magneto exchange figures reduced to a certain fraction of the C.B. load. This seems to be inverting the natural order of things, but it is understood that the figures have since been provisionally modified to—

Type of switchboard.	Busy hour load expressed in local calls.
C.B. .. .. .	220
Magneto (self-restoring) .. .. .	200
Magneto (hand-restoring) .. .. .	180

(9) *Page 72, Table E.*—The time taken by the "A" operator to pass the number and the slight pause before the assignment of the junction seem to be a legitimate part of the time value of an incoming O.W. call. This time, although small (say, 1 sec.), is an appreciable fraction of the total time per call, but is not given in Mr. Deane's figures.

(10) *Page 73, col. 2.*—It is stated that the "B" operator is often forced to demand a repetition of the "A" operator's application. This cannot apply to any appreciable extent as the standard instruction is for an O.W. "B" operator to remain silent in such cases.

(11) *Page 73, Curve No. 2.*—The method given suffers from the disadvantage that it is not easy to travel from one curve to the other quickly and accurately. The following quick cut suggests itself:—

From the lower curve:—	
Calls per position per half-hour .. .. .	16.5
Positions per operator .. .. .	3.45
Total "A" positions .. .. .	110

$$\therefore \text{no. of "A" operators} = \frac{110}{3.45} = 32$$

(12) It follows that curve No. 5, suitably modified as regards scales, is the most convenient form. For example, let the vertical scale read "0...90, 100," "valued calls per half-hour per position" (or 0...110, etc., according to load) and the horizontal scale read "0, 0.1, 0.2...1.0" "operator per position." Then if calls per position per half-hour = 16.5, 0.305 operator per position is required.

$$\therefore \text{no. of "A" operators} = 110 \times 0.305 = 33.6$$

The discrepancy between 33.6 and 32 seems to be due to the curves Nos. 2 and 5 not being drawn so as to be quite identical.

(13) This modified form of the curve lends itself to plotting a curve to show "operators required for given traffic" in any particular exchange, e.g., working on curve No. 5:—

A load of 60 calls per position per half-hour corresponds to 0.7 operator per position. Then for an exchange having 90 working positions,  $90 \times 60 = 5,400$  calls correspond to  $90 \times 0.7 = 63$  operators.

(14) *Page 73, Curve No. 3.*—This curve is an average curve, and is not considered sufficiently good as a basis for fixing operators' duties in particular cases. The allowance to be made depends upon the proportion of straight and split order wire positions and ringing positions.

The points to be considered are—

- (a) The only loss of efficiency, when a "B" operator handles several straight order wires serving one exchange, is that due to the application of table F, page 73.
- (b) Loss due to the increase in split order wire working when positions are taken over.

The most scientific plan seems to be to consider each exchange in detail, working on standard loads for the various types of positions, but allowing for the loss of efficiency in the case of split order wire positions, etc., when more than one position is being covered by any operator.

(15) *Page 91, Table G.*—The use of "A" operators' day loads for staffing purposes, except as a rough guide, does not seem justifiable, because of the differences in the conditions at various exchanges caused by the shape of the load line and by the efficiency with which the operators' duties can be arranged to meet the traffic. The theoretical day load figures for London Wall and Holborn show a 4 per cent. difference owing to difference in shape of load line. The cost of one unnecessary additional operator would far outweigh the value of the time saved in using an average figure in such cases.

(16) The same argument applies to the principle of making divisions self-supporting, page 91, col. 2, because the convenience of this arrangement is generally obtained at the expense of an increase in operators. For example, three operators might be required from 8 to 8.30 a.m., but one for each division, say 6, are employed. This excess of staff in the morning will probably cause more difficulty in staffing for the latter part of the day, and additional staff may have to be employed in order to make up for this, and to have six operators on duty at 7.30 to 8 p.m., when, say, only four are required.

It seems feasible to have a duty sheet with the operators' names arranged in position number order, and with the duties in a methodical order. For example, the effect on the arrangement of the operators at the switchboard during one week would be:

Pos. No., 2, 4, 6, 8, 10, 12, 14, 16, 18....  
Duty, B, D, A, C, B, E, A, C, B....

It will be seen that, independently of the periodic changes in duty, the operators would automatically spread out on coming on duty, while any stretch of nine or ten positions will be practically "self-supporting." Any slight irregularities in staffing that may arise should be met by the supervisors, acting on the motto "co-operation" rather than "competition," arranging their staff to help adjacent divisions, and temporarily lending operators when necessary, with a view to obtaining the best results in the exchange as a whole.

London, Oct. 21, 1910.

CHAS. H. TOMES.

METHOD OF LOCATING AND REPAIRING FAULTS IN UNDERGROUND CABLES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I FEEL sure that a description given in the JOURNAL by anyone who has had faults in underground cables as to how such faults were located and repaired, and what temporary measures were taken to keep up communication whilst the cable was being repaired, would be most interesting. To myself, who have only just had an underground system put down, and have got my first trouble to come (and may it be long in coming), such a description would be most useful.

G. GILLMORE, District Manager.

Douglas, I.O.M., Oct. 17.

BRASS NUMBER SOCKETS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

ANY of my *colleagues* who are still using brass number sockets may be interested in the following two tools, which have been found useful in over-coming, to a certain extent, two of the difficulties experienced with these sockets.

