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TELEPHONE MEN.

XI.—THOMAS ROWE.

THOMAS ROWE was born at Galphay, a village near Ripon in Yorkshire, on June 5, 1839.

His father was a somewhat remarkable man, who up to the age of 19 worked at a coal pit near Durham and did not know a letter of the alphabet. He, however, had a burning desire for knowledge and determined to educate himself, and eventually became a schoolmaster. Whilst at Skelton, near Ripon, he was retained by Earl DE GREY as grammatical instructor to two of his daughters at Newby Hall. The elder Mr. ROWE was a schoolmaster for nearly 40 years, and when he was unable to teach, Earl DE GREY allowed him a pension for life, and at his death the Marquis of RIPON continued it to his widow for her lifetime.

As the subject of this sketch obtained a pension from the Post Office Telegraphs in 1878 (after nineteen years' continuous service) and is now retired on a pension from the National Company, it will be seen that he has gone one better than the old people.

In 1852 the stationmaster of Ripon, who had also been a schoolmaster, and knew Mr. ROWE's father well, brought him in as first telegraph boy at that station. At that time the telegraph service was not open to the public, in fact the telegraph line between Leeds and Stockton had only been recently constructed, and the circuits were used purely for railway purposes. The British Electric Telegraph Company had constructed this line, the poles of which were Scotch fir, erected with the bark on, and the branches not very neatly trimmed off. They were about eighteen to twenty feet long, and the arms were put on in the form of the Roman letter X. No. 8 galvanised wire was used, and the construction staff made their own insulators as they went along, forming them out of gutta percha! The instrument used by this Company (British Electric Telegraph Company) was Highton's single needle, worked off Daniell batteries.

Sometimes when a passenger lost his luggage he would enquire if he could send a telegraph message and what the cost would be. It was the custom to make a charge of 1s., irrespective of the number of words, and the money went into the pocket of the

telegraph boy as a perquisite. The next year, when the British Electric Telegraph Company sent a gentleman from Head Office with forms, books and the card of rates, the charge to Leeds turned out to be 2s. 6d., to London 7s. 6d., and as, he explained, the receipts were to be handed over to the stationmaster, the subject of this article began to think that they were getting "very strict."

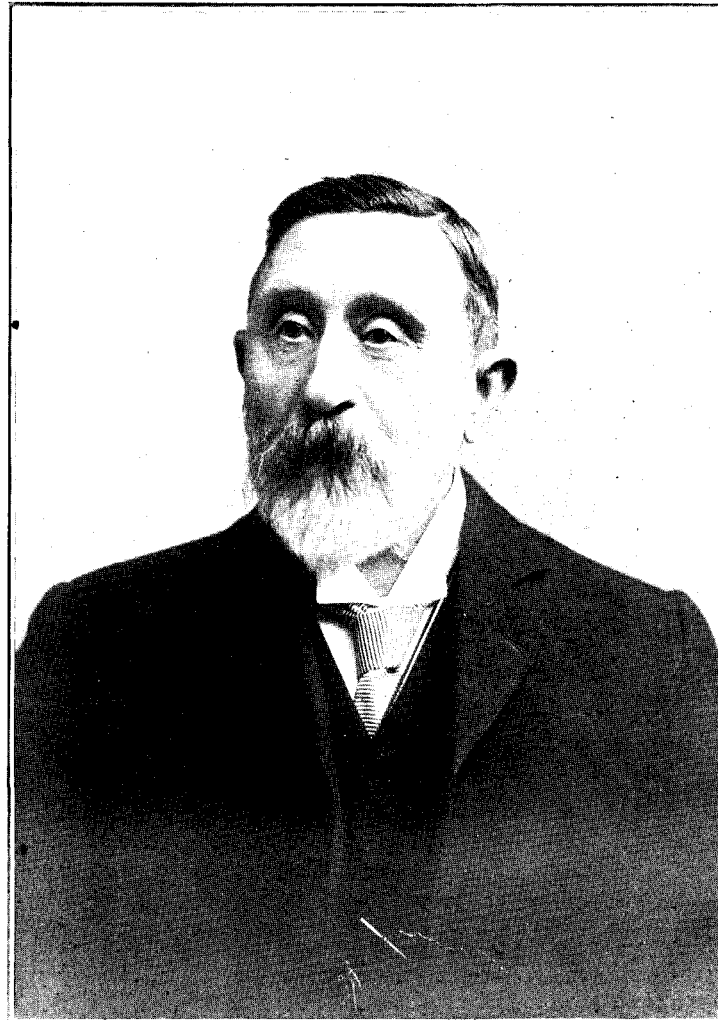
From Ripon Mr. ROWE was transferred to Stockton, and later he was appointed to teach telegraph boys at the various stations between Stockton and Leeds, when a proper system of telegraphing train orders was introduced. The next move was to open a town office in Bury, and Mr. ROWE was then transferred to Lancaster, going later to Warrington (Arpley Station), Preston and Bradford (Yorks).

As an item of present-day interest it might be pointed out that as far back as 1854 Lancaster was intermediate on an underground circuit between Liverpool and Carlisle. The contractor was the late Mr. HENLEY, of London.

Hull was next reached in Mr. ROWE's peregrinations, and here he became acquainted with a skipper of a coasting vessel; as he had never really relished sedentary work and longed for something of a more active nature, he left the Telegraph Company and took three or four short voyages, but finding that neither the skipper nor the mate understood navigation, and that there was no chance of learning it with them, he left the ship at South Shields and went home.

Shortly afterwards the engineering inspector at Pontefract, hearing that Mr. ROWE was disengaged, wrote for him to go to Leeds, and in January, 1859, he made his entrance into the Engineering Department of the British & Irish Magnetic Telegraph Company. His experience at sea,

although a rough lesson, was of the utmost value to him ever after. It was a good apprenticeship in discipline and ready obedience to orders, in hardihood and courage in danger. It was his first experience of rough, hard work, and enabled him afterwards cheerfully to tackle anything given him to do. In telegraph construction he found an occupation in which he could take the greatest interest. Fortunately he was placed under a first-class foreman, a really good construction



man, very strict and very particular about timekeeping. Curiously, at a later period this foreman did some very good and important work under Mr. ROWE.

Towards the end of 1859 Mr. ROWE was brought to Manchester and made Assistant Inspector under Mr. BINNIE, and some time later promoted to Inspector and held that position until 1870, when the Post Office purchased the telegraphs.

At that time the British & Irish Magnetic Telegraph Company were contractors to the Lancashire & Yorkshire Railway Company for all their circuits, which they maintained after construction. The district was essentially a railway one, with the exception of a road line which ran from Manchester to Stalybridge on the railway and thence by road to Barnsley over the Wood Head Moors. Between Saltesbrook and Boardhill Bar, the highest point of the moors, breakdowns were experienced every winter, and although the poles were low and strong, and there were only six No. 8 wires on them, the wires frequently became coated with ice to a surprising extent. One specimen brought to Manchester by Mr. ROWE measured seven inches in circumference.

On Feb. 5, 1870, Mr. JOHN WALSH, who had been the superintendent of the Manchester district, was made divisional engineer under the Post Office, and took Mr. ROWE over with him as Superintendent of the Manchester Sub-division of the Northern Division. In 1878, as the Postal Telegraphs had not paid, a committee of enquiry was appointed under Sir LYON PLAYFAIR, which recommended certain reductions on staff, and Mr. ROWE elected to retire.

On May 31, 1881, Mr. ROWE joined the Lancashire & Cheshire Telephone Company under Mr. T. CLARK at Manchester, and had charge of the Bolton district for twelve months. The last piece of work he did in this district was the opening of seven exchanges in North Wales, which had to be opened within a month to comply with license requirements.

On June 5, 1882, Mr. ROWE came to Liverpool and was introduced to Mr. CLAXTON. There were about 450 wires in the Liverpool district at that time, all overhead. Scarcely any attempt had been made to form proper routes. Wires had been run into the exchange from all directions in the most primitive manner, until there was hardly a place left to hitch a wire on to, and any amount of orders were coming in. The men had had no real training in sound construction work, knew nothing about the proper regulation of wires, and they had to be educated, which was one of the greatest difficulties the subject of our sketch had to contend with. Mr. ROWE commenced to build routes, starting from the outside and working inwards. As far as possible poles were used, and the wires gradually cleared from off the roofs. As the work progressed, faults began to be reduced, and upon the completion of the rebuilding work three linesmen only were necessary. When the exchange had grown to about 3,000 wires, and Mr. A. MAGNALL (now engineer for the Manchester district) was head linesman, at one period three days elapsed without a single line fault occurring, and the linesmen were at their wits end to profitably employ their time.

It was found that about 50 per cent. of the faults after gales were due to broken covered leaders, which were simply strung from the termination of the line wire on the chimney for any distance to the instrument. With a view to eliminating this class of fault, arrangements were made to run open wire from the chimney to as near the instrument as possible.

Many complaints were received at this time of wires "humming," and the annoyance and expense of removing wires so complained of became serious. A *sourdine*, formed out of rope and $\frac{3}{16}$ strand wire was introduced, which answered admirably, and saved very considerable expense in removal. In the immediate centre near the exchange, resort had to be made to covered cables, and these proved very useful while the overhead work was under reconstruction in the centre.

During the five years required to reconstruct the Liverpool system, trunk lines were being erected from Liverpool to Wigan, and later from Liverpool to Widnes, Warrington, Runcorn and Northwich, and Hare Castle (Staffs). A cable was run through the Mersey Tunnel in 1885, by which time pole lines had been built in Birkenhead, and it was then possible to give that centre telephone communication with Liverpool.

A trunk line was subsequently built to Chester, thence to Wrexham, Ruabon, and Llangollen. Lines were also built from

Wigan to Chorley, Liverpool to Southport, and pole routes extended in all parts of Liverpool and Bootle.

During the whole of this time a steady increase of new wires took place; an average of quite 1,000 per year had to be coped with, which meant a large increase in the number of gangs, and when the overhead work was in full swing about 30 gangs of men were employed.

When the Royal Insurance Company acquired property in North John Street to erect their new building upon, about 2,500 wires were removed from one of the warehouses, which shows how crowded the wires had become in the centre of the city. Of course, a portion of these were in cables.

In April, 1897, a start was made with underground work between the Central Exchange and Bootle, and to various points about a mile from the exchange to serve the main routes. Mr. ROWE was careful to press for underground work between the various exchanges, excepting the more remote ones, thus securing cable routes for the junctions. Up to the time of his leaving the service in August last, underground schemes, with a view to embracing the whole of the city, have been pressed forward, and very substantial progress has been made, which has reduced the overhead system to such an extent that gales have nothing like their former effect.

Liverpool has grown from 450 subscribers in 1882 to 25,000 stations at the present time, so that it will be seen that during Mr. ROWE's career a big system was built up, first overhead and then underground. He thus had a complete experience of telephone construction from the earliest methods, which is not the lot of every man, and he can well be designated as one of the pioneers of telephone line construction.

Mr. ROWE is one of the most genial of men, full of humour and anecdote, and is known by all telegraph and telephone men in Lancashire and Yorkshire as "TOMMY ROWE." He was, and is still, a great walker, and nothing delighted him more than to take a thick stick and trudge miles across country inspecting his routes, and on these journeys no faults escaped his notice. These walking tours kept him in excellent health, but when the district was made smaller in area, when the outside routes were taken over by the Post Office and underground work was established, his opportunities for walking were greatly reduced; nevertheless, at the present moment, although nearly 68 years of age, there are few who could do a day's walk, taking hedges and ditches, as he can. He is also particularly fond of gardening.

He took a great interest in the local telephone society from its commencement, not only reading papers, but giving practical illustrations by taking members of the society along his country routes and explaining every little detail to them.

He was most conscientious in all his dealings and was much liked, as well as respected, by the staff under him.

Although he has had a large amount of underground work to carry out, his great *forte* was overhead work, the good quality of which in many exposed places along the Mersey on very high warehouses told to his credit, and especially so when Liverpool, as is often the case, was visited by severe gales.

ANNUAL MEETING OF OFFICERS, 1907.

This meeting which will be held on May 30th and 31st, will be conducted on lines similar to those adopted last year.

The following papers are to be discussed—

- A.—Alterations in the Company's methods and practice in the following Departments consequent on the introduction of Measured Rate Service.
 "Accounting." By Mr. A. C. GODFREY, Chief Clerk, Liverpool. To be criticised by Mr. F. D. WATSON, Superintendent for Scotland, and Mr. J. STIRLING, Portsmouth.
 "Contract Department." By Mr. H. J. MACLURE, Contract Manager, Birmingham. To be criticised by Mr. R. A. DALZELL, Western Superintendent, and Mr. W. SENIOR, Leeds.
 "Traffic Department." By Mr. E. S. FRANCIS, Electrician, Liverpool. To be criticised by Mr. W. HOWE, Southampton, and Mr. R. GILMOUR, Belfast.
- B.—"Methods and Costs of Erecting Aerial Lead-covered Cable." By Mr. A. B. GILBERT, Glasgow. Criticised by Mr. C. ELLIOT, London, and Mr. B. WAITE, Cardiff.

APPRECIATION OF QUICK SERVICE.

THE following has been received at the Company's Bradford office from a limited company in the Huddersfield district:—

"The service is simply wonderful. It is marvellous how the operators get through their work. They invariably answer our calls before we have time to take off the receiver, after ringing up exchange."

RAW MATERIALS.

Paper read before the London Telephone Society by Mr. J. E. KINGSBURY of the Western Electric Company.

I AM afraid that the title which I have given to this paper may be a little misleading. It is probable that expectations as to its scope may be aroused which will not be verified. Let me say at once that when your secretary kindly gave me the opportunity of reading a paper for a certain date I gladly availed myself of it, but I had not any definite plan regarding the subject for selection, though I thought that something which might arouse discussion on the bearings of the work of my Company in relation to the work of your Company, would at least be of interest to us all, and might possibly be of some profit in facilitating the work in which both Companies are concerned, and in which the public also have a considerable interest. When, then, your secretary promptly followed up my acceptance with a request for the title of the paper for inclusion in the syllabus, I was in something of a quandary. I got out of it by thinking of a title which would permit of wide treatment—something akin to what I believe is called in the States a "blanket specification" and not unlike the cloak of charity in the variety of other characteristics which it may possibly cover. Yet I do not wish to give you the impression that I purpose wandering from my title as theologians sometimes wander from their text. It is rather in the interpretation to be given to the title that you and I may perhaps differ.

What is raw material? The term evidently had its origin in man's partiality for the inner man and like many other modern terms has survived from ancient times. There is every reason to believe that Adam ate his apple raw. The wheat is the raw material of the miller; the flour is the raw material of the baker, and of that domestic chemist, who, unfortunately, is frequently an incompetent "general." And thus perhaps from the primitive hearth the term was transferred to the primitive forge, but directly it left the kitchen it necessarily became a very elastic term and was applied by each worker to the material upon which he commenced operations, without regard to the processes which it had previously gone through, or the labour previously expended upon it. The raw material of the village blacksmith is the iron bar, but that iron bar has been wrought by others before it reaches him, and it is necessary to go still further back to observe it as unworked, or really raw, material. So it may be said that the raw material of your Company is the finished product of my Company.

You seek to extend the blessings of telephonic speech amongst the public and, incidentally, to pay a dividend to your shareholders. We seek to provide you with some of the important material required in your work, and, also incidentally, to make some return on the capital employed in our enterprise. The question for the moment is whether from the vast work of your Company and the not very limited scope of my Company's activities I can select a few points for consideration which are likely to be of interest and possibly of mutual benefit. I think I can, though I will at once admit that my difficulty is one of selection. Not what to include, but how to exclude the many points of interest which arise in considering the combined subjects of your work and ours, is the principal difficulty, and by way of solving it I purpose limiting my remarks to some few points bearing on the preparation of our raw materials into that finished condition which shall fit them for service as your raw materials.

First comes necessarily Invention.

Secondly, Design.

Thirdly, Manufacture, with a consideration of the conditions controlling it, and

Fourthly, Supply and Distribution.

I.—Invention enters in a greater or less degree into all that we make and you use. The invention sometimes emanates from one individual, is more often the combined work of several individuals, and is generally prompted by a requirement to meet a felt want justifying the proverb, that Necessity is the mother of Invention. I cannot trust myself to embark upon a recital of the many features of invention connected with telephonic apparatus, but I am tempted to refer to the telephone itself as an example of the extraordinary

scientific and practical results which have been attained by means of a few shillings-worth of raw material and a few shillings-worth of labour. There is the work of genius which stands out beyond all other inventions, not only in its results, but in the simple means and the slight cost by which those results are attained. To the invention of the telephone you and I are indebted for the raw material which provides our sustenance, and for many anxieties, worries and troubles, which I am afraid are not counted to our credit to the extent they should be; but you know as well as I do that the telephone was but the beginning of a series of inventions required to develop its use in the way we know it now. Many of those inventions which have gone into general use have been developed by our own staff of experts and most have been manufactured in our own factories.

II.—After invention comes design. Design is of two kinds. There is the manner in which the needful elements may be combined, and the form which such a combination assumes. In much of the apparatus with which you and I have to deal almost the only consideration is that of practical utility, but in some others the form assumes æsthetic importance. In both types, however, good design is inextricably mixed up with manufacture. Any apparatus the design of which omits from consideration the exigencies of latter-day methods of manufacture cannot be expected to be a success. It is to my mind just a question how far the inherited ideas of the most suitable appearance of certain objects will need changing by reason of change in methods. It was a safe rule that external lines should be constructional lines, but then there was a proportion between weight, mass, and strength, which is rapidly being changed.

Certain forms are pleasing. Are they pleasing because they are on true lines, or because we had grown accustomed to the relationship? At any rate we must recognise that many modern forms of construction having an external resemblance to older types are not examples of truth, and whilst I am ready to admit that we may have to trim a little, I am disposed to think that the form which is nearest the truth is the safest to assume. It is a far cry from the Tower Bridge to telephone apparatus, but by comparison I think that, in the main, the appearance of much of the latter is more in accordance with construction and therefore on sounder lines.

On certain classes of apparatus such as instruments in the subscribers' offices the strictly utilitarian view should not be allowed undue weight. A purpose has to be served, and if that purpose can be served just as well by a pleasing design as by an unpleasing one, then the former should be chosen. But there should be no sacrifice of efficiency for appearance. The purpose is the main thing and everything else must stand aside.

You can all make a mental picture of various combinations of the same three elements of magneto, transmitter, and battery box. There is the old familiar three distinct elements in separate square boxes screwed to a long four-square board, and there are the various other forms in which the three elements have not been so crudely placed but have been more or less tastefully combined. I am bound to say that many such combinations have been rather less than more tasteful, the total lack of ornament in the older form being perhaps more sound than the excess of ornament, the twists and little curly turns of many of the later forms. But the introduction of the central battery system which has done so much for efficiency has also been helpful on the æsthetic side. The need for fewer parts, some of them detachable, has considerably simplified the problem of how to place your raw material in a subscriber's office in a form which is not too raw for his susceptibilities.

As a simple and familiar example let us take the desk set of to-day. The necessary elements are four, a transmitter, a receiver, a switch and a pedestal to support them. The parts may be well designed in themselves but you cannot obtain a balanced structure as a whole. The exigencies of use require the transmitter to overhang in one direction and the switch and telephone in another, and this eccentric arrangement calls for a base which is wide and weighty and satisfies the eye as it satisfies the engineer.

These are but externals. Consider those features of design which are obscured and the work expended on them. The transmitter with all its parts, each and all having been designed with a view to the purpose they serve and to the facility of their

manufacture; the switch that its contacts may be safe and its action certain; the hook itself with no protruding points that may damage the diaphragm of the instrument it supports. To you who know these things it is but needful to recall them. You can realise without any words from me how the simplest instrument just bristles with large and small details the design of which has required, and the further improvement of which still requires, the greatest possible skill and care of a small army of experts in their several departments.

III.—Coming to the third division of manufacture, it is not too much to say that it would be impossible to supply the requirements of your service without producing the apparatus by means of labour-saving appliances and a highly systematised subdivision of labour, which is sometimes assumed to be very modern, but which is really of very respectable antiquity. We are sometimes excessively proud of some especially ingenious machine, and we have good reason to be proud of it, but it is just as well to remember that it is but the development in a higher form of the same principle which has been evolved before, when the circumstances have been such as to call for it.

You will remember that ADAM SMITH illustrates the advantage of the division of labour by recounting the processes in the manufacture of pins. He says: "The important business of making a pin is in this manner divided into about eighteen distinct operations, which in some manufactories are all performed by distinct hands." In one factory he cites, the processes were divided between ten men. The ten men could make among them upwards of 48,000 pins in a day, or proportionately 4,800 each, whilst without such subdivision of labour he estimates that they could not each of them make more than twenty.

With regard to machinery, ADAM SMITH says "everybody must be sensible how much labour is facilitated and abridged by the application of proper machinery," and he holds that the development of special machinery is itself a product of the division of labour. It was in 1776 that SMITH published his *Inquiry into the Nature and Causes of the Wealth of Nations*, and 56 years later CHARLES BABBAGE—known in his youth as the Calculating Boy, and celebrated in his manhood as the inventor of a calculating engine—wrote a treatise *On the Economy of Machinery and Manufactures*; a work which has been called "a hymn in praise of machinery." In this work BABBAGE gives a simple illustration of the advantages of making special tools, appliances, or machinery for the production of goods in quantity. "There exists," he says, "a considerable difference between the terms *making* and *manufacturing*. The former relates to the production of a *small*, the latter to that of a *very large number of individuals*; and the difference is well illustrated in the evidence given before the Committee of the House of Commons on the export of tools and machinery. On that occasion Mr. MAUDSLAY stated that he had been applied to by the Navy Board to make iron tanks for ships, and that he was rather unwilling to do so, as he considered it to be out of his line of business; however, he undertook to make one as a trial. The holes for the rivets were punched by hand-punching with presses, and the 1,680 holes which each tank required cost seven shillings. The Navy Board, who required a large number, proposed that he should supply 40 tanks a week for many months. The magnitude of the order made it worth while to commence *manufacture* and to make tools for the express business. Mr. MAUDSLAY therefore offered, if the Board would give him an order for 2,000 tanks, to supply them at the rate of 80 per week. The order was given; he made tools, by which the expense of punching the rivet holes of each tank was reduced from 7s. to 9d.; he supplied 98 tanks a week for six months, and the prices charged for each was reduced from £17 to £15."

Incidentally it may be remarked that in these days of effort to attain exact standards and accurate definitions, it seems a little unfortunate that the distinction made by BABBAGE between the two processes of production should have applied the word "manufacture" to the production of a quantity in which machinery enters largely and the hand but little, and the word "make" to the production of the small quantity in which the considerable use of machinery is absent, and the hand necessarily does most of the work. Considering that the literal meaning of "manufacture" is "made by hand," and that the word "make" is applicable to any method it might have been better if the terms had changed places. These, terms have, however, now come into use in the way that

BABBAGE used them, and consequently must be accepted. But we can give a wide interpretation to "manufactures," since all are the work of man's hands and not the product of Nature. But this is not a dissertation on words, and we must avoid too great a digression, and return to the discussion of the practical features which the word represents.

You have in the instance given by BABBAGE an example of the economy and the increased productivity which results from the use of special appliances in manufacture, and the example given is one which we can all readily understand.

Let us consider what were the conditions which must necessarily exist in order that the work might be carried out with that economy and dispatch which Mr. MAUDSLAY effected. In the first place it was necessary for the Navy Board to give an order for a large number at once. If they had confined themselves to ordering from hand to mouth—a few at a time, the maker could not have made special tools. It would not have paid. In the second place it was necessary for the Navy Board to make up its mind what kind of a tank it wanted, and to stick to its specification in every detail. Supposing after the first delivery the Navy Board had said "We want ten rivets along the side instead of nine." It is clear that the tools already made would be useless. New tools would need to be made, deliveries stopped in the meantime, and a number of hands laid off. It is easy to see that all this would have involved direct expense and loss, whilst in addition there would be the inevitable increased expense of a fresh start, instead of a continuous manufacture. One other feature not mentioned by Mr. BABBAGE is that, whilst the total number delivered in a given period was large, the first delivery was necessarily deferred for the preparation of the necessary tools.

Your problem and our problem to-day is just the same as this example which I have taken from a book three quarters of a century old. It differs only in degree. But the facilities of the times differ too, and, whilst the complexities have increased a thousandfold, science and the arts have also advanced so as to enable the complexities to be more easily grappled with. The main principles remain the same. For manufactures in quantity, special tools must be made, machinery must be specially adapted, and the organisation of the output specially provided for.

With few exceptions your supplies must be manufactured in quantity. It would be impossible for you to give the benefits of the telephone at the existing rates unless you were able to procure apparatus of the most perfect character, at the cheapest prices. What then is the policy which suggests itself as offering the best all-round results? Clearly if the manufacturer has an existing type which meets your requirements it must cost you less, deliveries can be more promptly made, and, whilst your commitments should even then be on a liberal scale, they need not anticipate the future quite so much as in the case of a type made to your order only. I am personally very much averse to the adoption of a pattern because it exists, when the conditions prevailing may make some other pattern or some modification necessary or desirable. To guard against any risk of mistake in such a matter it is only necessary that your reasons should be sound. If they are sound and they cover general principles it is more than likely that the desired modifications would be incorporated in the general output and you would get all the benefits. If, however, the changes were to meet only special conditions or personal preferences it would be desirable to make the differences as small as possible. To take the simplest case: You might adopt an instrument in which all the parts were of current manufacture and change only the wiring. The wires come through the backboard and are carried in longitudinal and transverse channels. The positions of the holes are determined by a template, and a machine is set with drills in the way which will permit the holes to be drilled most economically. The channels are cut simultaneously by little saws or mills by a machine which must be set for the purpose of cutting them in those exact positions. You need a change. A new template must be made, the drills reset, and the milling machine reset too. A special stock of these boards must be made apart from the general stock, and if the orders are not continuous so as to keep the machine fully occupied they will have to be reset from time to time according to the work required of them. As Prof. MARSHALL says, in his "Economics of Industry," "It is obvious that the efficiency of

specialised machinery or specialised skill is but one condition of its economic use; the other is that sufficient work should be found to keep it well employed." It is clear that a machine is not well employed when having work done upon it instead of doing work.

Of course it is not possible to obtain that continuous supply of all parts and all operations which is the aim of the economist and the manufacturer. The parts are so numerous and the progress of the industry so rapid that in some of the material for a switchboard, for instance, it is neither safe nor profitable to anticipate demand, and yet the demand may arise. Mr. REINKE, one of our Factory Superintendents, has furnished me with an example of this kind, and of the manufacturing process which necessarily ensues. He instances a particular key, and says: "As there is a certain probability of this key being no longer required it is impossible to make up any stock. This uncertainty makes it also impossible to prepare for any key which will replace it. Nevertheless, an order for an unexpected extension or even for a new switchboard may require these keys for, say, six operators' positions, that is 162 keys. As no stock orders have been placed, either for the complete apparatus or even for parts in view of the uncertainty of the situation, it becomes necessary to begin manufacturing by making up all the parts. This key contains 46 different pieces, requiring 211 operations, and 30 different kinds of machines. For each part, for each operation in fact, special shop orders must be placed and the manufacture of each part must be taken up from the beginning. There are required, among others for example, 162 springs of a certain kind, one per key. In order to punch these springs, which are special, two to three hours of skilled labour are required to set up the tools in the punch-press to be used. The workman then punches the springs in question in one or two minutes, when the machine has to be taken down again and set up for other work. This small order for springs must, of necessity, be handled exactly as any large order to insure its going through the shop regularly and on schedule time. This number of springs must be therefore scheduled regularly, it must be watched by the output department as any other of the 5,000 orders, the movement of the quantity of springs from one department to another must be followed up, special orders must be issued for cutting the raw material strips for the work of the punch-press department, for the dipping department, for the tinning department, and for the platinising department. Besides this, a special number of tickets must be issued for procuring the special tools required from the tool room. Between each operation the number of springs must be inspected and counted. All this is required for the one spring in question. Every other spring, every other of the 46 parts in fact, except a few standard screws, demands this same routine, the same supervision. Orders for the punch-press departments are issued for quantities usually of at least 10,000; and an order for a small quantity requires several times over the attention given to regular orders for large quantities. When a number of such small orders happens to come together, it is evident that a department may have its output halved or even quartered, since all the time available would be expended to set up the machines and only little time left for manufacturing. This quantity of keys, on account of the various difficulties encountered, would usually take about two months for completion and would cost several times the normal price." This refers to more or less exceptional conditions. The plan which the work generally follows I may give in the words of Mr. ALBRIGHT, our shop superintendent in New York, who recently read a paper before the Western Electric Club on "Shop Organisation, Equipment, and Manufacturing Methods." In the course of his paper Mr. ALBRIGHT said: "Most factories producing a large number of small parts seem to have developed along the two general lines—the first being to divide the factory into a number of departments, each of which performs all the machine operations upon and assembles a complete piece of apparatus. The other general plan is to divide the work into departments with reference to the class of mechanical operations performed. In other words, all turning is handled by one department, all drilling by another, all milling by a third, and so on. This method of arrangement gives the most economical results with respect to space occupied, machine equipment required, and, under proper inspection conditions, uniformity of product, but involves a far more complex organisation to handle its internal workings than the scheme first described.

In the manufacture of the majority of the apparatus that we produce, such as transmitters, receivers, relays, etc., we have an assembled article which can be resolved into a number of separate and distinct pieces or parts, each of which can be finished complete without reference to the other. There is no reason, therefore, why any of these parts should be manufactured with reference to any other part appearing in the same instrument. As a matter of fact, a particular part may be used in more than one instrument, and there are frequent cases where it is used in several different pieces of apparatus.

For this reason, we manufacture parts as such without particular reference to the piece of apparatus into which they will be assembled, dividing our manufacturing into two broad classes—first, the making of these parts from raw material, and second, the assembling of the finished apparatus from a stock of these parts. Each part is given a number by which it is known to the exclusion of all names, and to differentiate the stock from the raw material stock, it is called "worked material" or "piece parts."

A separate drawing is made of each part, carrying the worked material number, which contains all the information necessary for the manufacture of the part, and in addition, specifies the raw material which is to be used. It also gives the various pieces of complete apparatus in which the part appears.

For the use of the assembly departments and the other departments which require the information, assembly drawings are made for each piece of completed apparatus, in which each component part is marked with the Worked Material No. for purposes of identification. These drawings are accompanied by Stock Lists which give a summary of all the Worked Material parts used in the manufacture of the completed article.

The division of manufacturing departments adopted by us and this worked material plan are the nuclei around which our system of factory organisation has largely been developed."

Of course the question of the organisation and the plant is dependent upon the apparatus turned out, and the condition of the raw material to be worked on. Here your preferences are controlling factors, output and costs varying accordingly. Let us take one of the simplest possible examples—the frame for the card on subscriber's wall set. Do you want a cast frame or a stamped frame? The cast frame has a solid look, and its sharp angles are pleasing. But solidity is not required for the purpose it serves, and the stamping will certainly meet the requirements. You will note that there is no attempt to rival the sharp edge of the casting. By reason of the different method of production a rounded form has been assumed. Now the hand work in man-hours on the casting is four times that of the stamping, and the machine work in hours is fourteen times as great. The production of the stamping is obviously much the cheaper, but these comparisons are not measures of respective costs. Expensive tools have to be produced before a stamping is possible, which have to be set against the comparatively cheap models required for the preparation of a mould. And for these reasons the questions of time and quantity have an important bearing on the choice of methods. If you want delivery quickly or in small quantities, castings are prompter and cheaper. As your types become standardised and your quantities increase, the other method is the more economical. Let us proceed a stage further. Here is the bracket which holds the transmitter arm of the wall set. It is a solid, weighty, and well-finished casting. It answers its purpose well and it looks good, but it is costly. Recall what I have said earlier about design. This solid casting may be replaced by a very much lighter piece of metal which has all the strength needed, and which is less costly. The cast form undoubtedly approaches more nearly to inherited ideas of construction, but it probably exceeds what is required in strength and substance. The new form meets the requirements, and does not pretend to be what it is not.

IV.—In reaching my fourth division of supply and distribution I recognise that before such an audience as this I am approaching rather dangerous ground, for supply assumes delivery, and absence of delivery means disappointment. But the more dangerous the ground the more profitable may be the consideration of its difficulties, and so far from shirking this section I rather revel in its opportunities. Familiar as I am with our own problems I do not ignore yours. The economic conditions which have to be considered are the same to us both. An undue stock of your raw material is as bad for you

as an undue stock of our raw material is bad for us; and a deficiency is even worse, for your raw material has a continuous earning power whilst our manufactured product has for us an earning power only once for all.

To anticipate your demands in types, in quantities, in places, and to meet those demands as they arise must involve you in great difficulties, and disappointments by manufacturers I know are productive of much irritation. But whilst I have no excuses whatever to offer for manufacturers, I believe it is worth while for us to realise each other's difficulties, and that from such recognition mutual good may result. It is as obvious to you as it is to me that your business is *sui generis*. For your supplies (or the greater part at least) you cannot pursue the cult of the corner shop. The corner shop can only afford to keep stock which is in general demand. It follows that you are compelled to anticipate your requirements and take your own risks in keeping stocks. But you give your orders and you get your promises (or estimates as the case may be) regarding deliveries, and then the manufacturer fails you. Sometimes the manufacturer is in fault. Sometimes he is the victim of circumstances. Perhaps the suppliers of his raw materials fail him. Sometimes he is too sanguine in his estimates. (Was it not said before one of the Telephone Committees by someone who knows that "Manufacturers were a sanguine race"? and sometimes—I will not say the fault is yours, but—the delay is contributed to by you. Circumstances arise which require some change in an order, and the manufacturer is called upon to make the change because it is not realised what a difference the change may make. Nearly two years ago our Vice-President, Mr. THAYER, was addressing the Telephone Society of New York, just as I am now addressing the Telephone Society of London, and the subject which he chose was "Operating Methods and the Handling of Irregular Calls from the Manufacturer's Point of View." In the course of his address he outlined the process of putting switchboard orders through the factory, each taking its turn, the scheduling of every part having been arranged with infinite care to meet the requirements of the various orders. The work has got fairly under weigh and somebody wants to change something. Let me quote Mr. THAYER: "The engineer of one of the Companies sends us a communication to the effect that he is intending to make some changes in the circuits and a slight addition to the equipment of this switchboard, but that the changes are small and he hopes that they will not make any delay in the delivery of the switchboard. What he does not appreciate is the fact that the mere suggestion of a change involves delay. We do not know which one of the 48 different circuits will be affected by the changes, nor do we know how the change in the circuits or in the equipment may affect the frames or keyboards. There are over 11,000 pieces of iron in the frameworks, in which over 95,000 holes are to be drilled, some of them for holding the framework together and some of them for supporting the apparatus. We do not know how the location of these holes will be affected by the changes, nor do we know how many new drawings will have to be made. We do not know how many cable measurements will be changed, and consequently we must hold up the work of forming 10,000 cables. We, therefore, have to go ahead very cautiously with the work on that switchboard if, indeed, we can go ahead with it at all. When we get the details of the change they may be incomplete, or they may involve an arrangement of apparatus which is physically impossible. Until all these details are settled the work on that particular switchboard practically has to come to a standstill, and in that interval the engineers are studying the changes and producing new drawings and cable measurements in a period which has been set aside for other work, and this period, which has been assigned in other departments for work on this switchboard, is going by with nothing being done upon it. The schedule department has to revise its work, and if the changes in equipment are considerable the shops have to revise their programme. Having to do this extra work is not a serious matter, but the possibility of this extra work delaying the orders of innocent third parties is a serious matter. Any delay in any part of the progress of the changed switchboard is likely to alter the whole programme of filling orders unless a readjustment of the programme turns out to be possible." You will note, in passing, how similar is the plaint of the telephone manufacturer of to-day to the tank manufacturer of three-quarters of a century ago. It is only an enlargement. The holes to be bored

were the most important then, but they are the least important now, though they have grown from 1,680 to 95,000.

I have used this example of Mr. THAYER's because it is ready to hand and because it has the weight of Mr. THAYER's experience. It relates to switchboards, and I do not want to suggest that such a point now requires to be brought home to you. On the contrary, your Engineers' Department, as at present constituted, realises this as well as I do, and if we are troubled with changes at all we are pretty sure to find that it is architects or builders, or perhaps a local governing body that must bear the responsibility. But it was not always so. I do not hesitate to say that in the past very much of the delay for which manufacturers have been blamed was due to orders having been placed in their hands in an incomplete condition and changes subsequently made, which changes have been entirely responsible for delays that have to you seemed interminable. It is true manufacturers are a sanguine race. It is also true that they are in many cases a long suffering and uncomplaining race, and sometimes bear much blame which might be placed elsewhere. When it is realised that changes are expensive in time or money or both, it will be seen that it is true economy to take plenty of time in the preparation of a specification so that once in the manufacturer's hands it needs no amendment. And if the specification calls for the delivery of apparatus which is, from the manufacturing standpoint, a new departure—something not yet the subject of manufacturing routine—consider his estimates as to deliveries as estimates only. Your Engineer-in-Chief, Mr. GILL, and I were in New York in the autumn of 1905; a new piece of apparatus had been approved and manufacture on a large scale was to be shortly commenced. In the April following I made inquiries as to the progress made. In June I was informed that it was impossible to give a definite promise as to when deliveries would be made, as considerable trouble was being experienced with various parts pertaining to the apparatus. To quote from Mr. THAYER's paper again; he says: "My conclusion after some experience is that it is utterly unsafe to promise a new piece of apparatus until we have commenced to turn it out from the tools." You will therefore see that it is inadvisable to place undue reliance upon estimates regarding new apparatus, although they may have been made carefully. From what I have said about changes and delays it will be obvious that it is not true economy to make a change which saves twopence on an article costing two pounds and capable of contributing to the earning of at least two shillings per week, if a delay of more than half a day may result therefrom.

I have alluded to the fact that for economical manufacture machines should be constantly employed. It is clear that a manufacturer has sometimes to choose between surplus plant and lost orders. Manufacturers do not like to lose orders, and manufacturers who are in such close relations with their customers as we are to you are especially pained at disappointing those customers. Manufacturers of course can make forecasts. But can they make those forecasts so closely as to have on hand available for use just the right quantities and the particular kinds of machinery and materials to meet your demands? Clearly, better results might be obtained if an indication could be conveyed to the manufacturer of probable requirements in quantities and times so that the output might be provided for. This is but one of many ways in which a free exchange of ideas between buyer and seller would undoubtedly be of advantage to both.

The economy of distribution is studied of course and direct shipments are made so far as is possible. There are, perhaps, difficulties in making improvements, but it is of interest to note that in many cities on the other side of the Atlantic the Telephone Company does not handle a telephone set until it is in the subscriber's office. The requisition is made on our account, and we deliver the apparatus to the point stated. Then it comes into the possession of the Telephone Company and they fit it up. There is thus but one stock and one delivery. I mention this only as an interesting example of what can be done to combine efficiency and economy, not to suggest that it is equally possible under our different conditions.

I feel sure, however, that by taking thought we might facilitate our respective work, with advantage to ourselves and with benefit to others, for we agree that the more widely your raw material is

distributed the better for everybody. To encourage the telephone habit is your anxiety and ours. To achieve an object, it is a great thing for those with similar aims to pull together.

EMERGENCY ARRANGEMENTS.

BY A. B. GILBERT, GLASGOW.

In the agreement for telephone service the Company undertakes to restore the subscriber's service if and when disturbed, "with all possible despatch." This obligation, which under normal circumstances is of course amply provided for in the general arrangements for the working of the departments, calls for special organisation in case of serious breakdown, such as extensive damage to outside plant due to either fire or tempest. Such occurrences as these do not relieve us of the obligation, and nothing impresses the telephonic public so much with the Company's energy and watchfulness of their interests as quick restoration of the service in times of general breakdown.

In all large towns, especially in those towns or districts where most of our plant is overhead, some pre-arranged plan of campaign should be in force, and I give extracts from two instructions issued here with the object of bringing to bear in cases of emergency part or all of the outside staff with the least possible lapse of time.

INSTRUCTION 1.—EMERGENCY MEN FOR FIRE AND STORM.

It is very desirable to have a number of men living near Royal Exchange (centre of the city), looked upon as a special set of men who can be relied upon to turn out with a minimum of delay.

It is out of the question to rely on chance men turning up at a fire, and the object of having these emergency men is to ensure getting hold of six to eight men without loss of time.

There are ten men on this emergency list (names are appended). Supposing the engineer or other officer, on arriving at a serious fire, requires men, then he will proceed to the nearest telephone, call up Royal Exchange and advise the operator-in-charge to turn out the emergency men for such-and-such an address. The operator-in-charge at Royal should then get connected immediately to the Post Office, on the postal facility connection, and instruct the Post Office attendant to take ten similar express messages, which she should hand in quickly, as follows: "———, —— Street. Turn out at once, corner of Wellington Street and Sauchiehall Street." The engineer or other officer would be found awaiting the men at the address given.

It is expected by this pre-arranged method that a simple and safe means of meeting the first requirements of a serious occurrence will be provided.

INSTRUCTION 2.—WIND AND SNOW STORMS.

It is necessary to institute the practice of each and every foreman putting himself into direct communication with the controlling testroom of the district in which he happens to be working immediately after a bad snowstorm, severe frost or a heavy gale. Each of the foremen must be instructed accordingly and it is necessary to note that each man must take the instructions of the test clerk for these particular cases, and the latter will be held responsible for instructing the foremen to carry out any work; that is, he will decide the necessity for the attendance of a gang to the particular trouble.

Note that after a severe night the foremen must put themselves in communication by telephone with the testroom by nine o'clock, and although the assistance of the gang may not be required at that time, the foreman should again put himself in touch with the testroom at twelve o'clock, because reports do not come in and breakdowns are not discovered as a rule first thing in the morning.

If at mid-day the foreman is advised of damage he should again communicate with the testroom by four o'clock in the afternoon, because it may happen that instructions will have to be given the foreman to be carried out during the following morning.

Assistant engineers, the chiefs of the Cable Department and Slaters' Department will also be required to put themselves in touch with the Engineer's Office at the stated times.

It will be seen that the first instruction relates to emergency cases happening after ordinary business hours. A number of reliable men, knowing the town and the Company's plant, should be selected, and one may, I think, look for two-thirds of the men on the list turning up quickly at the place appointed. It is important for the men to understand that they should make for the specified meeting-place.

The second instruction gives the method of procedure to be adopted during working hours, and it is suggested that the arrangements set out will prove the most rapid and satisfactory means of commencing the work of restoring a breakdown. The testroom is the centre of information in cases of disturbance, and for that department to be in touch three times a day with the whole of the gangs in the district must constitute a valuable quantity in moments of anxiety and great pressure.

TONBRIDGE EXCHANGE REMOVAL.