Fig. 1 shows a tool for extracting sockets (made from an old bradawl), the point being of sufficient length to reach behind the socket but not long enough to project beyond the barrel of the jack, and being turned down, leaves a small

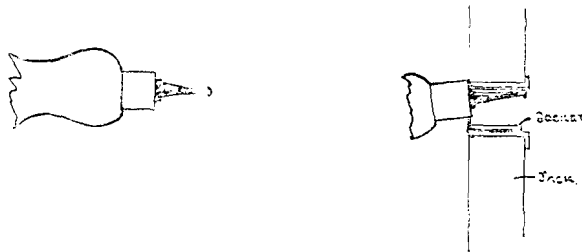


FIG. 1.

head as shown. The tool, of course, is put through the disc, and the head engages with the opposite end of the socket, enabling it to be readily withdrawn without damage.



FIG. 2.

Fig. 2 shows a small brass pin fitted on the socket box. It is of such a size that a socket pressed on to it has its sides slightly opened, thus giving a better grip in the jack.

Sheffield, Oct. 3.

S. R. V.

THE TELEPHONE SOCIETY PAPERS' COMPETITION SESSION, 1909-1910.

THE following are the awards made by the Education Committee in respect of this competition:—

CLASS I.—OFFICE (including Contract Work).

- 1st premium (£7) to J. F. Scott, Cashier, Glasgow, for paper entitled "The Psychology of the Office."
- 2nd premium (£3) to J. M. Anderson, Chief Clerk, Glasgow, for paper entitled "Capital and Revenue."

CLASS II.—OUTSIDE PLANT.

- 1st premium (£7) to H. A. Smith, Engineers' Department, Salisbury House, for paper entitled "Elementary Engineering Economics."
- 2nd premium (£3) to H. Green, Engineer-in-Chief's Department, Head Office, for paper entitled "The Design of Dry Core Telephone Cables."

CLASS III.—INSIDE PLANT.

- 1st premium (£7) to Thos. Pettigrew, Assist. Electrician, Glasgow, for paper entitled "Iron."
- 2nd premium (£3) to G. H. Bryant, Exch. Electrician, Salisbury House, for paper entitled "The Telephone Exchanges of London."

CLASS IV.—TRAFFIC.

- 1st premium (£7) to H. F. E. Deane, Traffic Dept., Salisbury House, for paper entitled "The Telephone Load Line."
- 2nd premium (£3) to A. E. Coombs, Traffic Manager, Bristol, for paper entitled "The Bristol Exchange Daily Originating Traffic."

CLASS V.—GENERAL.

- 1st premium (£7) to A. K. Murray, Contract Manager, Hull, for paper entitled "Success."
- 2nd premium (£3) to F. W. Roberts, Local Manager, Brighton, for paper entitled "Telephone Development."

INVENTORY OF PLANT.

THE following alterations and additions have been made to the list given in the October JOURNAL:—

Additions—

HEADQUARTERS.			
Boyd, J. H. H., Stores Clerk, Glasgow	..	..	Headquarters.
Hanchett, E., Wages Clerk, Salis. House	..	..	"
Skinner, R. A., Cost Clerk, Swansea	..	..	"
CLERKS.			
Dalziel, J. C., Clerk, Kilmarnock	..	..	Reading.
Kennedy, J. W. M., Clerk, Glasgow	..	..	"
Kirkwood, R. F., Clerk, Glasgow Buildings Dep.	..	..	Bristol.
DRAUGHTSMEN.			
Hill, F., Draughtsman, H.O.	..	..	Plymouth.
ENUMERATORS.			
Harvey, T., Foreman, Glasgow	..	..	Reading.
Jones, J. C., Chief Inspector, Chester	..	..	Wolverhampton.
Phillips, T. F., Head Office	..	..	"
Stelling, J. W., Local Manager, Halifax	..	..	Halifax.
Talbot, H. J., Assist. Eng., Streatham	..	..	Bristol.
Winstanley, P. H., Switchboard Staff, Head Office	..	..	Reading.

The following names should be deleted from the list:—

- DRAUGHTSMEN.
- Hunt, L. W., Chief Inspector, Ipswich.
- ENUMERATORS.
- Bruce, R., Asst. Eng., Belfast.
- Coles, W. H., Linesman Insp., Chippenham.
- Turner, C. H., Foreman, Birmingham.

Mr. R. B. Rae should have been described as Assistant Engineer and not as Engineer's Clerk.

WIRELESS TELEGRAPH SLIDE RULE.

WE have received from "The Electrician" Publishing Company a cardboard slide-rule (price 2s. 6d. nett) specially designed for calculations in connection with wireless telegraphy. By means of it, given any capacity and inductance, the corresponding wave length and frequency can be at once obtained, or conversely given the case where a certain wave length or frequency is desired, we can find the values of capacity and inductance which will give this. The wave lengths are in both feet and metres. On the back of the rule are printed certain useful data connected with wireless telegraphy, and instructions as to the use of the rule. Two scales on it correspond to the C and D scales of the ordinary slide-rule, so that it can also be used for general purposes. The rule should be useful to those who have frequent occasion to make calculation of wave length, or for similar purposes.

### THE TELEPHONE MASONIC LODGE.

The regular meeting of this lodge took place at the Masonic Temple, Gaiety Restaurant, Strand, on Oct. 15, when W. Bro. Stanley J. Goddard occupied the chair. He was supported by the full complement of his officers, as follows:—W. Bro. P. P. Kipping, I.P.M.; Bros. F. A. B. Lord, S.W.; P. J. T. Kenney, S.W.; C. E. Tattersall, Treasurer; W. Bro. F. O. Harke, L.R., Secretary; Bros. A. F. Paddon, S.D.; Wm. France, J.D.; W. Bro. C. E. Wetton, P.S.G.D., Mdx., D.C.; Bros. W. J. Downes, A.D.C.; F. E. Sims; W. Bro. R. H. R. Kenway and Bro. J. R. B. Gall, Stewards, and Bro. V. Baldwin, Orgst. Mr. Matthew F. G. Boddington, of the Engineer-in-Chief's Office, G.P.O., and Mr. George E. Pingree, managing director of the Western Electric Company, were duly initiated. Some 70 brethren afterwards dined together under the presidency of the Worshipful Master, and amongst the visitors were W. Bro. J. Morrison McLeod, P.G. Swd. Br., Secretary R.M. Inst. for Boys, J. S. Collett (Colombo), E. A. Fisher, E. Petley, T. Driscoll, and Bros. Alexr. Knox (Sydney), H. Davis and S. Maber.

The recently formed "Telephone Lodge of Instruction" is now affiliated with the Emulation Lodge of Improvements, and the session was formally opened on Sept. 6, when upwards of 40 brethren assembled to hear W. Bro. R. Clay Sudlow, P.G.D., President of the Committee of the Emulation Lodge of Improvements, rehearse the installation ceremony. This Lodge of Instruction now meets at the Mansion House Station Restaurant every Tuesday evening at 6 p.m. W. Bro. Edgar W. Wainwright has been appointed Preceptor.

Mr. E. A. LAIDLAW, of the Engineer-in-Chief's staff, London, has resigned his position with the Company to take charge of the telephone department of Messrs. Siemens Bros. & Company, Limited, at Woolwich, the resignation taking effect at the end of October. Mr. Laidlaw was apprenticed to the Western Counties and South Wales Telephone Company, Limited, in 1889 at Bournemouth, of which district he was made Chief Inspector in 1893. Subsequently he filled the following positions:—Chief Inspector, Plymouth, 1895, and Chief Inspector, Bristol, 1896, where he supervised the installation of the



E. A. LAIDLAW.

first C.B. exchange in Europe. In 1900 he was placed in charge of the construction of C.B. exchanges at Hull and Sunderland. He was transferred to the Engineer-in-Chief's staff in 1901, and then took charge of extensive reconstruction work at the Royal Exchange, Glasgow, and the Central Exchange, Manchester. Since 1904 he has been stationed at Head Office, where he has filled the position of Second-in-Charge of the Exchange Equipment Department. Mr. Laidlaw's genial qualities have gained for him a very large number of friends on the Company's staff, whose good wishes he will carry with him into his new field of activities.

### POST OFFICE INSTITUTION OF ELECTRICAL ENGINEERS.

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

"The Law of Contacts." D. H. Stroud, LL.B. .. 6d.

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

### EXAMINATION SUCCESSES.

**Head Office.**—Arthur J. French, General Superintendent's Office, Stores Department, first class (ordinary), second class (honours), City and Guilds Institute.

**Exeter.**—Engineer W. Sim recently obtained the following certificates (City and Guilds):—Telephony (ordinary), second-class certificate, (honours) second-class certificate.

**Sheffield**—Board of Education examinations: A. Broomhead, B. Glenn, and J. W. Wright, first class, mathematics, practical (stage I). F. Webster, second class, mathematics, pure (stage I).

**Hanley.**—F. Greswell, second class, mathematics (stage II). J. Frost, first class, building construction (stage I); second class, mathematics (stage II, honours); second class, telephony (City and Guilds); first class, applied mechanics (stage I). F. C. Butterworth, second class, advanced electricity and magnetism (stage II). W. D. Edwards, second class, ordinary telephony (City and Guilds).

**Darlington.**—Inspector W. Wilson was successful in obtaining a second class in the honours grade, telephony, in the recent City and Guilds Institute examination. F. G. Body, Clerk, obtained second-class certificates in magnetism and electricity, elementary and mathematics (stage I).

### NEWS OF THE STAFF.

Mr. H. DAVIS, Metropolitan Stores Manager, has been appointed to act as District Manager at Cardiff during Mr. Waite's absence on the Inventory staff.

Mr. F. BARR, Local Manager, Sheffield, on his appointment as one of the sectional chiefs of the Inventory staff, was presented by the District Manager (Mr. R. C. Bennett) with a gold watch on behalf of the staff and as an expression of the appreciation felt by the whole of the district of the genial and kindly manner in which he had carried out his arduous and responsible duties in the past.

Mr. A. PODMORE, Sub-Engineer, Sheffield, was presented with a pair of gold cuff links, subscribed for by the members of the staff, on the occasion of his transfer to the Inventory staff.