"RUSHED jobs" are by no means an unknown feature in the Company's operations, and however undesirable they may be from many points of view, they serve to show, in a degree corresponding with the magnitude of the undertaking, the extent of the Company's resources and the efficiency of its organisation. The recent removal of the Tonbridge Exchange is of interest from this standpoint. The necessity for the transfer was anticipated and new premises had been taken, but its completion within such a limited period, rendered suddenly necessary, had not entered into our calculations. The work, which comprised upwards of 2,200 yards of underground work and the opening out of ten distributing points, was begun on Nov. 19, at which date not a single wayleave had been negotiated. The order for trenching and pipe laying was only given to Messrs. AIRD & SONS, the contractors, on Nov. 16, and they finished their work within one week of starting.

The Engineer-in-Chief's Department arranged with the Stores Department for the despatch of the following cables:—

Nov. 16, London was instructed by Stores Department to transfer 1,050 yards of 25-pair cable, which arrived on Nov. 20.

Nov. 17, Hull was instructed to transfer 180 yards of 77-pair cable, which arrived on Nov. 24.

Nov. 16, Canterbury was instructed to transfer 173 yards of 600-pair, which arrived on Nov. 20.

Nov. 16, Western Electric Company was asked to put in hand 400 yards of 400-pair cable, which arrived on Nov. 22; 190 yards of 300-pair, which arrived on Nov. 23; and 281 yards of 150-pair, which arrived on Nov. 24.

Three manholes and fifteen surface pits were built, 2,282 yards of cable drawn in and 50 joints made, and the whole was ready for testing by Dec. 6.

The switchboard and testroom equipment, which consists of two 100-line message rate and flat rate subscribers' sections, one 100-line party line section, one junction section, and a 500-line testboard had also to be fitted, and this work was completed, together with the necessary cable testing, and the subscribers' changed over to the new premises on Dec. 15. The work was carried out by the district staff.

There are many factors which go towards the success or otherwise of undertakings of this nature, not the least of which is the supply of material; the despatch with which the cable in this case was handled makes the job worth placing on record.

MEASURED RATE SERVICE.

BY JOHN F. WHITELOW, District Manager, Hamilton.

THE potentialities of the new tariff are so far-reaching that it is inadvisable at this early hour to advance an opinion about its effect on the telephone public, both present and prospective. No one will gainsay the fact that it is the fairest rate policy that has ever been presented to the public. It is incontestable that telephone users should pay in proportion to the service they consume, as they pay for other services. We have continued the flat rate far too long, with the result that the busy subscriber expects to get more than his due, measured by the payment he makes. The present flat rate large user, to whom is offered the private branch exchange system when he applies for a second connection or an extension line, will not at once see the equitable policy of the measured rates, for the simple reason that it is not in his interest, or so he thinks; but a comprehensive study of the charges will soon convince him otherwise, and we must convince him for the benefit of the service generally. Now that this policy has been adopted we must press it, and I feel sanguine that the rates will readily be accepted once they are thoroughly understood. In a district such as Hamilton, with eleven exchanges in one area, this rate will have the effect of damping down unnecessary junction traffic. Our junction calls are 43 per cent. of the total, and it is well within the mark to say that 25 per cent. of the junction calls are unnecessary. For approximately 25 per cent. increase of stations it has been found necessary to increase the number of junction circuits by 100 per cent. This has come about wholly on account of the unlimited rates,

particularly the commuted two-party rate. The natural corollary then is if, through the introduction of the measured rates, the subscribers eliminate all unnecessary junction calls and thereby reduce our junction traffic to such a minimum that new stations require only a proportionate increase of junction circuits we are saving money. As the junction traffic increases and it becomes necessary to erect more junction circuits then we know that a full return will be made for this expenditure because each junction call is paid for.

For the next six months the Company will, perhaps, require to be content with a fewer number of new stations than was joined up in the corresponding period of the last three years. Possible new subscribers will not accept the new rates so readily as they did the former—the flat rates or the ten-party rate. There is more thought required on their part when considering the measured rate than was necessary for a decision for flat rate service, with the result that stations may not be acquired so quickly or so economically as hitherto. Formerly the most a canvasser had to do was to persuade a man that telephone service was necessary for his business. Then the question of the class of service was easily arranged. It is different now. After you have used all your eloquence, and finally persuaded him to take the connection, your prospective telephone user then commences to haggle over blocks of 100 calls, and for a considerable time he will be undecided how many calls he will commence with. The result will be that fewer orders will be procured to begin with, or rather until the canvasser has a larger visiting list and has educated people in the rate system. When that time arrives the new orders will reach a very much higher point per month than they did formerly.

A word about residence new business. Men canvassers will only waste their time in this direction. A lady canvasser making house-to-house calls will be more successful with this class of business. The lady of the house must be interested and made enthusiastic in the telephone movement, and an attack must be made on her weakest points, one of which is the strong desire to be on equal terms with her neighbours who have the telephone, or to have something which others have not. There is no one more capable of such canvassing work than a woman, and it is to the lady canvasser we must look for this class of business. Once the telephone is installed in a house, the lady telephone user, making social calls, becomes the best advertising medium the Company could procure. Over a cup of afternoon tea she will find means to inform her friends that the telephone has been installed at her house. I think, as a further aid to procure this class of business, the Company should issue periodically a shopkeepers' and house list of subscribers for each district, with, say, a list of rates on the back of this, what we might term, "Trades Directory." These could be delivered to houses and shops impartially, whether subscribers or non-subscribers.

We have pampered far too long the busy flat rate user, who is paying the same as the small flat user, and the maintenance of whose line is one of the principal causes of our very high maintenance charges. Let us hope that will be altered, so that any extra attention which the busy user demands will be duly paid for. There will then be much more satisfaction both for the subscriber and the Company. The pity of it is that this change was not made earlier.

PROVIDENT AND BENEVOLENT SOCIETIES.

Reading.—*Staff Saving Fund.*—The staff recently commenced a saving fund, the idea being to provide the members with a convenient means of accumulating their savings. The scheme has been well supported by everyone, with the exception of the line staff, and it is hoped that they will join in presently. Mr. Terras is acting as treasurer and Mr. Farrow as secretary.

Brighton.—There is a proposal on foot to start a staff provident fund here, for the purpose of assisting members in distress. The proposal emanates from Mr. F. W. Roberts, local manager, and it is hoped shortly to adopt rules and start the fund on a sound basis. In conjunction with this Mr. Parsons, chief clerk, is suggesting that a slate club shall also be formed. Probably by the time this appears in print both these suggestions will have materialised.

Bristol.—*Mutual Benevolent Society.*—At a meeting held during the month it was decided by the members present to join the Bristol District Benevolent Society, which was formed some time ago. The following sub-committee has been appointed to work jointly with the central committee in Bristol:—Hon. president, Mr. D. B. Fulton; vice-president, W. J. Norman; committee, J. L. de Medewe, H. Millett, A. D. Pike, W. J. Hodgetts, Miss Harry; hon. secretary, S. G. Hare. Mr. Hare being appointed representative on the central committee.

ENCOURAGEMENT.

"*Palman Qui Meruit Ferat.*"

BY W. F. TAYLOR.

I HAVE been extremely pleased to see the interest that has been taken in my short article on "Enthusiasm," which appeared in the January issue, and I have since felt that it might be followed up with advantage by a further article on a point which merits more attention than it receives, and which has not been touched upon by the two gentlemen whose interesting letters appeared in the February JOURNAL; that point is the one with which I have headed this paper.

In my opinion, nothing so tends to strengthen enthusiasm as *encouragement*. The motto of the immortal Nelson—Let him bear the palm who has deserved it—with which I have headed this article, is one which in every great service should be cherished and observed. The dictionary tells us that the word "encouragement" means—"That which serves to incite or inspirit, to animate, or embolden," and surely these are something to work for. I think it will be admitted that these words convey what every man, who has it in his power, should try to impart to those under him. I am quite aware that some hold the opinion that praise given is apt to produce that condition vulgarly known as "swelled head" in the recipient, but I do not think that this is the case, and the experiment is certainly well worth a trial. We have all, at some time or another, been in such a position that a few words of praise judiciously given would have sent us on our way rejoicing, but, as these few words were not forthcoming, we felt despondent, and said to ourselves—"What is the use of doing one's best when it is not appreciated?"—and often we have the feeling the other fellow who may not take half the interest in his work that we do, gets just as much thanks for it. Let me illustrate exactly what I am driving at.

A man travels daily, say in the Twopenny Tube, and he rises in a crowded car to give a woman his seat, and gets no thanks for it. Well, in the first instance he feels annoyed. If this happens over and over again, he thinks "What is the use of putting myself out when I get no thanks for it; I will sit tight," and he does. Thus, a member of the staff who plods on from day to day and never gets any thanks for his work, feels in a very similar frame of mind, and he too sits tight, and then farewell to enthusiasm, with its very great advantages to both the Company and the employee. It may be argued that the man or woman who continually strives to do his or her best generally wins through in the long run, whether praise has been given or not, but how much faster might he not have run if he had been encouraged just at the right point by those above him? How hard it is for any member of the staff, or of any other staff for the matter of that, to work year in and year out, with never a sign that his chiefs approve of the way he is going, unless it be a negative sign—that is, if he hears nothing to the contrary, he is to assume that all is well.

I have thought over the matter very carefully, and I cannot bring myself to agree to this principle; I am convinced if the men and women who have it in their power would only use their discretion, and give a word of praise here, and a word of thanks there, when it is deserved, they would get a great deal more work out of their various staffs.

The "roll of honour" which is published in an American telephone paper, and was mentioned in the editorial on "Enthusiasm," in the February JOURNAL is good, but it does not go far enough. What about the operators, the engineers, the electricians, the office staff and so on, who are in their own sphere, doing quite as good work, and without whom the canvassing staff would not be able to produce the several hundreds of pounds worth of orders in a month; why are they left out in the cold?

If there is to be a roll of honour I think it should cover every department. Where a man or woman does well, it matters not in what section of the work, the necessary praise should be forthcoming. If one is never praised when a specially good bit of work has been done in what spirit is one likely to take any blame which may come one's way; on the other hand, if one has been praised when it has been deserved one can take with a good grace blame when equally deserved and it then does some good, for one knows

that one is being justly treated. If it is a case of always blame, blame, blame, one's nature becomes soured and the natural result is bad work and discontent. This is, doubtless, a gloomy view to take, and some of the facetious readers of the JOURNAL will say that I had a touch of the liver when I wrote this, but I do not mind that if, in the long run, some good is done to the Company and the staff generally.

Let every one turn back the pages of their own lives and see if what I have said is not all absolutely true. Personally I have had no great cause to complain, and I am extremely grateful for every word of encouragement that has ever been vouchsafed to me, and as a special milestone in my service with the Company I remember the words of our respected General Manager, who said to me some years ago, after he had been looking into the work of the Contract Department in Glasgow, "Well, good-bye Mr. Taylor, go on and prosper." I have cherished those few words, and have ever since tried to give what encouragement lies in my power to those under me. What is to hinder every chief of a department, when one of his staff has done a specially good piece of work, from sending for that member and thanking him for that service and encouraging him with a few well-chosen words to go on in the way he is going and to try to create a new record? Further, when the New Year comes round what is to hinder him writing a circular to his staff and thanking them in his own name and in the name of the Company for the loyal support they have given him and them during the past year? If this is done the chief who does it will be surprised at the wave of enthusiasm which will be the result. I have tried it for many years, and I am therefore in a position to speak from knowledge on the point.

Now, if it is not considered high treason, I would like to have a tilt at Head Office (be easy with the blue pencil here, Mr. Editor). Is it not possible for the various departments there to send out a circular letter to the various districts at the beginning of the New Year or, on a special occasion, on the lines suggested above? I have no doubt that this has already suggested itself to the various chiefs of the departments, and the reason we have not seen such an arrangement is simply that it is considered unnecessary, and that the staffs know quite well that their services are appreciated. This, after all, is the negative sort of appreciation which is very disappointing from the staff's point of view, and I can assure the powers that be that such a circular would be very highly appreciated by the whole staff throughout the country.

In conclusion, I feel sure that better relations between the various chiefs of all the departments in the Company's service and their respective staffs would ensue if we heard more often the words, "Well done, good and faithful servant."

BANGEM'S TELEPHONE.

By J. S. R.

III.

"If your people can't manage their own exchange I'm not coming to show them how." These emphatic words of Mr. Bangem being punctuated by many blows on the table conveyed the idea that he intended living up to the patronymic bestowed upon his ancestors in honour of those characteristics which in ages past had made the name famous. "I'm entitled," he continued, "to as good a service as my neighbours, and they tell me that they have no cause for complaint." Such was the manner in which Mr. Bangem declined an invitation to visit the exchange, and the official, knowing that further argument was useless, casually remarked, "Ah! but your neighbour visited the switchroom last year." "What!" shouted Mr. Bangem, "He's been to the exchange? Why wasn't I asked, then?"

And with that contradictory spirit which was peculiar to him he jammed his hat on his head and called out "I'm going," arrived breathless and panting at the exchange with the exclamation, "I'm Bangem, I've come to see my board. Tell the manager I'm here!" The irrepressible office boy, as he passed this message on to another youth, added on his own account, "He thinks he owns the show because he's got a telephone and almost lives on the line. Board! It's board and lodgings he wants."

The condescension of Mr. Bangem in accepting the Traffic Manager's invitation to walk into the switchroom was reflected in his pompous manner of entering, but his surprise was so great that he forgot to remove his hat as he caught sight of the innumerable operators, all busy, apparently talking to invisible beings located somewhere below their chins, and at the same time dexterously plunging plugs with cords attached into the maze of holes on the multiple switchboard.

"But where are the bells that ring when we call up the exchange?" asked Mr. Bangem. "There are no bells here," was the reply.

"When a subscriber calls up the exchange it causes one of those little lamps to glow and thus indicates to the operator that a connection is required. Having put the subscriber through the operator waits for the lamp to become extinguished which is a signal for disconnection, and she then clears the line and the subscriber is thus in a position to receive another call on the same line if necessary."

"But where is the LITTLE girl who answers my telephone, queried Mr. Bangem?" He was evidently ill at ease as a tall ladylike girl was indicated to him. He stood behind the manager to avoid being seen and endeavoured to reach the door as speedily as possible, as if fearful of being observed by the very person he had expressed a wish to see. The words "important appointment" escaped him as he hurried away.

Ah conscience! In the operator he had recognised the daughter of an old friend.

The employees of Bangem marvelled that he should issue instructions of "How to use the Telephone," and still more so when he said, "Any person in any way discourteous to the operators will be instantly dismissed," but readers of this sketch, knowing the reason, may possibly weave a romance connected with the erratic and prosaic Mr. Bangem.

Finis.

A CHANCE MEETING.

It was a sultry January morning in Cape Town and I was busy looking over the mail.

There was a tap at the door, and in an accent I couldn't mistake came the remark, "I've come to look at your instrument."

He was just the ordinary looking inspector one meets in the street. There was nothing special about him barring his accent, which, as I've already said, was unmistakable and at once brought back to mind many pleasant memories of the "Royal" Exchange.

"Well, how does this weather suit you?" I inquired.

"It is hot, isn't it?" he replied, mopping his brow.

"Yes," I continued, "you never had this clear atmosphere in Argyle Street, eh?"

He brightened up.

"D'ye come frae Glesca?"

"I was some years there before coming to this country. Sit down."

"Then ye'll perhaps ken some o' the telephone folk?"

"A few," I replied. "I was their servant for about two years."

"No!" he exclaimed, "d'ye mean to tell me ye ken Mr. Mackie?"

"Fine," I replied.

"And Mr. Allan?"

"Yes."

"Mr. Valentine?"

"Oh, yes."

"Mr. Watson?"

"Yes, him too."

He looked earnestly at me and paused for a few moments as if in doubt. Then I repeated the names of several of his *confrères* whose names I remembered and he seemed assured.

"And what was your job," he at length asked.

"Chiefly traffic," I answered, "latterly contract work—new business, you know."

"Then you'd be amang the operators?"

"Yes, I had something to do with about three hundred of them."

"Did ye ken Lizzie — in Royal?"

"Yes, well. She was one of our best seniors."

"I believe ye," he added emphatically.

He sat for a few moments looking at his bag on the floor. The innocent compliment I had paid "Lizzie" had struck a chord, and it was easy to judge what was passing through the mind of this sober Scot.

At length he said he would see what was wrong with my instrument. Having spent some time on this occupation he returned to say "Good morning."

"Well, I'm glad to have met ye, Mr. Little. If ye've ony mare trouble just ring up 832 and ask for Bob M——. Tell me what's the metter and I'll sin pit it richt for ye. Guid morning."

[This little incident, which shows how National men meet in far corners of the earth and feel the old bonds of interest tighten, is sent us by Mr. A. I. Little, formerly Traffic Manager at Glasgow, and for a few months the very efficient head of the Glasgow Contract Department. Mr. LITTLE is now in another business at Capetown and we trust meeting with success.

TECHNICAL TERMS.*

BY THOMAS PETTIGREW.

THE study of electrical science is so hedged round with technical terms that long ago I thought that a paper explaining some of these terms would be of interest to the members of this society. There are many here who will be hearing these explanations for perhaps the hundredth time, but I suppose that the usual penalty of knowing a subject is to hear the same thing over and over again.

The subject is a very wide one, and I intend to deal with the hard practical terms only, leaving for some other member the task of explaining the mathematical and scientific fundamental principles upon which the units are based. A very complex and highly bewildering scientific explanation might be given in introducing this paper, but as I have made my watchword "Simplicity" I will not touch on this part of the subject.

Ampere.—The ampere is the unit of current, and has a sub-multiple unit, the "milliampere" = $\frac{1}{1000}$ part of an ampere. This is the practical unit of current, and the Board of Trade define an ampere as follows:—

"That unvarying current which when passed through a specific solution of nitrate of silver and water deposits silver at the rate of $\cdot 001118$ grammes per second."

Notice particularly that the ampere expresses a certain rate of flow of current rather than a quantity. By rate I do not mean velocity.

There are two units of quantity, the "coulomb" and the "ampere-hour."

The "coulomb" is that quantity of electricity conveyed by 1 ampere in 1 second. This unit is used principally in testing.

The "ampere-hour" is the unit of quantity in everyday use in telephone work, and is equal to 1 ampere flowing for 1 hour. This unit is used to express the daily or weekly output from our accumulators. When a new battery is ordered for an exchange we specify that it has to have a certain ampere-hour capacity, or in other words it must be capable of storing a sufficient quantity to supply current to the exchange for a certain number of hours.

E.M.F.—The idea of a current "flowing" immediately suggests some propelling agent, and the name given to the unit of electro-motive force (as the pressure or propelling agent is called) is the *volt*.

The volt is the unit of pressure, and is to the electrician what steam pressure per square inch is to the engineer. It is difficult to explain in simple terms what a volt really means, and the Board of Trade define it as "6974 of the electrical pressure at a temperature of 15° C. between the poles of a Clark standard cell."

The E.M.F. of this cell at 15° C. = 1.434 volt.

An ordinary Leclanché cell has an E.M.F. of about 1.45 volt.

There is another unit or term often heard, viz., "potential

difference" or "P.D.," which is usually given in volts. This is simply the difference in pressure between two points of a circuit in which a current is flowing.

It is quite correct to speak of a cell having an E.M.F. of, say, 1.45 volts, but it is not correct to say that this is a P.D. of 1.45 volts, as P.D. always implies a flow of current, and if a current is flowing the P.D. across the terminals of the cell will be something below 1.45 volt.

Resistance.—This term might be defined as corresponding to friction. Just as it is impossible to have an absolutely frictionless motion, so it is equally impossible to have a conductor with absolutely no resistance.

Every metal shows the property of resisting the flow of an electric current, but in a varying degree. The standard of resistance is very much like a standard yard or a standard metre, and is defined as follows:—"The ohm is the resistance offered to an unvarying electric current by a column of mercury at a temperature of melting ice of 14.452 grammes mass, and of a constant cross-sectional area of 1 square millimetre and of a length of 106.3 centimetres."

Ohm's Law.—George Simon Ohm, after whom the unit of resistance is named, discovered that the following relationship exists between E.M.F., current and resistance in all circuits carrying an unvarying current. What is now known as "Ohm's law" states, "That in an electric circuit carrying an unvarying current the current is directly proportional to the electro-motive force and inversely proportional to the resistance."

Written in symbols this reads $C = \frac{E}{R}$ or $E = CR$

By aid of this law it is possible to calculate and work out all problems dealing with voltage, current, or resistance, always provided that a continuous steady current is used.

One axiom which it might be as well for me to state is, "That in an undivided electric circuit the current is the same in all parts of that circuit."

Watt.—As it was James Watt who introduced the idea of using the horse-power to express the work an engine is capable of doing, or rather the rate it is capable of working at, it is exceedingly appropriate that the electrical unit of activity or rate of doing work should be named after him.

The "watt" is defined as "The power of a current of 1 ampere flowing under a pressure of 1 volt."

Thus, amperes \times volts = watts, and 746 watts = 1 electrical horse-power.

B.O.T. Unit.—This is the unit introduced by the Board of Trade to enable electricity supply authorities to form a scale of charges for the sale of electricity, whether used for lighting or power.

The Board of Trade unit is equal to 1,000 watt-hours, or voltage of supply \times amperes used \times hours in use, divided by 1,000 = B.O.T. units.

Take an example: A certain exchange is lit by twenty 8-candle-power lamps. If the daily average of all light used is equal to 75 per cent. of the lamps burning for two and a half hours, what is the cost of lighting per day with current at $3\frac{1}{2}d.$ per B.O.T. unit. Pressure of supply, 250 volts. Efficiency of lamps, $3\frac{1}{2}$ watts per candle-power.

$$\text{B.O.T. units} = \frac{\text{voltage of supply} \times \text{amperes} \times \text{hours}}{1000}$$

$$75 \text{ per cent.} = 15 \text{ lamps of 8 candle-power}$$

$$= \frac{250 \times 1.68 \times 2.5}{1000} = 15 \times 3\frac{1}{2} \times 8$$

$$= 420 \text{ watts} = 1.05 \text{ units at } 3\frac{1}{2}d.$$

$$= \frac{420}{250} = 1.68 \text{ ampere}$$

$$= \underline{3.675 \text{ pence per day.}}$$

* A paper read before the Glasgow Telephone Society, February, 1907.

$$\text{Or} = \frac{\text{watts} \times \text{hours}}{1000} = \frac{420 \times 2\frac{1}{2}}{1000} = 1.05 \text{ units.}$$

Voltage Drop and Watt Loss.—When an electric current is flowing through a conductor work is being done in overcoming the resistance of the conductor. If the current and the resistance of the conductor are known, then we can at once calculate the loss of

energy, for by Ohm's law $\frac{E}{C} = R$, E (voltage lost) = $C \times R$. This

gives us the loss in voltage in the conductor, and to arrive at the loss of energy we must again turn to Ohm's law :

$$\begin{aligned} E &= \text{voltage lost} \\ \text{then the watts lost} &= E \times C. \end{aligned}$$

Or put in another way :

$$\text{Energy lost in watts due to conductor resistance} = C^2R.$$

This energy is converted into heat, and it is this heating of the conductor which limits the current which can be safely carried by a given cross-section.

C^2R is arrived at as follows:—

From Ohm's law :

$$\begin{aligned} (1) \quad E &= C \times R \\ (2) \quad \text{But watts} &= E \times C \\ \text{Multiply watts} \times E &= E \times C^2 \times R \\ \text{Watts} &= E \times \frac{C^2 \times R}{E} \end{aligned}$$

$$= C^2R.$$

Magnetic Field.—This term may be defined as indicating the presence of magnetic lines of force. Where the density of the lines is greatest there is the strongest part of the field. The earth is a huge magnet having its north and south poles near to the geographical poles, and the whole surface of the globe is a weak magnetic field. It is the lines of force, due to the earth's magnetism, which make the mariner's compass a possibility.

Lines of Force.—This is the term given by Faraday to the invisible lines which are supposed to stream out of the poles of a magnet. As these lines of force play an exceedingly important part in the theoretical study of magnetic circuits, perhaps I may be excused if I, at the risk of serving up "cauld kail he't again," make a few remarks in further explanation of these magnetic lines of force.

The best way to grasp the idea of magnetic lines of force is to imagine them as being like exceedingly thin stretched elastic bands, whose elastic qualities are excellent.

We are now in a position to better understand the following points regarding their behaviour:—

- (1) Each line is a separate and distinct closed loop.
- (2) They lie alongside of, but do not cross one another.
- (3) They always tend to shorten and to group themselves together.
- (4) They always take the path of least magnetic resistance.
- (5) They are flexible and can be diverted from their normal position, but whenever the force producing distortion is removed they spring back to their original position.

I might here add that although these lines are invisible their numbers can be measured with great accuracy.

Magnetic Induction.—Michael Faraday, while experimenting in his laboratory one day, noticed a peculiar effect which was quite new to him. Investigation and further research not only enabled him to explain the effect, but led to his discovery of magnetic induction, which was then unknown. Before giving the results of his labours to the scientific world he formulated a theory explaining all the effects he had got, and his theory is held even now.

Briefly, his discoveries were that electric currents could by magnetic induction be generated in the following different ways:—

- (1) By making and breaking the current in a circuit, momentary induced alternative currents were set up in a second separate and distinct closed circuit.
- (2) By moving a conductor in a magnetic field.

- (3) By moving a magnetic field near to or away from a conductor.

To put the matter in a nutshell—whenever a conductor cuts, or is cut by, magnetic lines of force an E.M.F. is set up in that conductor.

Faraday's discoveries were no sooner made known than dynamos began to be designed, and from then till now progress has been very rapid with the result that to-day electrical machines stand first in efficiency, all other engines, motors, etc., falling far below them.

There is a further effect which was also noticed by Faraday, and to which the term

Self-Induction or Inductance has been given.

Self-induction corresponds to the property of *inertia* in matter.

When a train starts away from a station it does not start off at full speed—it would be a bad thing for the passengers if it did. The train starts away slowly and gradually speeds up until finally a maximum is reached. The train may now be said to be in equilibrium—that is, its speed is regular and constant—and under these conditions the train may be said to be moving by reason of its inertia, the engine only supplying the power necessary to overcome friction. The proof of this is that when steam is shut off the train will not immediately stop, but before coming to rest will travel a distance equal to the distance it took to get up full speed.

In other words, when we set a body in motion, we have to store energy in that body, and when the propelling force is withdrawn the stored energy is delivered up in keeping the body in motion for a short time afterwards. So it is with an electric current.

When a current commences to flow in a circuit it does not reach its true value instantaneously but only after a certain definite time. This time interval is known as the "time constant" of the circuit, and, of course, varies with the design of circuit, etc.

The delay is due to the storage of energy by the current which takes the form of building up a magnetic field round the conductor. The lines of force arrange themselves in concentric circles round the conductor. As they spring into existence, say from the centre of the conductor, in passing outwards they cut, and induce an E.M.F. in the conductor, which E.M.F. acts in a direction opposite to the E.M.F. which is maintaining the current.

There is thus a throttling action going on due to this back E.M.F. so long as the current is varying in value, but as soon as full ohmic current value is reached, the interference ceases.

Switch off the current, and what happens?

The field round the conductor suddenly collapses, passes into the centre of the conductor, thereby cutting it and setting up an E.M.F. tending to prolong the flow of the current. This E.M.F. very often can be seen in the effect produced by breaking a circuit, viz., a bright spark appears at the moment of rupture.

Special precautions have to be taken when breaking the circuit of the shunt coils of electric motors, as the E.M.F. due to the self-induction is such that it is only a matter of time until the insulation breaks down.

The unit of inductance is the henry, and is defined as follows:— "If in a circuit a current is started and rises uniformly from zero to 1 ampere in 1 second, and produces a back E.M.F. of 1 volt, then the circuit has an inductance of 1 henry."

There are many other terms of great importance to telephone men which I would liked to have touched upon, but as the subject is somewhat dry and the time is limited, I shall leave the other terms for someone else to explain at a future date.

THE TELEPHONE SCORES.

THE Glasgow Daily Record and Mail of Feb. 20 contained a paragraph with this heading. It recounted that a well-known Glasgow surgeon was recently in a train on his way to Ayrshire to conduct an operation when his house telephone rung up asking for his presence at an intermediate town where an accident had taken place. A reply was made that the surgeon had just left, and naming the train. "Oh! I might manage to intercept him at the station" said the local doctor, and actually did so.

Both medical men left for the accident, and after the services of "first aid" had been rendered, nurse and instruments were telephoned for from Glasgow. Pending the arrival of these, the surgeon went to fulfil his first appointment and got back in ample time to deal with the second case.

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THE TELEPHONE V. LETTER-WRITING.

Most people take the cost of a letter at the price of a postage stamp, but in reality a quantity of other items enter into the cost of a business letter and the total cost of the average inland business letter is far higher than is generally imagined. Such items are typewriting, stationery, copying, indexing, addressing, filing and labour in handling. It has been established by careful calculations made in two large offices that the total average cost of each outward inland business letter is about 5d. Similar calculations of the average cost of handling each inward letter, opening, registering, referring and filing, show that each received letter costs the business man about 1½d. So that the total cost of a business letter is in the neighbourhood of 7d., and as most business letters involve a reply or acknowledgment the average cost per letter to each party is 7d.

It is the daily experience of every business man to receive local letters containing messages which could have been sent more quickly, more effectively and more cheaply by telephone, and with less trouble to all concerned. Where the communication is over a considerable distance the letter is of course cheaper than the telephone service, but as regards local letters—and a large proportion of every business man's correspondence is local—the telephone message is incomparably cheaper, quicker and more effective than the written message. British conservatism, which opposed the mail coach, the railway, the telegraph, the typewriter, the electric tram, the motor-car, each in its day, and will only accept improvements after the most desperate struggle against them, is opposed to the telephone and wedded to letter-writing. It is our mission, as telephone men, to teach the British public better; that we have

taught them better to a considerable extent is shown by the thousand million telephone messages now handled every year, but much yet remains to be done, as the number of letters and postcards is over three thousand million every year.

This leads us naturally to the private branch exchange. For important business messages to be effectively handled by telephone it is essential that the business telephone should be rescued from the frivolous office boy, and that principal should be able quickly and easily to talk with principal, responsible officer with responsible officer, and departmental chief with departmental chief. The telephone message must go direct from the originator to the receiver with the minimum of friction and delay. This is effected in the most perfect manner by the private branch exchange, which takes the telephone to the user instead of bringing the user to the telephone. The old idea was a telephone in each building; the modern idea is a telephone in every room, on every desk and on every counter. We are making some progress towards that ideal; when we get a little further along the British business public will realise that telephone service and equipment must correspond in quantity with the requirements of each individual establishment, and that a single telephone cannot adequately serve twenty people in a large building and deal with a hundred messages a day. Then the private branch exchange will go with a rush, and the British business public will discover what the telephone service can really do for British business.

TELEPHONE RATES.

WE print this month a letter from a member of the staff which doubtless voices the feelings of many members of the staff who find the rate question growing a little beyond them, and who, perhaps from want of time to keep in touch with the progress and changing conditions of the business, are not quite in sympathy with modern methods of conducting the business part of the telephone service. We think that there may be a good many members of the staff up and down the country whose ideas roughly correspond with those expressed by our correspondent, who signs himself "ENTHUSIASTIC." They want a "universal tariff," something quite simple, with easy figures in it, like the Bank rate or the price of the local paper; they do not want their friends to be "bothered and worried" by the Contract Department, they do not fully realize the value of the Contract Department as a branch of the Company's service; they would like all the business information relating to a great and complicated business to be on a small card.

Perhaps some study of the reasons underlying the rates would change these views. Telephone service is not a commodity, but a service, and the requirements of customers for telephone service vary widely; consequently telephone service is supplied to different customers in varying grades and in varying quantities; consequently at different prices. There is a fundamental difference, wide and deep as an Alpine chasm, between a service and a commodity. But consider for a moment a few simple commodities, and even there "ENTHUSIASTIC" and those who think

with him will see that a universal tariff neither exists nor is possible. Take bread for example. Bread is one of the simplest of commodities, but it is sold in very different grades and quantities, with quite an elastic range of prices, from the aristocratic French or Vienna roll up to the solid quarter loaf. Take tea. The British public is fonder of tea than that of any other country, and it knows that the price of tea ranges from a few pence a pound up to many shillings a pound, and varies for different grades according to whether the tea is sold by the ounce, the pound, the large packet, or the chest. Now the baker's assistant or teaman who wants to get on in the world does not say, "Oh! bother all these different prices! Let us have a single price for bread or tea, it would be so much easier!" No. He learns the different qualities of bread and tea, and knows the reasons for the different prices, and knows how to advise the undecided customer which quality and what quantity to take. Viewed in this light, there is not such a vast difference between the telephone business and the tea business.

Take another service—transportation. Here we get a much closer parallel with the telephone business. A man wants to ride from one point to another in a city. Will not the annual cost depend on the distance between the points, the frequency of his journeys and the means of conveyance he chooses? Consider the variety of methods our traveller may choose for his transportation. He may take a halfpenny municipal tram, a penny business 'bus, a cab at sixpence or a shilling a mile, or he may maintain a private carriage for his exclusive and unlimited use; and the private carriage may range all the way from the modest "one-horse shay" through various stages up to the costly electric landaulette or the luxurious six-cylinder petrol car. What becomes of the universal tariff? Does not the cost to the supplier of the transportation facilities necessarily depend on the distance travelled, the number of rides and the means of transportation supplied, and does not the price paid by the traveller, the customer, necessarily depend on the same factors?

Now apply this illustration to the telephone business, and make not the old and hateful error of considering the telephone instrument as the unit of the business. The telephone is merely the tangible means to the subscriber of using the service, of sending telephone messages, just as the tramcar is of a form of travelling, but neither is the unit of the business. The traveller by tram uses, besides the tramcar, the generating plant, the conductors and rails, the car stables, he uses coal, steam, oil and electricity, and the services of a large organisation. The telephone user whenever he sends a message employs wires, cables, switchboard plant, junction plant, power and the services of a large staff. The telephone is supplied him in order that he may send and receive messages, and it is but an item in a great system built, equipped, maintained and operated for the sole purpose of handling messages in the most rapid manner possible. The cost, and the price, depend on the distance over which the messages may be exchanged, the number of messages sent in a given period, and the class and amount of telephone facilities supplied. In a small area messages are cheaper to handle than in a large one, because less line plant and less switchboard plant, less labour, maintenance and supervision are required. A large

number of messages a year cost more than a small number. If the subscriber has a small use he may share a line, take a party-line station—the telephonic tram or 'bus—and he gets it cheap; if his use is moderately large he takes a direct line—the telephonic private carriage, exclusive and always at command. If his use is very large, and he has a large establishment and many callers, he takes a private branch exchange with numerous junctions and stations—corresponding to a stableful of carriages and motors—the very perfection of telephone service. How could a "universal tariff" apply to all these different requirements and circumstances?

A word as to the Contract Departments. The words of "ENTHUSIASTIC" hardly do justice to the business-getting branch of the staff. It is the mission of Contract Departments to "bother and worry" people until those people acknowledge the value of telephone service in the only proper way—by signing contracts. It is a great mistake for any member of the staff to depreciate the work of the Contract Departments. The Contract Departments are a rapidly growing force in the Company's service. Their work is highly scientific, in the business sense of the word, and it requires energy, organisation, keen business ability, and a thorough knowledge of telephone rates and practice, with unremitting attention to detail. The Contract Departments are the business end of the Company's great organisation, and they are carrying on their work in a scientific manner. They should have the sympathy and help of all other departments. In fact, a little study of staff transfer news would show "ENTHUSIASTIC," and those who think with him, that the Contract Departments offer good opportunities for getting on—to those who are real enthusiasts.

A LINK WITH THE PAST.

THE biographical sketch of Mr. THOMAS ROWE which begins this number is, we think, unique in one respect. There can hardly be many members of the staff whose experience of electrical work goes back so far beyond the beginning of the telephone as to extend to those very early days of the telegraph when telegraphy was not regarded as a general system of communication, but merely as an adjunct to railway working. Mr. ROWE, starting his career in telegraphy in 1852, has seen two great electrical industries in their beginnings, and has seen them rise through their various experimental stages to exact methods and to great performances. It is difficult to us, at this day, to conceive that telegraph wires were once strung in the primitive way which obtained in Mr. ROWE's early days. But it was hard work with those primitive methods, and constant thought to eliminate the weak links which failures revealed, that evolved the high standard of line construction which Mr. ROWE set in his telephone engineering work at Liverpool, a standard to which he trained many of the staff during his long and successful career as telephone engineer. Though Mr. ROWE's long experience, but barely sketched in outline by the modest story of work accomplished we are able to print, makes him such an interesting link with the past, it is pleasant to record that he is a living link, and we trust that he may long live to enjoy his well-earned retirement as a telegraph and telephone patriarch.

TELEPHONE SOCIETY PROCEDURE.

THERE are now about twenty telephone societies in full working order, and as the expansion of this movement is bound to continue and extend to the smaller places, it may be a help to some of the societies to discuss briefly some questions relating to the provision of papers, frequency of meetings, etc.

As previously stated in an article in the October number of the JOURNAL we feel strongly that, for all small places certainly, and probably even for large areas, meetings held once a month are quite sufficient; if the meetings are held at shorter intervals, say weekly or fortnightly, there is a danger of exhaustion which a wise committee will avoid. This exhaustion is in two directions—in the number of persons who can be prevailed upon to read papers; and in the enthusiasm of the members generally.

Now that the end of the session is approaching it may be well to refer again to the question as to who shall be the head of the society.

It is very desirable that the one in control should be frequently changed, possibly it would be found that a committee elected for two or three years, retiring either one-half or one-third at a time, and the president and vice-presidents elected annually, the elections being held at the end of the session, would form as good a scheme as any that can be devised. There are many advantages in this frequent change of president; it prevents staleness, avoids difficulties in making a change, offers to each earnest member the chance of being the chief, and is a strong incentive to each president to do his very utmost to make *his* year a successful one.

As to papers in large societies there is no lack of these, but in the smaller ones it is different, and in the case of very small societies it is undoubtedly difficult to secure month after month that variety which is desirable. But there are several ways of meeting this, discussions may be carried along several lines, as for instance:

- (1) Discussions on written papers which will take the whole evening.
- (2) Discussions on shorter papers, of which there may be two or three in the evening.
- (3) Discussions on topical matters, *e.g.*, a discussion on "Measured Service," for this several speakers prepare a few remarks to start the discussion, and the rest, if the subject is well chosen, follows automatically.

On this third method alone a large number of meetings can be filled by subjects such as the current number of the JOURNAL, any development of a new kind in the locality, new service instructions, engineering circulars, or correspondence class papers, so that it would be found quite easy if necessary to run the society on these subjects alone. Everywhere, excepting perhaps the very large societies, it will probably be found that the best result is obtained by a mixture of the three methods, each serving a useful purpose.

It is very desirable to get papers from the junior members as much as possible. Papers by the seniors may possibly be more instructive, but probably they will not arouse such general interest as those by members of the rank and file.

There is no doubt that the telephone society has a great and

useful sphere of work but, like all new movements, it must be wisely directed by those in control or it is liable to spend its energy along lines which are not the most advantageous.

THE HALF-YEARLY MEETING OF SHAREHOLDERS.

AT the 39th ordinary General Meeting of the Company, on Feb. 21, Mr. FRANKLIN, the President, after referring to the tragic death of Sir JAMES FERGUSSON and congratulating Sir JAMES WOODHOUSE on his appointment to the Railway and Canal Commission, dealt with accounts for the past half-year. The accrued income in respect of the business was £1,241,843, as compared with £1,125,978 in the corresponding half-year of 1905; the Post Office royalty amounted to £118,499, as compared with £105,866, bringing the total amount paid by the Telephone Companies to the Post Office for royalty up to £2,250,000. The net income less royalty was, therefore, £1,123,343, as compared with £1,020,112. The working expenses had increased from £647,846 to £710,492. The net result for the half-year was £412,850 as compared with £372,265, an increase of £40,585. For the complete year the accrued income was £2,436,994 as compared with £2,212,358 in 1905, an increase of £224,636; the net income had increased by £199,243 and the working expenses by £127,069; £255,000 was carried to the reserve fund (which now amounts to £2,242,262) an increase of £20,000 on last year. The increase in the Company's stations has already been given in our January issue. The number of telephone messages transmitted during the year by the Company was 1,177,306,832. The average income from each station was £5 17s. 9d., or a cost to each subscriber of only about 4d. a day. The number of staff had increased by 608, the total now being 16,310.

RETIREMENT OF MR. JOHN GAVEY, C.B., ENGINEER-IN-CHIEF, GENERAL POST OFFICE.

In connection with the approaching retirement of Mr. GAVEY, his staff and many friends have decided to entertain him at a Farewell Dinner, to be held at the Grand Hotel on Thursday, the 11th April next, at which the Postmaster-General will preside.

Tickets, 7s. 6d. each, can be obtained from Mr. R. A. WELLS, Engineer-in-Chief's Office, General Post Office.

MANCHESTER OPERATORS.—A KINDLY ACTION.

BY GERTRUDE RICHARDS.

FOR many weeks prior to Christmas the operators' dining-room at Manchester was a scene of unusual interest and activity. The direct result of this was made manifest to the joy of numerous poor children in the neighbourhood of Charter Street, Ragged School, Manchester, on Christmas morning, when about 200 children were made supremely happy by being presented with gaily dressed dolls and other toys. This Christmas treat had been the subject of much work and patience on the part of the operators, who generously subscribed amongst themselves to provide the necessary funds, and spent a great part of their leisure time in purchasing and selecting the toys and making pretty dresses and clothing for the dolls. Before being despatched to the secretary of the schools, the presents were set out on the dining-room tables and made a very pleasing picture, an invitation being extended to all members of the staff to view them. A collecting box was placed in the room for the donations of the staff, and the money thus obtained (£1. 10s. 3d.) was handed over to the school authorities.

Early in the new year an entertainment was organised and was successfully held at the Ragged School, by the operators, Mr. SCOTT presiding. This effort was thoroughly appreciated by the 430 children present, who heartily joined in the choruses of the popular songs.

REVIEWS.

Practical Telephony. By Jas. Bell, A.I.E.E., superintendent, Postal Telegraphs, etc., etc., and S. Wilson, A.M.I.E.E., supervisor, Postal Telegraphs, etc.: 381 pp., 7½ by 5, with 322 illustrations. Price 3s. 6d. net. Fourth edition, revised. Published by S. Rentell & Co., Ltd., 36 Maiden Lane, London. W.C.—At one time there was a scarcity of telephone literature, but now we are in danger of a surfeit, and there is a deadly monotony both in the titles and in the contents of the telephone books which electrical publishers on both sides of the Atlantic are pouring forth from their presses. The present work is misnamed; it ought to be called "Who's Who in Telephone Apparatus, Galvanometers and Testing Instruments." It is admittedly a compilation of articles which have straggled through an electrical journal, pieced out with miscellaneous data gathered from all sources and illustrated with catalogue cuts and archaic blocks which have long ago earned rest and retirement. Even our beloved friend the iron box receiver of 1877 with the tilted diaphragm, bent accidentally when the instrument was sent to the wood engraver of our forefathers, has an honoured place. It is only fair to say that this "comic cut" appears in almost every other telephone book, though a moment's thought would tell any telephone man that the instrument as illustrated had a bad "fault" on it, and could not possibly talk. This picture quite prepares us for one of a Leclanché cell, and for several others of telephones and switchboards of merely archeological interest.