Mr. S. O. ALLEN was, on the occasion of his leaving the district to take up his duties as Traffic Manager, Southampton, presented by Mr. E. Williamson, District Manager, on behalf of the members of the Birmingham traffic staff, with an oak *scrutoire*. Mr. Williamson referred to the good work he had done as Exchange Manager at the Central Exchange during the period of three years he had been in charge. Several speeches were also made by members of the staff, who expressed their regret at his leaving, and good wishes for his future success and prosperity. Mr. S. O. Allen entered the service in June, 1899, and has served in Bath, Gloucester and Bristol. Previously to being transferred to Birmingham in November, 1907, as Exchange Manager, Central Exchange, he was Exchange Manager at Bristol Exchange. His many friends will wish him every success in his new sphere of activity.

Mr. W. J. MOORE, Assistant Engineer, Bournemouth, has, during the absence of the Local Manager (Mr. E. Harper) on the Inventory staff, been promoted to Acting Local Manager; and Mr. A. J. FAITHFULL, Engineer, Winchester, has been transferred to Bournemouth as Assistant Engineer.

Miss BESSIE C. YOUENS, on leaving the Company's service to take up another position, was presented by her colleagues on the correspondence staff, General Superintendent's Office, with a gold bangle, and by the engineering staff with a pendant and chain of gold set with pearls, olivines, and a ruby. Miss Youens, who has been ten years with the Company, has our best wishes for the future.

Miss AGNES MOIR, Senior Operator, Charing Exchange, Glasgow, has been transferred to Bearsden Exchange as Operator-in-Charge.

Miss ROSETTA ISAACS, Supervisor, Hillhead Exchange, Glasgow, was, on being transferred to be Senior Supervisor, Argyle Exchange, Glasgow, presented with a pendant by the staff in the former exchange.

Miss JEANIE DRANNAN, Chief Operator, Langside Exchange, Glasgow, has been promoted to be Clerk-in-Charge in the same exchange.

Miss MARGARET HAVILAND, Operator, Royal Exchange, Glasgow, has been promoted to be a Supervisor in the same Exchange.

Miss ISABELLA SPRENGER, Operator, Royal Exchange, Glasgow, has been transferred to Hamilton, in place of Miss FELICIA MCLACHLAN, who has been transferred to Royal Exchange, Glasgow.

Miss ISOBEL PORTER, Operator, Douglas Exchange, Glasgow, left on Oct. 20 to go to Australia. She was presented with a pendant and chain by the staff in her exchange.

Miss ANNIE E. L. WOOD has been promoted from Clerk-in-Charge, Dewsbury, to be Travelling Supervisor, Leeds. She was presented with a dressing case by the Dewsbury staff.

Miss HILDA MARY WARD has been promoted from Operator-in-Charge, Batley Exchange, to Clerk-in-Charge at Dewsbury.

Miss A. KITSON has been promoted from Operator, Batley Exchange, to be Operator-in-Charge.

Miss ELSIE FISHER, Chief Clerk, Contract Department, Birmingham, left the Company's service on Oct. 8. She was presented with a roll-top oak writing desk and stylo. pen, on behalf of the staff, by Mr. Maclure, the Contract Manager, who conveyed to her the feelings of himself and the staff in wishing her every success in the new sphere of life she was about to enter. Miss Fisher, in replying, expressed her great appreciation.

Misses LILY READ and IDA MARION AMBLER were each presented with silver purses on the occasion of their transfer from Ashton under-Lyne to St. Anne's-on-Sea and Bradford, Yorkshire, respectively. The presentation was made on behalf of the staff by Miss Driver, the Clerk-in-Charge.

Mr. JAMES OGDEN, Foreman, Ashton-under-Lyne, was presented with a handsome pipe and tobacco box on his transfer to Liverpool in a similar capacity.

Miss MAGGIE STOREY, Operator, Sunderland, has been promoted to be Supervisor at the same centre.

Mr. S. Y. BENNETT, Assistant Engineer, Bath, was presented by the local staff with a serviceable kit-bag on his transfer to the inventory staff.

Mr. R. W. BELL, Local Manager, Kochdale, was presented with a kit-bag and purse on leaving to take up his new duties at Bristol in connection with the inventory staff.

Mr. J. WILSON, Cost Clerk, Bolton, and secretary to the Staff Benevolent Society, was presented by the staff with a kit-bag on leaving to take up his duties in connection with the Inventory staff, Huddersfield. Mr. Wilson was accorded a hearty vote of thanks at a special committee meeting of the Benevolent Society for his services as secretary, to which the success of the society is largely due.

Mr. J. TURNER, Contract Officer, Bolton, has been elected secretary to the Staff Benevolent Society, vice Mr. J. Wilson, resigned.

Mr. FREDERICK TUFFIN, Exchange Inspector, Midland Exchange, Birmingham, left the Company's service on Sept. 22 to go to Sydney, Australia. He was presented with a shaving outfit by his colleagues in the Electrician's Department, who all wished him every success in his new sphere of life.

Mr. F. J. TINSON, Underground Foreman, who entered the Company's service in February, 1896, was, on resigning the Company's service, presented with a barometer as a token of esteem and good wishes for his future happiness, the presentation being made by Mr. W. Howe, District Manager.

Mr. A. EMLYN, of the Engineer-in-Chief's Office, on resigning from the Company's service on Sept. 27, was presented with a handsome crushed morocco letter case. The presentation was made by Mr. Prentice.

Mr. W. H. ROBERTS, Instrument Inspector, Nottingham, has been transferred to Sheffield.

Mr. H. SAYWELL, Nottingham, has been appointed local secretary to the Staff Transfer Association in place of Mr. P. R. Cockrem, who has been transferred to Headquarter's Inventory staff.

Mr. E. GASKELL, Fault Clerk, Nottingham, left the service on Sept. 1 to take up fruit farming in Canada. His colleagues presented him with an illustrated copy of Shakespeare's works.

Miss EVELINE HILDER, in the Fees Department at the Maidstone district office, has resigned her position to take up another appointment. On leaving she was presented with a travelling case by the staff.

Mr. A. SEABORNE, Collector, Brighton, has been transferred to Tunbridge Wells.

Mr. A. HARGRAVE, Contract Officer, York, on the occasion of his transfer to Manchester, was presented by the York staff with a gunmetal-cased watch and a fountain pen.

Mr. W. W. MORGAN and Mr. P. W. WHITING, Contract Officers, Hull, were, on the occasion of their transfer to Liverpool and Manchester respectively, each presented by the staff with a shaving set.

#### METROPOLITAN STAFF CHANGES.

##### Promotions and Transfers.

Mr. A. J. CROWE, Inspector, Gerrard, to Test Clerk, Hop.

Mr. C. WILSON, Outstanding Rentals Clerk, to Receiving Cashier, Salisbury House.

Mr. H. B. TAYLOR, Clerk, Metropolitan Stores Office, to Outstanding Rentals Clerk, Salisbury House.

Mr. B. R. BUNTON, Local Engineer's Clerk, Hammersmith, to Local Engineer's Clerk, North.

Mr. C. PHILLIPS, Local Engineer's Clerk, North, to Clerk, Divisional Engineer's Office, Sydenham.

Mr. W. HARNETT, Call Office Attendant, Salisbury House, to D.M.E.'s Clerk, Gerrard.

Mr. G. SMITH, Fitter, City, to Test Clerk, Gerrard.

Miss ETHEL HOWARD, Senior Operator, Gerrard, promoted to be Supervisor, Paddington.

On Miss MAY DE CHASTELAINE's promotion to Hammersmith as Supervisor she was presented by the Kensington staff with a silver backed hand mirror.

##### MARRIAGES.

Miss LILLA PATRICK, Operator, Farnham Exchange, recently resigned to be married, after over six years' service. Before leaving she was presented by the Guildford district staff with a case of cutlery as a mark of their esteem. The subscribers to the Farnham Exchange also presented her with a purse containing £17, together with an illuminated address, as a mark of appreciation of the courtesy and consideration she had shown them in the discharge of her duties. Miss Patrick was also the recipient of a number of other valuable presents from individual subscribers.

Miss KATE MOCKFORD, Chief Operator, Newmarket, who has resigned from the Company's service to be married, was on leaving presented with a handsome dinner service. The presentation was made, on behalf of the staff, by Mr. F. Summersell, Local Manager, Cambridge. Several telephone subscribers felt that the occasion should not be allowed to pass without the courtesy and efficiency with which she discharged her duties during the twelve years she was employed at the Newmarket Exchange being recognised in some way.

Mr. G. A. WHITTAKER, Exchange Inspector, Derby, was presented by the Local Manager, Mr. Stanley A. Young, on behalf of the staff, on the occasion of his marriage to Miss ETHEL GERTRUDE NELSON, late Travelling Supervisor in the Nottingham district, with a case of carvers, table spoons and a silver-headed hatpin, the latter being for Mrs. Whittaker.

Miss NELSON on leaving was presented with a dinner service.

Mr. J. AKED, Local Manager, Keighley, was the recipient of a fumed oak clock and vases from the staff of the Keighley centre on the occasion of his

marriage, which took place on Oct. 5. The presentation was made by Mr. R. Norton, the oldest member of the staff, who voiced the good wishes of his colleagues.

Mr. JOHN TULLOCH, Stores Clerk, Chester, was married on Sept. 12, when the staff presented him with a basket of cutlery.

Mr. J. GRAHAM, Foreman, Dewsbury, who has been in the Company's service many years, was presented with a handsome copper kettle and stand on the occasion of his marriage.

Miss ELIZABETH HANNAH CRAIG, Supervisor, Sunderland, who recently left the Company's service to be married, was presented by the staff with a silver flower stand.

Mr. THOMAS E. THOMPSON, Wayleave Officer, Sunderland, was presented by the staff with an oak pedestal and two beautifully designed flower pots on the occasion of his recent marriage.

Mr. HENRY GEORGE SMITH, Inspector-in-Charge, St. Albans, was presented with a piano stool and cabinet, fire screen and coal scuttle, by the St. Albans and Luton district staff on the occasion of his marriage on Aug. 29.

Mr. C. WOOD, Exchange Inspector, Bradford, was presented by his colleagues with a handsome silver tea service and cruet stand as a mark of their esteem on the occasion of his marriage. Mr. C. Brocklesby, Electrician, made the presentation.

Lineman Inspector W. HASSALL, of Wednesbury, on the occasion of his marriage, was the recipient of a handsome copper curb suite, the presentation being made by the Local Manager of Walsall, Mr. W. Dalton.

Mr. T. WALKER, Wireman, Swansea, was, on the occasion of his marriage, recently presented with a handsome clock, subscribed for by the members of the Swansea engineering staff. Mr. W. J. Hodgetts, Engineer, made the presentation.