On a work which is confessedly a compilation of miscellaneous articles and is obviously very badly put together it would be breaking a butterfly to attempt a serious review. As an example of arrangement we find a description of some of the National Company's London common battery exchanges, with illustrations and diagrams, followed about twenty pages later by a section on "The Post Office Common Battery System," in which common battery working is described *ab initio* as an entirely fresh subject. A few other examples will show how far the book will meet any test for logical arrangement, accuracy of expression or clear presentment of useful information. On p. 202 we learn that "A line connecting an exchange and one subscriber, or between two subscribers only, is called a *private line*." On p. 215, after an extended description of Post Office trunk line apparatus, followed by various miscellaneous matter, we learn, under the heading of "Transformers," that "An arrangement has been made between the Post Office and the National Telephone Company to enable the subscribers of the Company to avail themselves of the use of the Post Office trunk lines." This must have been great news to all concerned, and such an important announcement should not have been buried in the body of the book. After this, the statement that "the call-wire system provides immediate attention at the exchange to the subscriber's requirements" leaves us cold.

It would be unkind to continue quoting, though there are many other unconscious gems in the book; and over the literary style of it we draw a charitable veil.

The Telegraphist's and Telephonist's Notebook, 1906. Anonymous. 88 pp. 3½ by 5½, with five illustrations, calendar and eight pages of squared paper. Price 1s. net. Published by Rentell & Co., Ltd.—The "author" of this little work wisely conceals his identity. In the preface he says he has "long contemplated the notion" of compiling a notebook and diary (eight small pages of squared paper seem somewhat inadequate for a diary) suitable for the requirements of employees in the telegraph, telephone and railway services, "but lack of time has prevented him from accomplishing the work until now." The reviewer is sorry the gentlemen did not continue to be busy on his ordinary affairs. The miniature jumble of tables and tests may interest telegraph operators, during their intervals of rest, in matters scientific, but we doubt it. The telephone section contains five pages and deals with resistances of out-of-date apparatus and with the K R law!

SOME CANVASSING EXPERIENCES, WITH SOME REFLECTIONS.

By J. L. MAGRATH, Contract Agent, Edinburgh.

IF "the proper study of mankind is man," then assuredly we contract people are in a fair way of acquiring an exhaustive knowledge of humanity. The oddity and the eccentric, the quibbler and the debater, the progressive man and the slow-coach, are all met indiscriminately in the course of a day's work. And because, despite individual idiosyncrasies, human nature is in the main the same everywhere, and the same type of man may be found duplicated north, south, east and west, space may be granted for a few reflections.

Not so very long ago, we in Edinburgh found considerable difficulty in introducing private branch exchange business—even on the flat rate. It was one of the toughest of problems to convince a subscriber with one exchange line and several extensions that the additional exchange connection which he wanted should be led to a switchboard, and not to a separate instrument; that his existing number should be changed in order to allow of consecutive numbers being given; and that really we—The National Telephone Company—were better judges than he as to what was necessary for an efficient service. He could not see it, and often he became positively incoherent in his denunciations of what he termed "red tape," and in his ejaculatory declarations of his determination to get things his own way.

One of our most interesting experiences of this kind—the case is an outstanding one in my memory—was the prolonged tussle we had with the principal of a large firm of iron merchants. He had two exchange lines, a switchboard, and several extensions. He wanted a third exchange line; and there is no doubt that, from the traffic manager's point of view, he wanted it badly. But he would not have it on the switchboard; it must go to a separate department. In vain man after man tackled him on the point. In vain was it argued that more than half the value of the extra line would be lost; that calls might possibly come to it which would require to be answered by a man in some other part of the building; and that, *per contra*, calls which should properly go to it might be passed over the other lines. It was no use, he wanted that department connected. Our argument that this might easily be done by means of an extension stiffened his attitude. In his own mind, he had now found the "head and front" of the affair; we wanted more money.

This last position was so untenable that, as he was generally a reasonable man, we had no difficulty in dislodging him from it. When he was shown that for 30s. a year he was getting an additional instrument and increased service, he recognised that there was no "kill" for the Company in the deal, and to that extent he modified his attitude. Driven from that position, he made a grievance of the change of number. Here again he was met systematically with arguments, explanations, and examples. The system of pegging out old numbers was explained to him in detail; he was guaranteed no loss in calls; and patiently and laboriously, he was gradually driven from point to point until his legs were metaphorically kicked from under him.

He was convinced by this time that the Company was more interested in the question of service than in that of rental; since, had the latter been the sole consideration, he would have had his line from the very start, and the service might "go hang." A few judicious reminders to this effect kept that point of view constantly before him. But he had not made his last stand yet.

The electrician, who had deeply interested himself in the progress of events, now undertook to interview the redoubtable opponent, and, with some straight thrusts from the technical and traffic side of the matter, endeavoured to deliver the *coup de grace*. But the gentleman shut himself up in his office, and declined to see any more telephone men, or to listen to any more telephone talk. We might, or might not, give him the line as he wanted it; but he was not going to discuss it any further.

Then, at the electrician's suggestion, a letter was sent him. It was a long letter, composed carefully and thoroughly. It set out in minute detail the A B C of private branch exchange working. No

point was neglected; no argument overlooked. We simply collected the ammunition, so to speak, which we had been using in sections for weeks past, rammed it home, and discharged it in one shattering shot. And it carried the day. We got our third line on to the switchboard, and we got our extension to that particular department.

But the end was not yet. The arrangement after some time did not work satisfactorily. Complaints came in that calls from the extension stations were not dealt with promptly at the branch switchboard. This was investigated, and it was found that the clerks in the place were in the habit of frequently using the *service* instrument, while the poor operator stood helplessly by, watching her indicators fall one after another. This system was promptly and vigorously denounced. The clerks were instructed to keep religiously to their own extension instrument, and in a little while the service was pronounced admirable.

Nor was even this the end. Another exchange line and extension was put on recently, and the whole system transferred to the measured rate without an objection. Only the other day this one-time obdurate flat-rater purchased an extra twenty pounds' worth of calls.

I fear I may have dwelt unduly long upon this episode, but it is one so outstanding, and it epitomises so completely the average attitude of the public, that it may be considered worth recording at length.

That the imitative faculty which is latent in mankind in general is a quality which may often be turned to advantage in our business, is an axiom which is being constantly demonstrated. I know of one big firm of drapers here who subscribed to a private branch exchange installation, not primarily because of its utility, but because their most formidable rivals had it. Had it not been so, I question if they would have had it yet.

Generally speaking, tribute has to be paid to the readiness with which our largest private branch exchange subscribers convey their approbation of the system to hesitating doubters. Our first subscriber to this system on the measured rate has always shown himself most willing to take pains and spend time in emphasising to others the benefit which he whole-heartedly admits he has himself received from the service. His is the biggest installation we have; we make something of a show of it, and the subscriber himself has in many instances proved our best canvasser. His written approval is concise and all sufficient: "Our private branch exchange has already far exceeded our expectations as regards satisfaction. Before, we had instruments; now—we have service, and the best of service."

In so far as the largest firms are concerned, we are gradually finding the principle of the private branch exchange meeting with general acceptance. Our score is perceptibly creeping up. But the objections, the haggling over rates, the attempts to break prices, the urging of wayleave consents as reasons for special terms, the hundred and one stratagems resorted to by the man keen for a bargain! How we all know them! And how we have to hammer, hammer, hammer to make headway! The subscriber who, in former days, could make as many calls as he liked over as many lines as he cared to pay for, takes sorely the application of the measured rate to him. He is ready to admit, in theory, the equity of the principle of paying for what one gets; but in practice—"that's another story." But, in this, as in all other matters, it is a question of persistency, a contest of wills and wits. And we hammer away, cheerfully.

It is remarkable how, in the midst of refusals, of bad business, and of a corresponding depression, little items will occasionally crop up to enliven and to encourage, and to convince one that under the clouds the sun is still shining. A very little while ago, I noted three contracts coming through, which, for reasons, I looked upon with especial interest. One was from a man who was first called upon when the Contract Department was first started here eighteen months ago, and who, persistently, steadfastly, and vehemently, had since refused all attempts to induce him to become a subscriber. A second was from another "hard nut," who had, for long, baffled all efforts; and the third bore the name of a gentleman, who, when first called upon, genially offered to essay the task of discovering whether the canvasser's head was harder than the pavement!

The effect of these little successes in the midst of rebuffs and

set-backs was distinctly refreshing. It was good to find the theories of persistency and perseverance so opportunely demonstrated. These people who had refused before had now joined; would not these others who are refusing now also join later on? We all of us started hustling with fresh spirit.

And here may I say—without the suspicion of attempting to deliver a lecture—how absolutely essential are cheerfulness and courage? The two qualities are closely allied: if cheerfulness goes under, courage will start retreating. The man who loses his optimism, his enthusiasm, his conviction that he will come out on top, will also lose the courage and the grit that alone can take him to the top. And the man who loses his courage is done for; he is dead; and the world has no use for dead men.

From the few hints dropped above, it will be gathered that our progress in Edinburgh is not all rose water and honey. Not at all. We meet probably a bigger proportion of slow-coaches than is to be met in any other town of similar size in the three kingdoms. There are folk here who don't want to progress; who hate the word as signifying something demanding a quicker method of locomotion than they have been accustomed to; and who would personally resent any suggestion that they need an electric car while they have a horse tramway. These people are our hard problems, and they form a very considerable proportion of the community. In many cases, too, they are men of intelligence and some position.

As an example: A professional firm of repute is constantly asked for at the exchange. To all attempts to bring them on to the system, to all arguments that it is to their advantage to accommodate the clients who desire to get into touch with them, they simply turn a deaf ear. There are three partners, and on one occasion the canvasser interviewed all three together. They listened to everything he had to say, and then—the deluge!

Partner No. 1: "We don't want the telephone, and won't have it. If people want us let them come to us. We would not have the telephone for nothing." Partner No. 2: "We would not have the telephone if you paid us £10 a year for it instead of asking us to pay you." The canvasser suggested that the matter should be considered. Partner No. 3: "D—n you! If we want you we know where to get you; we don't want you now."

A contract manager feels as if he could dance a hornpipe with the canvasser on the day that such a firm's contract comes in.

Only the other day in a little bustling town some miles away, a medical man hustled the unfortunate telephone canvasser out of the door, and informed him that he "would have nothing to do with the inventions of the devil." This is the twentieth century!

The canvasser was informed that this gentleman has a rooted objection to railways, and always travels, where possible, by coach. What such an extremely mediæval person would have said had he lived when Caxton exhibited the first printing press to a startled world is a matter of interesting conjecture. Yet he may live to bless the "invention of the devil." Who can tell?

Experience teaches. Day after day, and week after week, there is borne in upon us, who are in hourly touch with the public, the value of the one great virtue—persistency. It is the one vital thing, without which all other gifts of a bountiful nature are incomplete, lacking its essential complement. It does seem often that—strive we ever so doggedly—our efforts are non-successful, our persistency in vain. Try again! Cheerfulness must not be allowed to go under; courage must not be permitted to retreat; persistency must be kept at fighting pitch. Try again! Get back to the charge! We want Danton's motto in our business: "Dare; dare again; dare always!"

RAPID REPAIRING IN LONDON.

AT 10.45 a.m. on a recent day a fire broke out on the premises of Messrs. J. Gaumont & Co., cinematograph specialists, at 15b James Street, Haymarket (formerly occupied by the Company as western district office, and later as head office stores), destroying five 52-pair cables and cross-connection box. Though the premises were completely gutted the pole remained in position, and the work of re-instating the cables and restoring the service to the 180 subscribers affected was vigorously taken in hand. The cables were drawn back on to adjoining buildings, and the damaged portions cut away and fresh lengths jointed in, with the result that by the following evening the whole of the subscribers, with the exception of a few private lines, were again in working order.

CORRESPONDENCE.

THE SELECTION OF OPERATORS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I SHOULD like to take this opportunity of thanking Miss Minter for her excellent paper on the selection of operators in the Metropolitan area. Seeing the large number of applicants interviewed by Miss Minter, her experience must be very wide, and it is kind of her to contribute this article to the JOURNAL. It contains many hints which will be of help to myself, and possibly to other provincial clerks in charge who have the selection of operators in their hands.

There are one or two things with which I do not quite agree, and I hope Miss Minter will forgive my criticisms.

Personally I do not see why an applicant should be entirely judged either by her educational abilities or by her handwriting, as these I consider are not the chief qualifications required of an operator. If an applicant is suitable in age, height, and appearance, and possesses good sight and hearing, distinct articulation, and last, but not least, good manners, I think it unnecessary that she should have to pass any educational examination. You can generally tell when interviewing an applicant the kind of education received, and whether she possesses tact and discretion, which of course are indispensable in an operator. Perhaps some readers of this letter will think that as some operators are eventually promoted to the supervising staff, educational abilities are then required, therefore it would be better for all to pass an examination at the beginning. Is it not possible, even if the operator does pass the examination, for her to lose that knowledge during the time between operator and supervisor, just as the Board School scholar often loses her stock of knowledge between the time of leaving school and sitting for the examination; this occurs in both cases if study is not kept up, which I believe I am right in saying it seldom is.

Then as to handwriting. I am afraid some of my most efficient operators would fail if judged by this. Why should good handwriting be considered so important? The operators are not clerks, and as they have so little writing to do I think that test might be omitted altogether, provided the applicant's letter is legible. Handwriting can soon be improved by practice, and efficient operators might be lost by the matron being too particular on this point.

One thing I am strongly in favour of, and that is that applicants should be medically examined by a doctor appointed by the Company. It stands to reason that the doctor who attends the applicant's family will endeavour to fill in the medical form to read satisfactorily, particularly if there are no apparent signs of ill-health in the applicant; whereas a doctor not interested in the applicant, and paid by the Company, would only pass those of a healthy constitution. Of course I should not advise the applicants to be medically examined until they had gone through a course of training, to prove if they would be suitable for the work of operating. Strong healthy constitutions are essential in operators; when three or four operators of one exchange are absent through sickness it is detrimental to the service, to the Company, and to the operators themselves.

Before I conclude, I should like to mention one big Want (with a big W) felt in Leeds, and I believe in other provincial towns, and that is a new and systematic method of training our operators outside the switchroom. Reading all about the wonderful Metropolitan School, with its splendid diagrams and apparatus, it makes us poor provincial operators feel we are not having the same chance as our London sisters, and yet we belong to the same Company. Of course we do not expect our training to be on the same large scale as in London, considering the difference in the number of operators trained, but we should be grateful if the Company would supply diagrams and apparatus to enable us to partly train our operators before they take up their places at the switchboard.

Leeds Exchange.

KATE FOTHERBY, Clerk-in-Charge.

A UNIVERSAL TARIFF.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I BEG to plead through the Company's JOURNAL for a universal tariff to be established in this country this year. Whether the future tariff is to be the measured rate or the unlimited rate, let it be a simple, a fixed, and an advertised one. It is all very well stating in the JOURNAL that "all the staff, some 3,000, should act as contract agents," "we are not enthusiastic enough," and that "America is rapidly going ahead," but how many can quote the rates? There must be many district managers and chief electricians who cannot quote the rates (much less accept a contract). It is the practice in Liverpool to refer all intending subscribers to the contract agent, and the writer has frequently been asked particulars by friends who did not want to be bothered and worried by the Contract Department. There are at the present moment about fifteen rates on the market; would not three or four be sufficient? It would be nice if full particulars of the system could be explained on cards which could be carried about by all members of the staff. It would be interesting to the people up north to know the rates in London for exchange lines, extensions, relay bells, etc., and I would suggest that a page or half a page of the JOURNAL be devoted each month to instructing the staff with all particulars in connection with telephone service; perhaps also the removal and stamp duty charges might be explained.

Liverpool, March, 1907.

ENTHUSIASTIC.

TELEPHONE ENTHUSIASM.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

By common assent the quality of enthusiasm is one greatly to be desired in telephone employees, especially in those whose business it is to secure orders. With Mr. Gifford's definitions and the addition of "knowledge" by Mr. W. C. White one is bound to agree, but to my mind the greatest essential of all is "conviction."

How much more eagerly does the commercial traveller set out on his journeys when firmly instilled in his mind is the conviction that his wares are the finest on the market.

This conviction must gradually crystallise as a knowledge of the telephone service and its working increases. Such knowledge is easily acquired by thought, an observant mind, and by study of detail; and here I would remark that each employee owes to the Company his or her most intelligent thought.

It is incumbent on us all to think less of the *telephone* and more of the *service*. Each contract secured is another person linked up in communication with tens of thousands of others; customers, suppliers, friends, doctors, etc. In a few brief seconds, day or night, distance is defied and a message with its answer, often of grave moment, is given and received.

Surely such facts, together with the knowledge that no other system of message transmission can in any way approach the telephone service, are sufficient to carry conviction to the enthusiastic point.

To those who dive too deep into the well of knowledge I would say, beware! To hurl a string of technical terms to a prospective subscriber is to court disaster and many a man has "caught a tartar" in this way. To be cornered on one's own arguments is undignified, and the loss of dignity often means the loss of an order. By all means study your business from its technical point if you wish, but remember that a little learning is a dangerous thing, and one is always well advised to rely on the plain straightforward arguments of the value of the service and its capabilities, sent right from the shoulder, and if one's conviction is real, it will be conveyed to the prospective subscriber and another victory won.

Enthusiasm is contagious, and once the newly made subscriber is convinced of the benefits he is acquiring, he in turn will wax enthusiastic and prove a valuable asset in the way of introductions.

Salisbury House, February, 1907.

GEO. W. LIVERMORE.

CALL OFFICE SITES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to Mr. Thomson's article in the February JOURNAL, I should just like to say that I cannot agree that undertakers' shops should be avoided, as it has been proved, at any rate in Hull, that this kind of shop pays as well as any other, the only condition being that the position is a good one. Undoubtedly the most suitable places for call offices are cafés, fancy stationers, high-class restaurants, confectioners, and tobacconists.

When a call office is decided upon, in my opinion, someone should be appointed to see that the outside sign is placed in the best position; also internal signs should be well placed in the shop.

It is a very important point that the instrument should be fixed so that the public can see it on entering. A directory should be always in a handy position for the users of the telephone, in order to save them having to ask for it, which occurs too often.

If a caller uses the telephone for a sustained length of time, additional pennies should be asked for, or some people would use it for an indefinite period, and become not only a nuisance to the call office keeper, but the cause of a loss of revenue to the Company.

With regard to silence cabinets, I do not consider that these are absolutely necessary. Special circumstances, however, sometimes call for them, but in the majority of shops where it is possible to instal a call office, there is no room for the cabinets, and it has been found in Hull that they make very little, if any, difference in the revenue; besides, the large expense has also to be taken into consideration.

Hull, February, 1907

E. DRESCHER.

METHOD IN ANSWERING AND MAKING CALLS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THE method of answering telephone calls advocated by Mr. Godfrey in the February JOURNAL has been in vogue in the Glasgow area for some time now. It was introduced in the interests of time saving and uniformity of expression and it is indeed both simple and concise; at the same time, while the end aimed at has to some extent been achieved, it is felt that the full benefit has not yet been derived. The difficulty seems to lie in the fact that there is a want of mutual understanding between the caller and the party called, and old subscribers as well as new are at fault. We, in the Contract Department, can do very little in the way of correction by reiterating "Contract Department, Telephone Company," if the other party persistently says, "Hello! Hello!" at the same time. Of course we might point out the correct way of making a call, but would this be taken in good part by the subscriber and have we the necessary time? I fear not.

It would almost appear that a school is required for the training of subscribers as much as one for operators. Time and again do we get into communication with *old* subscribers who have not mastered the most elementary rules, and who still wait for a return ring from the subscriber called. This of course we do not give, and when later they expostulate regarding our dilatoriness we seize the opportunity of explaining the correct method.

As the idea of using a phrase which would cut down preliminaries took root in America, might not the method employed there as a help to this end be also tried here? In some quarters a card printed as under is circulated, which is calculated to make an impression on the mind of the telephone user.

When answering this Telephone,
DON'T say "HALLO!" say

"This is....."

It will save time and promote good telephone service.

Telephone subscribers are a heterogeneous lot at present, and to make them into a homogeneous body of intelligent telephone users they must be properly instructed, otherwise I fear the ideal aimed at will not be realised.

Glasgow, February, 1907.

JNO. A. CRAVEN.

THE NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THE special appeal made by Mr. Clay to the Metropolitan and Head Office staff has, readers of the JOURNAL will be glad to learn, met with a considerable response. The number of members at the end of 1906 was 1,540, and as a result of that appeal there has been an increase of more than 450.

Still, may I be excused for impressing on the Metropolitan staff, which comprises about 4,500 persons, that the answer to the various appeals which have been made, however gratifying in itself, is not really commensurate with the importance of the subject and the strength of the staff. We should like, if possible, to see every member of the staff join us as a matter of course. Perhaps that is not to be expected—though, having regard to the small amount at which the subscription has been fixed, there is no substantial reason against it. Nothing that can be called a personal sacrifice is demanded, and if a large number of employees yet hold back, it is, I am sure, merely from want of thought and not from any objection to the scheme.

The true ground of this appeal to those who are still outside the society is that we wish it to fulfil the intentions of its promoters, and this it can only do by the aid of numbers. The old maxim that many can help one, though one cannot help many, applies with special force to an organisation of this kind. This is essentially an emergency fund, and does not resemble the great friendly societies from which a member has a right to draw certain specified benefits under specific conditions. If it were a body of that kind, the contribution would necessarily have to be much greater, and the whole constitution of the society would be different. It is a voluntary effort in the direction of affording benevolent aid to those members who may need it, but in a more regular and certain manner than the collections which have hitherto, more or less, answered the same purpose. It follows that most of the subscribers will in all probability never require the assistance of the fund, and it need hardly be said that those who did not actually want help would, of course, not apply for this any more than for any other form of charity. But we are confident that such a consideration would not deter a single generous-minded member of the staff from paying a small annual sum or such donation as he can afford, in order to show practical sympathy with his less fortunate fellows, and to enable such as are in distress to receive a more liberal grant than can be afforded if the money is drawn from a comparatively small number of members.

Those who have not joined are requested to send their names in at once to me at Salisbury House. Donations will be thankfully received from other districts wishing to help the cause.

ARTHUR T. WALLER,
Hon. Secretary, National Telephone Staff
Benevolent Society.

STAFF CO-OPERATION.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

Now that the establishment of Contract Departments in the principal towns throughout the kingdom is the order of the day, I should like to bring before my readers the question as to whether these departments—in many cases very young organisations—are really getting the co-operation and assistance it is so essential they should receive from all branches? From what I can see of things I am rather inclined to think that they are not. Although there may, perhaps, be no desire on the part of the staff at large not to co-operate, I am inclined to think that it is more a case of want of thought rather than any desire to see the Contract Departments struggling along for life.

As an illustration, take the number of engineers and wayleave officers employed throughout the country—men whose sole duty it is to be in touch with the public. These are the members of the staff who, in my opinion, have exceptional opportunities of scattering broadcast seeds for the Contract Department to follow up. I venture to say that the majority of the people who are interviewed by our men daily for wayleaves, etc., are non-subscribers and know practically very little of the great advantages to be derived by taking up the telephone service. Do these members of the staff, when encountering such folk, take every opportunity of endeavouring to secure them as subscribers? I am afraid not, otherwise our subscriber's list would be very much larger than it is at the present moment.

It will no doubt cross the minds of my readers that if these officers introduced canvassing into their day's work, too much of their time would be taken up, so that their other duties would suffer. I think that if these gentlemen, already referred to, only used a few carefully chosen arguments, applicable to the man's particular line of business, not very much time would be lost, and orders might result, and if the party were not inclined at the time to see eye to eye with our representative, particulars of the interview could be sent to the Contract Department, and if dealt with systematically, such information should form a huge field for operations. I do not happen to know the total number of wayleave officers and engineers on the Company's books at the present time, but for the sake of argument, we will take it as at least 300, and if each of these gentlemen introduced the telephone service to, say, three non-subscribers a day this would give us 280,800 interviews in the year, and if the Contract Department could only turn 2½ per cent. of these interviews to orders, the Company would be the richer by 7,042 additional stations.

Without wishing to be too optimistic, I do think that more business could be secured if there was far more co-operation shown on the part of the staff to assist the Contract Department in securing new business.

Let it be clearly understood that these few remarks do not apply to the Brighton centre, where co-operation amongst the staff is the very soul of the organisation.

Brighton.

C. F. MOORHOUSE, Contract Manager.

HIC ET UBIQUE.

THE following is from *London Opinion*:

The National Telephone girls are teaching subscribers how to save time in the process of getting a number. But surely all this instruction is superfluous. If you really want to save time, put on your hat and go and see the man personally.

We invite the subscriber to try the process. We will be magnanimous and not take into account the space of from ten minutes to two hours occupied in his self-imposed peregrination, nor the cost of his cab, train, tram or omnibus fare. We merely suppose him arrived at his friend's office, only to find him engaged with, say, Mr. Smith. This it must be allowed is quite as likely as that his telephone will be engaged—supposing he has an adequate installation. Our subscriber is begged to take a seat for "just one minute." Accordingly he cools his heels for such period as "just one minute" shall happen to signify. Or . . . he may find his friend "out," in which case he goes home a sadder and wiser man, and relies on the telephone in future.

Why does not some poet write an inspiring ballad on the Deathless Joke. It lingers, but it will not die. Age cannot wither, nor custom stale its infinite monotony. And all the while it amuses no one, and that is its tragedy.

THE *Gentlewoman*, in a paragraph which points out that houses unprovided with the telephone do not let nowadays, and that it will shortly be as much a matter of course in a well-ordered mansion as are bathrooms and electric light, concludes with an inspiring picture of the Strenuous Life:

I heard of a lady the other day, in search of a man to make up a party, who sat at her telephone for two solid hours ringing up every man of her acquaintance. She was rewarded by at last finding the required article. For those who give bridge parties the telephone is invaluable, for one of the party is so apt to fail at the last moment, and then all one has to do is to have a list of one's bridge friends' numbers and ring them all in turn till a player is secured.

EXACTLY a year ago we commented on a dog story wherein the animal barked into the transmitter of "one of the old-fashioned telephones which does not require that the receiver should be taken off its holder." We expressed a desire to meet that telephone. This year's dog story, however, rises to the occasion completely. A correspondent of *Our Dogs* describes the super-canine intelligence of his subject in the following words:—

A National Telephone Company's domestic instrument was employed. The dog is "rung up," no matter where it is (providing that it is within the sound of the bell). It will proceed to the apparatus, and, taking the receiver from its hook, places it to its ear in readiness to receive the message. A number is then transmitted through a distance of some 200 feet, and the dog finds the exact number so communicated from out of a series of numbered cards.

We offer no comment, except to say that we regard the story as a sign of the times, and that we are anxiously scanning the columns of the angling press and of our remoter American contemporaries to discover if the telephone can be dragged into a good fishing or snake story.

FOREIGN INTELLIGENCE.

United States.—The following statistics of some of the Bell Telephone Companies at end of 1906 are to hand. Chesapeake & Potomac Company (operating in Baltimore, Washington, etc.), 70,167 stations; Philadelphia Company, 95,914; Delaware & Atlantic (operating in the east of Pennsylvania), 68,297; Hudson River (operating in Hudson River valley), 49,712; Central New York (operating in Syracuse and the central part of the State), 32,757; Empire State (operating in the north-west of New York State), 12,099; New York & Pennsylvania (operating in the north-west of Pennsylvania), 32,514; New York & New Jersey (operating in Long Island, Staten Island, and New Jersey), 131,442; New York Company, 236,902. The net gain during the year has in each case been enormous—the New York Company, 47,000; and the Philadelphia, Delaware & Atlantic, and New York & New Jersey, 20,000 each. Greater New York (whose population seven years ago was three and a half millions) has now 279,000 stations.

Bulgaria. which according to the latest available statistics possesses a development of 675 stations, is about to spend 690,000 francs on two trunk lines; one from Sophia to Plevna, Tirnova, Schumen, and Varna, and the other between Plowdiw, Stara Zagora, Sliwen, Jamboli, and Burgas.

Russia.—In Warsaw the telephone system has increased during 1906 from 6,347 to 8,590 stations. This is stated to be partly due to the reduction of the subscription from 150 to 60 roubles, and partly to the usefulness of the telephone in summoning assistance in the unsettled state of the city.

WHAT THE COMPANY IS DOING.

EXCHANGES were opened during March at Upholland (S.W. Lancashire), Bream (Gloucester), Blarney (Cork) and Bryn (Swansea), making a total of 1,291 now working; 3,141 stations were added during February, making a total as at Feb. 28 of 413,943.

LONDON.—Private branch exchange agreements have been completed with the following:—Arundel Hotel, Cadogan Hotel.

Paddington.—The new common battery exchange was successfully opened on March 9. The new building is immediately adjacent to the old. Owing to the necessity of giving the old building into the hands of the building contractors by March 16 it was absolutely necessary to make the transfer on March 9. The testing of the equipment, for which the Maintenance Department is responsible, was carried out under great difficulties, owing to delay in the delivery of certain stores from the suppliers. The testing of the B positions disclosed a peculiar defect on the junction circuit, entailing a modification which was only completed by the morning of March 8. This defect was of such an extraordinary nature that it could not well have been foreseen, and the Investigation Department at Head Office are now engaged in elucidating the mystery. There are in round numbers 4,000 subscribers' lines and 700 junctions at Paddington, and these were transferred to the new exchange without a hitch. The method adopted to separate the two switchboards until the moment of transfer was a novel one. Wooden matches with their heads severed were inserted between the bobbins and armatures of the cut-off relays, and these were tied together with thread in strips of ten. At the psychological moment the men stationed at the relay frame pulled the matches away from the relays, thereby completing the circuit between the lines and the exchange. The success of the change-over under most trying circumstances was due undoubtedly to the energy displayed by all concerned.

BRIGHTON.—Agreements have been signed for private branch exchanges by the Hotel Metropole, Brighton (for seventeen stations), and by the Holden Motor Co., Brighton (for eight stations). Underground cables are now being drawn in at Hurstpierpoint, Sussex. Cables are being laid on the railway at Preston, Brighton, for the northern junction lines to Burgess Hill, Hurstpierpoint, etc.; and the laying of the underground pipes notified in last month's JOURNAL has been finished at Patcham.

THAMES VALLEY DISTRICT.—An underground extension scheme for the Taplow and Ray Park districts of Maidenhead has been sanctioned and will be commenced at an early date. The switchboards at Ascot, Wargrave and Newbury exchanges are being extended. A new exchange will shortly be opened at Theale.

EASTBOURNE.—5,500 yards of pipe and 550 yards of blocks have been laid in connection with the extension of the underground work at Eastbourne.

LEICESTER.—The larger business communities here are taking very kindly to private branch exchanges, realising to the full how efficiency can be alone obtained through methods which are based on business principles. The laying and jointing of a length of 2,600 yards of 600-pair cable has just been completed.

BURTON-ON-TRENT.—There have been two lengths each of 326 yards of 100-pair armoured cable laid over the Ferry Bridge. The important brewery firm of Messrs. Worthington & Co., Ltd., have signed an agreement for a private branch exchange and a 50-line board is about to be fitted there. Negotiations are pending with other large breweries in the town.

SHEFFIELD.—A four-position monitor's desk has been fitted and brought into use. A three-position junction section is being fitted and is approaching completion. The multiple jacks are being raised in order to give increased outgoing junction accommodation. Eight private branch exchanges are now working in connection with the Sheffield district, with a total of 26 junctions and 164 extensions, the largest private branch exchange having six junctions and 44 extensions. Total guaranteed calls 85,500.

HUDDERSFIELD.—A complete underground scheme has been approved, and will be put in hand at an early date. Two 240-line sections are being added to the existing switchboards at this exchange.

BRIGHOUSE AND ELLAND.—Estimates have been submitted for underground schemes at these places.

HOLMFIRTH AND SKELMANTHORPE.—Estimates are being prepared to convert these exchanges into metallic circuit working.

MILNSBRIDGE.—Estimates and plans are being prepared for underground and overhead cable schemes to transfer the subscribers' lines at this place from earth circuit to metallic circuit working, and transfer to new premises.

FALKIRK.—A new switchboard equipment for 400 lines with two junction sections has now been brought into use at new premises at Falkirk. The work in connection with the metallic circuiting of subscribers' lines at Falkirk was commenced last month. The existing open wires are being replaced by aerial cables.

STIRLING.—*Extension of Underground.*—A start has been made on the underground work at Stirling which was sanctioned recently.

CARDIFF.—Arrangements have been completed with the Taff Vale Railway Company for the installation of telephone call-office cabinets on their Queen Street Station platform, Cardiff, and the Penarth Station platform, with a promise that on completion of the Pontypridd Station alterations the Company will be allowed to fix a cabinet on this platform also.

SWANSEA.—Two miles of aerial cable and 560 yards of underground cable (additional) have been run in connection with the reconstruction scheme. A quantity of open wire has been cut down.

HEREFORD.—A new 1,000-line test board has been authorised. The following underground work has been laid and is approaching completion:—Two miles single pipe, 180 yards cement blocks, 2,329 yards cable drawn in.

SALTASH.—A length of 420 yards of 20-pair composition armoured submarine cable (dry core) has been laid crossing the River Tamar at Saltash, running parallel to the famous bridge. A feature in the laying of this cable was that it was pulled across from side to side, and not run out from a barge as is most usual when laying submarine cable.

SOUTHEND-ON-SEA.—An additional 50 party-line switchboard has been fitted and brought into use, also two sets of accumulators with necessary charging apparatus have been installed to replace primary cells; 644 yards of underground cable have been replaced by larger cables, and 2,704 yards of additional cable have been drawn in.

NOTTINGHAM.—An extension of the existing common battery switchboard at Nottingham by seven new sections, at an approximate cost of £10,000, has been sanctioned by the Board.

METROPOLITAN STAFF DINNER.

THERE was a large gathering of the Metropolitan staff at the Holborn Restaurant on the evening of March 15, the occasion being the eleventh annual Metropolitan staff dinner, Mr. C. B. Clay presiding.

The function was a success in every way, the number attending being largely in excess of previous years and included several prominent officials from head office.

Mr. Clay, in making his annual brief remarks, adverted to those affairs of the past year of interest to the staff generally, and referred with satisfaction to the fact that nothing untoward had marked the history of the Company since the last annual gathering. He spoke of the loss the Metropolitan staff had sustained by the transfer of Mr. Moorhouse to Brighton, but welcomed Mr. Taylor, who had already made his mark as the new chief of the Contract Department. Mr. Clay then touched on the newly formed Benevolent society, which, as is well known, was originated and suggested by himself at the last annual dinner. In commenting on the progress made he stated that there was already a membership of 2,000. After giving some striking instances where the society had done excellent work in coming to the assistance of those of their fellows who had fallen by the wayside, he concluded with an eloquent appeal to everyone present to increase the scope of the society's activities by making every member of the staff a subscriber to the fund.

Mr. Lowe, in proposing the health of Mr. Clay, commented on the fact that he had presided for ten consecutive years. The esteem in which the staff held their chief was borne out by the way in which his suggestion regarding the benevolent fund had been taken up. The seed sown last year had grown into a big tree. He wished it were possible that when the great change took place and the Post Office were our masters, that Mr. Clay could follow us and still be our chief. If this could be so, he was sure there would be great satisfaction among the staff and a feeling of greater security that their affairs were in safe hands.

The toast was enthusiastically received with acclamation accompanied by musical honours.

NEWS OF THE STAFF.

Mr. W. R. SENIOR, who has been Contract Agent at Hull since the establishment of the contract office there, has been promoted to be Contract Agent at Leeds.

Mr. E. W. NEWTON has been appointed Contract Agent for the Croydon district (Metropolitan area).

Mr. R. P. LOWE has been appointed Contract Agent for the Eastern district (Metropolitan area).

Mr. A. K. MURRAY, Chief Canvasser, Glasgow, has received the appointment of Contract Agent for Hull. He has been eleven years in the Company's service in Glasgow, and his transference to Hull was made the occasion by members of the Glasgow staff for presenting him with a token of congratulation and good wishes.

Mr. G. J. MERLEHAM, Canvasser, Glasgow, has been appointed Contract Agent for Plymouth, and his fellow employees in the Contract Department presented him with a token of esteem before he left to fill his new position.

Mr. JOHN ASHTON, District Manager, Leicester, has been elected a Member of the Council of the Leicester Association of Engineers.

Mr. ROBERT W. TRENWITH, Glasgow office, has secured the prize for elementary mathematics at the Glasgow High School evening classes. He gained 97 per cent. of marks.

Foreman BOWIE, of Glasgow, has received a grant of £3 from the Education Committee for a suggested improvement in channel iron arms, while Foreman PORTER has received £2 for a suggestion regarding the wall spike.

Mr. WM. STEWART, who for some years has acted as Chief Clerk to the Engineer, has now been appointed an Assistant Engineer, Glasgow.

Miss A. H. MOON, Senior Operator, has been transferred from Central Exchange, Liverpool, to Liscard Exchange, Birkenhead District.

Mr. S. C. COWARD, Chief Inspector, Liverpool, has been transferred to take charge of Sale's Department under Contract Agent.

Mr. J. PARRY, Foreman Instrument Inspector, Liverpool, has been promoted Chief Inspector, Liverpool.

Mr. R. BOOTH, Foreman Instrument Inspector, Liverpool, has been promoted as Chief Fitter, Liverpool.

Mr. W. MUNN, Sales Canvasser, Liverpool, has been promoted as Foreman Fitter, Liverpool.

Inspector G. FIELD, Cardiff, who has been promoted to be Chief Inspector at Newport, was presented by the Cardiff local staff with a writing bureau.

Miss F. BALL, Forewoman of the Coil Winding Department, Nottingham Factory, was recently the recipient of a handsome silver-mounted dressing-case on the occasion of her resignation.

Mr. ALEXANDER COOK, a Canvasser of the Metropolitan Sales Department, has resigned his position to take up an appointment as manager and engineer for Messrs. Marconi Limited, in connection with a new company being formed in the Brazils.

Mr. EWING, Engineer, Portsmouth, was presented with a diamond ring and a gold mounted fountain pen by the staff on his leaving the district to take up a similar position at Brighton.

Mr. L. W. HUNT, Inspector, Ipswich, has been promoted to Chief Inspector.

Mr. W. G. T. POPE, late of the Exchange Equipment Department, Head Office, who has taken up a position at Buenos Ayres with the United River Plate Telephone Company, was on Feb. 13 presented by Mr. Cook (Assistant Engineer-in-Chief) with a travelling clock and leather despatch wallet as a mark of goodwill and esteem from the members of the Engineer-in-Chief's staff.

Miss E. C. APHORPE, for many years Clerk-in-Charge of the Brighton Central Exchange, has been transferred to Folkestone to take up similar duties there. Before leaving Miss Aphorpe was the recipient of a purse of gold as a testimonial from the Brighton staff.

Consequent on this transfer, Miss E. A. TROTT has been promoted from Supervisor to Clerk-in-Charge in Miss Aphorpe's room; Miss M. AGUTTER has been promoted from Monitor to Supervisor, and Miss M. HOLLAND from Senior Operator to Monitor.

Mr. J. L. HARR, Senior Inspector, Oldham, has been transferred to Ashton-under-Lyne as Chief Inspector.

The following members of the Liverpool staff have completed 25 years service with the Company:—R. T. ELLINSON, Surveyor, 27 years; W. WOOD, Switchboard Construction staff, 27 years; E. LUNDY, Storekeeper, 26 years; G. JOHNSTON, Lineman, 27 years; J. HUNTINGTON, Wayleave Officer, Bootle, 26 years; J. PARKER, Assistant Engineer, 25 years.

Miss L. LEIST, Operator, Harrogate, was presented by the staff of that centre with a gold locket and chain upon resigning her position on Feb. 14, after between four and five years' service.

Miss F. DIXON, Senior Operator, Nottingham, has been promoted to be Supervisor.

Miss E. G. NELSON, Supervisor, Nottingham, has been promoted to be Monitor.

Miss M. EATON, Junior Operator, Nottingham, has been promoted to be Senior Operator.

Mr. J. R. BLACK has been appointed Chief Clerk at Guildford in place of Mr. A. BOOTH, who is resigning after having filled the post for four years. Mr. Booth joined the service in 1897 as a Junior Clerk, and attained to the Chief Clerkship by his perseverance and industry.

Institution of Electrical Engineers.—Mr. E. A. LAIDLAW (Engineer-in-Chief's Dept.) has been elected as A.M.L.E.E.

MARRIAGES.

Mr. C. A. JACKSON, who is well known in his work in connection with the London study under the Metropolitan Engineer, was married at the latter end of December last, and was the recipient of a dining-room clock from his colleagues at London Wall, the presentation being made by Mr. Elliott.

Mr. F. HOMFRAY, Local Manager, Windsor, who is to be married at Easter, has been given a wedding present by the Thames Valley staff.

Miss C. BURTON, Leicester, has resigned the position of Senior Operator to be married. She was presented with a silver cake dish by the staff.

Miss AMY WHITE, late Supervisor at Brighton Central Exchange was married on March 9, to Mr. J. LEWIN, Chief Inspector of Norwich. The ceremony took place in St. Peter's Parish Church, Brighton, a number of the staff being present. Miss White was the recipient of a handsome Queen Anne plated tea service with mustard pot and pepper sifter, subscribed for by all branches of the service in Brighton.

The following members of the Metropolitan Traffic staff are leaving to be married:—

Miss L. M. AFFLECK, Operator, Hop Exchange.

Miss F. E. DEAN, Clerk, Croydon Exchange.

Miss E. LEWIS, Operator, Streatham Exchange.

Miss E. B. MANN, Operator, Hop Exchange.

OBITUARY.

We regret to say that Apprentice W. E. WRIGLEY, son of Mr. J. Wrigley, Contract Agent for Sheffield, who had been suffering from phthisis for over nine months, died at the age of seventeen years on Feb. 27. All friends of Mr. Wrigley will sympathise him with him in his grief.

LOCAL TELEPHONE SOCIETIES.

London.—A meeting of the above society was held at Salisbury House Hall on Feb. 27, Mr. Bailey in the chair. The attendance numbered 60 members (25 per cent. of the total). The following papers were read and discussed:—"Sales Development," by Mr. W. V. Pegden, and "Electrical Testing," by Mr. T. Mitchell. It may be interesting here to state that the society hope at an early date, also during the next session, to introduce competitions for the best papers from junior members—prizes to be awarded.

Southern (London).—The monthly meeting of the society was held at 7 p.m. on March 13, when a very interesting paper was given by Mr. F. H. Hayden entitled "Common Battery Subscribers' Circuits." The subject was dealt with fully, starting from the ordinary common battery instrument, and including all the wiring diagrams at present in use, and the standard switchboards. Twenty-three lantern slides were shown, and each circuit was discussed in turn, the meeting lasting until 10.15 p.m.