Miss LILIAN MILLS, Operator, Sheffield, on resigning to be married, was presented with a set of dessert spoons and forks.

Inspector H. SHAW, Sheffield, on the occasion of his marriage, was presented with a clock.

Mr. F. P. WARD, Correspondence Clerk, Sheffield, was on Sept. 23 the recipient of a handsome oak *secretaire*, presented by the staff on the occasion of his marriage. Mr. Thyne, the Chief Clerk, made the presentation, and expressed on behalf of all the subscribers the good wishes for the future happiness of Mr. Ward.

Inspector S. F. CHAPELOW, Durham, was presented with a Queen Anne teapot by the staff on the occasion of his recent marriage.

Mr. T. A. FREEMAN, Fee Clerk, Southampton, was on the occasion of his marriage presented with an occasional table, the presentation being made by the District Manager.

Mr. A. J. SQUIRES, Assistant Rental Clerk, Southampton, who entered the Company's service in January, 1906, was on the occasion of his marriage presented with a music stool by the district office staff, the presentation being made by F. W. Richards, Chief Clerk. As a matter of interest it may be mentioned that Mr. Squires is also an artist, and has two paintings hung in the Southampton Art Society's Exhibition.

Miss J. GIBSON, Senior Operator, Selkirk, was presented by the members of the Border district staff with a handsome china tea set on the occasion of her marriage.

Miss EMILY MANEY, Mid Yorks district, Travelling Supervisor, was presented with an oak clock and silver cake stand on the occasion of her resigning to be married. She entered the Company's service on Feb. 24, 1899, and was promoted to be Travelling Supervisor June 18, 1909.

##### Metropolitan Traffic Department.

Miss AMELIA WILSON, Operator, Dalston, on leaving to be married, was presented by her late colleagues with a case of fish knives and forks.

The following operators at Holborn, who have left the service to be married, received the following gifts:—

Miss EMILY CASTLE, a coal scuttle and set of specimen glasses from the staff; a silver butter knife and a painting from personal friends at the Exchange.

Miss EMMA RAVENING a set of oak trays from the staff; brush and crumb tray and fern pots from personal friends.

Miss GLADYS CAVE (who is to be married in New Zealand), a clock and jam spoon from the staff; jam dish and tea cloth from late colleagues.

##### OBITUARY.

We regret to record the death of Mr. T. W. BATHGATE, Joiner, of the Manchester electrical staff, who died on Saturday, Sept. 24. Mr. Bathgate, who entered the Company's service in August, 1898, has been absent from duty since July 18. He was greatly respected by the whole staff, and was a very conscientious workman. The funeral took place at his residence, Kendal, on Sept. 28, flowers being sent by the electrical and clerical staffs.

We regret also to record the death by drowning of ex-wireman F. JEUNE and labourer F. JEUNE, jun., son of the former.

The father had for ten years been a member of the outside staff at Jersey, but had resigned therefrom during the present year. The son was still in the employ of the Company as a labourer. It appears they went on Oct. 16 for a trip to St. Aubins in the son's sailing boat when, on the return journey, a sudden squall struck the boat and caused her to sink, carrying young Jeune down with her. His body was found beneath the boat, but as no trace of the elder Jeune can be discovered it is presumed that his body has been carried out to sea.

Young Jeune was a most steady and willing workman, and was greatly esteemed by his comrades. He had been a member of the outside staff for the past six years. The funeral took place on Oct. 19, when a suitable wreath was sent in the name of the Jersey staff. The Company was represented by Mr. Howard Eady, District Manager, Mr. S. Amy, Chief Clerk, and Mr. J. J. Berry, Chief Inspector, Jeune's comrades in the gang acting as bearers.

### STAFF GATHERINGS AND SPORTS.

**Swansea.**—A smoking concert in connection with the Swansea Telephone Society was held at the Adelphi Hotel, Swansea, on Oct. 14, when a good muster of members spent an enjoyable evening. Mr. W. E. Gauntlett (District Manager) occupied the chair. An excellent programme had been prepared, the following artistes doing excellent service:—Messrs. E. W. Thomas, F. Tagholm, H. G. McArthur, J. Walker, W. Bevan, H. Cranage, C. Trickey, B. Francis and H. Dennis. Mr. H. P. Poole proved an excellent pianist. During the interval the chairman made a short but excellent speech, dealing with the work of the society and the need for the staff to render themselves as efficient as possible. Mr. W. Pennington (P. O. Sectional Engineer), on behalf of the visitors, expressed his pleasure at being present and meeting future colleagues in the telephone service of the State. The committee, Messrs. C. A. Bevan, H. G. McArthur, W. King and F. Tagholm, are to be congratulated on the successful results of their efforts.

**Newcastle-on-Tyne.**—A smoking concert was held on Sept. 28 in the Savoy Restaurant to bid *adieu* to those members selected for the inventory staff. There was a good attendance and an excellent programme was arranged and carried out under the direction of Mr. J. Jordan. Mr. F. W. Gaskins, who was chairman, took the opportunity on behalf of the district staff to present Mr. R. W. Jackson, District Engineer, with a handsome leather kit bag. Mr. Gaskins stated that the present was not given as a leave-taking, but as an appreciation of the staff's long association with Mr. Jackson and as a token of the esteem they held him in. Mr. Jackson in accepting the gift referred to his long association with the National Company, and the Northern District Telephone Company prior to amalgamation, and thanked the staff for the valuable assistance they gave him in carrying out his duties as late Local Manager and all those who had since served under him as district engineers.

**Edinburgh.**—*Ampere Gif Club.*—The final of the summer hole-and-hole tournament was decided over the Braid Hills course, when Mr. John Robertson defeated Mr. W. C. Black by five up and three to play.

**Sheffield.**—*Annual Trip.*—About 70 members of the Sheffield staff and friends had an enjoyable day at Cleethorpes on Sept. 17. A special train was provided by the Great Central Railway, and the journey was made in record time. On arrival the staff broke up into several parties and took full advantage of the amusements provided. The weather was quite tropical, and the staff were unanimous in the opinion that it had been one of the most enjoyable outings ever indulged in. One of the parties, who preferred boating by moonlight, had the pleasant experience of being landed by a horse and trap, which had to go out to them quite half a mile through the water owing to the lowness of the tide. Dancing on the pier ended the day, and the start back was made at 9.30 p.m. The committee for the arrangements were Messrs. K. F. Jones, C. Marsden, H. G. Rowe, H. A. Stokes, W. Thyne and Miss Raynor.

**Cardiff.**—The district staff held a smoking concert on Saturday evening, Oct. 1, at the "Marchioness of Bute" Hotel, Cardiff, to celebrate the appointment of the District Manager, Mr. B. Waite, as one of the sectional chiefs on the inventory staff. The chair was occupied by Mr. J. James, Engineer, and during the evening occasion was taken to make a presentation to Mr. Waite of a silver cigarette case and match box. Mr. James made the presentation, and asked the District Manager to accept the gift with the best wishes of the staff. Speeches were made by the Chief Clerk, Contract Manager and the Local Manager for Newport. The operating staff were unable to make their presentation themselves owing to Mr. Waite being out of town until that evening. However, the Traffic Manager, who was at the smoker, presented Mr. Waite with an umbrella and amber cigarette holder on their behalf. Mr. Waite suitably replied, and gave a short *resumé* of the work done since he was associated with Cardiff as District Manager. Towards the close of the evening the Chief Electrician presented Mr. Ginn with a pipe and tobacco pouch, Mr. Hague with an umbrella, and Mr. Smart with a walking stick on the occasion of their appointment on the inventory staff. The concert was thoroughly enjoyed by everyone present, and thanks are due to Messrs. Lucas, Bateman, Jennings and Garland, who so ably contributed towards the success of the evening.

### LOCAL TELEPHONE SOCIETIES.

**Bath.**—The opening meeting was held on Oct. 5, when Mr. R. A. Dalzell presided and gave an interesting address dealing with economy in telephone administration, illustrated by concrete examples, and emphasising the value of careful preliminary studies in relation to any proposed scheme. Mr. W. A. Taylor's paper, "Local Office Work," dealing with this branch in all its details, was also read. Interesting discussions followed, and the success of the inaugural meeting promises well for the forthcoming session, staff being present from Trowbridge, Swindon, Devizes, Bradford, Radstock and Chippenham.

**Birmingham Operators.**—The first meeting of the session was held in the central operators' dining-room on Oct. 13, the president, Mr. E. Williamson, being in the chair. A paper was read by Mr. M. Bowes on "Supervision," which was very interesting. The speaker dealt with the subject from the supervised point of view as well as the supervisors'.

**Bournemouth.**—On Oct. 12 the local society held its first meeting of the session. Owing to the wet weather only a small percentage of the members attended. The vice-president (Mr. W. Howe) occupied the chair. A very interesting paper was given by Messrs. Hunt, Beal, Moore and Blewdon on "The Life of the Works Order," which was supplemented by the chief clerk, Hants, Dorset (Mr. F. W. Richards). Mr. W. Howe addressed the meeting and a very full discussion took place, followed by a vote of thanks to the speakers.

**Cardiff.**—A general meeting was held at St. John's Schoolrooms, Cardiff, on Sept. 6, when the syllabus for the session 1910-11 was arranged. The following officers have been appointed:—President, Mr. R. A. Dalzell; vice-presidents, Messrs. B. Waite, J. James, W. H. Kirk, W. J. Marsh and S. F. Whetton; hon. secretary, Mr. G. R. Woodworth; treasurer, Mr. E. O. Phillips.

**Dover.**—The fourth session opened with a very successful meeting at the district offices (Dover) on Oct. 11, when an excellent paper was given by Mr. E. J. Woods (Local Manager, Margate) on "Faults in Overhead Plant: How Preventable." Mr. C. F. Ashby (District Manager) occupied the chair. Mr. Woods illustrated his remarks by drawings and showed a number of interesting experiments. On the conclusion of the lecture some good points were raised and a keen discussion followed. There was a total attendance of 43, including seventeen non-members, mostly construction staff and faultsmen.

**Exeter.** The committees have been appointed and a varied syllabus has been prepared, a start being made on Sept. 25. It has been decided to start a library in connection with the grant allowed by Head Office last year.