Sheffield.—At the meeting held on Feb. 27 a paper on "Service Inspecting" was read by Mr. S. B. Townsend. This was followed by a debate entitled "Is the New Pattern Instrument with Hand Microtelephone an Improvement on the Old Pattern with G.T.I. Fixed Transmitter." Mr. S. B. Townsend spoke for the G.T.I. with fixed transmitter, and Mr. E. S. Byng for the new pattern with hand microtelephone. After the discussion, in which nearly everyone took part, a vote was taken, the new pattern being considered the better instrument by a considerable majority.

Bristol.—The third meeting took place on March 14. There was a very good attendance (Mr. R. A. Dalzell being in the chair). Mr. E. L. Preston (local manager) gave an instructive paper on "The Prevention of Faults, Line, and Instrument," illustrated by diagrams and photographs on lantern slides prepared by Mr. A. Perkins. The subject made a useful one for debate. Mr. J. E. Jones (chief electrician) contributed a paper on "Common Battery Working." Various diagrams and photographs of common battery apparatus were shown by means of lantern slides lent by Head Office. The subject was interestingly dealt with.

Birmingham.—On March 1 an interesting paper was read by Mr. F. C. G. Baldwin (engineer) to a large and appreciative audience. Mr. G. Hooper (vice-president) presided, and among others present were Mr. A. W. Smith (Wolverhampton) and Mr. Julius Maclure. The subject dealt with related to underground work, telephone poles, pot-heads, and various methods of distributing and carrying wires and making connections. The whole was illustrated with lantern slides. On March 15 Mr. C. W. Piggott (traffic manager) read a paper entitled "Operating" before a large gathering of members of the society. Mr. Hooper presided, and on this occasion many operators were present by special invitation. The lantern slides played an important part in illustrating both obsolete and up-to-date switchboards and methods of operating, ranging from the Ericsson Bell board to the common battery board.

Blackburn.—The seventh meeting of the session was held in the Weavers' Association Rooms on March 8, Mr. Remington being in the chair. Instead of two papers one only was read, namely, "Points in District Office Work," by Mr. Stevenson, chief clerk. Correspondence, outstanding rentals and fees, works orders, new lines and measured rate bookkeeping were all dealt with in an interesting and instructive manner. The discussion which followed was participated in by a large number of the members. The attendance numbered 55, equal to 67 per cent.

Newcastle-on-Tyne.—The fifth monthly meeting was held on Feb. 21 with Mr. Jackson (local manager) in the chair and 36 members present. Mr. F. W. Gaskins read a paper on "The Newcastle Underground Work." He dealt with the different methods of distribution (viz., from pot-head on poles, pot-head on wall, and pot-head in cellars), and gave costs for each class. A plan of the redistributed area and a curve showing faults before and after redistribution were exhibited. Curves for transmission, local and trunk, were also shown. Questions were asked with respect to the redistributed area and transmission equivalents, and a very interesting and instructive discussion followed.

Oldham.—The members of the above met on Feb. 21, when Mr. Bowes (engineer, Oldham) read a paper on "Underground Construction." Oldham being at the present time in the midst of drawing in and jointing cables in connection with the underground scheme, this subject naturally aroused great interest. Mr. Bowes expressed his thanks for the able manner in which Mr. Bake (draughtsman, Oldham) assisted with the set of plans. The last meeting of the 1906-7 session was held on Thursday evening, March 14, when a paper was read by

Mr. W. Crompton of the Engineer-in-Chief's Manchester staff, the subject being "Transmission." The lecturer dealt with the subject in a very able manner. There was a good attendance, including Mr. T. A. Prout, the assistant provincial superintendent.

Brighton—On March 4 a lecture on common battery extensions was given by Mr. H. Hatton, electrician. The lecture proved to be most interesting, dealing with the subject in an up-to-date manner, and making clear many points which it is necessary that the technical staff should be conversant with. On March 18 Mr. W. Knight lectured on "The Construction of Aerial Routes," embracing derricking of poles, fitting of brackets, regulating wires, junction route building, pole routes, knots and ropes, etc., the lecture proving to be most interesting and clear. The humorous side was not neglected.

Leicester—The fourth meeting was held Jan. 25 with Mr. John Ashton (president) in the chair. A most interesting exposition of the transmission limits as specified by the Post Office was given by Mr. Leonard Price. His lecture, for the sake of the junior members of the society, dealt principally with the introductory formulae and arguments. By the aid of enlarged diagrams (40 by 30) the table of equivalents was clearly shown as applied to the Leicester area, it being made apparent by the diagram that with average growth and the use of 10-lb. cable Leicester would be within the limits as required by the Post Office for many years. The fifth meeting was held on Feb. 8, the president again being in the chair. Mr. Marshall (chief clerk) demonstrated the utility of the works order in a most interesting manner—his explanations being greatly facilitated by an ingenious diagram which showed the relationship of the red, blue and white slips to the various departments. Starting at the contract office, the different phases in the career of the works order were shown commencing with the issue and detailed expenditure, and subsequent completion and collection of revenue and terminating in the all-important cash book. Exceedingly interesting were the statistics of the growth of the Company's business since the formation of the Leicester district, and also of the probable rate of increase up to 1911. Mr. S. Coles (an apprentice) then read an excellent paper on "The Apprentice." The principal points dealt with were the essentials of an apprentice, viz., youth, education and attention to details—and a suggestion was made that a school for apprentices be inaugurated. Mr. K. O. Ashby in his discourse on "A Subscriber's Point of View," had an unlimited field and took advantage of it. Mr. Ashby—having obtained permission to get the opinion of various subscribers on the telephone service—secured amongst others that of an Anglo-American resident in Leicester who preferred the local service to that of our friends on the other side of the water. The sixth meeting was held on March 4, the lecturer on this occasion being Mr. Herbert Laws-Webb who gave his lantern lecture "Telephony on the Continent of Europe." Mr. John Ashton, president of the society, presided over the meeting which was attended by 96 per cent. of the members, in addition there were several Post Office officials, the total attendance being 80. A vote of thanks was proposed by the chairman and seconded by Mr. F. H. Barber, who said he had heard that a small automatic system was being inaugurated by the Post Office in a village near Leicester. The seventh meeting was held on March 15 with the president in the chair. There was an attendance of 66 per cent. The first part of the evening was taken up by Mr. G. E. Thorpe with a paper on "Stores," in which there were some interesting statistics. The duties of the stores clerk were fully described and the correct methods of storekeeping suggested, the suggestions aroused active discussion. Mr. E. L. Hague with the "Mathematics of Line Work" occupied the second part of the evening, his explanations of vectors and their summation, the triangle of forces, stresses on terminal stays, angle stays and struts being facilitated by diagrams. He also demonstrated the law of the parallelogram of forces with specially constructed suspended balances and weights. Mr. Hague's paper will be continued on Monday, March 25, when the president will also give a paper on "Hints."

Glasgow—The eighth lecture of the session was given in the Glasgow Technical College on Feb. 27 by Mr. Thos. Pettigrew, whose subject was "Technical Terms." Mr. Pettigrew dealt with a number of the technical terms in everyday use by members of the staff, and explained these in his usual lucid manner. The lecture was illustrated by experiments and on the blackboard, and was much appreciated by the members. A discussion, taken part in by a number of those present, followed, to which Mr. Pettigrew replied. The hope was expressed that next session Mr. Pettigrew might see his way to give the society something further on the same subject, and he kindly indicated that he would not be disinclined to do so. There was an excellent termination to the session's syllabus in the lecture room at the college on March 13 when Mr. B. S. Cohen, of the Engineer-in-Chief's Department, lectured on "Telephone Transmission Measurements." This lecture, which was unavoidably postponed from Dec. 19, had been eagerly looked forward to by the members, and expectations were fully realised. Mr. Cohen's learned disquisition on his profoundly intricate subject, illustrated on the screen by a number of excellent slides, was followed with interest. By far the greatest interest, however, was exhibited by the audience in the oscillograph and the practical demonstration by Mr. Cohen of the working of this wonderful invention. At the close of the lecture Mr. Watson, superintendent for Scotland, proposed a vote of thanks to Mr. Cohen and his assistants (Mr. Stiles, of Head Office, and Mr. Hossack), and this was heartily accorded, Mr. Cohen briefly acknowledging. An interested member of the audience was Dr. Magnus Maclean, professor of electrical engineering at the college.

Plymouth—On Jan. 29 an experimental evening was arranged and conducted by Mr. A. R. Wran, local manager, and Mr. W. E. Walton, chief electrician. The preparation, jointing, and testing of dry core underground cables was very ably described by the former. Power leads of various voltages (alternating and direct) were available, and some interesting and instructive experiments relative to the construction and maintenance of the Company's plant were given by the latter. On Feb. 26 Mr. Distin, district manager, Exeter, gave his paper, "Elementary Mechanics and its Application to Line Construction." There was a good attendance, which included Messrs. Dalzell

(president), Currall (chairman), and Cooper (Bristol). By the many carefully prepared diagrams the lecturer brought home to the audience his subject in a most clear and unmistakable manner, and was warmly applauded on conclusion. The meeting concluded with a few remarks from the president. On March 12 a paper, "Private Branch Exchange Working," was given by Mr. A. E. Ball to a good audience. As this new system is being pushed to the front additional interest was taken, and a keen discussion followed.

Luton—A special meeting was held at Luton on March 2 with the object of bringing the society and its advantages before the notice of the staff in outlying centres. A photograph was taken in the afternoon, and the staff had tea together before the meeting. A very interesting lecture was given by Mr. H. C. Davidson (a member of the staff at Brighton), on "Central Battery Working." The system was very clearly explained, the various parts of the apparatus and their uses being demonstrated by means of complete "positions" for "A" and "B" operators, and also by a large number of skeleton diagrams kindly lent by Mr. F. W. Taylor, district manager, Brighton. Over 60 members attended, including the district manager, and the local managers from Watford, Bedford, Ware and Luton.

Coventry—A meeting of the Midland district telephony society was held on March 11, when Mr. Alfred Coleman (hon. president) presided over an attendance of 36. Mr. A. Coleman, jun., gave a very practical lecture, based upon the "Construction of the Birmingham Common Battery Board" which he illustrated by means of 50 slides prepared from photographs taken by him during the progress of the work, several showing the work in an uncompleted state owing to the non-arrival of certain material. During the course of his lecture he made comparisons between the working of the multiple board and the common battery board, showing the various improvements brought into use. During the evening the chairman gave an historic record of the development of switchboard work at Birmingham which was listened to with close attention by those present, particularly that referring to the infancy of the project.

Bristol—The second meeting took place on Feb. 11. There was an attendance of 69 members, Mr. Dalzell, president, in the chair. Mr. Perkins gave an interesting paper on "Progress in the Bristol district," illustrated by lantern slides prepared by himself. The lecturer gave a survey of the progress from 1896 to 1906, showing statistics, curves and photographs marking the increase in exchanges, stations, calls, improvements in types of switchboards, cables and general apparatus. A discussion followed on some of the helps and hindrances to progress.

Cardiff—The fourth meeting of the society was held on Feb. 13, the chair being taken by the district manager, Mr. Waite, when Mr. Edwards read a very excellent paper on "Overhead Construction." The attendance was not so good as at previous meetings, and this was unfortunate as the paper given merited a much larger audience.

Liverpool—The fifth paper of the session was read on Feb. 21 by Mr. J. O. Cooper, of Birkenhead, entitled "Power and its Application to Telephony." Mr. Prout, assistant superintendent, was in the chair, and was supported by the district managers for Liverpool, Manchester and Birkenhead. Mr. Cooper treated his subject in a very able and simple manner, and the course of the paper was followed with very great interest. The curves and diagrams, shown by means of lantern slides, were very clear and thoroughly illustrated the subject.

Portsmouth—At a meeting of the above on Jan. 24 a paper was given by Mr. Padget, electrician, and Mr. Bennett, chief inspector, entitled "Telephone Circuits." Some excellent enlarged diagrams were shown, and the functions of relays and apparatus very lucidly explained. Mr. Bennett had prepared diagrams of some faults difficult to locate, and these were discussed by different members of the staff. In spite of the snowstorm there was a good attendance, 75 per cent. of members being present. The chair was taken by Mr. Stirling, district manager. The fifth meeting of the society was held on Feb. 28, when a paper was read by Mr. S. J. Pharo, switchroom manager, entitled "The Cardinal Points of Operating." Mr. Pharo dealt very fully with the subject, the heads of his paper being as follows:—Brief description of switchboard; importance of good operating in its relation to getting new business; description of team work; statistics of lost calls and how to reduce them; how to maintain a four seconds' service; importance of prompt clearing; necessity for courteous address, patience with subscribers; and anticipation of switchroom faults by systematic testing. In the discussion which ensued, Messrs. Stirling, Bennett, Crampton, and Albany took part. The meeting was attended by the provincial superintendent, Mr. C. J. Phillips, whose contribution to the discussions was warmly appreciated by the members present.

Swansea—The general society here held its usual monthly meeting on March 4, when an excellent paper was given by the chief electrician, Mr. J. Radford, on "Subscribers' Circuits, from the Instrument to the Indicator, with a Description of Party Line and Junction Cords, Calls, etc." The paper was most instructive and interesting, and was much appreciated by a goodly number of staff present. The district manager (Mr. Gauntlett) presided.

The operators' society held its fifth sessional meeting on March 6, when an interesting paper was given by Mr. W. H. Crook, on the "District Office and its Relation to Operating." Works orders, Post Office fee accounts, message rate subscribers' cards, etc., were shown as illustrations of the paper, and the lecturer laid special stress on the loss sustained by the Company, if and when the operating staff neglect to record all calls. The paper was much appreciated by an attendance of 94 per cent. of available operating staff.

STAFF GATHERINGS AND SPORTS.

London—The Salisbury House Football Team who have this year retained possession of the "Clay Challenge Cup" were entertained at dinner on Feb. 26 by the president (Mr. Harvey Lowe) and vice-presidents of the club (Messrs. Bailey, Davis, and Gray). A number of members also attended, and the affair which took place at the Clifton Arms passed off very pleasantly under the chairmanship of Mr. Harvey Lowe. Mr. Bailey who presented the cup and medals made

a very happy speech, congratulating the team on their performance in retaining the cup, and wishing them success in the future. He specially complimented Mr. Wild, who has captained the winning team on the last four occasions the cup has been won. Mr. Hibberd, on behalf of the team and club, expressed thanks to Mr. Clay in respect of the cup and to the president and vice-presidents for the entertainment that evening and the support of the club during the season.

Southern Football Club.—A very successful concert was given by the above club on Feb. 15 at Caxton Hall, Westminster, under the patronage of Mr. C. B. Clay, Mr. C. M. Bailey and several other Metropolitan and Head Office officials. There was an excellent programme, which was much appreciated by an audience of about 300, a large proportion of whom were ladies. It is hoped that this may become an annual event.

Presentation to Mr. Hunt.—A smoking concert was held at the Rose, Old Bailey, on Jan. 24. Mr. Elliott occupying the chair. The musical arrangements, directed by Messrs. Penson and Clarke, were very highly appreciated by all present, and a most enjoyable time was spent. During the evening Mr. Elliott, on behalf of the subscribers, presented to Mr. F. A. Hunt a gold watch, and expressed the esteem and regard in which he had been held during the many years he had been connected with the City district, and regretted that the health of Mr. Hunt necessitated his removal to Westminster.

Dublin.—The dinner of the Dublin staff was held in Jury's Hotel on Jan. 26, a limited number of guests being invited, including Mr. W. Dillon, the Company's local solicitor, and Messrs. Moir and Kinsay, the superintending engineer and sectional engineer respectively of the Postal Telegraph Department. Mr. F. Cowley, provincial superintendent, occupied the chair. In proposing the toast of "The National Telephone Company, Limited, and Board of Directors," coupled with which were Mr. T. Harrington, M.P., and Mr. W. Dillon, Mr. Cowley stated he was very pleased to preside at such a gathering. Some statistics were given by him of the progress of the Company in Ireland for nine years back, from which time up to 1902 there was an increase of 70 per cent. in stations and 150 per cent. since then to date, but he emphasised the fact that the increase must continue. Mr. C. H. Sibley, the district manager, proposed the toast of "Our Guests," and read letters from Mr. Harrington, the local director, and Mr. Jefferson, K.C., regretting their inability to be present. Mr. Moir, in responding, dilated on the great importance of efficiency, and spoke in glowing terms of the NATIONAL TELEPHONE JOURNAL which, he said, was remarkable not alone for the general "get up" but for the human interest it took in the staff, and that, unlike their own journal, it published staff gatherings, marriages, promotions, etc., and he made a point of getting a copy monthly. The remaining toasts were "The Staff" and "The Chairman," which were proposed and responded to in suitable terms. The association football club which was formed at the beginning of the season now drawing to a close has up to the present played fifteen matches, nine of which they won, and should they be successful in the three remaining fixtures they will figure second in the league competition, thereby obtaining runners-up medals. This is a record which should be by no means discouraging to the officers of the Company in this district to whose financial assistance the team owe their success.

Reading.—A football match between the Guildford and Reading staffs was played at Prospect Park, Reading, on Saturday, March 9, the game resulting in a win for Reading. The visitors, among whom were Mr. Greenwood (Aldershot) and Mr. Black (Guildford district office), afterwards paid a visit to the Reading Exchange, and in the evening were entertained at tea in the Tudor Arms by the Reading staff, tea being followed by an enjoyable smoking concert presided over by Mr. Terras.

Nottingham.—On March 9 Mr. J. H. Wilson, who has recently been promoted from being local manager, Nottingham, to be district manager, Luton, was presented by the members of the local staff with a dressing case as a mark of esteem. The district manager made the presentation and wished Mr. Wilson, on behalf of the staff, success in his new sphere. The district staff held their annual whist drive and dance at the Arboretum Rooms on March 23. Members of the staff attended from all parts of Nottinghamshire, Derbyshire and Lincolnshire, and the visitors included members of the Nottingham factory and Messrs. British L. M. Ericsson's staffs. The function was most satisfactory, the company numbering about 150.

Nottingham Factory.—A football match was played on March 2 at Beeston against the B.L.M. Ericsson football club. The Factory had the better of the game and won 3-2, the goals being scored by Wilcockson 2, and Clayton. The return match was played at Nottingham on March 16, the Factory losing 2-1, Wilcockson scoring the only goal. The Factory were leading by 1-0 at half-time, but owing to their right back spraining his ankle, had to play ten men during the second half, during which time, aided by a strong wind, Ericssons pressed continuously.

Gloucester.—The first annual social gathering was held on March 8. A good proportion of the staff and their friends were present, numbering in all about 100. The district was represented by parties from Gloucester, Cheltenham, Hereford, Stroud Valley, and Dean Forest centres, and included guests from the Gloucester and Cheltenham Post Office Telephone and Telegraph Departments. The district manager (Mr. Fulton) with Mrs. Fulton and Mr. and Mrs. Pike (Cheltenham) were also present. A most enjoyable evening was spent in dancing, whist, general games, etc., one of the chief items of the evening being a musical programme, contributed to by members of the company's staff. Although the hour arranged for departure was 1 a.m., at the request of those present this was extended, and it was after 2 a.m. before the proceedings were finally "rung off."

Durham.—The third annual dinner of the district staff was held at the Hotel Metropole, Stockton-on-Tees, on Friday, Feb. 22, Mr. J. W. Swithinbank (district manager) presiding. Speeches were delivered by Mr. E. F. Jarvis, who was the guest of the evening; Mr. J. W. Swithinbank, Mr. T. Hann (chief clerk) and others. An excellent musical programme followed, songs, etc., being

rendered by Messrs. Fuller, Hinchley, Lucas, McMurdo and Wade, and Mr. H. G. Dunn ably officiated at the piano.

Southport.—This centre of the south-west Lancashire district held their third annual dance on Feb. 12. About 55 members of the staff and friends participated in a very pleasant evening.

Kilmarnock.—A social meeting was held on Feb. 16 on the occasion of Mr. Alex. Poole's departure to Canada. He was presented with a travelling bag and a pipe by Mr. G. A. MacDonald, on behalf of the staff of the Ayrshire district.

Leicester.—The first annual whist drive and social evening was held on Feb. 18, at the Oriental Café. The first part of the evening was devoted to whist, the prize winners being—Ladies: Mrs. W. J. Bailey, Miss G. Townsley and Miss G. Thomas. Gentlemen: Mr. Renwick, Mr. Stork and Mr. Diamond. After supper an enjoyable musical programme was provided by members of the society.

Birmingham.—A well attended whist drive took place on Feb. 5, when about 180 members of the Birmingham and district staff and their friends were present. The prizes were distributed by Mr. R. U. Tucker, the chief clerk. The committee are to be congratulated upon the success of the undertaking, which was due in a great measure to the indefatigable efforts of the hon. secretary, Mr. Savage.

The electrical staff held their annual dinner on Jan. 19, when between 50 and 60 members were present. Mr. Gatty, chief inspector, presided, and he was supported by Mr. Spiers, engineer, and Mr. Comyns. The evening's entertainment concluded with a concert, towards which members of the electrical staff generally contributed. It was thoroughly enjoyed by everyone present, and the committee were thanked for their trouble.

Edinburgh.—The district staff held a whist drive on the evening of Jan. 22. Fourteen tables were occupied, and play was engaged in for about two hours. Tea was served by the ladies, and Mrs. Stewart, wife of the district manager, afterwards presented the prizes to the winners. First, Miss Armstrong; second, Mr. R. Rae; booby prize, Mr. Bald. A most successful and pleasant social gathering was brought to a finish by Mr. Stewart, who expressed his own and Mrs. Stewart's pleasure in coming, and his hope that this would only be the first of many such evenings.

The staff held their annual dance on Feb. 22 in the North British Station Hotel. The company of over 140 ladies and gentlemen included Mr. J. D. W. Stewart (district manager) and Mrs. Stewart, Mr. Watts (Engineer-in-Chief's Department), Mr. Gray (local manager at Bradford) and Mrs. Gray, Mr. Sim (burgh engineer at Edinburgh) and Mrs. Sim, and Mr. E. H. Robson (audit staff). Dancing was engaged in from eight till a quarter to three, the Scotch reel, to the accompaniment of the bagpipes (played by a member of the staff), being heartily enjoyed by the English members of the Company. All the arrangements reflected great credit on the committee and their secretary (Mr. J. H. Allan). The second whist drive was held on March 6, when a number of the staff temporarily in Edinburgh, from other districts, joined the company. The prize winners were Miss Wallace, Mr. Joseph Orr, and Mr. H. V. Main.

The Amfère Golf Club held the first meeting of the season on March 7. The committee was formed of Messrs. J. D. W. Stewart (president), R. C. Wilson (captain), J. H. Allan (secretary and treasurer), J. Crear, W. Knox, A. Marshall, and G. R. Scott.

Sheffield received a visit from a number of the Nottingham district staff on March 9, when a return football match was played on the Sheaf House ground. A very enjoyable game ended in a victory for the home side. In the first half J. Thompson registered the first point for Sheffield. In the second half, C. Marsden and A. Padmore further increased the lead, whilst R. Burt added a fourth with a capital shot, Sheffield thus winning by four clear goals. Tea was afterwards taken at the Cambridge Hall, and a very pleasant day was ended by a visit to the Central Exchange.

Bristol.—A successful society gathering took place on Saturday, March 9. Progressive whist, music and recitations made up an enjoyable evening's entertainment for all present.

Association Football.—The return match between Electricians and Office staff was played on the Clifton Downs on March 16. The play was exciting from start to finish, resulting in a win for the Electricians by 3 goals to 2. The first match on Feb. 16 had resulted in a draw, 1-1.

Eastbourne.—The staff held their annual dinner on March 15 at the Royal Restaurant, the local manager, Mr. R. Curling, presiding, and Mr. W. S. Dawson being in the vice-chair. Mr. Dawson was responsible for the arrangement of the musical programme, which gave general satisfaction. The same gentleman proposed a vote of thanks to the chairman, and all who made the event so successful.

The operating staff held their first annual dinner on March 13, when a full muster sat down to an enjoyable repast, presided over by Miss Tarrant, clerk-in-charge. The evening was devoted to music, games, etc., and so agreeable was the result that the party did not break up until a late hour. Much as the young ladies enjoyed themselves, however, it was ultimately resolved to amalgamate with the male staff in future years, thinking apparently "it is not well to be alone."

Brighton.—A cricket club has been formed at Brighton, the district manager, Mr. F. W. Taylor, being president, and Messrs. F. W. Roberts, H. Hatton and J. G. A. Ewing, vice-presidents. Mr. H. Hemstock has been chosen secretary, Mr. F. H. Johnson, captain, and Mr. D. Gunn, vice-captain. An excellent pitch has been secured in Preston Park. On Saturday, March 9, a football match was played at Hove Park, Brighton, between sides chosen by the Portsmouth and Brighton staff respectively, the former winning 3-2. After the match tea was taken at Chatfield's Hotel, and an enjoyable smoking concert was carried out. Mr. F. W. Taylor, district manager, presided, and amongst others present were Messrs. Moorhouse (contract manager, Brighton), Roberts (local manager), Ewing (engineer), J. Stirling (district manager, Portsmouth), H. Legge (engineer, Portsmouth) and S. J. Pharo (traffic manager, Portsmouth).

Blackburn.—*Football Match.*—Two teams selected from the Blackburn and Preston district staffs met in a football match on the Hole-i'-th'-Wall Ground, Blackburn, on March 9. Mr. Remington, district manager, Blackburn, kicked off, and a well-contested game resulted in a victory for the Blackburn staff by 2 goals to 1. After the match Blackburn entertained the Preston players to supper at the Crown Hotel. A party of 50 enjoyed an excellent repast, after which various members of the staff contributed to the entertainment. Mr. D. Munroe, chief inspector, Preston, thanked the Blackburn friends for their hospitality, and Mr. R. Anderson suitably responded.

Whist Drive. A very successful whist drive organised by the Blackburn operators was held in Welding's Rooms, Blackburn, on March 15. Miss Woods and Mr. Airey won the first prizes, while Miss Ianson and Mr. Macdonald secured the second prizes. Refreshments were served, and were followed by songs. Altogether a very agreeable evening was spent, and the ladies were heartily congratulated by the male staff.

Liverpool.—A whist drive, promoted by the operators of the Central Exchange, Liverpool, was held at the Avondale Cafe on Saturday, March 2, at which 144 ladies and gentlemen were present. The first lady's prize, a silver-backed hair brush, was won by Miss Coward; the second prize, a gold brooch, being won by Miss Gilmour. The first gentleman's prize, a silver cigarette case, was won by Mr. Hawley; and the second prize, a silver-mounted walking stick, by Mr. Moses.

Bradford.—A whist drive and social evening was held at the Hotel Metropole on Feb. 15, about 80 persons being present. After the drive supper was served, and to wind up a programme of songs, etc., was gone through, contributed to by the following:—Misses Hindle and Hopkinson, and Messrs. Verity, Calvert, Hall and Lees, Mr. Hudson acting as chairman.

Glasgow.—The staff held a very enjoyable "At Home" on the evening of Saturday, Feb. 23. The programme was composed of dances, songs, recitations and instrumental music, all of which contributed towards the success which followed the efforts of the committee.

Canterbury.—On March 8 the Canterbury district staff held their first annual social gathering in St. George's Hall, Canterbury. A very pleasant evening was spent by upwards of 100 members of the staff from Canterbury, Dover, Folkestone, Margate, Ramsgate, etc., and a few friends, under the presidency of the district manager, Mr. C. F. Ashby. The principal features of the evening's enjoyment were the songs contributed by Mrs. Rhodes (Ramsgate) and Mr. Ashby (Canterbury), both of whom were deservedly encored, and the production of the sketch, "Browne with no E," by several members of the Canterbury staff. Supper was taken at 11, and the proceedings finished at 2 a.m. The Dover and Folkestone contingents who came by bus fully enjoyed their ride back. A word of praise is due to the committee for providing so excellent a programme, and especially to the efforts of Mr. J. Law.

Luton.—A very successful gathering of the staff of the Herts and Beds district was held at Luton on March 2. A photograph was taken at Wardown Park by Mr. Langdon Davies (local manager, Bedford), after which many of the staff visited the town football ground to see the match: Luton *versus* Crystal Palace. After tea the opportunity was taken to make a presentation to Mr. J. A. Bonathan (who is leaving the district) of a gold watch as a memento of his work in the district.

Portsmouth.—The annual dinner of the district staff was held at the Naval Hotel, Portsmouth. The chair was taken by Mr. J. Stirling, district manager, amongst those present being Mr. Legge, engineer; Mr. Padget, electrician; Mr. Pharo, traffic manager. The visitors included Mr. Fwing, engineer, of Brighton; Mr. Willet, Brighton; Mr. Rolls, of the electrical staff H.M.S. *Vernon*, and Mr. Wilson. There was a good muster of nearly 100. The chairman proposed the toast of the "National Telephone Company" in a very comprehensive speech, and detailed the Company's history in the competitive centres, relating several amusing anecdotes (of which by the way he seemed to have an inexhaustive supply) to illustrate his points.

An athletic club has been formed here, and on Feb. 16 a football match was played between the National Telephone Athletic Club and a local team, the Monarchs, who won by eight goals to three. As this was the first match and the men had not been playing together before, the result was not so bad as it appears on the paper. It is proposed to enter a cricket team in the Portsmouth and District League for the coming season; Mr. Legge has been appointed captain and Mr. Pharo secretary.

Belfast.—A social gathering of the staff was brought to a very successful issue on March 4, the occasion being a presentation to Mr. Gilmour (district manager), on having completed 25 years' service with the Company. Mr. Adam Duffin (local director) occupied the chair, and presented Mr. Gilmour, on behalf of the local directors and staff, with a solid silver tray, suitably engraved. Mr. Thomas W. Pim, also a local director; Mr. Cowley, provincial superintendent; and Messrs. Broomhead and M'Cashin, of the local staff, having spoken on the event, three cheers were given for Mr. Gilmour, and "He's a Jolly Good Fellow" heartily sung. Mr. Gilmour made an interesting speech in reply. A musical programme was afterwards submitted, and highly appreciated.

Harrogate.—The first annual whist drive and social evening was held on March 1 at the Cafe Imperial, Parliament Street. There were twenty tables engaged and six prizes were given. The ladies' first went to Miss Langley, and the second prize to Miss Gospel. The gentlemen's first was taken by Miss Wood (who had to take a gentleman's position) and the second by Mr. C. Metcalf, whilst the booby prizes were captured by Miss M. Long and Mr. D. N. Skelton. After whist, supper was provided, and a capital programme of songs and other music came all too soon to an end at 2 a.m., all being unanimous in voting the function a great success.

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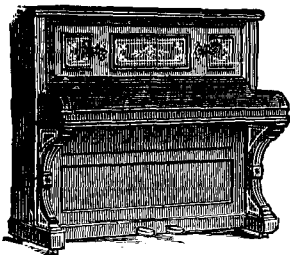
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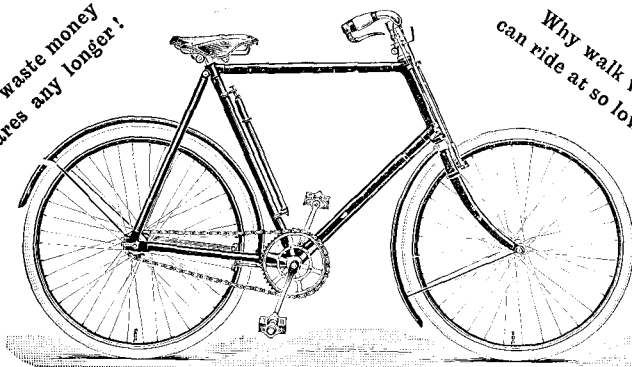
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TELEPHONE MEN.

XII.—CHARLES JOHN PHILLIPS.

MR. PHILLIPS was born in 1851 at Mitcham, Surrey, and was educated at a private school. He began his electrical career in 1870 in the service of Hooper's Telegraph Works, Limited, who first made a success of the manufacture of india-rubber cores for submarine cables. He was first employed for a short time in the London office, and then joined the electrical staff under Mr. T. F. P. BRUCE WARREN, chief electrician at the Hooper Core factory at Mitcham. The manufacture of the "North China" cables for the Great Northern Telegraph Company, altogether about 2,000 miles in length, was then in hand, and a little later that of the Western and Brazilian Telegraph Company's cables was begun. In June, 1873, the first section of these latter cables, Pernambuco to Para, about 1,200 miles in length, was shipped in the ss. *Hooper*, the first vessel constructed specially for cable laying and at that time, with the exception of the *Great Eastern*, the largest ship afloat. Mr. PHILLIPS was one of the electricians accompanying this expedition, which was in charge of Mr. J. R. FRANCE as Engineer-in-Chief, and Mr. BRUCE WARREN as Chief Electrician, Sir WILLIAM THOMSON (now Lord KELVIN), and Professor FLEEMING JENKIN were the consulting engineers to the Western and Brazilian Telegraph Company, and joined the ship at Madeira. At this time Sir WILLIAM carried out several experiments with his deep sea sounding apparatus, and did a good deal towards perfecting it. Quite close to Madeira 2,000 fathoms of water is found.

Mr. PHILLIPS was second in command at the Pernambuco shore station during the laying of the cable to Para, and afterwards had charge during the laying to Bahia and Rio de Janeiro. He afterwards joined the *Hooper* again at Para and proceeded in her to Cayenne, laying that section of the Central American cables on the way. He remained six months in Cayenne, and then went on to Trinidad, where he had charge of the shore station during

the laying of the cable to Santa Cruz. He later had charge at Porto Rico and Cienfuegos, in Cuba, whilst other sections were laid to Santa Cruz and Santiago respectively. He returned to England *via* New York in 1875. The streets of New York then, although the telephone had not arrived, were very much crowded

with overhead wires, enormous poles carrying long arms and very heavy beds of wires being planted in the pavements on both sides of the street.

In the earlier part of 1879, Mr. PHILLIPS first came into contact with the telephone business, assisting a Mr. BAYLEY, an American, who was attempting to introduce in London a carbon transmitter, which he contended was clear of the Edison patent. This transmitter spoke very well; it was tried under the auspices of the late Major-General WEBBER over some of the Royal Engineers' lines, between their New Cross and Strood Depôts. At this time Mr. PHILLIPS met several of Edison's representatives in this country, amongst others, Mr. CHARLES EDISON, who brought over the chalk receiver and Mr. JAMES ADAMS, who had previously arrived with the Edison carbon transmitter. The headquarters of the Edison Company were then at 6, Lombard Street, where a small model exchange of about six subscribers' lines was fitted up. On Sept. 9, 1879, Mr. PHILLIPS joined the Telephone Company, who were then located at 36, Coleman Street, as assistant to Mr. FLETCHER, their engineer, with whom he had been previously associated when he was on Sir WILLIAM THOMSON's staff. The then manager of the Company, Mr. FRED ORMISTON, was also an old cable man, having been resident engineer for the Western and Brazilian Telegraph Com-



pany in Pernambuco. At this time nine subscribers were connected on a Williams' switchboard, which took two operators to work, one to do the switching and the other the talking. The first work given Mr. PHILLIPS to do was to substitute what were known as Silvertown sets, containing a Blake transmitter and Bell receiver for the sets made up

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If the poles are in good condition and the cable can be run fairly well away from the portions of the pole which have been weakened by cutting for arms, and if the poles are upright or well set against their work, they can be economically utilised. But as a general thing, in cable work, it does not pay to pull up a second class pole in order to save erecting a new one.

The economy of a new pole may not always appear obvious, but it will be generally found in such cases that the final saving in labour, especially where a number of wires are already on the pole, will more than counterbalance the extra cost of the new pole; and when the work is complete, there is the satisfaction of seeing strong and reliable construction in return for the time and money spent.

STAYS.

It is difficult to exaggerate the necessity for good staying at any time, but staying is of special importance in connection with aerial cable work. The tension of the steel suspending wires and height of the cable are the two main factors to consider in calculating the stress on a pole. The tension of each steel suspending wire, after regulation, is estimated at from 700 to 800 lbs. As a wooden pole, however, even when well stayed is far from being a perfectly rigid structure, the whole route adjusts itself to the strain, and a comparatively slight deflection of a pole may considerably reduce the tension of the steel wires. With regard to the stays required, if the steel wires were regulated to a stated tension by means of a dynamometer ratchet, there would be no difficulty in calculating exactly what is required. Failing this, my experience is that two $\frac{1}{4}$ stays, with a spread of about half the height of the cable, are sufficient for a terminal pole carrying five steel wires and a 50-pair cable.

For side stays the strain may be arrived at graphically, if the angle and the tension of the wires are known, or can be estimated. For an angle between the two spans of 150° and a spread on the stay of one-half to one-third the height of the cable from the ground, one $\frac{1}{4}$ stay is generally sufficient. For an enclosed angle up to 110°, two $\frac{1}{4}$ stays are necessary. Heavier cables need more in proportion.

The best position on the pole when one side stay only is fixed is directly above the suspending wires, as it is then clear of the cable, and where two stays are required I fix one above and one below the suspending wires. Line stays should be erected at short intervals, and are absolutely necessary before the suspenders can be regulated. A fairly ideal arrangement would be to stay every other pole, but this is rarely possible. Poles at bad angles must be line stayed, or they are bound to become distorted. It may also be necessary, when direct staying cannot be done, to erect flying stays of three or four steel wires, attached to a stay pole some distance away.

I wish particularly to emphasise that routes must be well stayed in the first instance before any attempt is made to regulate the suspenders, and the staying facilities should always be borne in mind when selecting positions for poles. If a pole carrying lead-covered cable once comes over, it is very difficult to pull it upright again.

SUSPENDERS.

These consist of steel wire of No. 10 gauge, the weight per mile being 226 lbs., and the breaking strain 1,730 lbs.

It will be seen from Table II that the number of wires varies according to the length of the span and the size of cable to be erected. It is advisable, I think, if a short span of 50 yards is erected in a series of longer spans, to run the larger number of suspenders right through. With rubber-covered cable two suspenders are used up to 25-pair, and three suspenders for 50 or 100-pair cable.

The position of the suspending wires on the poles should, as already stated, be as low as possible. In erecting aerial cables, in opposition to the practice followed in the erection of open wires, the first cable should be in the lowest position and subsequent cables, if any, should be placed above.

In urban districts 30 feet clearance has to be given over all


roads, and if the suspending wires are attached at a point about 35 or 36 feet up the pole there will be sufficient allowance for sag to ensure this. In long stretches where no road crossings occur 25 feet clearance is sufficient. The cable should, however, be kept as level as possible, and sufficient height should be allowed to well clear existing or prospective buildings. On wood poles before erecting the suspending wires a sheet of zinc is fixed round the pole; about 8 inches is sufficiently wide, and it is best cut in two lengths so that one overlaps the other, thus . If the zinc is wrapped round the pole in one length there is a tendency for the suspending wires to draw it tight in the middle and for the edges to bulge outward. The sharp edge is bad, and also allows water to lodge between it and the pole.

TABLE II.
Number of Suspending Wires for Lead-covered Dry-core Aerial Cable.

Size of cable.	10-lb. conductor.		20-lb. conductor.	
	Spacing of slings.	No. 10 steel.	Spacing of slings.	No. 10 steel.
25-pair	2 feet	A. 4 B. 3	2 feet	A. 4 B. 3
50 "	"	5 3	"	5 3
75 "	"	6 3	"	6 3
100 "	"	7 4	"	7 4
150 "	"	7 4	"	"
200 "	"	8 4	"	"

A.—Spans of over 50 yards and up to 70 yards.
B.—Spans of 50 yards and under.

After fixing the zinc the suspending wires are each passed twice round the pole and made off separately with a No. 16 iron binding wire. A suitable length for the binder is 6 feet. A distance of three-quarters of an inch is first wrapped round the single suspender next to the pole, then 5 inches round the two steels. The end of the suspender is then turned back over the binding wire, and the binder finishes with a wrapping of three-quarters of an inch round the main steel wire. A block of wood, placed between the wire being bound in and the other suspenders, keeps them apart while the work of making off is being done. The make off is finally painted with preservative paint. It is also usual to paint the whole length of steel wire while it is being run out.

The coils of No. 10 steel are very heavy, and the wire having so much spring is difficult to handle. In order to overcome this I designed a drum barrow with a vertical revolving drum large enough to take a coil of No. 10 steel. The drum is also arranged so that it can be used for the smaller coils of 100-lb. copper. The use of this has lessened the labour of running out, and it was found much quicker than letting the No. 10 steel out by hand, particularly when unskilled labourers were employed.

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TABLE III.

Length of span.	No sag perceptible.	1-ft. sag.	2-ft. sag.	2-ft. 6-in. sag.
yds.	lbs.	lbs.	lbs.	lbs.
60	1,000	200	100	50

The sags were measured by holding a rule against the suspender in the centre of the span and sighting between the two poles, but it is to be understood that these figures are only approximate. The regulation of steel suspending wires might with advantage be made the subject of a special investigation.

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
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group of suspending wires when regulated, as they should be, to form one taut bar, will have a sag of about 6 inches, and the tension will be correspondingly less. When the cable is run the sag increases to about 2 feet 6 inches for a 50-pair, to 3 feet for a 75-pair, and to 4 or 5 feet for a 100-pair cable, in a span of 60 yards.

It is necessary, if the cable is being run on an existing route, and more particularly if poles have been renewed and working aerial wires will be crossed, to examine carefully each point of crossing and to move well out of the way all wires which may interfere with the erection of the cable. A little extra time spent in doing this will be well repaid when running out the cable.

The additional sag which the weight of the cable will give to the suspending wires must be taken into consideration when doing this and about another foot added, in order to provide against slings hanging down and poles coming over slightly.

SLINGS.

The method of attaching the cable to the suspending wires is the next point. The perfect sling has yet to be invented. The slings used by the Company are strips of raw hide $4\frac{1}{2}$, $6\frac{1}{2}$, or $7\frac{1}{2}$ inches long and three-quarters of an inch wide. A slit is cut lengthways about half an inch from one end, and at the other end an eyelet is let into the strip through which passes the end of the suspending hook. To use the sling the strip is wrapped round the cable, and the hook together with the eyelet end of the sling passed through the slit. This tightly grips the cable. The hook forms a single loop, which, when opened, is slipped on the suspending wires and afterwards clipped together with a pair of pliers. A disadvantage is the extent to which the hook has to be opened to pass it over six or seven suspending wires. Also, the rawhide stretches, and if the slings are not of the same thickness the length may vary after the cable is up.

A good sling will stand a strain of about 1 cwt. before it gives way. This is much more than it is called upon to carry in an ordinary way, but care must be taken at the first pole that the whole weight of the cable from the drum to the top of the pole does not fall upon any one sling. A newer type of sling has a double hook instead of the single loop of wire.

There are several other types of slings made. Zinc hangers are used in the United States, and also hangers with ordinary marlin in place of the rawhide strip. The rawhide sling is probably the best.

RUNNING OUT CABLE.

I consider that five spans, averaging a total of 250 to 300 yards of cable, give the length that can be most economically and safely handled, for lead-covered cable up to 75-pair 10-lb. conductor, or 50-pair 20-lb. conductor. For 100-pair cable, about three spans, or 200 yards of cable, give a fair length. More can, of course, be run in special cases.

The weight of the individual length of cable to be run should be considered in conjunction with the straightness or otherwise of the route, as if there are any severe angles shorter lengths must be handled than when dealing with long, straight stretches. The lengths I have given are not excessive for ordinary angles, and the total weight of cable varies from 10 to 20 cwts. in these cases. The main point to be borne in mind is that in pulling cable along by winch all the strain is on the end of the cable, and if it is too great the end of the cable will be pulled off, causing much delay and trouble.

To prevent the cable binding at each pole and to ease the friction generally round the bends, I have had a number of wood pulleys made. The over-all dimensions of the pulley are 6 inches diameter by 2 inches in thickness; a semi-circular groove is cut in the face of the pulley, about 1 inch in depth and $1\frac{1}{2}$ inch wide (Fig. 1), the edges being rounded off. A $\frac{1}{2}$ -inch hole, taking a $\frac{3}{8}$ -inch combiner bolt, is drilled through the centre of the pulley and a holder is made out of 1-inch bar iron. These pulleys are lashed very quickly to each pole and at once adjust themselves to the pull of the cable, which lies in the groove. The size specified takes easily any cable up to 100-pair (10-lb. conductor), and severe angles have been successfully taken without any flattening of the cable. A slightly wider groove is required for cables of larger diameter.

The length of cable from the drum to the top of the first pole

should be led in a gentle curve over one or more of these pulleys. No other support is necessary. In leading cable round complicated and numerous bends I have found them invaluable.

Two-inch Manilla rope is used for pulling the cable along, and the length of rope should be sufficient to cover the whole section in order to avoid moving the winch when the cable is partly run.

The winch used is the ordinary pattern. It must be firmly fixed to the ground, and the man in charge should be instructed to pull *very* steadily and slowly. The cable grip is the usual laced wire grip, and the end of the cable should be beaten down a little before this is put on in order to give a good hold. Too much attention cannot be paid to this point, as otherwise the grip may suddenly leave the cable in the middle of a span. Pulling along by hand has generally been adopted when running rubber-covered cable, but for lead-covered cable there seems no doubt that a winch is the best. The chief advantage is the steady pull, which also straightens all bends out of the cable, making a great deal of difference in its final appearance. The cost is less than that of hand pulling, and fewer men are needed. Lead-covered cable runs out much better when the power is applied steadily. Jerks, which are more or less inseparable from pulling by hand at each pole, may damage the cable. The men, moreover, are fully employed in changing over the slings, as lengths of more than two yards should not be left unsupported when running the cable out.

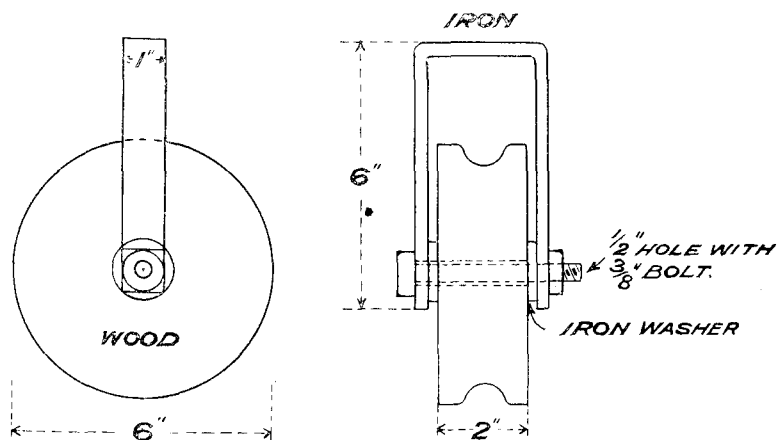


FIG. 1.

In the first few spans run out each alternate sling was left off until the final span was reached; ultimately, it was found to be quite safe if every third sling only was hung on to the suspending wires when pulling with a winch. This throws less work on the men changing over the slings, and enables the cable to be run out more quickly. No difficulty was found in passing the slings through the pulleys at each pole.

The position for each sling should be marked on the cable as it leaves the drum. Chalk was at first used for this, but it soon rubs off, and in the event of slings slipping the distance had to be re-measured. The method finally adopted was to cut a length of 2 feet of No. 8 iron wire, to one end of which was fixed a small brush. This served as a combined measure and marker, and used with a little siderosthen paint, will be found very useful.

The arrangement of men is important; perhaps this point will be best illustrated by taking one or two lengths actually run.

In the first case the cable measured 222 yards, and was a length of four spans of 50-pair (20-lb. conductor) cable, the total weight being approximately 13 cwts.

One man was stationed at the drum to mark the positions for the slings. Two men were up the first pole, one putting slings on the cable and the other hooking them on to the suspending wires. I may say that the slings were always put on up the pole to avoid passing them through the pulleys leading up to it. At each of three other poles one wireman was stationed, and, finally, two men at the winch, one turning the handle and the second coiling up the rope as it was hauled in. This disposed of eight men, and, including the foreman, nine men in all were employed. The cost of hauling in this case was 1.11d. per yard, and the total cost 2.1d.

per yard. None of the men had had any previous experience with this class of cable. A total of 914 yards of 50-pair cable were run on this particular route in four lengths. The average cost for the whole length was 2.05d. per yard. The lengths were determined by local circumstances.

In the second case 293 yards (five spans) of 75-pair 10-lb. conductor cable was erected. The weight of the cable was 15½ cwts. Nine men were employed, but while erecting the last span the drum was left unattended; otherwise the arrangement was practically the same as before. Another man would have been advisable here, but was not available. The cost of running out 707 yards of 75-pair cable, of which the above was a portion, worked out at 1.08d. per yard for hauling and 1.93d. per yard including all charges. It will readily be seen that the full number of men is not required until the cable is partly run. The method generally adopted is to start one gang on the work and then about two spans of cable have been erected by mid-day. A second gang then joins them to complete running out the rest of the section and clear all away on the completion of the work. A fairly competent wireman should be able to work a pole by himself if the cable is run out at a steady rate and if there are no bad angles, each third sling only being hung on the suspending wires until the last span is reached. This span must in any case be taken slowly, as all the wire loops in the slings have to be clipped tightly together to prevent them slipping off the suspending wires.

A little difficulty is sometimes experienced owing to the raw hide sling slipping along the lead covering of the cable at the start. It is possible that the thin layer of siderosthen paint used in marking the distances off on the cable may aid in preventing slipping.

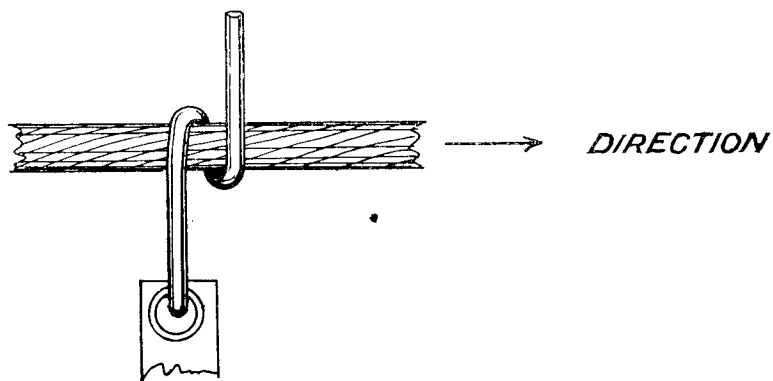


FIG. 2.

Another point to be remembered is that the sling should be hung on the suspending wires with the free end of the wire loop facing in the direction in which the cable is being run (Fig. 2); otherwise there is a tendency for the hook to bind and cause serious trouble. Is it necessary to add that in going round a bend the cable must be on the inside of the bend, clear of the pole?

As some figures showing the cost of actual running may be interesting I give them below (Table IV.). They are based on about three miles of cable erected.

TABLE IV.
Dry-core Lead-covered Aerial Cable. Cost of Running.

Size of cable.	Weight of conductor.	Lowest cost per yard.	Highest cost per yard.	Average cost per yard.	Average length of section erected.
25-pair	10 lbs.	—	1.49	1.49	213 yards
50 "	10 "	1.706	2.127	1.96	281 "
50 "	20 "	1.75	2.4	2.05	254 "
75 "	10 "	1.93	2.44	2.18	253 "
100 "	10 "	2.4	2.77	2.58	201 "
100 "	20 "	—	3.96	3.96	121 "

It is usual to lash the cable in at each pole, but I doubt whether this is necessary on level lengths. A rawhide strip is used, one end being tied tightly round the cable in the direction of

the route and the other to the pole. The cable must not be tied rigidly to the pole or the vibration may result in breaking the lead sheathing. The tendency of the rawhide strip to slip when tightening up may to some extent be counteracted by using powdered resin on the surface of the cable.

JOINTING.

I need not spend much time on the subject of jointing. A stage is required for the joiner to work on, and this is conveniently made of two 8-wire arms spiked or bolted to the pole. Boards are laid across these and should be fastened down firmly. Branching joints should be supported in some way and the branching cable taken in a gentle curve to the pole, to which it may then be fastened with lead clips, up to the pot-head which is at the top. The pot-head should be tightly lashed or clipped to the pole. Ordinary straight through joints do not require much extra support, but I have generally fixed an extra sling at each end of the joint as an additional precaution, to ensure safety.

The details of jointing are a matter for a separate paper, but I would just urge one point with regard to pot-heads, and that is that they should be made separately and pass an air-pressure test before they are jointed on to the cable. Such a course may save much subsequent trouble and expense in making leakages good.

PROGRESS AT JERSEY.

By HOWARD EADY, District Manager.

During the past year a considerable extension of underground work has been successfully carried out in St. Helier and its suburbs, the work of laying the concrete blocks and pipes being executed by a local contractor, and the drawing in, jointing and distribution of the cables by our own local staff.

As the external work of running the distributing lines from the various cable terminals was in progress, the opportunity was seized to reconstruct the 1,000-line test cabinet fittings, and bring these up to date by fitting sneak-coil arresters in place of the old tag pattern strips, and at the same time to convert all single line circuits.

The work of changing the old pattern for the new strips necessitated somewhat careful management, as we were dealing with working wires. In order to permit of the new strips being placed in their permanent position in the test frame, it was first necessary to erect a temporary wooden structure and transfer the old pattern strips with their jumper wires thereto, then drill holes in the iron frame to take the new strips, fix the latter, and re-transfer the jumper wires; as they were fixed in their proper places the single circuits were then, in conjunction with the outside work, made metallic.

An item of interest to those engaged in underground operations may perhaps be found in the fact that a good many of our cables were drawn in by means of a horse, the longest length so drawn being 570 yards of 50-pair; this method was found to be both cheaper and quicker than hauling in by hand or winch. The hauling line, running through a pulley, was so arranged that should the slightest hitch have occurred the line could have at once been let go and the strain taken off; no difficulty, however, with an intelligent man leading the horse, was experienced, and the one horse-power tractor was found to be so flexible that the cable could be moved a few inches at a time as easily as a few yards.

A new sub-exchange with 120-line test cabinet and a 50-line upright standard pattern switchboard, with 22 subscribers connected, was constructed during March at La Rocque, three and a half miles from St. Helier; this addition makes a total of thirteen exchanges in the island of Jersey.

THRIFT CLUB, CANTERBURY.

The staff at the district and local offices, Canterbury, have recently formed a thrift club, the object of which is to encourage members to save money for the purposes of their annual holidays and Christmas leave, withdrawals only being permissible on these occasions, or in case of severe illness, transfer, or of leaving the Company's service. The first month's working has proved very satisfactory. The joint secretaries and treasurers, Messrs. E. F. Foster and B. Holloway will be pleased to supply details of working to any other district desirous of forming a similar club.

CO-OPERATION IN OUR WORK.

By JNO. H. BIGLAND.

RECENTLY our London Contract Manager spoke strongly on the necessity of having enthusiasm for our work, and pointed out the keenness which he found on the other side of the Atlantic. That we in England have room for improvement in this matter is unfortunately only too true.

Three years' residence in Canada has brought home to the present writer another point on which we should do well to imitate our transatlantic cousins. I mean the absolute necessity for better feeling between departments and closer co-operation in our work.

I have in my possession a most excellent little pamphlet on this subject, written by Mr. THURBER, General Manager of the New York Telephone Company. The idea which he takes for his text, as it were, and the one thought which he drives home on every page, is the dominating principle that in all our actions we are working "for the Company, first, last, and all the time."

Obviously the very best way to co-operate with other departments is to do our own work thoroughly and promptly. If this were always done, the machinery of the Company would roll on sweetly and smoothly, and everyone would be satisfied and happy. Unfortunately, we have not got to the millennium yet and we must face actual, not ideal conditions. We all make mistakes at times, and we shall all continue to do so; doubtless this is a good thing, for the "perfect" individual is apt to be an insufferable prig.

What I want to bring out is this: If one department makes an error, another department can usually assist in putting matters right if it likes, so saving the Company's reputation. For example, the contract office for some reason or other delays the sending in of a new agreement; here is an excellent chance for the engineers to co-operate by making a special effort to rush the completion of the line. Or, again, the engineers have been slow to complete, no matter for what reason, there may have been genuine difficulties, or there may have been negligence; here is the chance for the fitting department to come to the rescue with specially prompt and careful work in order that at all costs the Company's reputation shall not suffer.

Now, let us ask ourselves straightforwardly if this is, in practice, the spirit which pervades our daily operations. Are we not rather prone simply to excuse ourselves, are we not at times almost glad to be able to turn round and point out some blunder made by another department? If we are, then it is perfectly plain that we are thinking only of ourselves, in a wretchedly narrow manner, and not identifying ourselves with the broader interests of the Company as a whole, we have lost sight of our watchword "the Company first, last, and all the time." Not long ago we Englishmen were being told to "think Imperially." We in the National Telephone Company can paraphrase this, and make up our minds to "think Nationally"—as opposed to "departmentally."

I have known cases where a fault has remained unduly long on a subscriber's line because two departments were haggling and arguing between themselves as to whether the fault was in one man's district or another, or because the outside staff were trying to shift the responsibility on to the inside staff, or *vice versa*. Meanwhile the subscriber, in ignorance of all this, is losing the service for which he has paid, and, worse than all, he is forming harsh judgments of the efficiency of the Company as a whole.

Another common source of trouble and delay is the difficulty one department often experiences in getting information from another. All our various branches dovetail so closely into each other, that it is constantly necessary for one to know what the other is doing, or for one to have certain information which another can supply. Such information should always be given promptly and cheerfully, on the assumption that it would not be asked for without necessity.

After all it is thankless and uncongenial to point out shortcomings without suggesting a remedy; it is always easy to criticise, but not always quite so easy to point to a way out of the difficulty. In the present instance, however, it seems that the solution is a pleasant and agreeable one. Our great trouble here, in this huge London at any rate, is that the members of the staff do not know each other personally half enough, consequently the

first step towards real co-operation should be for us to get together socially as much as possible. At our Metropolitan staff dinner Mr. CLAY drew attention to the fact that social gatherings had, in the past year, been more frequent than formerly, and expressed a hope that they would become still more general. The writer will be only too pleased to help on in any way this good cause.

I fear this article is running to an inordinate length, but the extreme importance of the subject must be my excuse. At the commencement I alluded to Canada. While there, I could not help being struck with the friendship which existed between the various members of the staff of the Bell Telephone Company, the entire absence of anything like personal or departmental jealousy, and above all the splendid loyalty to the Company.

This is what *we* want; we must all pull together, and we must always and in all circumstances be guided by the fact that it is "the Company first, last, and all the time."

THE CRY OF THE LEARNER.

By GEORGE COLQUHOUN, *Edinburgh.*

THE reference to learners in the two last issues of the JOURNAL brings a very important feature of the Company's working under observation, and having had under review for many years various types of boys, perhaps I might be allowed a few remarks on those "indispensable creatures."

Let us take the case of a boy who enters the Company's service. We know that he looks on life in a very different manner from an adult. He is filled with youthful enthusiasm; he begins life with high hopes and high ideals. He sees right before him the promised land of material prosperity, and not unnaturally he fails to observe the obstacles in his path. As the Company do not engage boys for the mere sake of giving them something to do, but in order that they may perform certain duties, we have in the daily repetition of those functions a striking test of the solidarity of the learner. Previously he has been ignorant of that phase of existence known as the routine of daily life, and the similarity of each day soon dispels his superfluous enthusiasm. The learner who is easily tired of his work deserves less sympathy than pity, as he is likely to become a burden to himself and others, but the lad who possesses a dogged determination that enables him to take a continued interest in his work, and a sustained anxiety as to its proper execution, is likely to become a useful servant of the Company, and deserves every consideration. It is desirable to make the transition period as interesting as possible, and as varied in regard to number of departments. It should be impossible for any learner to complain of limited opportunities, and especially one with the requisite amount of ambition. When a lad leaves one department to enter another, a statement might be supplied by the one under whom he has served, as to his ability, what feature of the work most appeals to him, and any other details that will enable his superiors to accurately gauge him, in order that he may eventually drop into that sphere most adapted to his mind.

The somewhat elaborate scheme outlined by Mr. ALLAN looks like the Army Reforms of successive War Ministers, very well on paper, but it is very different in practical working, because no two boys are alike in ability or temperament. Finally, the more attention paid to learners, their good points noted, and their interest sustained and quickened, must eventually produce a higher standard of individual efficiency to the exclusion of those who unfortunately can only be ranked as unemployables.

Learners must, however, recognise how much lies with themselves, and endowed by Nature with an average amount of intelligence and determination to succeed, need have no fear for the future.

TELEPHONE FIRE CALLS IN GLASGOW.

FROM the report of the Glasgow Fire Brigade for year ending December 1906, it appears that while 348 fire calls were given over street fire-alarm system 114 calls were given through the telephone exchanges. In view of the fact that the Glasgow street fire-alarm system is a very elaborate one the number of alarms given by means of the telephone is considerable.

THE WORKS ORDER.*

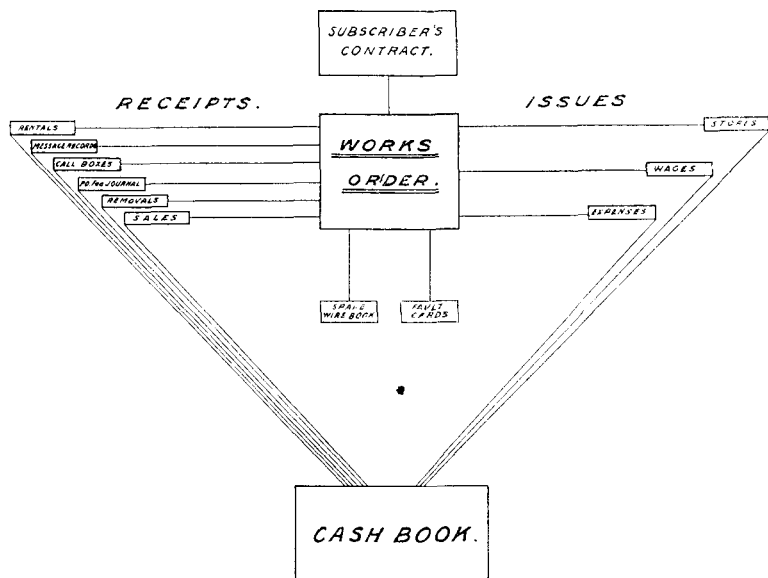
By H. MARSHALL, Leicester.

SYSTEM may be said to be the root principle of all successful enterprise. Nowhere perhaps do we see this principle better exemplified than in the National Telephone Company's business, which has been built up on as systematic a basis as could possibly be devised.

A study of the part played by the Works Order is most interesting, and should prove the value of a sound system of bookkeeping.

The Works Order is the connecting link between all departments of the service, and finds employment for all grades in the execution of it. Originating from the results of the Contract Department, it passes to the Construction and Electrical Departments, affects the Operating Department, and, on completion, is dealt with by the Office Department.

Although the subscriber's contract is the foundation on which the telephone business rests, its supplement, the Works Order, may



be termed the superstructure by means of which that business is built up; it affects the financial results of the business, its execution involves the outlay, its completion starts the revenue. Not only is the Works Order the connecting link between each department of the service, but it is also the link between practically all the Company's books and accounts.

As soon as the efforts of the Contract Department have resulted in securing a subscriber, the contract for the service decided upon is accepted and passed into the district office.

A Works Order is forthwith issued for the execution of that contract. This Works Order is made up in three parts; two are sent to the local manager, who, in turn, after recording, issues the first (or pink slip as it is called) to the foreman who is to construct the overhead work. The other (or blue slip) is issued to the chief inspector, who is responsible for the instrument work.

STORES.—The foreman and inspector now apply, by means of requisition slips, to the storekeeper for the necessary material and apparatus to carry out the work, and as in the absence of these requisition slips (which bear the number of the Works Order concerned) the storekeeper is unable to issue stores, the Works Order may be said to be the key which unlocks the stores.

WAGES.—During the process of constructing the line and station the time occupied by each person is accounted for by means of the time sheet, upon which is allocated the number of hours

chargeable to each Works Order. From these time sheets the pay-roll and wages analysis books are made up.

EXPENSES.—Travelling vouchers and other incidental expenses incurred in executing a Works Order are charged through the petty cash return.

The issue of material, allocation of wages, and charging of expenses represent the expenditure portion of the Works Order, and from the three sets of books kept for the purpose we are able to ascertain the total expenditure in the district, or, if required, the cost of any particular Works Order.

The work of connecting a subscriber with the exchange being completed, the Works Order is returned to the district office and from the pink and blue slips, together with the office copy, entries are made to:

(1) **RENTAL REGISTERS.**—The due date and amount of annual rate is posted to these books, and this rate is payable on the due date each year so long as the subscriber remains on the system. No entry can be made, nor when once made taken out of the rental register, without a Works Order for the new entry or for the cessation of the old having first been issued.

(2) **MESSAGE RATE RECORDS.**—If the connection is for a message rate or 10-party line subscriber, in addition to the rental register, entry cards have to be made out for recording the calls made by this class of subscribers. These cards are made up from the particulars supplied daily from the switchroom, and for the purpose of keeping these records a daily summary, a monthly balance book and a party line register are necessary.

(3) **AUTOMATIC BOXES.**—If the line is equipped with an automatic box, in lieu of starting the card just mentioned an entry is made from the Works Order into the automatic box register. The cash is collected from these boxes once a month.

(4) **POST OFFICE JOURNAL.**—Should the subscriber desire Post Office facilities, an entry is made in the Post Office Fee Journal, giving number, name, and amount of deposit made. The work entailed in the keeping of this book is enormous compared with that required in connection with some of the district office books, for while a flat rate subscriber's rental has only to be dealt with once a year, his Post Office fee account, involving as much and often more labour, has to be made up and collected once a month.

(5) **REMOVALS.**—If the Works Order is for the removal of a subscriber's instrument from one position to another an entry is made from the Works Order to the Removal (2b) Return.

(6) **SALES.**—If for sale of apparatus the entry is made to the Sales (2a) Return.

Practically every demand for payment of cash dates from the completion of a Works Order immediately preceding that demand, or is a recurring demand dating from the completion of a Works Order in a previous year.

The cash received in settlement of these demands is posted from the receipt books to the "cash book," and from the cash book against the debits in the various records. The Works Order is the originating record of all sums due to the Company, the cash book the record of the receipt of such sums. The cash book also forms a debit and credit record of the Company's cash transactions, from which is compiled the monthly balance (No. 1) return of receipts and expenditure.

In addition to the foregoing, the instrument inspection and fault cards are made out from the Works Order; these cards are kept as a record of the instrument apparatus in existence, and show the dates of the periodic inspections and dates of faults and repairs.

The spare wire book, and one or two minor books are also kept up from the Works Orders.

The accompanying rough diagram will help to illustrate the course of the Works Order. That the system is an ideal one I think all will be inclined to admit.

NOTICES.

COVERS for binding Vol. I. of the JOURNAL can now be obtained, price 1s. 6d. each. A sample will be sent to District Offices if desired. Reading cases with cords for holding twelve numbers, price 9d. each, are also obtainable. Reproductions, price 6d. each, of the portrait of Mr. ROWE are now ready, and that of Mr. PHILLIPS is on order.

* A paper read before the Leicester Telephone Society, February, 1907.

FOREIGN INTELLIGENCE.

Austria.—A new tariff scheme is being introduced, based on the use made of the telephone service by the subscriber. The various areas will be classed in groups, as follows: Group I., systems with 20,000 subscribers and over; Group II., 5,000 to 20,000 subscribers; Group III., 2,000 to 5,000 subscribers; Group IV., 500 to 2,000 subscribers; Group V., 200 to 500 subscribers; Group VI., under 200. The subscribers will be divided into classes, according to the extent of their use of the telephone. Class A includes very heavy users (6,000 to 12,000 calls); Class B, heavy users (3,000 to 6,000 calls); Class C, light users (up to 3,000 calls); Class D, residences (not more than 2,400 calls); Classes E and F, two and four-party lines, the latter being applicable only to residences. The two-party line subscriber is allotted three-quarters the number of calls, and the four-party subscribers half the number of calls allowed to a residence subscriber.

Group.	Class A.	Class B.	Class C.	Class D.	Class E.	Class F.
I. ..	£20 0	£16 0	£12 0	£9 12	£7 4	£4 0
II. ..	16 0	12 16	9 12	8 0	5 16	3 8
III. ..	12 16	10 8	8 0	6 16	4 16	2 16
IV. ..	10 8	8 12	6 16	5 16	4 0	2 8
V. ..	8 12	7 4	5 16	5 4	3 12	2 4
VI. ..	7 4	6 0	4 12	4 12	3 4	2 0

The classification of existing subscribers will be arrived at in the following manner:—Counts of the outgoing calls will be made on four separate working days during a given period, and an average of the four counts taken and multiplied by 300. New subscribers will be placed at first in the lowest business connection or residence class, and an adjustment made after the specified four counts have been made.

France.—Here, also, telephone tariff reform is promised by the Government by means of a tariff based on a charge per call. The problem is to relieve the small subscribers without overcharging the large. Thirteen new exchanges are to be constructed in Paris, equipped to serve 200,000 subscribers, and 300 new junction wires are expected to be working by October next. Parliament will be asked to vote 50 million francs for the new schemes.

COMPLIMENTARY DINNER TO MR. JOHN GAVEY, C.B.

ON April 11 a complimentary dinner was given to Mr. JOHN GAVEY, C.B., M.Inst.C.E., Engineer-in-Chief of the Post Office, on his retirement from that position after a service extending over 40 years. The dinner took place at the Grand Hotel, Trafalgar Square, and there was a distinguished company present, including the Right Hon. Sydney Buxton, Postmaster-General (who presided); Mr. H. Babington Smith, C.B., C.S.I., Secretary; Sir John Denison Pender, K.C.M.G.; Sir Robert Hunter; Dr. Glazebrook, F.R.S., President I.E.E.; Major O'Meara, R.E., C.M.G.; Mr. W. E. L. Gaine; Mr. F. Gill; Mr. J. Ardron, C.B.; Mr. A. F. King; Mr. A. M. Ogilvie; Mr. J. J. Cardin, C.B.; Mr. A. Anns; Mr. S. J. Goddard; Mr. C. B. Clay; Mr. C. J. Phillips; Mr. W. W. Cook; Mr. H. Laws Webb; Mr. W. M. France; Mr. D. Stuart; Mr. J. Gall; Mr. W. V. Morten; Mr. Alex. Siemens; Mr. H. R. Kempe, M.Inst.C.E.; the company numbering 200 in all.

After the toasts of "The King," "The Queen, the Prince and Princess of Wales and other members of the Royal Family" had been duly honoured, the POSTMASTER-GENERAL proposed the toast of "The Guest of the Evening," and in doing so stated that letters of regret for inability to be present had been received from Earl Granard, Sir William Preece, Sir J. C. Lamb, Mr. S. C. Hooley, and other gentlemen. Telegrams had also been received from Signor Marconi and Herr Sydow, Under-Secretary of State, Berlin. Mr. BUXTON referred to the great service done by Mr. GAVEY in regard to telegraphs and telephones, and in regard to wireless telegraphy. The toast was supported by Mr. KEMPE. Mr. GAVEY, in responding, expressed his sense of the kindness and evidences of friendship of those present. Mr. GAINE proposed the toast of "The Post Office," Mr. BABINGTON SMITH responding. The toast of "The Visitors" proposed by Sir ROBERT HUNTER and replied to by Sir J. DENISON PENDER, K.C.M.G., and Dr. GLAZEBROOK, F.R.S., brought the proceedings to a close.

Major W. A. J. O'MEARA, C.M.G., has been appointed successor to Mr. GAVEY as Engineer-in-Chief at the General Post Office.

SWITCHBOARD MAINTENANCE.

By A. R. PULFORD, Chief Inspector.

THE recent articles by Messrs. FRANCE and EDMONDS on the training of operators have no doubt been most instructive to those whose duties bring them into practical touch with this most important branch of the service, and, I venture to say, it will be admitted that the proper training of the different staffs in the handling of their particular branch of a most important public service must be beneficial to the successful working of that service. The primary object of this article is to emphasise the importance of the maintenance of the switchboard apparatus and the serious liability to leakage in the cost of its upkeep. The cost of switchboard maintenance is governed solely by the manner in which the cord and keyboard equipment is used by those whose duties call upon them to handle it. An operator may be very smart and quick at her work, but unless she uses extreme care in handling the different mechanisms provided for her use, she may be the unwitting cause of serious inconvenience to subscribers; as the latter always judge by results, it is obvious that they will make no allowance for a quick service if it is a bad or indifferent one. Hence, the opinion that a school of operating should be an essential portion of the equipment of a large centre.

DIAGRAM OF TEST RECORD.

Position	Cords														Date
J.A.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	28/3/06
FRONT															26/5/06
BACK															26/10/06
KEY															26/11/06
CONTROL															26/11/06

✓=OK ✗=Repaired by Operator ⊗=Not reported by Operator

Date 28/3/06 refers to first row of marks read vertically, 26/5/06 to second row, and so on. Period covered by test is from 28/3/06 to 26/11/06.

I have, for some years, given a considerable amount of attention to the maintenance of switchboard apparatus, and, for the benefit of those placed in a similar position, offer the suggestions which arise from the following description of the method in vogue in Belfast.

RECORD OF CORD TEST FROM 5/12/06 TO 7/3/07.

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FRONT	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BACK	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
KEY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CONTROL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Total for "A" positions	110 = 39.14 %	Cords in use	.. .. = 490
" " "B" "	106 = 37.72 %	Per cent. of faults per cord	= 57.34
" " "C" "	65 = 23.13 %	Number of days	.. .. = 80
	281	Number of positions	.. .. = 34
		Average per position	.. .. = 8.26
		Number of calls per busy hour	.. .. = 200 per position.
		Number of times each cord might be used	= 14.28.
		Per cent. of possible bad connections	.. .. = 57.

NOTE.—The above shows the number of bad cords which would have been left in the positions for at least one day had not this test been made.

All the cord and keyboard equipment of one section of the switchboard is spoken through each morning in the following manner:—A junior places himself in the position of an operator, and two of the electrical staff take the part of subscribers desiring to speak to each other. Each cord is connected in turn and while being spoken through is violently shaken by the junior; the listening key

is also "flicked" backwards and forwards about half a dozen times, and thus the condition of the cords and keys is subjected to a thorough test; when the cord has been proved the clearing signal is given by each "subscriber," and in the case of automatic ringing the control ringing keys are proved. It will be seen that by a man with a trained "telephone ear" defects which would have a detrimental effect on a subscriber's opinion of the service will be quickly detected. This special test is quite independent of the usual operator's test for noisy cords.

I give a sample page of a note book used in recording the test, and it will be readily seen that it gives a record of the condition of the apparatus for a considerable period at a glance, and also a practical indication of the efficiency or otherwise of the repairer's work. I also attach a record of a full test through each position, which explains itself. An important point is that defects are discovered which would give trouble in practical working and would not otherwise be notified. If these records were exhibited for the benefit of the staffs concerned it would, I feel sure, have a good result. It must be remembered that the longer a cord, for instance, remains fit for use the more cost of maintenance is saved; and when it is also considered that a very small proportion of a six-foot cord is actually used before the cord becomes too short for service, the value of a little foresight in this direction is seen to be of some importance. The "handling" by each operator can be readily traced through the Position Book.

TELEPHONIC EDUCATION.

BY L. PARSONS, *Chief Clerk, Brighton.*

THE existence of "Telephone Societies" in connection with the Company's various centres, together with the excellent classes conducted by correspondence from the Engineer-in-Chief's office, constitutes a splendid means of education for those possessing the ambition to become educated. These societies and classes are fairly well supported, but there is room for considerable improvement in this direction, and it is with a view to emphasising this fact that these words are written. Too many of the men who would make ideal managers fight shy of the technical drudgery. This, of course, can be well understood in the case of men who are past their thirties, and perhaps have duties to perform as husbands and fathers, which militate against any time being spent on self-education; who, too, in some cases, have struck out for themselves lines of duties in their own time, which occupy a good portion of their leisure, and which they cannot give up for self-educational purposes now that the Company offers the facilities.

Had these same facilities been available ten or fifteen years earlier, some of such men would have eagerly availed themselves of them. There is observable a regrettable tendency among the junior staff to follow the lead of some of their seniors in this direction, the younger men failing to grasp the fact that the educational advantages have come too late for their elders, while for themselves the situation degenerates into a "Come day, go day, God send Sunday" attitude. The action of many seniors in sacrificing their time for example's sake, while caring nothing for the study, is highly commendable, but it cannot be expected that they should all do this. In too many instances it would mean sheer waste of time to those interested in family, musical, church, temperance, or other work. These remarks may with advantage be digested by the office staffs, and it must not be overlooked that a smart clerk, sufficiently grounded in technical knowledge, is of the class from which managers are drawn in many large organisations, and often the best managers, too.

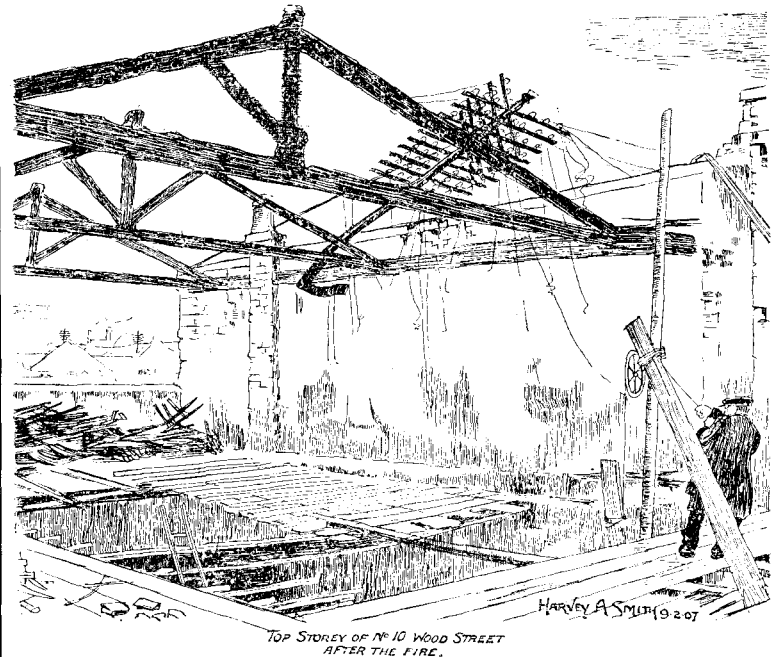
All that is required is a little ambition, combined with application, but without these qualities a clerk is likely to remain a clerk, and it should be remembered that all clerks cannot be chief clerks. It cannot be too seriously impressed on the staff, and on the junior staff in particular, that promotion is greatly facilitated in these competitive days by free use of all the educational advantages obtainable.

EMERGENCY RECONSTRUCTION IN THE CITY.

A DISASTROUS fire broke out at 11-12, Wood Street (which is, as is well-known, in the City danger zone) on March 4. The first alarm being received at 7 p.m., Mr. BASCOMBE, the Divisional Engineer (being summoned from his home), was present within 50 minutes from receipt of the call, and remained during the night directing the work of reinstating the 170 subscribers' circuits which had been cut out.

The emergency men promptly responded to the call, and as a result of their untiring energies, superintended by Messrs. CLARKE and PENSON, the cables destroyed by the fire were reinstated and all jointing completed (temporarily) by 9 p.m. of the 5th. The remaining circuits of open wires were reinstated and all communications restored by two o'clock of the 6th. It would appear that this was a highly creditable result, reflecting most satisfactorily upon all concerned, especially when it is remembered that in this short time three 52-pair cables were run out and jointed in six places, and the work also involved the running of various open wires and branches.

A pole with test box stood on the party wall. The accompanying sketch shows the perilous position of the pole after the fire.



TOP STOREY OF NO. 10 WOOD STREET
AFTER THE FIRE.

The building being entirely gutted, a platform, as shown, had to be made across the bent iron girders and a derrick erected before the pole could be taken down, which was imperative owing to the dangerous position it occupied, held by one stay only.

A search party is still looking for the test box.

LEICESTER TELEPHONE SOCIETY.

MR. LEONARD PRICE presided over the eighth meeting, which was held on Friday, April 12, with an attendance of 60 per cent. Miss M. Law, chief operator, read a paper on "Operating," full of excellent advice to operators and the staff generally. The essentials of a good operator were clearly stated and the relationship between the staff and subscriber reviewed. The importance of courtesy on the part of both operator and subscriber was emphasised, as was also the necessity for the exercise of patience and tact. "The Sinews of War" was the title of a paper read by Miss M. Barr, cashier, in which the subject of the Company's revenue was most capably handled. The method of dealing with the numerous amounts was explained from receiving to the payments into the bank. Perhaps no branch of the Company's work shows the increased popularity of the telephone better than the return from automatic boxes; this and the rental return proved exceptionally interesting. As in operating so in the cash desk it was the attention paid to the details which made or marred the success of our business.

SWANSEA TELEPHONE SOCIETY.

THE general society here held a special meeting on March 26, when a lecture was delivered by Mr. R. A. Dalzell on "Efficiency with Economy." The lecture was based on notes taken from a paper read by Mr. Gill (Engineer-in-Chief) at London. There was a gratifying attendance and the lecture was much appreciated.

MAGNETO INSTRUMENT FAULTS; PRIMARY AND SECONDARY IN CONTACT.

THE following is an excerpt from a paper read by Mr. J. PARRY before the Liverpool Telephone Society on "Telephone Instruments."

Speaking of the Ericsson table set he says:

"This is a fault which in its description seems rather complicated and unlikely, but it is frequently met with. It is the foundation of numerous 'chronic' complaints, and is the cause of

"We will now consider the effects.

"The receiver is 'framing' (Fig. 1) as shown by the bridge marked 'fault.' (In the diagrams the parts of the circuit affected by the fault are shown in solid lines and the remainder in dotted lines.) Current coming from line 1 will pass to the receiver, across the fault to the frame of the microphone, from the frame of the microphone round the primary of the induction coil to the battery terminal marked Z E, from Z E to the bottom contact of the switch hook (i.e., the arm which makes and breaks the connection between the centre point of the bell coils and Z E), from here to the centre point of the bell coils, round the right-hand coil to the

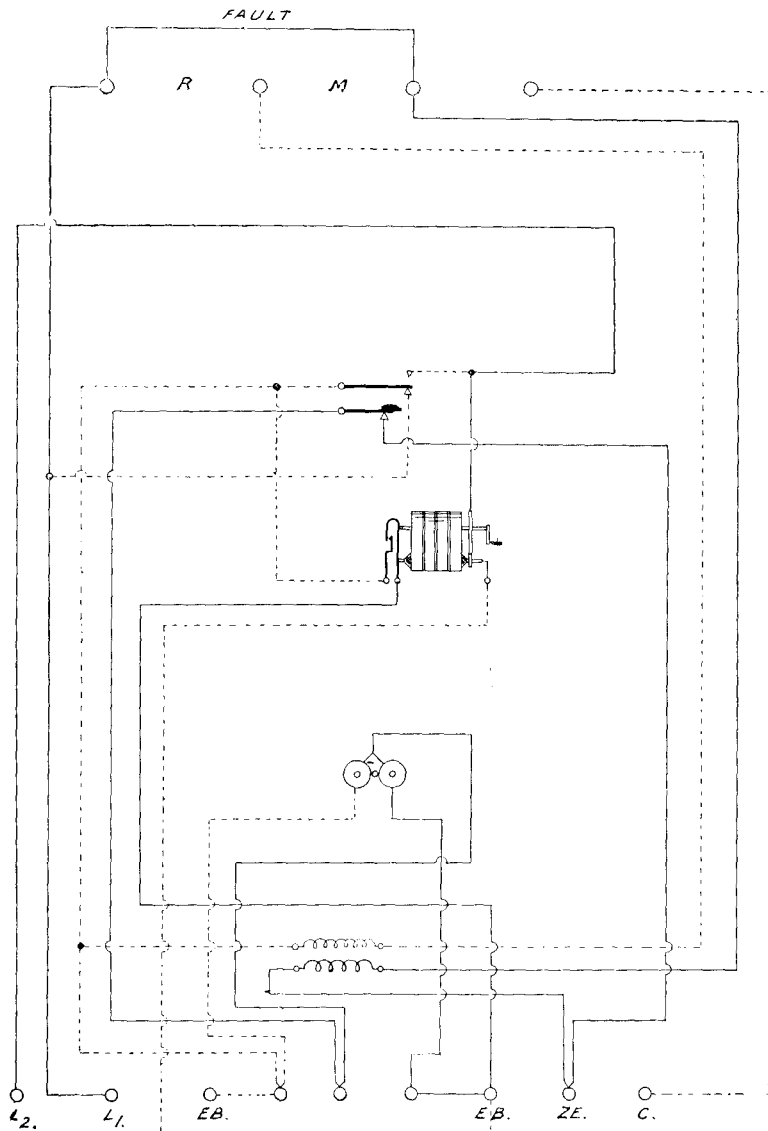


FIG. 1.

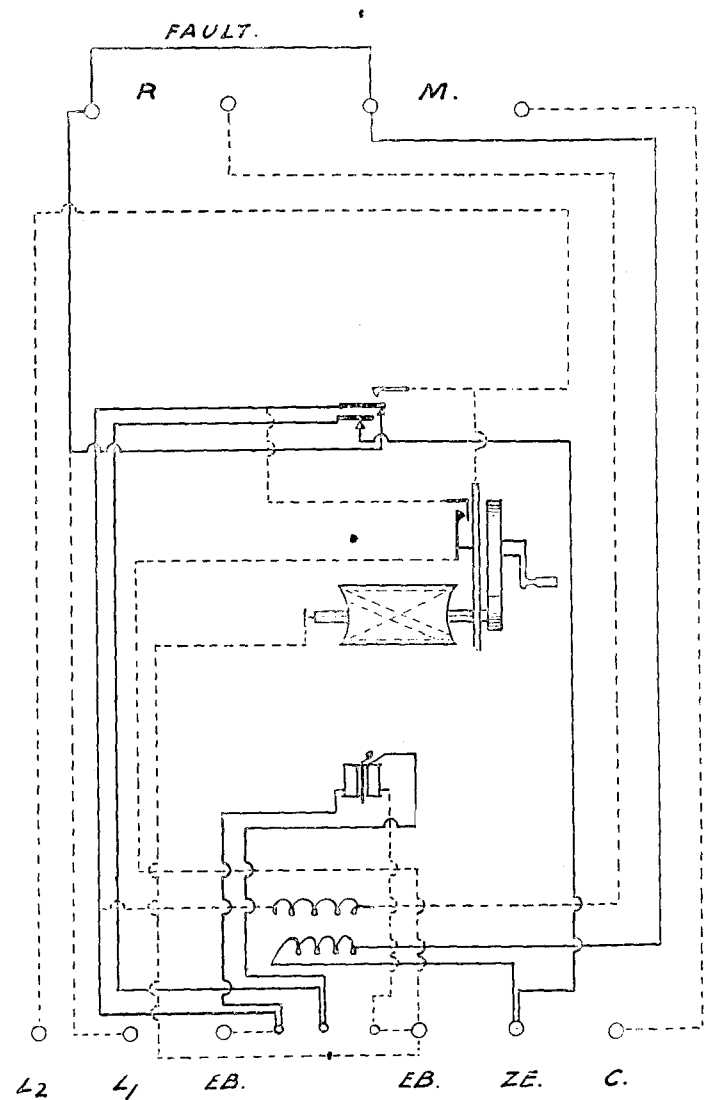


FIG. 2.

most of the many mysterious troubles to which this type of instrument is subject.