**Greenock.**—The annual general meeting was held in the Contract Department on Oct. 11, under the chairmanship of Mr. A. Ramsay Lamb. The hon. secretary submitted his report and briefly reviewed the past session. The balance sheet was read and adopted. The following office bearers were elected for the coming session:—Hon. president, Mr. F. Douglas Watson; president, Mr. A. Ramsay Lamb; vice-president, Mr. John A. Swanson; secretary and treasurer, Mr. A. Wilson.

**Gloucester.**—A meeting was held at the district office on Sept. 29 presided over by Mr. C. Elliott, District Manager. The balance sheet for the past session having been read, the following officers were elected for the session 1910-11:—Mr. R. A. Dalzell, president; Mr. C. Elliott, District Manager, Mr. F. W. Sceats, Assistant Engineer, vice-presidents; Mr. S. G. Hare, hon. secretary and treasurer.

**Hull.**—The annual general meeting of this society was held at the Shakespeare Hall on Oct. 17, under the chairmanship of Mr. A. K. Murray. After the minutes of the past session were read and confirmed, the secretary and treasurer presented their reports, which were adopted. The following officers were elected for the ensuing session:—President, Mr. C. C. Wort; hon. secretary, Mr. A. E. Pinnock; hon. treasurer, Mr. G. R. Hill.

**Isle of Man.**—The first meeting was held on Oct. 3, when the president and officers were elected. A short address was given by the District Manager on the whole staff pulling together. It is proposed with the funds in hand to buy some more standard works on telephony and electrical subjects to lend to the staff. Prizes will be given for First, the best three papers read during the session; second, the best suggestion or device to improve the system of working in any department; third, for the inspector who has the best kept district; fourth, the inspector who has the least ordinary faults on his section; fifth, the best timekeepers in all departments.

The second meeting took place on Oct. 14 at the new meeting room, Rosebery Chambers. A paper was read by Mr. G. Gillmore, District Manager, on "Preparations for Breakdowns on Overhead and Underground Systems."

**Leeds.**—The principal officers for the ensuing session will be Mr. J. C. Chambers (hon. president), Mr. W. V. Morten (president), Mr. W. R. Senior (chairman), Messrs. G. H. Sergeant and J. H. Corlett (corresponding and financial secretaries respectively). The session was inaugurated by a whist drive and dance, arranged by Mr. P. S. Niemann, on Oct. 21.

**Leicester.**—The opening meeting was held on Oct. 14. The president (Mr. F. Lucas) occupied the chair, and in a short introductory speech outlined the programme of the ensuing session, which promises to be of exceptional interest. Mr. Lucas emphasised the necessity of the continued loyal support of all members in regard to attendance and punctuality. Mr. J. Hyde, Sheffield, read a paper on "Automatic and Semi-Automatic Exchanges," which he illustrated by lantern slides. The lecturer has a masterly grasp of the system of automatic working dealt with, and was listened to with much interest by the members present; the attendance averaged 62.5 per cent.

**Southern (London).**—This, the oldest of the Metropolitan societies, opened a new session on Sept. 23 with a successful paper read by Mr. E. S. Byng, A.M.I.E.E., upon "The Factor of Safety." The president, who was in the chair, before introducing Mr. Byng, addressed a few remarks to the audience, who were present in good numbers, and, it is pleasing to note, included quite a number of visitors. At the close of the last session the following gentlemen were elected as officers for the present session:—President, Mr. W. Blight; vice-presidents, Mr. T. M. Inman, Mr. G. H. Payton; committee, Messrs. Baxter, Bignell, Hayes, Morphew, Shipton and Ware; hon. secretary, treasurer and librarian, Mr. H. W. Grant (Hop Exchange).

**South Midland.**—The annual meeting was held at the district office, Coventry, on Oct. 13, when Mr. J. Mewburn presided over a fair attendance of members. The hon. secretary (Mr. W. H. Oliver) read the fourth annual report and balance sheet, which, upon the proposition of the chairman, were unanimously adopted. The election of officers for the ensuing year was then proceeded with, and resulted in the following being elected:—President, Mr. J. Mewburn; vice-president, Mr. R. S. Grosvenor; secretary and treasurer, Mr. W. H. Oliver. A short address upon the objects of the society was then given by Mr. R. S. Grosvenor, which was followed by a short discussion, the main part of the latter being how to make the meetings more interesting to the members. It was decided to award the sum of £1 1s. to the writer of the best paper given during the session by a member of the society.

**Swansea.**—A general meeting was held at the Docks Exchange Hall on Sept. 27, Mr. W. E. Gauntlett (District Manager) occupying the chair, when it was unanimously decided to continue the monthly meetings of the society during the coming winter. The balance sheet for last session was read, after which the election of officers was carried out. The following members of the society were elected:—President, Mr. W. E. Gauntlett; vice-presidents, Messrs. C. A. Bevan, A. G. Bristow and W. J. Hodgetts; secretary, Mr. W. H. Crook; treasurer, Mr. J. A. Thomas. An excellent syllabus is being prepared, and a successful session is anticipated. The first meeting takes place on Oct. 19, when Mr. W. E. Gauntlett (president) gives a paper entitled "The Present Position."

**Torquay.**—The first meeting of the session was held on Oct. 3, when the president (Mr. H. Reid) opened with an address and afterwards read a paper entitled "Traffic and Engineering Economy." Many interesting points were raised and discussed, and diagrams shown as the paper progressed. An enthusiastic discussion followed.