"The faults occur in several ways, most of them intermittent, giving results which have apparently no connection with their cause and offer no clue as to their locality.

"Usually the subscriber complains of his bell being faint, this being the part most obviously affected; on being tested it appears that the bell armature is demagnetised. Perhaps in testing the instrument is moved and the fault disappears. It is this bewildering intermittency which makes the trouble so difficult to locate.

"In giving one or two illustrations I have taken the case of the receiver coil being in contact with the receiver frame, this being the simplest to illustrate and describe. The frame of the receiver, being one with the frame of the transmitter, is part of the primary circuit, and the receiver coil being in contact with it will of course result in the primary and secondary being in contact.

spring of the cut-out and the frame of the generator to line 2. In this case it is clear that if the subscriber were being called he would receive a very moderate ring, the current flowing round only one coil of the bell.

"Fig. 2 shows what happens to the other coil. Beginning at the left-hand tag of the bell coils and tracing the circuit it will be observed that the left-hand coil in this illustration is short-circuited. From the left-hand tag to the top arm of the hook, to the contact beneath it, up to the receiver, across the fault to the frame of the microphone through the primary of the induction coil to Z E, thence to the bottom arm of the hook and the centre points of the bell coil.

"If the contact were on, as shown in Fig. 3, it would have a similar effect on the bell; one coil would be short-circuited and at the same time the current would flow round the other in series with the coil of the receiver; further, you could hear faintly with the

hook down. In this case the circuit is from line 1 to the receiver, through the coil, across the fault to the frame, from here through the induction coil primary to Z E, and through the lower arm of the hook to the centre point of the bell, round the right-hand coil to the cut-out, thence to the frame of the generator and line 2. It will be seen here, then, that the receiver in series with one coil of the bell is across from line 1 to line 2 with the hook down.

"In the three illustrations given so far, it has been taken for granted that the conductor of the cord connected to the frame of the transmitter is joined up to the Z E side of the primary, but this is not always so. It might be, as in Fig. 4, joined on to C. Now with the hook down, there is a permanent current passing round the receiver in series with one bell coil. This current is from

occurs, but a little thought and careful study of the diagrams will prove more instructive than a lengthy description.

"Mention of a few of the ways by which the fault can be caused will perhaps prove of interest.

"A strand of the tinsel from the hand-set cord may be touching the receiver case at its terminals.

"The cord may be bared a little from the wear due to friction at the point where it is attached to the instrument.

"One of the two wires going to the receiver may be cut into by the edge of the tube, just where they come through to reach

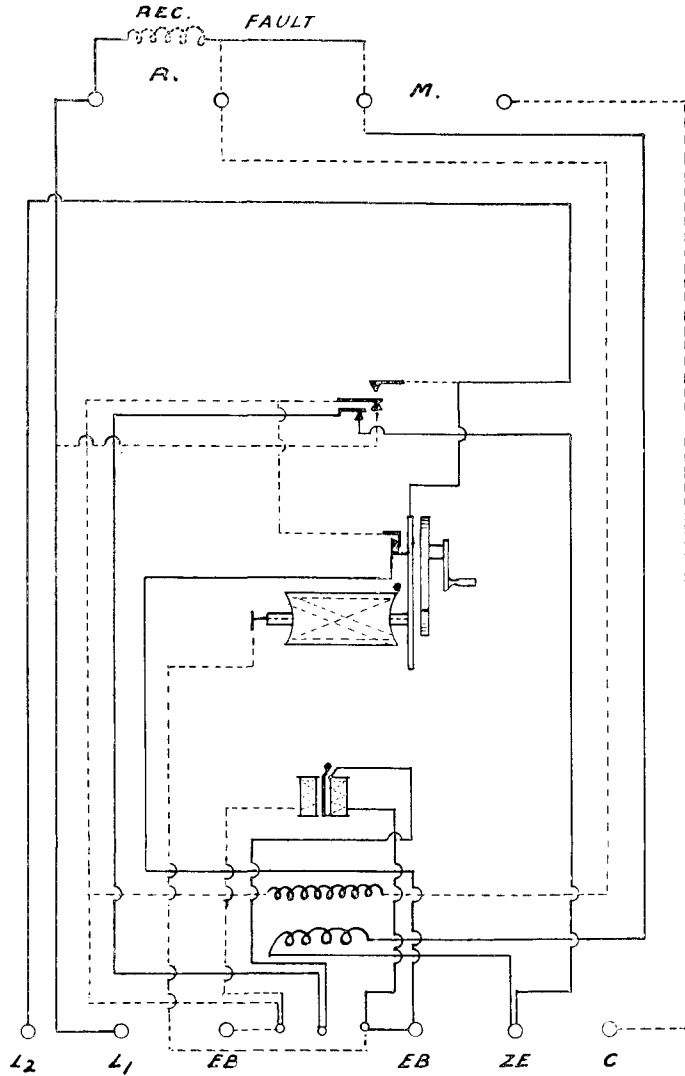


FIG. 3.

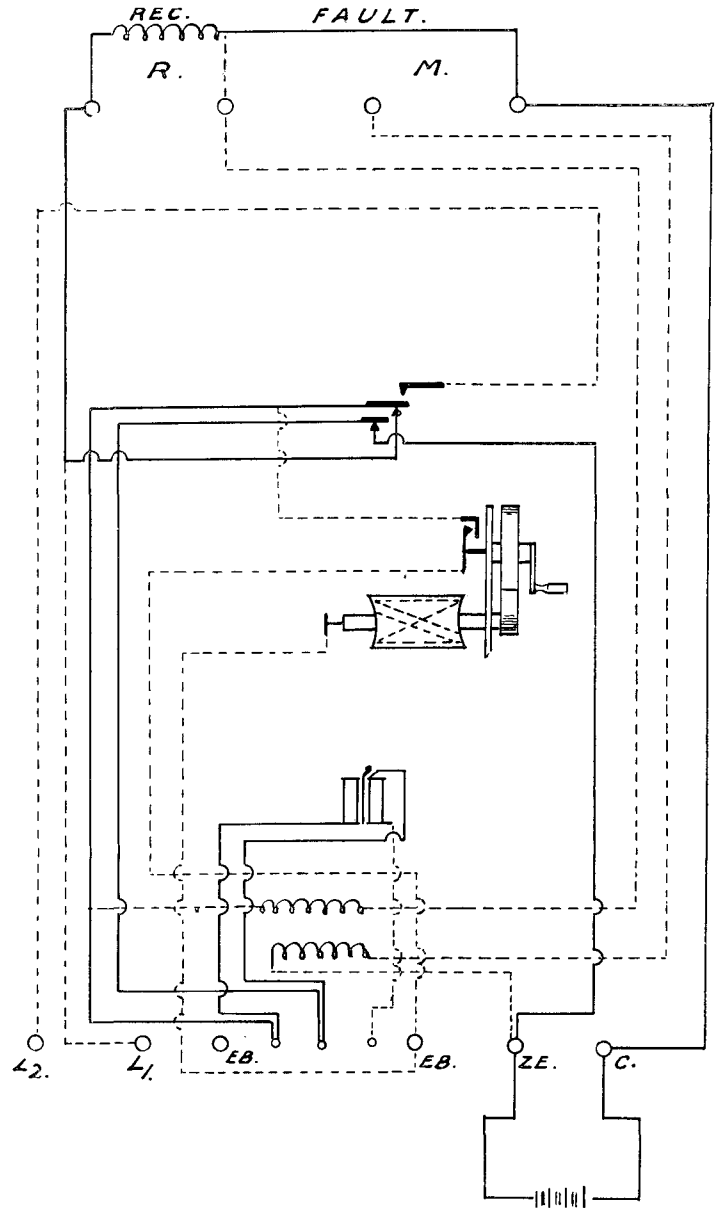


FIG. 4.

the primary battery used for the local transmitter circuit joined across Z E and C.

"It flows from C to transmitter, passing across the fault and round the receiver coil to the upper arm of the hook, from here to one side of the bell coils, round the left-hand coil to the centre point, thence to the underneath arm of the hook and Z E. It should be noticed that if the contact were on the other side of the receiver coil we should still have the same leakage of current, though not apparent in the receiver. The bell also would be affected, the coil of the bell which the current passes round being, of course, short-circuited.

"More could be said about this fault and the many ways it

the receiver terminals. Lastly, the microphone or instrument cord may be slightly bared at the rings they pass through on the instrument. Black, greasy looking marks at these points should be regarded with suspicion, as should the cord be slightly bared at either of these places, not only may the primary and secondary get in contact, but other faults might be caused which I have not time to enter into.

"These descriptions only apply to magneto call and clear systems, where the centre point and earth connection are not used. Also these faults do not affect the working of an instrument having earth connection when the receiver is off the rest, as the centre point and earth connection is then broken."

SOME HINTS ON THE TRAINING OF CAN- VASSERS: THE DUMMY INTERVIEW.

By J. R. BROWN, *Contract Agent, Glasgow.*

NEXT to the proper selection of canvassers there is no matter which concerns the Contract Agent more than the training of them.

For a telephone canvasser a man with experience "on the road" has his advantages in the matter of interviewing, and all things being equal is perhaps preferable. It is not, however, a wise step to reject a man because he is inexperienced, as one frequently comes across the very material which, with proper training, will develop into a first-class man.

Some men are born canvassers, with a style of their own, just as some men are born poets or orators, and to amend or alter the natural article in the effective canvasser would have the same effect as Samson's tonsorial operation had on him.

The great majority of men pushing the telephone business are not born but *made* canvassers. They need training, and what is more, they need to come in touch with a living force which will give them that enthusiasm without which success would be impossible. In the pages of the JOURNAL and elsewhere a good deal of advice has already been given on this matter of training, but the last word has not yet been said. Neither is it possible to frame a set of instructions to suit every individual case. A new man has much to learn and frequently much to forget. How to make the most of the material selected, how to get an accurate estimate of the man's abilities, and what steps to take to develop and direct his powers, require specific treatment and can only be settled on the spot.

Speaking from experience, it will be found that a few days in the office, not twirling his fingers, but with plenty to do, is essential for a start. These few days may be employed in reading canvassers' reports and getting a grip of the matter required in them; in getting to understand the nature and importance of record cards, the different classes of service and rates, and last but not least, in getting "enthused" with the importance and possibilities of the telephone service.

By the time a man has had two or three days in the office he has got an idea of the methodical nature of the work and the importance of every detail. He will have witnessed the alertness and dash of men on the canvassing staff with whom he is soon to be on terms of comradeship; he will have been impressed with the earnestness and keenness of the men around him, and inspired by their success. A new world opens up before him, and if there is any grit in the man at all, the office training will have laid the foundation for a successful career.

With this preliminary schooling over he may now be taken in hand for oral training, and the burden of this training should be conscientiousness to his employers, enthusiasm in his work, and the scope in the service for ambitious and hard-working men. By the time a man has had three days in the office, and has had another day's inspiring oral work it will be found that he is keen to get out. He is restive, like a high bred steed, eager to get to his freedom, and he feels he would like to show what he can do.

Reaction is not uncommon, and it is wise to watch for this. A keen man may soon realise that he is not getting the business he anticipated and is apt to get disheartened. A word of encouragement has in most cases, more effect than a growl, and it will be found that in the majority of cases the third week puts the man on his feet; industry and enthusiasm are only needed to ensure continued success.

It must be admitted, however, that a man may be fairly intelligent, know telephone matters well, have a good address, be keen enough too, and yet not be a success.

He seems to get his prospective subscriber just so far, and there he sticks. Looking over his reports a number of people are on the point of signing but they delay or refuse to go further. It is very difficult sometimes to discover his weak point.

The "Dummy Interview" adopted in Glasgow has proved very helpful and may be of interest in centres where it has not been tried. The *modus operandi* is to get an experienced canvasser to

take his position in the Contract Agent's room, and the canvasser to be tested is brought in to interview him. The interview lasts about ten minutes. The "old hand" is familiar with the reasons common to people who "do not need" telephone service as well as with the arguments against telephones in general, and these one by one are advanced and answered by the interviewer.

The Contract Agent watches the man from the moment he enters the room and notes every weakness in manner and argument, every failure to press home an answer or to impart convincing information. It is this mode of interviewing that has enabled us to discover the cause of failure in some canvassers. It has revealed defects in manner that were entirely unknown to the man himself, yet quite sufficient to spoil an interview. For instance, standing with his hands in his pockets, playing with his moustache, or tugging at his waistcoat. In one case a man actually sat down on the corner of the table.

These are small things, but just such little things as give a bad impression and prevent business.

The abrupt, aggressive, irritating tone of voice, which plays havoc with the nerves, is revealed; the man himself, so accustomed to the sound of his own voice, never notices its defects, but such a voice does not entice a stranger even to listen, much less to do business.

Besides defects in manner and speech, the trial interview shows up the lack of information or weakness of argument on the part of the canvasser. It shows his ability or his inability to impress the would-be, or, rather, often the would-not-be subscriber that the article he is selling would be of immense value to him, and is indeed the very thing *he needs*.

While there naturally must be to some extent an air of unreality about the interview, and perhaps the canvasser may be a bit nervous, knowing that every word and action is being watched, still it is an education, and the canvassers, knowing that, submit to the ordeal without demur. They realise that it is meant to be a help to them in their business, and in most cases they go from the interview stronger and with greater confidence in themselves, armed with fresh arguments, and consequently better fitted for their work.

Even after every effort has been tried we have occasionally to admit failure to bring a man up to anything like good quality. This arises mostly from want of interest. Lack of enthusiasm has more to do with failures than any other cause, and there are unfortunately some men into whom you could not put enthusiasm with a shot gun. That class of man discovers—even before he is told—that he is in the wrong business and his career is short.

Success in one's work arises not so much from the wages one gets for it, as from the interest one takes in it, and a man who can move about in the enthusiastic atmosphere of telephone men and remain lackadaisical or uninterested has small hope either of doing well for himself or of being a credit to the company he represents. Fortunately, however, that class of man is the exception, and our experience is that few men can help catching up the spirit and entering into the work with the determination to succeed.

NOTTINGHAM FACTORY PROVIDENT FUND.

At the annual meeting of the Factory Provident Fund held on Jan. 17, 1907, it was decided to make the following grants from the amount collected during the year ending Dec. 31, 1906:—

	£	s.	d.
General Hospital	33	15	0
Nottingham Dispensary	10	0	0
Nottingham and Notts Convalescent Home ..	7	10	0
Eye Infirmary	3	5	0
Children's Hospital	5	0	0
Women's Hospital	3	0	0
Nursing Institute	3	3	0
Samaritan Hospital	2	0	0
Sanatorium for Consumption	5	10	0
Sisters of Nazareth	2	0	0
Throat and Ear Hospital	2	10	0

£77 13 0

Over £350 has been distributed between local charities during the seven years this fund has been in existence.

THE SELECTION OF OPERATORS.

By FLORENCE J. MINTER, *Examining Matron, London.*

I SHOULD be glad of a small space in the JOURNAL through which to refer to Miss FOTHERBY'S letter on the above subject, and to correct, as far as possible, the impression which I appear inadvertently to have given her, and perhaps others, on the educational question in my article of December last.

She must, however, first pardon me for saying that on carefully and impartially perusing the article, I cannot see how I have caused her to think that a candidate is or should be "entirely judged by her educational abilities or handwriting." Surely it will be seen that, although I certainly consider education a necessary qualification, it is only one of the many to be taken into consideration, and in speaking of handwriting in particular and the Board School system in general, I was commenting more or less on the educational question as applied to all classes of labour, and basing my remarks on the facts gleaned from the candidates themselves, as well as on the results shown by the examination.

Only last week I had before me an applicant hopelessly ungrammatical, who, needless to say, would never reach so far as the educational examination; who informed me that she left school at thirteen, having been placed in the seventh standard at eleven and a half direct from the fifth, the head mistress saying it was unnecessary for her to pass through the sixth! If one compares the class of subject taught in the seventh standard with the brain-power of the average child of eleven and a half, it will be seen that my digression into a criticism of the methods of the present-day school authorities was to some extent justified.

With regard to the question of the actual educational abilities of the candidate, Miss FOTHERBY must again forgive me if I say she is looking at this question too much from the provincial point of view, but certainly from a standpoint that many seniors in London take up to-day. Fifteen or twenty, or even ten years ago operating was not what it is now, and I think a glance at the syllabus of the operating school will convince anyone of the education necessary for the beginner to grasp the theoretical part, at any rate, of the work. Not only is this so, but the question of promotion is a big one for the traffic manager to face in London, where there is a staff of 176 clerks-in-charge and supervisors whose positions have constantly to be filled from the ranks, and most telephone people will, I think, concede the necessity of educational abilities there. If an applicant has not lost her knowledge between school and time of entry into the Company, she will certainly not lose it later, between the time of operator and supervisor, although very few actually keep up their studies. The habits of thought and speech have been acquired and become part of the character.

Although we promote our exchange clerks from operators, the standard of handwriting of the girls is not high, and although I criticised especially this subject, it will be seen that it was as being a general commercial requirement much neglected. If a girl spells correctly and speaks grammatically, poor caligraphy certainly does not disqualify her, although she naturally loses marks.

Speaking generally, however, in the provinces the comparatively few girls required gives a wider scope for selection, and one would naturally be able to choose without difficulty those possessing all the qualifications Miss FOTHERBY mentions. In London, I am obliged to go beyond that and make a further selection from those who are not so obviously suitable, and sometimes to form my final conclusions by judging what a candidate is mentally from the educational abilities shown. Even with five years' experience and the thousands passing through my hands, I must confess to unwelcome surprises when marking the papers.

As to the general tone of any large community, I think we all agree as to which would be the better among an equal number of educated or semi-illiterate persons.

With regard to the medical examination, I would just say, briefly, that although with the comparatively few dealt with annually the expense in the provinces would not be so great, it must not be forgotten that each learner in London is paid 10s. weekly whilst

learning, for at least five weeks in the school, plus the probationary period in an exchange, and it would be a serious item in the expenditure of the Traffic Department if £2 10s. had been expended uselessly on each of the 79 considered medically unfit in 1906. The upkeep of that same operating school which Miss FOTHERBY justifiably thinks so wonderful is so very great that no unnecessary expense must be incurred.

In conclusion, lest Leeds should think that I am looking upon her criticism scornfully—I was recently told London looks down on all things provincial, a statement which, on behalf of all my London colleagues, I most emphatically refute—let me say that I, too, was once a "provincial," so that it is easier for me to see both sides of the question.

THE USE OF DECIMALS IN ESTIMATING.

By J. S. TERRAS.

THE suggestion put forward in this note is made with the view of reducing the time occupied in extending the values of material on Head Office estimates. The proposal is that material should be priced and extended in decimal values of £. An example may serve to show how this method would facilitate the calculations. To extend the value of, say, 567 lbs. of a certain class of wire at the stock list price of 1s. 0¹/₈³/₄d. per lb., with or without the aid of a ready reckoner, represents a good deal more work than taking the price as £0.0507 and finding the extended value with a slide-rule as £28.75, approximately, which is sufficiently near the true result for the purposes of an estimate. In the case of many of the stock articles the price is not given by the unit in which the article is commonly reckoned, but is given per 100, per gross, or per mile, thus involving a sum in proportion instead of a direct multiplication. To get the value of so many insulators at 46s. 10¹/₂d. per 100 is much more laborious than to make the calculation by slide-rule at £0.0234 per insulator. The money total of an estimate extended in this way would, of course, show a slight error from the true result, but it would be sufficiently close for all practical purposes. A priced stock list could be issued showing the prices per ordinary unit in decimal values of £, and the system would give the estimating clerk useful experience in handling a slide-rule.

TECHNICAL TERMS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. ROY, chief inspector, Cork, has kindly drawn my attention to a very obvious mistake in the arrangement of the figures of one of the numerical examples in my paper on "Technical Terms." As the figures may be misleading to the younger members of the staff, I shall be glad if you will publish the enclosed correction.

Glasgow, April, 1907.

THOMAS PETTIGREW.

Rearranging the figures as given, the example should read:

$$\begin{aligned} \text{B.O.T. units} &= \frac{\text{voltage of supply} \times \text{amperes} \times \text{hours}}{1000} \\ 75 \text{ per cent. of lamps} &= 15 \text{ of } 8 \text{ candle-power.} \\ \text{Current required for 15 lamps} &= \frac{15 \times 8 \times 3\frac{1}{2}}{250} \\ &= 1.68 \text{ amperes.} \\ \therefore \text{B.O.T. units} &= \frac{250 \times 1.68 \times 2.5}{1000} \\ &= 1.05 \text{ units at } 3\frac{1}{2}d. \\ &= \underline{3.675 \text{ pence per day.}} \end{aligned}$$

This particular example can of course be worked out without finding the current, as:

$$\begin{aligned} \text{B.O.T. units} &= \frac{\text{watts} \times \text{hours}}{1000} \\ 15 \text{ lamps of } 8 \text{ candle-power, taking } 3\frac{1}{2} \text{ watts per candle power, will consume} &= 15 \times 3\frac{1}{2} \times 8 \\ &= 420 \text{ watts per hour.} \\ \therefore \text{B.O.T. units} &= \frac{420 \times 2.5}{1000} \\ &= 1.05 \text{ units at } 3\frac{1}{2}d. \\ &= \underline{3.675 \text{ pence per day.}} \end{aligned}$$

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VOL. II.]

MAY, 1907.

[No. 14.]

ENTHUSIASM, ENCOURAGEMENT, CO-OPERATION.

In a great organisation such as ours the personal equation is always a topic that arouses keen and widespread interest. When a large body of workers is concerned very different results may be obtained according to whether all pull together, or some pull hard and others hang back in the traces, or some pull one way and others pull against them. The pages of the JOURNAL have lately shown how much interest is taken on all sides in the discussion of the value of enthusiasm and of co-operation, and it has been pointed out by one observer that encouragement discriminately applied may do much to promote both enthusiasm and co-operation. Lest some may think that in ventilating these subjects the JOURNAL is rather leaning towards the interests of the proprietors than towards those of the staff, we have a few words to say as to the value of enthusiasm, encouragement and co-operation to the individual who possesses those qualities or practises those policies.

After all, it is the policy of enlightened self-interest which is the most successful in the long run; which is another way of saying that it is the ambitious man or woman who will get on and produce the best results for all concerned, provided always that the ambition, which is the driving power, is qualified by the intelligence and enlightenment that supply the steering and the regulation of pace requisite for the due consideration of the rights of fellow-travellers along the highway of life. Following a lonely furrow is dull work; even if the lonely furrow be transmuted into a meteoric flight it is still, though more spectacular, lonely and to a certain extent selfish. While we may justifiably often look inward and consider things from the point of view of, as the saying goes, looking after No. 1, we achieve the best results even for ourselves by observing a due regard for the rights and good opinion of Nos. 2, 3, 4 and the many

other numbers among whom we move, live and have our being. Ambition, which we ought all to have, will not alone do the work; it must be tempered by observation, sympathy and a recognition of the value and power of co-operative effort.

As the organisation whose ranks are pervaded by enthusiasm and among whose branches there is thorough and hearty co-operation, is an all-conquering one, so is the individual who is possessed by enthusiasm and practices co-operation bound to be successful. Occasionally a voice arises crying out "What do I get, by being enthusiastic or by co-operating with other departments? No pecuniary or tangible reward." That is a most mistaken point of view. It may be impossible to reward tangibly and immediately every result procured through enthusiasm or co-operation, but the enthusiast and the co-operator is marked for promotion and advancement surely and inevitably. Very often, when some post of responsibility falls vacant or is about to be created—for with the growth of the business the organisation must constantly expand—it is difficult to find the man who by enthusiasm and co-operation, by enlightened self-interest, has qualified himself to fill it. If those consulted could say "A is your man, he's an enthusiast," or "B is always giving useful hints, he ought to be promoted," do not A and B reap the reward of their enthusiasm and spirit of co-operation just as surely as if they got a spot-cash commission for each little transaction? And is not steady advancement the much more valuable reward?

The contrary spirit, the spirit which causes a man to hang back, to do just sufficient to hold his job and no more, the spirit which causes a man to do things which will delay or harass some other worker or department, is even more harmful to the individual than it is to the organisation. The man who just holds his job will find in time that his job becomes a loose fit and will no longer hold him, and the man who by neglect or by overt act harasses and impedes a fellow-worker soon gets a reputation which does not lead toward promotion. Moreover, lack of enthusiasm and lack of co-operation can only engender a lack of interest which is deeply harmful to the individual. The man who works with enthusiasm and makes a point whenever the opportunity offers of co-operating with others in furthering the general aim—in our case the development of an efficient telephone service—soon finds his interest broaden tremendously and he is encouraged to go on and learn more and so to increase his usefulness and his earning power. That the opportunities for the enthusiast and the co-operator are great nobody can deny. They occur in multitudes every day. The wayleave man can often give useful hints and information to the engineer and to the contract man, the collector to the instrument man, the instrument man to the traffic man or the contract, the traffic to the maintenance—and so on indefinitely.

Perhaps the humble co-operator who picks up some useful bit of information and passes it on, who keeps his eyes open and gives a hint of impending trouble or advantage in the right quarter, or by a stitch in time or a little extra bit of work saves embarrassment in another department—often thinks that his efforts are unrecognised and will go unrewarded, so "what's the use." This is the wrong point of view for the man's own sake, for by neglecting to co-operate he neglects the opportunity to broaden and quicken his interest, to learn more and to raise his value; but it is also

generally an unfounded point of view. Some managers and chiefs of departments believe less than others in encouragement, or practise it less, whatever their belief may be, but all are quick to recognise the useful actions of the co-operator, and in their own interests—since it is their mission to get the work as a whole well done—pick out for promotion to responsible positions the men who have shown a general interest in the work and have been guided by the spirit of co-operation.

The telephone business wants men and women who want to get on, men and women imbued with enlightened self-interest; it wants men and women of ambition, of enthusiasm and cultivators of the co-operative spirit, and it can provide for them plenty of encouragement of the most substantial kind. That the qualities which are named at the top of this article are even more important to the individual than they are to the organisation a very little thought will show. It is true of any organisation that the absolutely necessary man does not exist. But to the individual this obviously does not apply; the necessary man for him is himself, and every effort he makes to improve himself renders his existence more profitable to himself and more enjoyable.

SWITCHBOARD MAINTENANCE.

THE weakest link in the chain of connections between two exchange telephones—and what an astonishing chain it is when one comes to analyse its varied assortment of links—is undoubtedly the switchboard cord. The switchboard cord, although, with the multiple principle, it gives the telephone switchboard its marvellous flexibility and adaptability, is the telephone man's scourge. At every other point in the circuit we have solid metal; we can put metal to metal and solder them into one, and where we have moving contacts we can make them so that they both move freely and make good contact when required. If the switchboard cord could be made as solid and reliable as almost all other parts of the circuit can be made, the lot of the maintenance man would be relatively a happy one. But in the cord we are compelled to use relatively weak material, and, for reasons of space, weight and flexibility, to deny the cord the strength and solidity which it ought to have to enable it to stand up to its constant and very trying work; work, by the way, which is too often made needlessly trying by the manner in which the cord is handled.

It is no small feat to put three important conductors, attached at one end to the very compressed parts of an extremely slender plug built up of numerous minute sections of metal and insulation, into a flexible cord of small dimensions, and to give that combination sufficient strength and flexibility to stand constant strain, bending and movement, and still maintain the continuity and insulation of the inclosed conductors. On the maintenance of the continuity and insulation of the conductors in the slender and hard-worked cord depends, to a great extent, the efficiency of the service, for, as Mr. PULFORD points out in his very practical article on "Switchboard Maintenance," the subscriber has just cause for complaint, however rapid and smart the service may be, if the connection is unsatisfactory from a transmission point of view. That it is unsatisfactory to have a conversation by telephone, maybe on important and delicate business, punctuated by a series of cracks and crackles, is to put it very mildly; such an experience is

exasperating to a degree, and a single example is quite sufficient to offset in the mind of the subscriber the pleasing impression of months of good service.

Both to operators and to maintenance men we commend Mr. PULFORD'S excellent article. Prevention is so much better than cure in our case that it is like the difference between a telephone message and the effete telegram or the archaic letter. Operators can do much to prevent cord faults by handling the cords and plugs more tenderly and more scientifically. Let them remember that the cord contains several delicate conductors, each vitally necessary to good telephone service. Constant bending and pressing of an electrical conductor will more or less quickly, but quite surely, "do for" that conductor, by breaking either the insulation or the conductor itself. Therefore it is destruction to press plugs home by the cord and to pull them out by the cord. We saw once in the captain's cabin of a big ship this motto: "Put your trust in Providence, but *wind the chronometers.*" One might paraphrase this in a little motto to be painted on every position of a switchboard: "Give a quick service, but *handle your cords by the plugs.*" The maintenance man knows well what the cord is and what trouble it can cause when mis-handled, or even when suffering from fair wear and tear—for we are far from suggesting that all operators ill-treat their cords. Maintenance men will therefore read Mr. PULFORD'S article with interest and profit, and perhaps some will be able to furnish the JOURNAL with further useful points on the subject.

TWO AMERICAN TELEPHONE REPORTS.

THE years roll rapidly by, and the periodical recurrence of the annual reports of the American Telephone Companies frequently reminds us of the possibilities of the telephone where State regulation does not exist, and municipal obstruction is unknown. The report for 1906 of Mr. FREDERICK P. FISH, President of the American Telephone and Telegraph Company—the parent telephone company of the United States—not only tells a tale of prodigious progress and prosperity, but voices a confident prophecy of continued rapid growth which has every sign of being well justified. The companies which form the American Telephone Empire of which the American Telephone and Telegraph Company is the head, increased their stations during 1906 from 2,528,715 to 3,068,833, a gain of 540,118, or over 21 per cent. The rate of gain is remarkable, and taken together with the enormous development already existing, it illustrates forcibly the possibilities of telephone development when once the telephone habit has fairly taken hold of an active people.

In meeting this rapid extension of the telephone service and in preparing for still further extension, the combined American companies spent nearly £16,000,000 of new capital during 1906, of which over £13,000,000 went for exchange systems, land and buildings, and the remainder for suburban and long-distance trunk lines. The total capital added during the past seven years—a period during which American telephone development has increased nearly five-fold, from about 600,000 stations to over 3,000,000 stations—has been just short of 60 millions sterling. Mr. FISH says that the plant has been kept at such a high state of efficiency by systematic maintenance and reconstruction out of

revenue, that it could not at the present time be reproduced for less than £14,000,000 in excess of its cost.

Not the least interesting part of the report is that which deals with the difficulties of adjusting the plant conditions to meet the rapid growth which set in a few years ago and to meet the unlimited future growth expected. Here we quote a few passages *verbatim*:—
 “If the very great development of the business could have been foreseen, and the engineers and manufacturers had, at an early date, solved the cable problem so that cables of large capacity could have been installed originally in the places where a large number of circuits would ultimately be required, much money would have been saved. Now that it is certain that the business will develop on lines of reasonable profit to an extent much greater than even the most enthusiastic telephone man ventured to expect a few years ago, and cables for exchange distribution are made which are in all respects satisfactory vehicles of transmission, it would be the height of folly not to anticipate the certain extension of the business by providing facilities for future growth when they can be most economically installed. There will always be a substantial amount of open wire construction where few circuits are likely to be required, but the substitution of cable for open wires as the demands upon the plant increase is sound practice, even though it involves an investment based upon the certain requirements of the future rather than upon what is immediately necessary.”

Mr. FISH goes on to say that the large increase of subscribers of recent years, amounting to nearly 1,500,000 stations from 1901 to 1905, practically exhausted the plant of the Bell companies, and involved rebuilding that plant to a large extent. In 1906 additions were made to construction which not only took care of the great development of that year, but which “resulted in plant conditions, based on scientific study, which will enable the growth of future years to be taken care of with an economy and efficiency due to the application of the most approved methods of work. Constant additions will have to be made to the plant, but they will largely be on predetermined lines, utilising, extending and rounding out the systematic plant conditions that now exist. The effort has been made to design buildings and to provide central office equipment that will not be exhausted in a short time. Careful engineering studies have been made of nearly all the large cities in the country, open wires have been displaced to a large extent, and underground construction and aerial and underground cables have been installed that were not merely adequate for the growth then in sight but for a substantially larger growth. The lines upon which increases of plant should be made have been laid out in advance, so as to fit into the work now done.”

Turning to the current annual report of the Bell Telephone Company of Philadelphia, we find figures and statements which most effectively illustrate the remarks of Mr. FISH, whose report summarises the work of all the Bell companies. This company operates in Philadelphia and suburbs and in a number of smaller places more or less tributary to Philadelphia. It had in service on Jan. 1, 1907, a total of 164,211 stations, having added in 1906 39,421, a gain of over 31 per cent. In Philadelphia the company had at the beginning of this year 95,914 stations, having added in 1906 19,528, a gain of 25.6 per cent. The gross revenue for 1906 was £1,100,000 and the expenses £766,000, leaving a net revenue of

£334,000. Nearly £219,000 of revenue, or practically one-fifth of the total, is from “toll line” service, a source of revenue which in this country is in the possession of the Post Office. The total capital issued is £4,575,000 in round figures, and on this dividends of 6 per cent. were declared. The report states that to meet the rapidly growing demand for telephone service large additions were made to the plant during the year. In all, the company owns 49 specially designed telephone buildings, of which twelve were completed and nine put in service during 1906. No less than 771 miles of underground duct were added to the exchange systems in 1906, 390 in Philadelphia and 381 in other parts of the territory. The total underground plant at the end of the year consisted of 2,620 miles of duct, 13,400 manholes and over 1,100 miles of cables containing 242,600 miles of wire. Eight new exchanges were equipped during the year; the facilities at ten exchanges were greatly increased, and similar work was in progress at seven other exchanges at the end of the year. Of the total stations in service just 97 per cent. were connected with common battery exchanges. Of the stations gained during the year 18,053 (46 per cent.) were in business houses, and 21,368 (54 per cent.) in residences. Of the 164,211 in service at the end of the year, 91,119 (55.5 per cent.) were in business houses and 73,092 (44.5 per cent.) were in residences. These figures illustrate the remarkable extent to which the telephone is being adopted in the homes of the American people. As regards private branch exchange development, the Philadelphia company added 1,282 private branch exchanges during the year, with 8,823 stations.

The Philadelphia report concludes with an interesting paragraph regarding the staff. The number of employees of all classes was, at the beginning of 1906, 4,283 and at the end of the year 4,349; of the latter number 2,329 were men and 2,020 women. The company maintains a number of training schools in which new employees are instructed and fitted for the special work to which they are to be assigned. Separate schools are conducted for operators, business representatives, cable men, switchboard men, and instrument installers. These schools have achieved excellent results. “The employees in all departments,” says the report in conclusion, “have displayed such fidelity, skill and diligence in the performance of their duties as to merit the highest commendation for the unusual and gratifying record of work accomplished.”

THE SWANSEA OPERATORS' TELEPHONE SOCIETY.

By A. E. COOMBS, *Exchange Manager*.

AT Swansea there has just been completed the first session of above society, which, I believe, is the only one of its kind in the United Kingdom. This being so, a short review of the session will be of interest.

At a general meeting of the exchange staff in August, 1906, it was decided to form a special operators' telephone society, to be distinct from the general telephone society which was being formed. It was thought that the subjects discussed at the latter could not, beyond a fair proportion, be devoted to traffic and operating matters; and also that the inner working and detail of traffic matters which would appeal to the operating staff could not be expected to be of interest to the other departments. Traffic cannot be dealt with in one or two lectures, and the exchange staff had no right to expect more than their share of the syllabus. With a special society,

however, traffic matters could be exclusively dealt with, and so prove of benefit to all.

The district manager agreed to this, so it was decided to hold meetings monthly from October to March. This has been carried out, and the following were the various papers given:—

- (1) "Efficient Operating: Some Ways and Means of Attaining it." (Exchange manager.)
- (2) "The Telephone; Operators; Operating." (District manager.)
- (3) "Phases of the Telephone Service." (Test clerk.)
- (4) "The Quarterly Curve: Its Use and Abuse." (Exchange manager.)
- (5) "Traffic and Operating: How it Affects and is Affected by other Departments." (Provincial superintendent.)
- (6) "The District Office and its Relation to Operating." (Chief clerk.)
- (7) Short papers by operating staff.

The average attendance throughout the session has been 95 per cent.—the lowest was 93 per cent. and highest 97 per cent.

The society has handsomely achieved its object and has proved of undoubted benefit from many points of view. The service has been greatly improved. In October, 1906, the average total time of operation was 9.8 seconds. In March, 1907, this had been reduced to 6.8 seconds—a clear saving of three seconds a call; while the lost calls have been reduced from 32 per cent. to 20 per cent.

Enthusiasm and interest have been aroused and maintained. Several valuable suggestions have been made by various members of the exchange staff; all suggestions made have been tested, and many adopted, with beneficial results. The last meeting proved one of the best. Sixteen short papers were given by the operating staff, each speaker expressing her view of exchange work and organisation; what the handicaps were, and what might be done to improve the service. The tone of the papers was distinctly good and original. It was the unanimous wish that these meetings should be continued next October, as it was felt that they had proved a great help to the staff.

In conclusion, it would not be right to pass over without comment the active support accorded the society by its president, Mr. W. E. GAUNTLETT, district manager, who has devoted much of his time and interest on its behalf. Our thanks are also due to the vice-president, Mr. R. WILLIAMSON, and to Messrs. W. H. CROOK, G. HEY and A. G. BRISTOW.

A TELEPHONIC RETROSPECT—NEWS OF 1889.

BY W. H. GUNSTON.

THE telephone has come and conquered with such astounding rapidity that in accepting it as a universal and integral part of the economy of things we are apt to forget how brief is its history. Beside it the telegraph appears almost venerable, and the railway (the wonder of our grandfathers) an old-time institution. It is difficult to realise that the earliest beginnings of the telephone are barely 50 years old, and that to an electrical mind PHILLIP REIS'S instrument of 1861 stands somewhat in the relationship of the diplodocus or megalosaurus to the zoologist. Eighteen years, therefore, so insignificant a period as history goes, takes us back much more than halfway to the establishment of the first telephone exchange, and a review of the first numbers of an extinct journal called the *Telephone*, which appeared at the beginning of 1889, is full of interest and affords much matter for thought and comparison.

The following passage in the first editorial is significant:—"Ten years ago little or nothing was known of the telephone. In July, 1877, Mr. PREECE brought the first pair of practical telephones to Europe. There are now more than 200,000 in daily use." This figure may be assumed to refer to Europe, as on another page it appears that on May 1, 1888, there were 158,712 subscribers to the Bell Telephone Company in America. Europe has now a million and three-quarters telephones, whilst under the more favourable conditions of America, unembarrassed by political

caprices or the leisurely methods of State development, her 150,000 has increased to well over four millions.

The telephone trunk line system of the world in 1889 was very circumscribed in extent, and almost in an analogous condition to the railway network in 1840, inasmuch as a limited number of important lines were open and working, but a larger and more important number were projected or under construction. With the exception of a Post Office line to Brighton, London was practically without long distance communication at all. The London and Birmingham trunk was under consideration, and doubts are expressed in the second number of the *Telephone* as to whether the proposed gauge of the wire to be used (No. 12½ hard drawn copper) would give satisfactory speaking to single wire subscribers. It sounds strange in our ears to hear it put forward as a disadvantage that in Birmingham the system consisted largely of underground wires, and that in London a large amount of underground work existed in the Embankment subways and in the tunnels of the District Railway; but the telephone cable of those days had not, of course, been brought to its present perfection. Enormous wayleave difficulties were encountered on the route, and when the long wished-for line had nearly reached London insurmountable obstacles were placed in its way by the Hendon and Hampstead local authorities. The Company ultimately overcame the difficulty by securing an easement on the Finsbury Park and Edgware line of the Great Northern Railway. The provinces were better off than London, trunk communication existing between the Birmingham, Nottingham, Sheffield, Leeds, Bradford, Manchester and Liverpool systems. Most of these were copper metallic circuits, but the Bradford-Manchester line consisted of 49 miles of single wire, and the provision of a direct metallic circuit from Sheffield to Manchester was necessary in order to give satisfactory communication with the south *via* the London-Birmingham trunk. In France there were trunk lines between Paris and Lille, Havre, Brussels, Lyons, Marseilles, etc., the Brussels trunk being described as a good one, but in an article by Sir WM. PREECE doubt is thrown on the commercial utility of the Lyons and Marseilles lines. In Germany the longest lines were those between Berlin and Breslau (349 kilometres) and Berlin and Hamburg. Lines from Berlin to Frankfurt and Cologne, and from Munich to Nuremberg, etc., were, however, in course of erection. The Van Rysselberghe system of simultaneous telegraphy and telephony was adopted to a large extent on trunk lines in France, Belgium, Switzerland and Austria. Vienna was connected with Brunn, and lines were projected to Prague, Trieste and Budapest.

The *Telephone* directed a good deal of attention to foreign intelligence, and it is interesting to compare the figures for 1888 or 1889 with the latest data obtainable.

The Telephone Company of *Austria* in 1888 had 4,500 subscribers, of which 1,600 were in Vienna and 610 in Prague. There are now 53,000 subscribers' stations in Austria, about 25,000 of which are in Vienna.

France in 1888 had 9,500 subscribers, of whom 5,300 were in Paris. She has now 137,000 stations, of which Paris claims 53,800.

Germany (1889) had 39,700 subscribers, of whom 11,000 were in Berlin and 4,800 in Hamburg. Berlin at this time had by far the largest telephone system in the world, considerably outstripping New York and London, each with about 6,900 subscribers. Last year there were 510,831 telephones working within the jurisdiction of the Imperial Post Office, including 75,000 in Berlin and 31,000 in Hamburg.

Sweden had 13,000 subscribers, Stockholm 5,800. The total stations in the country at the beginning of last year were about 120,000, and in Stockholm over 50,000, these being on two systems, however, with many duplicate subscribers.

Switzerland in 1888 had 7,626 subscribers. Last year the Confederation had 56,000 stations.

Norway had 3,930 subscribers. It has now about 40,000 stations, 13,000 being in the Christiania district.

Russia had 7,585 subscribers. There were 67,000 stations working at the beginning of 1906.

Italy had 9,183 subscribers. According to the latest returns obtainable there were about 31,000.

In the *United States* on May 1, 1888, the Bell Telephone Company had 158,172 subscribers. The largest systems were: New York, 6,902 subscribers; Chicago, 4,694; Cincinnati, 3,110; Boston, 2,785; Philadelphia, 2,785; Detroit, 2,710; and San Francisco, 2,552. In December, 1906, the telephone stations of the Bell Company actually stood at 2,715,367. The number of stations of the various independent companies in the States are difficult to ascertain, but they must bring the grand total up to well over 4,000,000. At the beginning of last year, New York had 221,902 stations; Chicago, 111,008; Philadelphia, 75,846; Boston, 75,896; San Francisco, 49,853; Cincinnati, 26,047; and Detroit, 18,121. The difference in the increases of Boston and Detroit is very noticeable.

I do not attempt to give the percentages of these stupendous increases of the telephone system in eighteen years, nor is it necessary. The twenty-fold and thirty-fold increases at once strike the eye, and it were meticulous to go into decimals. Another notable feature of the above figures is the extremely disproportionate rate of development in different countries. France and Italy were at much the same level in 1889; to-day one has 137,000 stations and the other 31,000, though the population of France is but 20 per cent. higher than that of Italy. The development of Russia has been at a higher rate than that of Italy, the birthplace of so many eminent electrical men; but the Russian telephone development is very low for the enormous population of the Russian Empire. Numerically the development of Germany has always been high, and at present the Empire contains practically as many telephones as the rest of the Continental States put together.

Perhaps, however, to us the most interesting intelligence given in the first number of the *Telephone* is the "Statistics of English Telephone Companies as at the end of November, 1888." The National Company had 9,938 lines (Glasgow 2,125, Bradford 778, Leeds 717, Birmingham 716), the Lancashire and Cheshire 4,517 (Manchester 1,400, Liverpool 1,577), the Western Counties 2,571 (Bristol 503), the South of England 1,684 (Brighton 458), and the United Telephone Company, operating in London, 6,978. This amounts to 25,688 subscribers' lines, and the figures of the North of England, Sheffield, and Irish companies would probably have brought the total for the British Isles to 28,000. This modest figure had increased as at the end of last year to 407,000, taking National Company's stations alone. The grand total for the United Kingdom is about 470,000. Noticeable is the fact that whereas Berlin had half as many telephones again as London, London (which now has over 130,000) has half as many telephones again as Berlin; and Glasgow, which was formerly far behind Hamburg, is now in front of the German seaport.

Amidst all these figures of progress and the vivid impressions induced of remote, early beginnings in 1889, there are features in these first numbers of the *Telephone* which strike one as extremely familiar and, indeed, topical. There is the discussion of the vexed questions of high and low rates, of State and private control, of monopoly and competition, which afford matter for controversy in the journals of to-day. There is quite an air of familiarity about the short paragraphs, the descriptions of burglars baffled by the telephone, of fire alarms promptly given, and of election and football results received in record time, which are part and parcel of the minor news items in the Press to-day. A few months ago for instance there was a discussion in the Press as to the proper word for a telephone message. In No. 1 of the *Telephone* Mr. A. R. BENNETT, in an article entitled "Wanted, a Word," discusses the merits of telelogue, phonema, symphonema, phonosema, phonogram, tonophrase, tonogram, chordogram, and wiretalk; and correspondents entering into the fray suggest telemot and telepheme. But the public would have none of these neologisms and says telephone call or message to this day. Last but not least, the not very illuminating (and now venerable) comparisons of Stockholm and London, to which we are so accustomed, appear in those early pages (quoted from the *Chicago Journal of Commerce*) with the usual inaccuracy in favour of Stockholm, which is said to have 4,832 subscribers as against 4,193 in London. It will be seen that these figures do not agree with those given by the *Telephone* itself. It is worthy of remark, however, that whilst the systems of the two cities approximated one another at that time, London has now increased twenty-fold, whilst the Scandinavian system has increased thirteen-fold.

CORRESPONDENCE: DICTATING AND TYPING.

By J. R. THYNE, *Glasgow*.

ONE of the most important branches of office work is that dealing with correspondence, and perhaps, so far as readers of the *JOURNAL* are concerned, the principal section of this is that side of the correspondence which emanates from the Company's offices. The only data which very many of our subscribers have upon which to form opinions of the Company's commercial methods and of the ability of its managerial staff is that supplied by the letters they receive, and in accordance with the manner in which these are constructed, typed, addressed and delivered, does the Company stand or fall. If for no other than business reasons, therefore, it is essential that letter writing should not become a lost art among us, and anything that will assist towards this end and enable us to gratify our subscribers (or our prospective subscribers) by giving a prompt reply to their enquiries should be welcomed.

In the February issue of the *JOURNAL* Miss KEIR gave a description of our Typewriting Department in Glasgow, in the course of which particulars were given of the rules laid down so that letters could be dictated early in the day, while certain hours were set aside exclusively for typing, so that work would not accumulate unduly with the typists. It was found impossible to adhere to these rigidly however; difficulty was experienced in getting all letters dictated typed on the same day, and there had usually to be a "beat up" in the evening to insure that all important letters had been passed for signature. With the object of improving matters, we are at present experimenting with a view to greatly reducing, if not entirely abolishing, the use of shorthand by the typists, they typing direct from dictation. No doubt a few particulars of this method will be of general interest, while criticism and advice will be welcomed by us.

The first impression made by the above proposal generally is that comparative values have been lost sight of and that the undoubted gain to the typist is much more than offset by the loss of time on the part of the dictator. It was realised that if this were so the system would stand condemned; but before making any change in our methods records were compiled by aid of a stop watch, which showed the speed at which letters were dictated by the various chiefs of departments (who, of course, were unaware that they were under test), and the result of twenty tests showed an average speed of 60 words per minute.

A trial was then made, and it was found that our two chief typists could type from dictated matter at the rates of 75 and 80 words per minute, while our two younger typists attained a speed of 62 words per minute. It is clear, therefore, that so far as straightforward typing is concerned, it is possible for the typist to keep pace with the average dictator.

It was borne in mind, of course, that the typists have more to do with a letter than type the matter actually dictated; suitable matter has to be chosen and carbon paper inserted. These have to be placed in the machines and the date and reference typed, and when a number of letters have to be dictated at a spell, it would seem that time must be lost by the dictator.

We are all aware, however, of the relation existing between procrastination and time, and one of the numerous benefits arising from the use of an installation for dictating letters by telephone is that there is nothing to be gained by accumulating letters which have to be answered. Under the new system, there is still greater encouragement to do what has to be done *at once*, so that letters are not likely to accumulate.

Even when a considerable amount of correspondence has to be dealt with, however, arrangements can be made to reduce delay to a minimum. We have not yet hit upon an arrangement for feeding the typewriter automatically, but supplies of letter paper dated and with carbon paper in position are prepared by the typists in leisure moments and held in readiness by them, while routine parts of letters, such as "Yours faithfully," "District Manager," are typed in later when the letters are being checked. The result is, that by the time the dictator has turned over the letter dealt with and has mastered the contents of the second letter, the typist is ready for him.

Naturally it is found that the best results are obtained when

letters are dictated deliberately and at a fairly uniform speed, and the endeavour to do this, combined with the knowledge that he cannot at will alter a word or reconstruct a sentence, serves as good training for the young dictator and has a tendency to give us better constructed letters.

There is no doubt that it is with a peculiar feeling of satisfaction that one dictates letters under the new system, and this sense of capacity and despatch is intensified when the typed letters are brought in for signature within a few minutes of being dictated.

It is pleasant to be able to record that it is in this way that the chiefs of the various departments look upon our recent innovation, and so far they have personally experienced no appreciable delay or inconvenience.

CORRESPONDENCE.

ENTHUSIASM.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

In reference to the letter on "Staff Co-operation" in last month's JOURNAL, the one great question seems to be, "Why are there not more contracts signed than there are?" and Mr. Moorhouse implies that it is owing to the lack of enthusiasm on the part of the staff to help the Contract Department's work. It may be suggested that not in all centres is the Contract Department so willing to encourage the staff to try for business as in Brighton. What encouragement is given to the ordinary member of the staff to introduce the telephone, if the signature is obtained by the canvasser, who claims the credit? Nothing pecuniary, only a faint idea that it may be mentioned to the district manager. On the other hand, if he were given to understand that it would be greatly to his interest, he would be more willing to do his best to get an order.

Enthusiasm will be found in a greater measure in those who find there is something to be got out of it. Take the case of a man who gets a stated salary, and the one who gets 10 per cent. more, which is the greater enthusiast of the two? In the letter by "Enthusiast" he complains of too many rates, also he is not in full possession of all the charges. Is it not better to have too many goods to sell than not enough? as often one is asked the question, "What other rates have you?" Also, if he is so anxious to get contracts, no doubt the Contract Department would be only too pleased to supply him with full details, as they are always anxious to secure a new station, from whatever source it comes.

In centres where there is no Contract Department the co-operation of all branches of the staff can often be brought into force by the local managers, wishing to raise enthusiasm, being willing to point out the best suggestions to put forward when canvassing, and giving them the benefit of their experience, which may often save the subscriber and the Company money. Mr. Moorhouse will be glad to know that as one of the staff I have been able to get 28 contracts since Jan. 1, rental value over £216, which shows that there is co-operation amongst the staff at Guildford as well as at Brighton.

Guildford, April, 1907.

CO-OPERATOR.

[Well done! Mr. Co-operator.—Ed.]

ENCOURAGEMENT VERSUS GET ON OR GET OUT!

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I READ with great appreciation Mr. W. F. Taylor's article on "Encouragement" in the April JOURNAL, and trust space may be found for a few comments thereon. One learns with age and experience not to expect "encouragement"; it is very gratifying and pleasing when one gets it, but the right kind of "enthusiast" will not be affected very much either way. It is not an essential, only the polish on the sword, the absence of which will not check the fighter. An out-and-out enthusiast does not want to get to heaven on a feather bed, and would not if he could; waiting for the word of encouragement to buck him up is too slow a job for the enthusiast: he must be always on the war path, he must "GET ON OR GET OUT." I am inclined to think that if we could obtain Nelson's personal definition of his motto, "Let him bear the palm who has deserved it," he would probably say—Give the palm to the man who rode on over all obstacles and won the race, never stopping for the coveted word of encouragement. The man suggested by Mr. Taylor as giving way to a spirit of despondency because he does not get this encouragement is no enthusiast, but a species of hot-house plant, he is a spurious imitation of the genuine article; the former can be detected from the latter by his staying powers. Results achieved are the best encouragement, whether the words of praise reach our ears or not. "Facts speak louder than words," and inevitably bring their due reward sooner or later. I fancy I hear an undertone saying, somewhat despondently, "Yes! generally later." Well, never mind; this is one of the obstacles; keep going, the coveted palm is ahead, it is yours for the getting, it would be comparatively worthless if secured without a struggle.

I hope my remarks will not be understood to mean that I wish to throw cold water on "encouragement." Far be that from me! They are intended as an encouragement for those that do not get it when anticipated. There is no SQUASHING AN ENTHUSIAST!!

Hastings, April, 1907.

B. GIFFORD.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

REGARDING the three articles which appeared in the January and February issues of the JOURNAL on the above subject, it is needless for me to say that I was very much interested in them. I may say that we have got some rampant telephone enthusiasts in this district: in fact, one of my canvassers, who does a little bit in the way of evening entertaining, has now introduced a telephone

song into his repertory, and I think I can safely put it that a large proportion of his engagements lead to business.

We had a similar case to the one mentioned in the February JOURNAL under the heading of "Smart Contract Work at Philadelphia." The office boy had occasion to be in a tobacconist's shop when he overheard the remark by a gentleman that he would very likely have the telephone, he found out who the man was and reported to the office.

A canvasser was immediately despatched to the prospective subscriber, and during the course of conversation he (the canvasser) was asked if the Company employed detectives to open up new business for them as he had only casually mentioned it to a friend of his that day that he thought about going in for a telephone. Ultimately the Company benefited to the extent of one exchange line order.

I can hardly agree with Mr. White's remarks when he states that very few of the Company's staff have seen the inside of an exchange. I may mention that the first thing I do after engaging new canvassers is to take them over the exchange and thoroughly explain its working to them. I have been able, through the kindness of the exchange manager, to arrange for each of my canvassers to have a periodical visit to the exchange, and I am sure everything will be done to make those visits interesting.

Cardiff, February, 1907.

J. D. DUNCAN

EMPTIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. TULLOCH's article on "Empties" in the February JOURNAL is certainly interesting, in so far as it gives us some insight into the method of handling stores outside the London district, a question of some moment. That our records respecting empties should be carefully kept is obvious, and also that those records should be such as to render it as easy a matter as possible to trace any empty or empties if necessary, but, if I may venture an opinion, based upon some years' experience in a large London instrument store, it is that no such elaborate system as set forth in the article is necessary, inasmuch as it would entail, in London at any rate, a very considerable amount of work and waste of time. I do not remember more than one single instance, and at the particular store I have in mind we handled from 3,000 to 3,500 empties per year, where the Company had to pay. And the disputes re empties were not, on an average, one in six months.

The method adopted was the Company's ordinary D.N. Book in triplicate, one special book being kept for empties alone, in which were recorded the empties, with the requisition numbers and references or marks, great care being taken in obtaining for all empties dispatched the carrier's signature. The last-mentioned item, perhaps, is the all-important one. This done, you may safely let the empties go; if they arrive at their destination—all right; if not—then trust the suppliers to do the rest, viz., write to the head storekeeper. Before the suppliers do this, however, they know perfectly well that they must furnish the particulars fully as to what consignment, etc., the case was connected with. Thus is obtained, gratis, all the information necessary for tracing the missing goods, and the onus of proving delivery can at once be passed on to the carriers, which not infrequently they succeed in doing. This generally is the method in operation in London, and judging by the results a departure therefrom would be unwise as well as unnecessary.

The system described in Mr. Tulloch's article may of course be peculiarly adapted and suitable for the district in question, and I would congratulate the author, although on which of the following points I am not quite certain of:—whether because he has sufficient time himself, or staff to work the system, or whether he has so few empties to deal with as to enable him so to do. To use a nautical illustration, the system seems me "a long way round," something like going through the Suez Canal to get to New York.

Salisbury House, February, 1907.

G. GOLDSMITH.

CALL OFFICE IMPROVEMENTS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THE value of the call office as an important part of the telephone system is now fully recognised, and there are one or two points that I introduced into Liverpool, which have, in my opinion, considerably increased the value of their use and the takings. Perhaps other district managers would like to give them a trial.

A notice has been placed *inside* the boxes worded as follows:

"Callers are requested not to remain in the cabinet whilst waiting for 'engaged' numbers, thereby preventing other persons from using the telephone."

A directory has been hung by a chain *outside* the cabinet. It is obvious that if the public pay attention to the first notice, and utilise the directory fixed outside the cabinet, it allows of more traffic being handled from these particular boxes.

Where more than one cabinet is required on a railway station, placing them together has given better results than when they are placed in different parts of the station, this being due, undoubtedly, to "team work."

Where additional boxes have to be placed in different positions a painted notice on the window of each, pointing out the position of the other, will often be the means of preventing a call being given up on account of the box which the user first goes to being "engaged."

E. J. HIDDEN, District Manager.

Liverpool.

WHAT THE COMPANY IS DOING.

NINE exchanges have been opened during the month, making a total of 1,300 now working. They were Hardwicke (Gloucester district), Theale (Reading), Rainham (West Kent), La Rocque (Jersey), Ashton-in-Makerfield and Aston (S.W. Lancashire), Hailsham (Sussex), and Penryn (Plymouth); 3,502 stations were added during March, making a total at the end of that month of 417,436.

LONDON.—At *Wood Green*, 3 $\frac{3}{4}$ miles of trench, pipes and blocks have been completed, and cable of various sizes is now being drawn in.

At *Friern Barnet*, 1 $\frac{1}{4}$ mile pipe trench has been completed.

At *Southgate*, 5 $\frac{1}{2}$ miles pipe trench is nearing completion.

At *Enfield*, an extension from the Southgate scheme is about to be commenced by the Company's contractors which, when completed, will give a complete underground service between Enfield and London.

Agreements have been concluded with the following for private branch exchanges:—Waldorf Hotel (400 stations), Ladies' Empire Club, and Hotel Curzon.

SOUTHAMPTON.—An extension of underground work is now in progress to Shirley district, which means the laying of 2 $\frac{1}{2}$ miles of 3-inch pipe, and about 1 mile of 500-pair cable. An exchange has been sanctioned for Chandlers Ford. The Netley Exchange is now ready and will be opened shortly. A 300-line multiple section will be brought into use in the Southampton Exchange this month to increase the capacity of the party-line section to 500 lines.

WALSALL.—The existing switchboard has been replaced in a new switchroom by a 400-line multiple board with two junction sections; accumulator plant, etc., has been installed. The exchange premises have also been structurally altered and enlarged. The transfer was carried out quite smoothly, without any break in the traffic.

CHESTER AND NORTH WALES DISTRICT.—*Northwich*.—An aerial lead-covered cable system has just been completed. Upwards of three miles of 25 to 100-pair cables have been erected.

Colwyn Bay.—A conversion of plant from overhead to underground has been carried out, and some 3,400 yards of cable laid.

Crewe.—A comprehensive underground system has been approved.

Shrewsbury.—An underground extension has been commenced to Kingsland, an important residential district.

Llandudno.—An enlargement of the present underground has been authorised, and about 1 mile 540 yards of new cable will shortly be drawn in.

Carnarvon.—Half a mile or so of aerial lead-covered cable will shortly be erected.

Crewe.—New premises have been acquired, to which the present scattered office and stores departments will be removed.

New Exchanges.—Estimates have been passed for opening new exchanges at Llanberis, Bettws-y-Coed, Christleton and Rossett, and active canvass is being made in some fourteen other places hitherto untouched.

WEST YORKSHIRE DISTRICT.—*Rawdon*.—Estimates are being prepared to metallic circuit this exchange by means of overhead cables.

Settle.—A 50-line standard pattern switchboard has been fitted here.

Keighley.—The work of fitting a 200 party-line section to the Keighley switchboard has been put in hand in the new switchroom at this centre.

Ilkley.—Estimates have been submitted for underground work at this place in order that the whole of the subscribers may have the advantage of a metallic circuit system.

Shipley.—Estimates have been submitted to fit up a central battery equipment at this exchange, the number of subscribers having during the past twelve months rapidly increased, especially since the introduction of measured service tariff.

Bradford.—One mile 1,070 yards of pipes has recently been laid and two miles 282 yards of cable drawn in, in connection with the extension of the underground work at this place. Estimates to the amount of £15,450 have been sanctioned to provide underground work in various parts of the Bradford area, and the work will be proceeded with at the earliest possible date.

PORTSMOUTH.—A contract has been obtained from a large firm of outfitters and drapers for a private branch exchange of 23 stations, two junctions and 5,000 calls. Table instruments are to be fitted on the counters in the various departments for the use of customers.

LIVERPOOL.—*Mossley Hill*.—3,654 yards of piping and 465 yards of

three-way blocks have been laid at Mossley Hill, forming a portion of a complete underground scheme which is at present in hand.

Vauxhall Road Section.—4,326 yards of pipes and 2,328 yards of three-way blocks have been laid, and 2,443 yards of cable laid and jointed.

This work forms a new route providing facilities for additional junctions to the north exchanges of the district, and at the same time providing the new north exchange with junctions.

Cressington Park.—780 yards of 3-inch piping and 2,075 yards of 1-inch piping have been laid in Cressington and Grassendale Parks, forming a complete underground scheme for distribution by direct underground wires to each subscriber's residence.

The measured service is making great progress in the Liverpool district, and up to the present orders have been obtained for 85 private branch exchanges with 249 junctions and 559 extensions, the principal ones being the Liverpool Mersey Docks & Harbour Board, 10 junctions, 154 stations; the Liverpool Cotton Association, 32 junctions, 44 stations; Cooper & Co., 8 junctions, 21 stations.

BOURNEMOUTH.—The underground system has just been extended to Constitution Hill, bringing it within two miles of Poole. Work has been commenced on the extension of the underground system in Holdenhurst Road district. A new 500-pair cable has been decided upon for the Winton district. Estimates for a 600-pair cable for Boscombe and also for a combined underground and aerial cable scheme for Poole have been sent in. The work in connection with the extension of the switchboard at Bournemouth has been commenced, which will give an increased capacity of 600 lines, with a new transfer section for party-line working. The additional lines will be equipped principally with lamp-signalling, the accumulators being charged direct from an alternating current system by means of the new mercury arc rectifier. An additional 50-line section has just been completed at Parkstone Exchange, and the work of fitting an additional 50-line section at Swanage Exchange has been put in hand.

EXETER.—A cable in the bed of the river Exe near Topsham has been replaced by a length of 290 yards of 30-pair double-armoured cable.

DUBLIN.—Two additional three-position sections of switchboard, equipped for 400 flat and message rate subscribers and 200 party lines are in course of erection at Dublin Central Exchange.

A private branch exchange equipped for 50 lines has been fitted at the Irish International Exhibition, which opens on May 4. Sufficient junctions are being run into the Central Exchange.

A large extension of underground cable is in course of building at Cardiff Lane and Clontarf, Dublin. The total length of cable to be used is 6 miles 853 yards.

NEWS OF THE STAFF.

Mr. J. F. GUEST has been appointed Contract Agent for the City district, Metropolitan area.

Mr. G. W. LIVERMORE has been appointed Contract Agent at the branch contract office which has been opened for the south-eastern district at 6 and 8, Marshalsea Road, S.E.

Mr. J. TAYLER, Assistant Exchange Manager, London Wall, has been promoted to Exchange Manager, Battersea.

Mr. S. W. HARVEY has been appointed Assistant Exchange Manager, Hop Exchange.

Miss E. M. STORER, Operator, Hammersmith, has been transferred to Cambridge and promoted to be Clerk-in-Charge. Before leaving her fellow-workers at Hammersmith, she was presented by them with a silver-mounted brush and comb in token of remembrance.

Miss A. L. WEST, Operator, Hop Exchange, has been promoted to be Supervisor, London Wall.

J. KNOTT, Walking Foreman, Barking, has been promoted to be Local Engineer, east.

Mr. W. S. KAY, who acted as Assistant Chief Clerk at Sheffield, has now been appointed Chief Clerk at Wolverhampton. He was the recipient of a dressing case from the staff on his leaving the Sheffield office, after fourteen years' service. The presentation was made by the district manager, Mr. R. C. Bennett.

Mr. ROWLAND HILL has been appointed Assistant Exchange Manager, Manchester Central Exchange, vice Mr. Cruce transferred to the Metropolitan area.

Miss MAY POWER, Senior Operator, Cardiff, who has been in the Company's service for close on ten years, has resigned on account of ill-health.

Mr. F. D. LATIMER has been transferred from the class of Associates of the Institution of Electrical Engineers to that of Associated Members.

Mr. H. J. HERINK, Exchange Inspector, Norwich, has been obliged to retire temporarily through ill-health. He has been granted three months' leave and has gone to Switzerland to endeavour to recruit his health.

Miss M. A. RANCE, Operator, Ipswich, has been promoted to be Senior Operator.

Mr. B. H. BAYLEY, late of Salisbury, has been appointed Wayleave Officer in the Guildford centre.

Mr. W. ARNOLD has been promoted from Instrument Learner to be Junior Inspector at the Aldershot centre.

Mr. T. MARSH, Wayleave staff, Bristol, resigned on March 28. He started for Canada on April 4. A purse of money was subscribed by the Bristol staff. Mr. Marsh has served fifteen years on the Bristol staff.

Mr. NOAH CHAMPION, of the Manchester district office staff, retired on pension on March 28 after 25 years' service. As a testimony of appreciation and esteem on the part of his colleagues, he was the recipient of a handsome gold watch, and Mr. Scott (district manager), in making the presentation, referred to Mr. Champion's long period of faithful service, his interest and useful influence with the staff, especially the younger portion, and expressed the hope that Mr. Champion might be spared many years of health and comfort wherein to enjoy his well-earned retirement.

Miss A. BOWMAN, Senior Operator, Central Exchange, Liverpool, has been promoted to be Monitor at Royal Exchange.

Miss F. M. PARSONAGE, Senior Operator, Central Exchange, Liverpool, has been promoted to be Monitor at Royal Exchange.

Miss G. LEE, Senior Operator, Royal Exchange, Liverpool, has been promoted to be Monitor at Central Exchange.

Miss F. DURANDU, Senior Operator, Royal Exchange, Liverpool, has been promoted to be Monitor at Royal Exchange.

Miss K. E. WYLLIE, Senior Operator, Liverpool, has resigned owing to ill-health.

Miss A. MEHAGAN, Junior Operator, Bootle Exchange, has resigned to go to Canada.

Inspector TURNBULL has been transferred to Glasgow from Walsall. Before leaving he was presented, on behalf of the staff, with a handsome case of pipes and cigar-holder.

Mr. W. H. MACNAMARA, Instrument Inspector, Swansea, has been appointed Inspector-in-Charge at Penzance. Prior to leaving Swansea he was presented with a silver cigarette case and pipe.

Miss E. S. M. TWYMAN, who has resigned her position as Correspondence Clerk, after two years' service, has been presented by her fellow-members of the Canterbury staff with a silver-backed hairbrush and comb, together with a group photograph of the Canterbury staff.

MARRIAGES.

Miss A. SHEPPERD, Chief Operator at the Guildford Exchange is leaving after seven and a half years' service to be married.

Mr. WM. GRIFFITHS, Inspector, Hanley, was presented by the staff with a tea service on the occasion of his marriage.

Mr. T. C. HORSEFALL, Inspector, Hanley, has also lately been married.

Miss WEALE, Night Operator, Hanley, has resigned from the service to be married.

Miss J. C. SCOTT, Huddersfield, has resigned the position of Senior Operator after thirteen years' service, to be married. She was presented by the staff with a very handsome clock.

Mr. CHAS. BROCKLESBY, Chief Inspector, Bradford, who has recently entered the married state, was presented by the Bradford and West Yorkshire district office staff with a canteen, case of fish cutlery, and jam spoons.

Mr. T. W. BARNES, Stores Clerk, Manchester, was married to Miss ALICE HAMER, late Senior Supervisor, Manchester Central Exchange, on April 10, 1907.

Miss C. BROWN, for some years in charge of the Fees Department in the Cardiff district office has resigned the service owing to her approaching marriage.

Mr. H. R. HONICK, Chief Switchboard Fitter, Nottingham Factory, on the occasion of his marriage, at Easter, was the recipient of a silver-mounted cruet and sugar basin from his colleagues. Mr. Stanton, foreman, Switchboard Department, made the presentation.

Mr. H. ANDERSON, Instrument Fitter, Notts Factory, was presented by Mr. Fox, foreman, on behalf of the Table Set Department, with a silver-plated cruet on the occasion of his marriage.

Miss M. PALING, Notts Factory, who was married at Easter, received a suitable present from her fellow-workers.

Mr. J. G. LEWIN, Chief Inspector, Norwich, was presented by the district, contract and local office staffs, on the occasion of his marriage, with a dinner service and set of carvers. The district manager (Mr. O. W. Stevens) made the presentation in the test room at the Norwich Exchange.

Mr. H. HERVEY, Stores Department, General Manager's office, on the occasion of his marriage last month was the recipient of a dining-room clock from his colleagues.

London Traffic Department.—The following are leaving in view of their approaching marriage:—

Miss E. BAYLISS, Operator, London Wall.

Miss E. DRUMMOND, Operator, Westminster.

Miss G. DUNK, Operator, Avenue.

Miss M. JOHNSTONE, Senior Supervisor-in-Charge, Stratford. Miss Johnstone entered the service in June, 1895, and has been on the supervising staff since June, 1902.

Miss B. G. SAKER, Operator, Bank.

OBITUARY.

We regret to announce the death, which occurred on April 16, of Miss WATERS, New Ross Exchange.

We regret also to announce that G. ORTON, Mechanic Liverpool, died on March 16 after a very short illness. He joined the service prior to May, 1893, and his demise is greatly regretted by his fellow workmen.

CHAS. SLATER, who served as an apprentice with the Company for two years in the Potteries district, and who showed exceptional ability in every way, has lately died, much to the regret of all the staff who knew him. He was a lad of exceptional promise.

HIC ET UBIQUE.

IN last December we drew attention to the circulation of the JOURNAL in distant lands. Since that date subscribers have joined in Hamburg, Hanover and Munich (Germany), Sliema (Malta), Cape Town, Kimberley and Pietermaritzburg (South Africa), Buenos Ayres, Cordoba, Santiago de Chile, and Georgetown in British Guiana (South America), Buffalo and Atlanta (United States), Perth and Adelaide (Australia), Barbados and Caicos (West Indies), Honduras (Central America), Toronto (Canada) and Penang in the Far East.

Under the heading "Are Londoners Polite?" a somewhat extraordinary letter signed "Canadian" appeared in the *Daily Mail* last month. "Canadian" ventured into somebody's office and asked permission to use the telephone, expressing his willingness to pay. A lady—it is not stated with what authority or whether she was the clerk, manageress or wife of the telephone renter—accords him permission, stating that there is no charge. Then a "man" appears from a rear office and very properly, we think, suggests that a public telephone *near by* would satisfactorily answer the caller's purposes. Failing to get the connection desired the extraordinary Canadian, not content with borrowing the subscriber's telephone, coolly asks him if he will kindly try. "He replied that he would not, as he was too busy, and he at once removed the telephone." How he performed this feat is not stated, but "Canadian" considers the act "one of marked discourtesy."

THE *American Telephone Journal* has the following remarks on Lightning and the Newspaper Men. The combination is certainly calculated to produce something pyrotechnic:—

The way some telephone men will talk to a reporter is astonishing. The latest evidence that someone has taken a young newspaper man and spoken with him in a fatherly fashion until he was well "filled," comes from a city where lightning went on a rampage and ate up a telephone cable or two. This wasn't enough for the man who had to make a story. Something brilliant, startling, anything to make the story fit the occasion, had to be worked up. He was probably looking for information that would help him out on this kind of a story, and he surely got it. "Large blue balls of fire danced along the wire, cracking like the reports of revolvers." How is that for a good one?

Still, in spite of the amusement this gives a telephone man, it's pretty poor stuff to circulate among subscribers and those who are prospective telephone users. There are too many timid ones who are likely to persuade themselves that putting in a telephone is just like hurrying ahead the day of judgment.

LOCAL TELEPHONE SOCIETIES.

London.—A meeting was held on March 25, Mr. C. B. Clay occupying the chair. Mr. W. Blight read his paper entitled "The Attenuation Constant." The subject being highly technical only one member entered into a discussion, viz., Mr. B. Cohen, who in the course of his remarks suggested that Mr. Blight had thoroughly mastered the problem of the attenuation constant, but even this did not overcome the problem of transmission, which subject he hoped that Mr. Blight would still further pursue. The president then proposed a vote of thanks to Mr. Blight, which was given in the usual manner. A notice was then read giving particulars of a prize competition for the three best papers from junior members of the society, the subjects invited being "Office Work," "Electrical Work" and "External Engineering."

Southern London.—The monthly meeting of the society was held on April 17, a paper being given by Messrs. Baxter, Caseley, Coupland and Scott entitled "The Inspector and his Work and Common Battery Instrument Faults." The subject proved very interesting, and was illustrated by lantern.

Cardiff.—The sixth and final meeting of this session was held at Cardiff on April 16, when the vice-president, Mr. B. Waite, read a paper entitled "The Planning and Carrying Out of an Underground System." The chair was taken by Mr. J. James, and there was a large attendance. The lecturer dealt with a somewhat complicated subject in a most lucid manner, explaining how the necessary statistics were arrived at, the manner of estimating and planning the growth of an exchange, how the theoretical centre of the telephone area is found, and entered fully into the considerations of rents, etc., which govern the

location of an exchange. The subject of transmission was next dealt with, the lecturer giving data as to the weight of wires required for varying lengths of junction and local circuits. Junction requirements were also considered, and the method of estimating the number of junctions and the grouping of same was explained by the aid of diagrams. Distributing points formed a special feature, and the advantages that would be gained by underground distributing boxes at the junction of main and branch ducts, enabling the full capacity of cable to be used, were enlarged upon. The lecturer had plans showing the elevation of buildings, and explained the manner in which block-wiring would be carried out in some of the premises in Cardiff, which were ideal buildings for this work.

Liverpool.—The sixth monthly meeting was held on March 21, Mr. Wolstenholme, district engineer, contributing a paper entitled "Emergency Organization." The lecturer outlined his scheme for mobilising staff which might be required in cases of emergency. He also showed, by means of lantern slides, areas most affected by gales and snowstorms, and sketched his arrangements in progress for establishing emergency stores at these points. He also referred to the advantages of cable cards in place of the present cable head books.

Hanley.—The sixth meeting was held on March 22, when a paper was given by Mr. Jas. Frost on "Underground Work," Mr. Schofield being in the chair. The paper dealt with the following points:—General underground work; comparison of cost of overhead and underground wiring; laying of cables in different kinds of conduits; square wooden ducts and terra cotta ducts; underground obstructions; jointing and laying of pipes; preservation and laying of concrete blocks; first types of underground cables; different kinds of cables; twist of wire in cables; sheathing cables with lead; laying of cables; drawing in by cable grips; transmission lost; and different methods of distribution.

Bristol.—The fifth meeting of the session took place on April 11, Mr. Perkins presiding. Mr. J. T. Smith gave a paper entitled "Helps to District Office Working," showing how the work of all departments is related to the district office. An interesting and animated discussion followed and was entered into by all departments.

Dublin.—The twelfth meeting of the session was held on March 11, Mr. C. H. Sibley in the chair. Mr. T. J. Early read a paper on "Office Work," illustrated by diagrams, which dealt chiefly with the following subjects:—Works orders; express forms; record of calls for measured rate; call office automatic boxes; rentals and rental registers; issue of directory; storekeeping and issues; junction fees; corresponding and filing, etc., etc. A discussion followed with reference to methods of storekeeping and issue of stores, and automatic box collections.

The last and thirteenth meeting of the session was held on March 25, and was opened by Mr. C. H. Sibley, who gave some very interesting statistics as to the rapid growth of the telephone service in America. Particular interest was directed to the large number and size of private branch exchanges at hotels, &c., and the quality of the service received by the subscribers, also the method of dealing with faults. At the same meeting Messrs. Hughes and Gardiner continued their paper "Instruments and Inspections," which was opened at the meeting held on March 5. A description of the working of common battery instruments was much appreciated, and a discussion ensued as to the effects of current on the primary and secondary circuits of the instrument induction coil. It was decided to hold a general meeting on Monday, April 8, in order to elect a new committee for the coming session. Following the advice of the article in the April JOURNAL, Mr. Sibley said that he would like to see the chairmanship go round the staff, and on a vote being taken Mr. E. Jarrett, local manager, was elected. The committee of six were elected, and a vote of thanks was passed to the hon. secretary, who was re-elected.

Blackburn.—The last meeting of the session was held in the Weavers' Association Rooms on March 22, Mr. Remington being in the chair. The attendance was very satisfactory 59 members being present, a percentage of 71. The meeting was on the same lines as the corresponding ones for the past two sessions several papers of ten minutes' duration being read. Two prizes were offered, one of 7s. 6d. and the other of 5s. for the best paper on "Outside" and "Inside Work" respectively. There were two entries in the "Outside" section and six for the "Inside." In the former Faultsman Lord (Burnley) carried off the prize with a good paper on "Clearing Line Faults." The contest in the "Inside" section was very keen, Junior Inspector Turley (Burnley) winning the prize of 5s. with a clever paper on "Operating." In view of the general excellence of the papers it was decided to give a second prize of 3s., and this was won by Junior Inspector Thornley (Blackburn), who dealt with "Accumulators." Afterwards the election of a committee for 1907-8 took place. The only alteration was the election of Mr. Slater as secretary, vice Mr. Stevenson, who resigned much to the members' regret, after holding office from the formation of the society in 1904.

Portsmouth.—On April 4 a paper was given by the provincial superintendent, Mr. C. J. Phillips, entitled "Telephone Reminiscences." An interesting set of lantern slides were shown to illustrate the lecture, which was appreciated by a good attendance of members. The paper covered the actual working conditions of exchanges at the commencement of the telephone industry in this country, and as Mr. Phillips was connected with some of the earliest he was in a position to deal with the operating and construction in detail. The chair was taken by Mr. Stirling, district manager, the total number of members present being 73.

Newcastle.—On March 21 a paper was read by A. E. Tinwell on "Common Battery Working," Mr. A. L. E. Drummond, district manager, presiding. The paper dealt with the following subjects:—Brief history of the development of telephony, repeating coils (type 11A), the progress of central energy working, modern common battery exchange, power plant in connection with same, battery description of plates and chemical action. The paper was illustrated by drawings and diagrams shown on a screen by lantern. The paper was of unusual length and extremely interesting. A short discussion followed in which the chairman, Mr. George Marshall, and Mr. A. Livingstone took part. Questions were asked with respect to working extensions on the common battery

system and also with respect to the difference in cost of power for working on the magneto system as compared with common battery. Suitable explanations were given in each case.

The last meeting was held on April 16 before an attendance of 42, which constitutes a record for the session. The first paper was delivered by Mr. W. H. Abbott, of the district office, on "Stores generally." He dealt with the bookings in and out, and also carefully explained the method which the storekeeper should adopt when issuing or receiving material, so as to avoid the possibility of any errors. He also suggested an improvement as regards the method of taking stock, and impressed upon everyone present the principle which should obtain in order to further the cause of the system. Several other items were dealt with and carefully explained, after which a discussion lasting over half an hour took place, in which the lecturer dealt with every question asked in a way for which great credit is due to him. The second paper, on "Junction Circuits," was given by Mr. Marshall, chief inspector, and was illustrated by diagrams. At the close of the meeting it was announced that eleven new members were proposed for the next session, which is very encouraging, seeing that the first session had only just drawn to a close.

Birmingham.—The concluding meeting of the present session was held on April 5, when Mr. H. Julius Maclure, contract manager, delivered an address to the members on "How the Company's Business can be Increased by the Staff." Mr. G. Hooper, vice-president, presided, and among those present were Messrs. F. C. G. Baldwin, C. H. Piggott, R. U. Tucker and A. W. Smith (Wolverhampton). Many ingenious suggestions were made by the speaker, showing how it was possible for every member of the staff—from the lowest to the highest—to aid the contract department in obtaining new subscribers, and a series of charts showing the various rates were exhibited. He strongly advised everyone present to make themselves familiar with the different systems, so that they might be able to give an intelligent answer to any question that might arise when questioned by a possible subscriber. An animated discussion took place in which Messrs. Smith, Morris, Comyn, Brown and others took part.

Glasgow and West of Scotland Districts.—The annual general meeting was held in the district office on the evening of March 27, Mr. W. A. Valentine, president of the society, in the chair. It was agreed that female members of the staff be eligible for membership in future, and that the membership fee for next session be 1s. instead of 1s. 6d. The report by the outgoing committee of management was read by the secretary and the treasurer submitted his financial statement, which was considered very satisfactory. It was agreed on the suggestion of the chairman that it would be in the interests of the society that the offices of president, vice-president, secretary and treasurer should not be held for more than one session by the same individuals. Before demitting office Mr. Valentine expressed the pleasure it had given him to preside over the meetings of the society since its inauguration three sessions ago, and indicated his intention of continuing to take a close interest in its work. A very cordial vote of thanks was accorded him, and it was unanimously agreed to appoint him one of the honorary vice-presidents of the society. Mr. William Allan was appointed president for next session, and the other officials and committee of management were thereafter elected. The session has been a very successful one, and it is the intention of the committee of management to maintain the high standard of excellence to which the society has attained in the matter of the fare submitted to members at the fortnightly meetings. The syllabus for session 1907-8 is already in course of preparation.

Manchester.—The annual general meeting of the above society was held on March 22. The secretary's report showed that the library now contains 76 volumes. Nine papers were given during the session, and the meetings were fairly well attended. The session closed with a balance in hand. The following officers were duly elected for the ensuing year:—President, Mr. A. Magnall; vice-president, Mr. W. Taylor; hon. secretary, Mr. A. Stewart; hon. treasurer, Mr. W. Cleary; hon. librarian, Mr. H. Hyde; committee, Messrs. T. J. Clark, W. B. Cheetham, H. H. Escott, H. Green, R. Jackson, G. P. Morrison, J. Scott and G. F. Staite.

Coventry.—A meeting was held on April 15 at Priory Row, Coventry, when Mr. John Mewburn, district manager, presided over a good attendance. Mr. J. N. Lowe gave a lantern lecture on the "Construction of Open Wires." Some sixteen specially prepared slides were exhibited, together with twelve from Head Office. At the close of the lecture a lengthy discussion was entered into. The principal points brought out were the staying and strutting of poles, use of S.A. cups, brackets, the leading in of wire to premises, the substitution of bronze for copper on junction routes, and the rotation of circuits. The meeting concluded with a short address by Mr. Mewburn, based on the leader "Telephone Society Procedure" in the April JOURNAL.

Manchester.—A paper on "Transmission Measurements" was read before this society on March 15 by Mr. B. S. Cohen of the Engineer-in-Chief's Department. The lecturer emphasised the value of measurements in connection with the telephone business, even although the results arrived at did not seem to have any definite application at the moment. A splendid collection of oscillogram slides was shown, as also some interesting diagrams. Actual experiments with the oscillograph proved a very popular and instructive feature of the lecture. A description of the use of the apparatus—a form of thermal galvanometer—was given. A considerable number of those present asked many questions at the close of the lecture and Mr. Cohen showed himself a perfect master of his subject in replying. There was an attendance of about 100, including visitors from other districts in the province. The chair was taken by the president, and a vote of thanks to Mr. Cohen was accorded in the usual manner.

Cardiff.—The fifth meeting of the society was held on March 12, at which there was a good attendance. The chair was taken by the vice-president, Mr. B. Waite. A paper was read by Mr. F. S. Whetton entitled "Dynamos and Motors," which was thoroughly appreciated by all present. The evolution of the dynamo from the magneto generator was first dealt with, after which the different kinds of armatures, windings, etc., were explained with the aid of excellent diagrams. The third part of the paper dealt with commutators, and

the different kinds of dynamos, viz., series, shunt, compound and separately excited. The last portion of the paper dealt with motors, and again diagrams formed an attractive feature. In opening the discussion the vice-president referred to the importance of the subject, not only to telephone employees but to all users of power, and gave some interesting particulars as to the large growth of this industry in the Midlands. After the meeting it was decided to hold a dinner on April 20, to bring the session to a close and a small committee was formed to make the necessary arrangements.

STAFF GATHERINGS AND SPORTS.

London.—On April 6 the Northern district operators held a social evening at Northampton House, Highbury, at which Mr. J. F. Edmonds presided. The programme consisted of songs, etc., and dances, and a very enjoyable evening was spent by 140 of the staff and friends.

Eastern District.—The second annual smoking concert took place on March 1 at the Eastern Hotel, Limehouse, when the chair was taken by Mr. C. E. Tattersall, supported by Mr. W. Blight in the vice-chair. The staff was well represented, and among the guests were Messrs. C. M. Bailey, L. Harvey Lowe, J. L. Brown, J. A. Hunt, A. Bascombe and F. Witherby. An excellent programme had been arranged by Mr. W. R. Penson, a thoroughly enjoyable evening being spent by all present. The concert was preceded by a dinner at the hotel, which was also a great success and well attended.

On Wednesday, March 13, a social evening, given by the electrical and engineering staffs of the Eastern district was held at the East Exchange. A most successful programme under the direction of Messrs. A. F. Paddon, C. Corke, and D. Hutchinson was carried out in excellent fashion by the following members of the staff: Misses B. Brotherwood, M. Hooper, J. Munday, H. Musloe, Messrs. O. Crouch, H. Deane, A. E. Mitchell, W. R. Penson and J. Taylor. The tack and nail driving competition for the ladies caused great amusement, whilst the hat trimming competition for the male staff was funny in the extreme.

Hull.—On Friday, March 22, a smoking concert was held at the London Hotel, at which Mr. W. R. Senior, who has been transferred from Contract Agent at Hull to a similar position at Leeds, was presented by the staff with a silver cigar case as a token of respect and esteem.

Oldham.—The members of the telephone society held their general meeting and dinner at the Swan Hotel on March 26. After an excellent dinner the report for the past session, which has been a most successful one, was given. A vote of thanks was passed to the retiring officers. Mr. Pugh was again unanimously elected president; Mr. W. Shea, vice-president; Mr. J. H. Flint, hon. secretary; and Mr. M. Pinder, hon. treasurer. The following were elected members of the committee: Messrs. Blackburn, Bowes, Cleary, Hart and Moul, and Mr. W. Lee (chief clerk), auditor. Afterwards a most enjoyable musical programme was rendered by the members, and a splendid evening terminated at 10.45 with all the members looking forward to another session.

Portsmouth.—On Good Friday the Portsmouth National Telephone Athletic Club journeyed to Southampton in response to a challenge from the Southampton National Telephone Football Club. A team with some 25 supporters left Portsmouth by the 8.45 train, whilst another contingent of fifteen including Mr. Legge, Mr. Blight and Mr. Pharo, made the journey on bicycles. A keenly contested game ended in a result of 5 to nil in favour of Portsmouth. After lunch the visitors were shown over the Southampton Exchange by Mr. J. Gwyer, local manager.

Preston.—A football match took place on March 23 between teams selected from the Blackburn and Preston staffs. The result was a win for the latter by 4 goals to 3. After the match a social evening was held at the Hotel National, Preston.

Manchester.—The annual staff social evening and dance was held at the Midland Hotel on Feb. 15 and proved a great success. The attendance was close upon 500, and the proceedings, which comprised concert, dance and whist drive, lasted from 8 p.m. to 2 a.m. In response to invitations issued by the committee several visitors were welcomed from surrounding districts, including staff representatives from Liverpool, Leeds, Warrington, Ashton-under-Lyne, Bury, Rochdale, St. Helens and Southport. A feature in the concert programme which met with much appreciation was the performance of choruses and part songs by members of the Manchester staff under the conductorship of Mr. T. J. Clark.

Liverpool.—The annual dinner was held at the "Bear's Paw" Restaurant on March 23, the chair being taken by the District Manager. After the dinner a most enjoyable concert was given by the members of the staff and other artistes. Special mention should be made of the fine singing of Miss Pattie Greaves, whose songs were received with every evidence of appreciation. The contributions of Miss Affleck, Messrs. T. H. Green and Ben Adams to the programme were also greatly appreciated, and an exhibition of juggling by Mr. A. P. Whittle was very interesting.

Bristol.—An Association football match was played on the Clifton Downs on April 13, Electrical v. Line Staff. The result was a victory for the Electrical Staff by 8 goals to nil.

Blackburn.—A very successful whist drive organised by the Blackburn male staff was held in Booth's Cafe, Blackburn, on April 9. Miss Higginbotham and Messrs. Wallwork and Holt won the prizes.

Durham.—At a recent meeting of the Durham district staff it was decided to form a recreation club, and the football team—selected from the district and Middlesbrough and Stockton local office staffs—has already met with success; the results of the three matches played being: v. attendants of Cleveland Asylum, draw; v. staff of Hartlepool's Centre, win 12 goals to 1; v. *North-Eastern Daily Gazette* staff, draw. A cricket team is being chosen in connection with the "Chambers Challenge Cup" competition, and fixtures with local teams will also be arranged.

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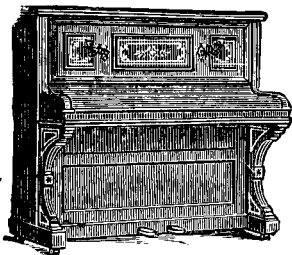
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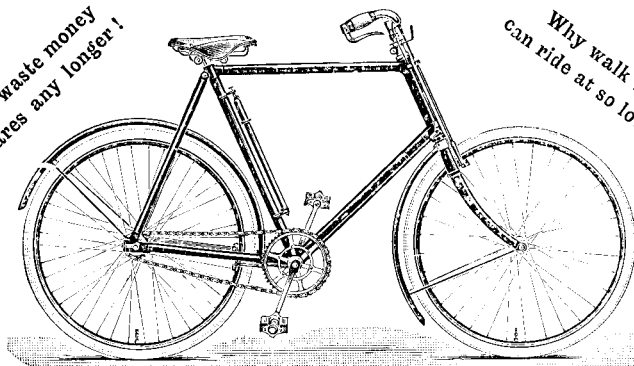
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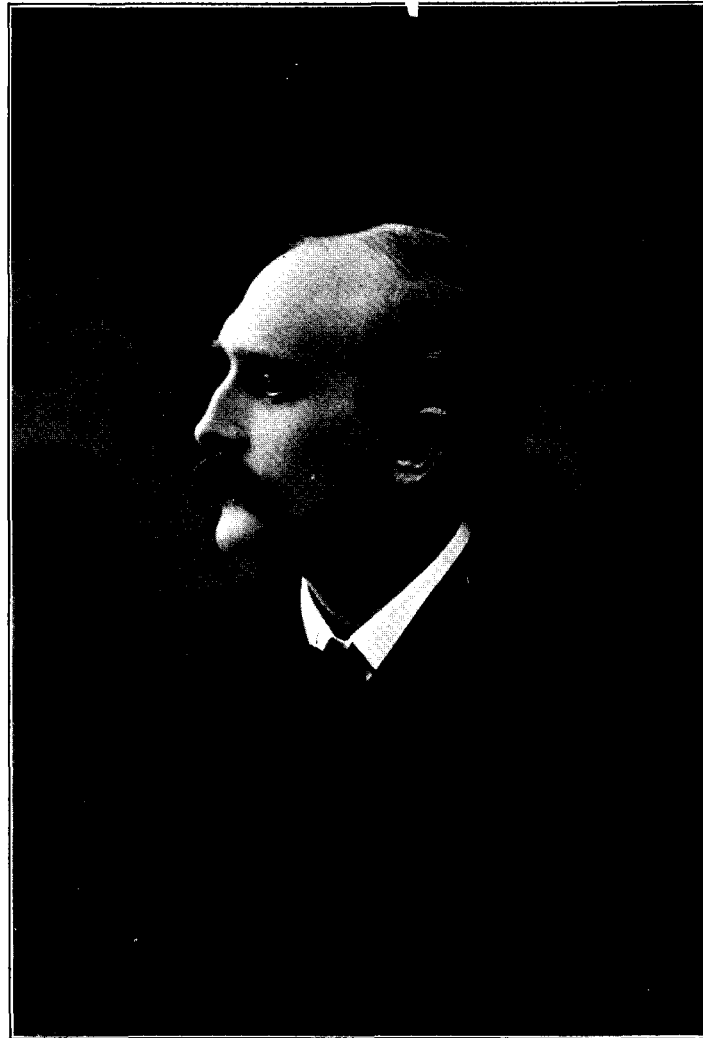
No. 15.

TELEPHONE MEN.

XIII.—FRANCIS DOUGLAS WATSON.

FRANCIS DOUGLAS WATSON is a Glaswegian, having been born in the smoky city by the Clyde in 1865. He was educated first at a private school in Ludlow, Shropshire, and latterly at Hutcheson's Grammar School, Glasgow. His first experience of business, after a short trip to the United States and Canada to "open his eyes," was in the engineer's office of the Clyde Trust in Glasgow, the body which manages the harbour and docks of the city. Remaining there only a few months, however, he entered the service of the National Assurance Company of Ireland, in their Glasgow office, first as junior and afterwards as Cashier and Bookkeeper. In 1883 he was appointed Correspondence Clerk to Mr. D. JOHNSTONE SMITH, then the District Secretary of the National Telephone Company in Glasgow, and he has been a telephone man ever since. These were the days when the telephone exchange business was in its early struggles and gave little promise of becoming the vast industry it is to-day. Mr. WATSON is one of the select band of early recruits who threw in their lot with a young and feeble enterprise and have gone through all phases of growth with it.

Promotion to be Cashier of the Glasgow District Office was followed by promotion to the post of Assistant District Secretary, and on Mr. JOHNSTONE SMITH'S resignation in 1891 Mr. DOUGLAS WATSON was appointed District Secretary for Glasgow and the West of Scotland, having charge, also of the Whitehaven and Barrow districts in the North of England. Mr. JOHNSTONE SMITH at the time of resigning his position as District Secretary was appointed a Local Director of the Company, a post which he still holds. The territory at this time managed from Glasgow embraced the districts now known as Glasgow, Greenock, West Highland, Mid-Lanark, Ayrshire, and also Falkirk and Grangemouth (now amalgamated with Stirling), besides the English districts named. At the reorganisation effected in 1893 by the present General Manager, Mr. DOUGLAS WATSON was appointed as the first Superintendent for Scotland, and he has remained in that position up to date.



With one notable exception telephone progress in Scotland has been fairly steady and uneventful; the exception referred to is Glasgow, the Town Council of that city having always been celebrated for taking their own way of doing things and for clinging to their own way with great tenacity. For many years the public supplies of gas and water have been owned and managed by the municipality. Later they took over the electric lighting system; then a municipal high-pressure water power system was laid down. The Tramway Company's lease, on its expiry some years ago, was not renewed, and the day after the old company's cars stopped, a fully equipped horse-car service by the Corporation was started. This has since been changed to an electric system and much extended. In most of these municipal monopolies the Corporation management has managed to make both ends meet, and even overlap, at least on paper, and has given a fair service, and doubtless these facts had an influence on the decision of the Corporation to start in the telephone business. After much negotiation and discussion, culminating in a public telephone enquiry in 1897 under Sheriff JAMESON (now Lord Ardwall), the Postmaster-General granted the Corporation a licence in 1899, and the Corporation telephone system became an accomplished fact in 1901.

The later phases of this movement are recent history and need scarcely be recalled. It may suffice to say that the Corporation system, as such, is now a thing of the past, having been recently acquired by the Postmaster-General. The five years of bitter and powerful opposition which the National Company so successfully encountered in Glasgow, before the Corporation admitted defeat and sold out to the Post Office, have not been without their compensations; but they contained some anxious moments for the subject of our sketch. It has been whispered that it was a surprise, if nothing worse, to some worthy members of the Town Council that the "National" was not promptly driven out of Glasgow by municipal telephone competition. As things turned out, the operation was in

a fair way of being reversed when discretion took the place of valour and the Corporation Telephone Committee made up their minds to sell their business to the Post Office, at a loss running into large figures.

Elsewhere in Scotland, as already indicated, no such troubles have occurred, and Mr. DOUGLAS WATSON has had the pleasure of seeing the system grow steadily and incessantly in numbers and public utility in all quarters of Scotland, from Wick and Stornoway in the north to Berwick and Dumfries in the south.

The continual and uneventful progress of the telephone business in Scotland is in no small measure due to Mr. WATSON'S organising ability and close attention to detail. He is the typical telephone man, enthusiastic, keen, alert, receptive of new ideas and ever on the look out for improvement and for increased efficiency in every direction. His quick insight into difficulties and his very practical willingness to help others out of them, coupled with a sympathetic nature, a strict sense of justice and a happy touch of humour, make him justly popular with all members of the staff.

Strange to say, although an ardent Scot, he does not play golf. He has been known in his younger days to attempt a little cricket, but in his leisure moments now, when not fishing or shooting, he is happiest in his carpenter's shop.

TELEPHONIC TRANSMISSION MEASUREMENTS.

MESSRS. B. S. COHEN and G. M. B. SHEPHERD, of the Engineer-in-Chief's Department, read a paper on "Transmission Measurements" before the Institution of Electrical Engineers at the rooms of the Society of Arts on May 9. Great interest was manifested in the paper, and so many members wished to take part in the discussion that this had to be adjourned until May 16. On the latter date at the commencement of the meeting the President announced that the Fabie premium of £10 to each author had been awarded to Messrs. COHEN and SHEPHERD.

Lengthy reports of the proceedings appear in all the principal electrical papers, to which our readers are referred.

A NEW FEATURE.

With the view of increasing the personal element, which is one of the most popular features of the JOURNAL, it has been decided to supplement the series of "Telephone Men" with portraits and short biographical sketches of some of the women who have earned distinction in the field of telephony.

A SHORT TERM CONTRACT.

The telephone company had been advertising four-party lines for \$60 a year, and the advertisement mentioned that this amounted to 16 cents a day. One morning a man entered the Contract Department and said, "My wife is going to give a party to-night, and I want a telephone put in my house right away;" then, putting 16 cents on the clerk's desk, he continued, "I only want it one day."—Chicago Operating Bulletin.

PAISLEY HOSPITAL FUND.

DURING the last twelve months the employees of the Company on the Paisley staff have collected the very gratifying sum of £15 16s. 7d., and at a general meeting of the staff it was proposed to allocate the sum of £15 10s. as follows, carrying forward a balance of 6s. 7d.:

Royal Alexandra Infirmary	£	s.	d.
Victoria Eye Infirmary	7	0	0
West of Scotland Homes, West Kilbride	3	10	0
	5	0	0
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"HELLO, YOUR OFFICE IS ON FIRE!"

"ONE day last week I was informed by telephone of a fire in my own office, not six feet away from where I was standing," said a prominent Wall Street broker.

"A client with whom I had been talking, after lighting a cigar, threw the burning match into the waste basket under my desk. As I went to the door with him, I heard the telephone bell ring violently. When I answered the call, I was surprised to be told that there was a lively blaze under my desk, which had been seen by a bright office boy in the opposite building.

"The fire was hid from me by a high filing cabinet, and might have done considerable damage before I discovered it myself. I am now hunting for that boy," he added. "Anyone quick-witted enough to think of telephoning in such an emergency I can use in my business."—The Ingleside.

THE DOOR-TO-DOOR CANVASS.

BY GEO. W. LIVERMÖRE.

Ability to secure orders is born of knowledge and confidence, and in this case the knowledge required is of the simplest kind; the study of such simple points as the relative time for a message and its answer to travel between Kensington and the City:— (a) By letter; (b) by telegram; (c) by telephone. The result of such a simple test will surprise, and it will originate in the active mind many similar examples, proving without doubt the superiority of the telephone service over all other methods of word transmission. In a door-to-door canvass, it must be door to door, and in buildings where there are many offices, floor to floor and door to door; a great mistake is often made in picking out the "likely" looking places. The work must be thoroughly and systematically done, for as sure as an "unlikely" looking man is missed, that will be the man whose order will go elsewhere.

Descriptive literature is very necessary, and a pamphlet left behind at every visit, whether an order is secured or not, will not only emphasise the arguments used, but will possibly excite the curiosity of some casual visitor who will desire to know more about the service.

Two of the most common arguments used against taking telephone service are:—

(1) No use for the telephone.

(2) Am a beginner in business; must keep expenses down.

With regard to the first, that man has never studied the question, the proper points have never been brought before him. If he be in a large way of business, time is valuable. What greater saver of time is there than the TELEPHONE SERVICE? If a small man, time and money must both be watched. Where can be found a greater economiser than the TELEPHONE SERVICE? Can it be of no use to know that he is linked up to tens of thousands of others in business and in private life? The beginner who argues that he cannot afford it, must keep expenses down, paves the way for the representative to convert him with his own argument "must keep expenses down." What about those innumerable railway journeys, those inevitably unsatisfactory and abbreviated telegrams, those countless postage stamps? Has he ever considered that the average cost of a typewritten letter is between 4d. and 5d., as against the cost of a telephone message which averages a penny or so. What about the stock kept in the suppliers' warehouses, which in reply to a telephone message is in the subscriber's own premises almost as though he had sunk capital to purchase and store it?

Then the saving of time. The new man must be prompt, he must be able to strike a bargain on the spot; delays which might be suffered in an old firm will not be tolerated in a new man. The new man requires to be enterprising if he is to get a standing quickly. If a possible subscriber is brusque, he should be interested. Every fair-minded man will hear what is to be said on the subject, and if in ten minutes he is still unconvinced there is something amiss with either the arguments employed or with the manner of their employment.

It is not always possible that an order shall result on the first visit, so care should be taken that the man is left in such a way that future visits will not be distasteful to him. Diplomacy and tact will frame one's arguments in such a way that they may be driven home boldly, yet avoiding offence.

Once a subscriber is gained he does not cease to interest; his usefulness to the order seeker, if carefully exploited, has only just begun. When he begins to use the service, he will surely find that friends with whom he has business or private relations are not connected; their names should be obtained, and so on, until this snowball system embraces a large number of prospective subscribers.

In conclusion, the salient points necessary to the successful canvasser are a stout heart, knowledge of the business, straightforwardness in argument, and simplicity in illustration. The most successful inventions have been the essence of simplicity, and he will be the most successful man whose simple truths are pressed home with conviction.

RECONSTRUCTION IN BUENOS AIRES.

By H. PLANCHON, *Chief Engineer, United River Plate Telephone Company.*

THE Libertad Exchange is the first common battery exchange in the Buenos Aires system of the United River Plate Telephone Company. It is installed in one of the Company's properties at Calle Libertad, No. 41, which has been transformed and enlarged to receive the new equipment. The new building has been erected in a yard, so that the new switchroom can communicate with the old magneto switchroom; this room was completed about two years ago. The switchroom was supported by means of two

apparatus which arrived at the end of March. Part of the subscribers' sections arrived in the first fortnight in April and the rest a little later. The sections were sent all mounted, but it was found that the packing cases were too bulky. The sections were, therefore, partly dismantled and lifted up through an opening in the exchange room. The installation was begun at once and proceeded without any difficulty. The manufacturers had received detailed plans showing the exact position of all the pieces of apparatus and of the switchboards, and the position of the holes to be cut in the floor of the switchroom, so that all the cable supports were found exact or needed little alteration to fit.

The main frame was erected first in order to start the connection of the underground cables. A slot had been cut in the floor under the main frame to allow the rubber-covered wires from



NEW "LIBERTAD" COMMON BATTERY EXCHANGE, BUENOS AIRES.

rows of six columns, and the space below was used as a stores shed.

When the Company decided to instal a common battery switchboard it was found that the space below the switchroom was needed to contain the auxiliary apparatus, and as the height between the ground and the main cross girders of the switchroom was 17 feet, it was found more economical, in order to save cables and to get better use of the ground, to excavate the space below the switchroom and to build an intermediate floor 13 feet high and to place the mechanics' repair shop in the basement, than to instal the apparatus on the ground level.

The construction of this intermediate floor was started on Oct. 25, 1905, and was just ready in time to receive the

pot-heads to pass from the mechanics' shop below, which is in communication with the main entrance of the underground cables. The underground paper cables are connected to No. 22 B. and S. rubber-covered wires, and pot-heads filled with compound are made just underneath the main frame.

The main frame has ten horizontal shelves and the strips of connectors are in row of twenty pairs, so that a vertical set of ten strips provides for a 200-pair cable.

As the cables in use are 200, 300, 500 and 600 pair, the numbering of the cables is very easy and the line of pot-heads under the floor is very neat. A 500-pair cable is split into two under the floor of the apparatus room and is connected in two pot-heads, one of 200, the other of 300 pairs; the 600-pair cable is split into three

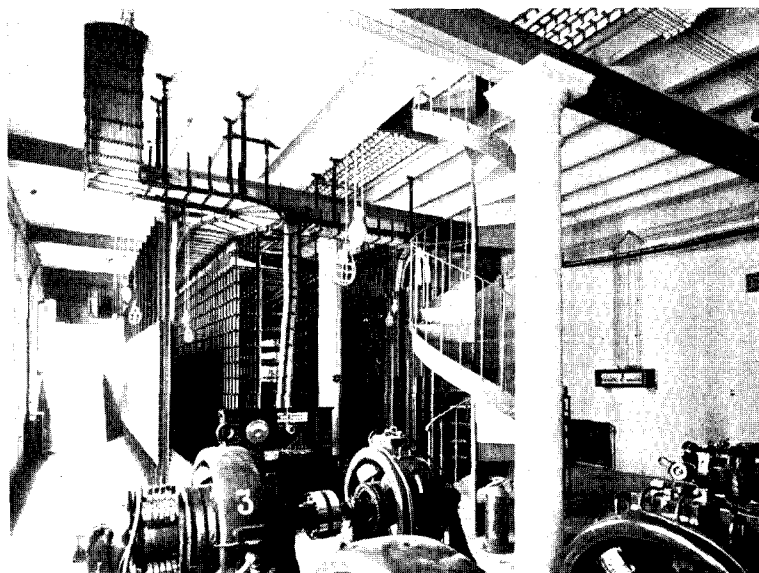
pot-heads of 200 pairs. These pot-heads are clamped to iron supports running under the floor of the apparatus room.

The main frame is of the 4 A. type, the horizontal side first equipment is for 5,000 lines, while the vertical side first equipment is for 100 special lines and order wires, 200 incoming trunks, 200 outgoing trunks, 100 bothway trunks and 3,000 subscribers' lines.

The ultimate capacity for incoming and outgoing trunks is 600 lines each. The main frame can be extended to an ultimate capacity of 14,000 lines.

As soon as a new line was brought through the underground cables to the main frame a double cross connection was made to the first part of the main frame, which was the common battery side, and to the last part of it, the magneto side, and the line to the old "rosace," or circular distributing board, was cut, leaving the drop of the standard switchboard only in connection with the new main frame and the connection to the new board ready. This manner of transferring the lines to the new main frame avoided extending the old "rosace" and also making the joints on all the underground cables, and gave good results.

The intermediate frame is 40 bays long, the horizontal shelves being of 800 lines capacity, corresponding to a row of 800 jacks on the switchboard. The ultimate capacity, both on the horizontal and vertical side, is for 11,200 lines.



POWER PLANT, "LIBERTAD" EXCHANGE, BUENOS AIRES.

The relay rack is thirteen bays long, the first equipment being for 3,000 subscribers' line and cut-off relays and 60 bothway trunk line and cut-off relays. There is room for a second rack for completing the equipment to about 10,000 relays.

The cable support for the multiple cables leaves at one end of the I. D. F. and passes through an opening under the cable-turning section. The cable support from the main frame to the I. D. F. arrives at the other end. The cable support for the answering jack cables is placed between the I. D. F. and the relay rack and passes under the subscribers' section (38-40-42), so that the run of cables is minimum.

In the power plant there are two charging sets, one a 15 horse-power 220-volt motor, direct coupled to a 300-ampere 30-volt generator, used as a reserve unit; the other set is a 15 horse-power 400-volt motor, direct coupled to a 300-ampere 30-volt generator; this set is for general use.

The two ringing machines are of type P. 1, the motor current for one is supplied by the 220-volt mains, while that for the second is taken from the 24-volt accumulator battery. Both ringers are equipped with high speed interrupters, automatic ringing, busy back and "don't answer" attachments.

The power board consists of two panels, the motor panel on the left and the generator panel on the right. The motor panel is equipped with the ringing fuses and also with resistance lamps for the ringing current.

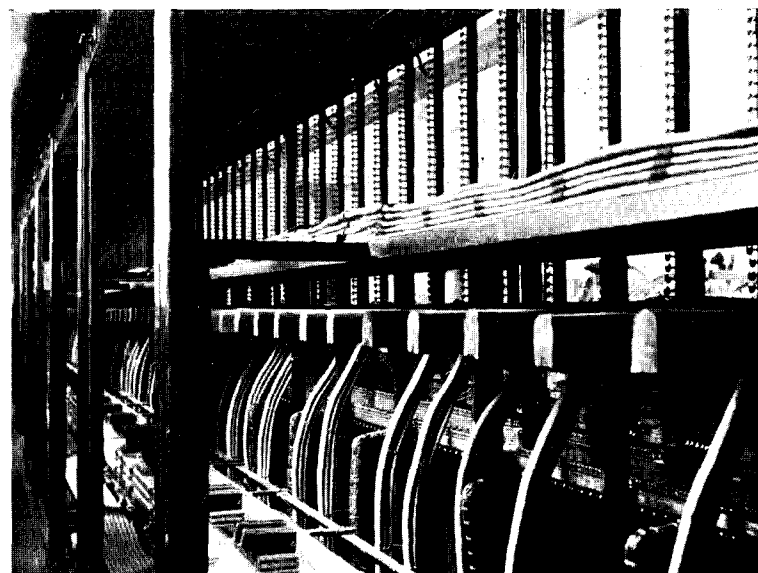
The wire chief's desk is a one-position desk fitted with ten lines to the switchboard or other desks, a set for fifteen testing keys, twenty plugging-up lines and a voltmeter; the keyboard is equipped with two sets of special connecting cords, one answering plug, one testing plug and one earth plug.

The battery room is separated from the apparatus room by the wall to which the power board is secured; it has an outside door, a window and two ventilating shafts to the roof of the building. The battery consists of 11 type O. K. 17 E. P. S. cells of 2,000 ampere-hour capacity. The tanks will take eighteen more plates, which will bring the capacity to 4,200 ampere-hours; they are mounted on individual stands and a platform is run the complete length of each side of the battery. The voltmeter leads are soldered to copper rods burnt into lead lugs giving a neat appearance to the cells.

Two wells have been sunk in the mechanics' shop, one under the main frame for the main frame earth, and one under the positive pole of the battery for the battery earth.

All the power cables between the machines, power board, battery, fuse panel and relay rack are run under the floor of the room in galvanised iron pipes.

A spiral staircase for service purposes leads from the apparatus room to the switchroom above.



BACK OF COMMON BATTERY SWITCHBOARD.

The switchboard is a No. 1 relay switchboard, five-wire system. It consists of a cable-turning section, one dummy one-third section, one bothway trunk section, six subscriber sections, one incoming junction section and one dummy section.

Each subscriber section is a three-position eight-panel multiple with capacity for 9,600 multiple jacks. The answering equipment per section consists of 360 jacks and lamps in six panels, with an ultimate capacity of 480 in eight panels.

The present multiple equipment is for 3,000 lines. The outgoing trunk equipment is of 80 jacks, and the bothway trunk equipment of 60 jacks, multiplied every six panels. The ultimate capacity of bothway or outgoing multiple trunks is 600.

The keyboard equipment consists of fifteen pairs of cords, with an ultimate capacity of seventeen, ten order wire keys, with an ultimate capacity of twenty, and a ring down order wire key.

Each panel is provided with a pilot lamp, and one instruction lamp is fitted for every position.

The keyboard is made for the future installation of meter keys. The positions Nos. 2 and 4 are each equipped with 30 bothway trunk local jacks and lamps, the keyboards are provided with fifteen ordinary cord circuits and with two special cord circuits for connecting two bothway trunks together.

The junction section is equipped with 27 cords per position. Each cord circuit includes a plug and cord, a supervisory lamp and an automatic ringing key.

The junction positions are wired at present for incoming trunks from magneto exchanges, but they can be easily transformed for working incoming trunks from other common battery switchboards.

A switching key in each position permits the grouping of the order wires and the operators' sets on to one position for night work.

Four special ringing through circuits are provided for toll connections from the toll exchange in another building.

The chief operator's desk is equipped with listening-in lines, service lines and lines for observing service. The information operator has at her disposition several incoming lines to the junction and subscriber sections.

The switchboard is lighted by means of a double set of electric lamps fitted in continuous reflectors on which are painted the numbering of the positions. The switchroom is further lighted by means of three Nernst lamps. There will be five fans installed shortly, and five more when the switchboard is extended on the other side of the room.

The switchboard and desks are of mahogany with a high French polish, which gives a handsome appearance to the switchroom.

The exchange was completed early in November, 1906, and though all the outside lines were not reconstructed and brought to the new main frame, it was decided to open the exchange with about 170 working lines on Nov. 17.

The reasons for this premature opening were the following:—The Libertad magneto exchange had a capacity of 1,400 lines and had been filled up for over two months. In order to accept new subscribers those whose numbering was from 1401 to 1500 and from 1571 to 1600 were transferred to another exchange of the system, the "Buen Orden" Exchange, by means of the vacant pairs of a 200-pair trunk cable connecting these two exchanges; 130 subscribers were so connected to the Buen Orden Exchange, but by the end of October there were no more vacant pairs in this cable, and rather than take more subscribers and transfer them to the Avenida Exchange, which was also pretty well congested, it was decided not to take any more contracts before Nov. 20 and to connect the new subscribers whose premises were in the districts already provided with distribution cables to the new switchboard, giving them numbers above 1600. The new subscribers whose premises were not in the above districts were taken on and given numbers from 1500 to 1570 and connected to the vacant drops of the magneto exchange. This premature opening of the new exchange also saved the work and expense of installing some temporary standard switchboards and released a number of magneto sets which were required urgently for the provincial exchanges.

Condensers had been placed in the magneto sets at the same time as the inside wiring was renewed and metallic circuited at the subscribers' premises.

The testing and clearing away faults of these 170 lines occupied three days. As soon as a line was tested inside and outside, a small piece of mica was inserted between the springs of the cut-off relay and the heat coils were put in place on the common battery side. As there were more lines already connected to the magneto side of the main frame than to the common battery side, the coils to be taken off for the change over were painted with a small white spot.

Bothway trunks had been put between the five main exchanges in the town and the new Libertad Exchange.

On the new switchboard, to recognise at once if a Libertad subscriber was still connected to the old magneto exchange, the busy-back tone had been placed on the sleeve of the multiple jacks by connecting a lead from the busy-back attachment to the sleeve terminal on the horizontal side of the I. D. F. On the magneto switchboards the local jacks were plugged up with wooden plugs immediately after the change over.

Operators at the other exchanges had received instructions to always ask for connection to the magneto exchange. If the call was for a Libertad common battery subscriber, the call had to be transferred to this exchange by means of ring-down bothway trunks. Operators of the new exchange receiving a call for Libertad subscriber had to test the multiple jack, and if the busy-back tone was heard they had to transfer the call to the Libertad magneto board by means of bothway trunks.

The change over took place on Saturday, Nov. 17, at 8.30 p.m. The electricians pulled out the heat coils, the Libertad common

battery operator plugged in three times in each local jack to work the cut-off relays and release the mica insulators, and the operators of the magneto exchange put the wooden plugs in the local jacks of the subscribers transferred.

The operators at the new board then rang up each subscriber and tested all the lines. The only faults found were the tip side of one line earthed, two open lines and six permanent glows due to receiver being left off the hook. The next morning these faults were cleared, and new common battery sets were sent to those subscribers who had left their receivers off the hook.

In the following fortnight all the magneto instruments were changed and new subscribers whose numbers were above 1600 were connected. The change over of the other subscribers is now going on gradually at a rate of about twelve daily, observing the same rules as for the first change over, *i.e.*, taking the busy-back tone off the multiple jack on the common battery switchboard and putting in a wooden plug in the local jack on the magneto board.

At first each operator at the new board has from 80 to 85 lines to attend to, whereas on the old switchboard she had only 60 to 70. When most of the subscribers are transferred the operator's load will be gradually increased. The service has not been impaired and no complaint has been received from the subscribers, who are rather pleased with their new telephone sets.

The opening of this exchange will relieve two other exchanges which are congested, and a first extension is already in course of manufacture. New junction sections will be placed in the old exchange room when the magneto board is removed and the present junction sections will be transformed into subscriber sections. The main frame, repeating coil rack and fuse panel will also be extended.

Room has been left in the apparatus room for installing the subscribers' service registers, and the 30-volt service register generator will be installed in the vacant space between the ringing machines.

The entire equipment was manufactured and installed by the Western Electric Company in accordance with plans and specifications made by the writer.

This telephone exchange is the largest common battery equipment installed in South America.

Two other similar equipments are in course of installation for the "Juncal" and "Mitre" Exchanges. The Juncal Exchange will replace a 2,200-line series multiple switchboard. The Mitre Exchange is to be equipped for 2,400 subscribers' lines and will replace three magneto exchanges with standard boards, which now serve about 1,500 subscribers.

Projects are also under consideration for two other common battery exchanges for replacing the Avenida Exchange, which has a magneto bridging board of 4,000 lines capacity, and the Buen Orden Exchange, which has a magneto standard board of 1,200 lines capacity.

When all these new exchange equipments are installed Buenos Aires will be not only the best telephoned city of South America, but will be comparable with some of the best telephoned cities in North America and in Europe.

FOREIGN INTELLIGENCE.

Switzerland.—The Confederation possessed at the end of 1906 384 telephone networks with 53,711 subscribers. The number of exchanges was 384 and of sub-exchanges 326. The mileage of lines was 16,980 and of wire 273,162. The total number of telephonic communications was 39,979,400, of which 32,389,341 were local and 6,956,995 trunk conversations.

New Zealand.—At the end of 1905 the length of the telephone lines had increased from 1,160 to 1,264 kilometres, and the length of wire from 15,823 to 17,744 kilometres. There were at that date 13,423 stations in the colony, of which 2,260 were in Wellington, 1,854 in Auckland, 1,702 in Dunedin, and 1,647 in Christchurch. The total number of exchanges was 85.

Austria.—Despite the introduction of the measured service at higher rates, 2,960 new orders for telephones have been received and 983 applications to be transferred to the new party line system. The Government is putting in hand the installation of automatic exchanges at Graz, Cracow, Linz and Innsbruck.

Italy.—The Government is proposing to spend 8,200,000 lire on the telephone service during the ensuing three years. It is intended to erect wires of larger gauge, to increase the existing systems, and to establish the service in places which are not at present served. New trunk lines of 4 millimetres bronze are to be erected between Rome and Ancona, Rome and Bari, Ancona and Bologna, Bologna and Padua, Rome and Genoa, Florence and Genoa, Venice and Milan and Rome and Milan. The service is to be introduced in all towns with 10,000 inhabitants, as well as into all places sending 20,000 telegrams a year.

THE ADAPTABILITY OF THE NEW STOCK LIST TO STORES BOOK-KEEPING.

By B. R. COCKREM, *Nottingham.*

I THINK the new Stock List might be made more use of in many ways to facilitate the keeping of the Stores Ledger Cards. I notice how great help might be derived from the fact that each article proper is quoted first, and the various grades and sizes following in strict alphabetical sequence.

I venture to suggest that the Stock List itself be used as an index to the cards in the following manner, which is now being adopted in this district.

It is assumed that stores clerks understand the stock they are responsible for, and also under which of the four headings to place any article they may have to deal with.

Four sets of cards are used:

One set for instrument stock.

- ” ” line ”
- ” ” sales ”
- ” ” tools ”

Each set of cards is subdivided alphabetically, guide cards being used for each set, and to prevent confusion the tabs of the guide cards for each class of stock are painted a different colour, viz.:

- Instrument stock Red.
- Line ” Blue.
- Sales ” Green.
- Tools ” Yellow.

Before the advent of the new list it was our practice to index the cards, and, of course, give each ledger heading a number, viz.:

Description.	Card No.
Bronze wire	501

It is in the indexing where we are making the greatest alteration. It has been stated already that we are keeping four sets of cards, one set for each class of stores, and again each set is subdivided alphabetically, but instead of giving each card a number we are using the initial letters of the card headings, plus the Stock List number of such heading, thus:

Description.	Bronze wire 40 lbs.
Initial letters	W. B.
Stock List No.	1

Therefore the card is marked W.B.1. This code fulfils a double purpose.

1. It gives a distinctive mark to the heading for posting purposes.
2. It obviates the necessity of showing the Stock List number separately on the cards.

In adopting our “initial letters” several difficulties cropped up, the greatest of which was to give articles “letters” as near their full description as possible. The only way out of this difficulty was to use the same letters twice but not in the same class of stock, therefore the same letters do not appear twice in any one set of cards.

This alteration of system might appear at first sight to be a big undertaking, but it was not really so, because no district could possibly use every item mentioned in the Stock List, therefore the index has only to deal with those items the particular district is interested in.

To illustrate the change more fully I give below a few instances showing ledger cards as headed under the old style and the new.

OLD SYSTEM.		NEW SYSTEM.	
	Card.		Initial Letter.
Arms O.A.41	262	Arms O.A. 41.. ..	A.O.1
Bolts arming 8"	274	Bolts arming 8"	B.A.1
Bolts insulator S.A.6	290	Bolts insulator, S.A.6	B.I.8
Cable D.C.1Pr.	305	Cable D.C.1Pr.	C.U.18
<i>The above stock has blue guide cards.</i>			
Cells dry No. 1	34	Cells dry No. 1	C.D.2
Jacks test sps. of 20	113	Jacks test sps. of 20	J.T.1
S.L.			
125M Wall sets with H.M.T.	223	Wall sets with H.M.T.	I.W.8
125N ” ” C.B. complete	219	” ” C.B. complete	I.W.13
126 Table set with H.M.T.	200	Table set with H.M.T.	I.T.1
<i>The above stock has red guide cards.</i>			

In the old system the Stock List number was quoted on the left-hand corner of each card. In the new system this is not necessary, as after the code letter a figure is quoted which is the Stock List number of the specific article.

In conclusion, it may be said that the new system consolidates the work of a stores clerk, gives him an intimate knowledge of the Stock List, which he is taught to rely upon to a much greater extent than before, also that when once the letters are committed to memory the number will follow very quickly, consequently saving much valuable time when preparing estimates.

It is even possible to educate the inspectors to book out instruments by initial letters. In fact, in this district the full description of every instrument used and its local code is type-written and exhibited in a prominent place where the inspectors have access. It has been found that after a few weeks' training the plain works wonderfully well, preventing wrong postings, which often occurred in the past owing to the vague descriptions often used; the inspectors prefer now to use the codes, thus saving time and increasing accuracy.

A copy of our code is appended:

STOCK LIST.—COMPLETE INSTRUMENTS.
Table Sets.

New Code.	Old Stock List No.	Description.
I.T.1 ... 126	...	Table set with H.M.T. with generator.
I.T.7 ... 126I	...	” ” ” without ” (party line).
I.T.9 ... 126K.	...	Desk stand, common battery complete with receiver.
I.T.10 ... 126M.	...	Bell case for common battery desk stand with induction coil.
<i>Wall Sets.</i>		
I.W.1 ... 125	...	W.S. with H.M.T. with generator, all patterns.
I.W.7 ... 125L.	...	W.S. with H.M.T. without generator, auto clear.
I.W.8 ... 125M.	...	W.S. with H.M.T. without generator, party line.
I.W.13... 125N.	...	W.S. complete common battery.
I.W.D... Nil	...	W.S. complete Deckert pattern for party lines.

THE CONTRACT OFFICE.

By GEORGE E. NICHOLLS, *Contract Department, London.*

THE “office” section of a Contract Department is necessarily a minimum quantity, but it is nevertheless of vital importance. Its purpose is to maintain a clean channel for the transfer of the results of the department to the district office and to keep records for the contract agent's reports and returns. Incidentally it often decides the first impression conveyed to an intending subscriber, either by the attention given at the counter or by the manner in which the telephone call is replied to.

The contract received or handed in by the canvasser is first handed to the correspondence clerk for the papers relating thereto to be attached. It is then entered on a new business card and submitted to the contract agent for certification, after which it is sent forward to the Works Order Department. The copy is simultaneously passed to the typist for a covering letter, directing the subscriber to the proper quarter for any enquiries regarding completion. If the contract is with an existing subscriber and necessitates a change of number a letter is forwarded with the copy advising the subscriber of the new number allotted. After the contracts have been disposed of the cards are entered on the tabular records for the contract agent's return, and then filed in alphabetical order. By these means the contract is freed from all unnecessary delays.

The three maxims quoted on the operator's blackboard, viz., “Courtesy, Accuracy and Speed,” cannot be better applied to any branch of the work than here. Firstly, the chief contract clerk is the general officer to the department. On the one side the canvassers must have adequate supplies of forms and stationery, and on the other side the district office looks to him for answers to all sorts of

queries relating to the work in hand. Meanwhile the contract agent is ever eager to know the exact results of the day's work. Secondly, the clerk is looked to as an authority on service instructions, with which he is in hourly contact in guiding the agreements to the Works Order Department in such a form as to be readily translated for work to be commenced. The records must be so built up as to ensure a correct account being shown at any time. Thirdly, the contract clerk has to combine with these qualities that of speed. Directly a contract is signed the subscriber, who has been imbued with enthusiasm by the canvasser, expects to have the workmen about his premises. It is essential that the office work should be carried through methodically; not with that slavish adherence to a given method which prevents an urgent matter having priority, but in a way which will enable a special transaction to be rapidly effected without disorganising the rest of the work. The canvasser is expected to present his contract and copy in a condition fit for passing forward, and the clerk who recognises that his chief is not to be burdened with the work of detecting petty errors and omissions will endeavour to acquire a quick perception of any points that will prevent the Construction Department or the register clerk from fully satisfying the subscriber's wishes. Probably no position is more fruitful of enthusiasm than that of contract clerk. The more contracts dealt with the harder the work, but the greater the reward. The contract agent is pleased as results go up, and the general life of the office assumes a brighter aspect. The chart shows a high peak and everyone is anxious to do more.

In the evolution of the Contract Department from a section of the district office there has, I think, for some unknown reason, been a strange tendency to despise the work of the new department. This may have been due partly to the trouble experienced with canvassers generally, prior to their having the advantage of the education obtained through a position in a well-organised Contract Department.

The time has now arrived when the department can claim to have fulfilled its purpose, and can refer, without undue pride, to the evidence of its ability to maintain the prestige of the Company with a single eye to the general advancement of telephony in the United Kingdom. From this point of view it will doubtless appeal to every loyal member of the staff to render some service to the department; not only might they count it an honour to help in any way the departmental returns, but they might realise that it is on the success of the Contract Department's work that the whole of our vast organisation is based.

None of us is proud when it is necessary to reduce the staff, but on the other hand, each individual takes pleasure in watching the gradual growth of the numerical strength of the service, which is at present, at the most, only in its infancy.

The whole prosperity of the staff is dependent on the success of the Contract Department; so that he who helps the Contract Department helps himself.

EXPLOSION AT WOOLWICH ARSENAL.

SOME weeks ago Woolwich was the scene of a terrific explosion which occurred at the Chemical Research Department of the Royal Arsenal, the cause of which is not yet publicly known.

The damage in the vicinity was very great, many shops and houses having their fronts and roofs completely shattered. The Company's plant, consisting principally of two large junction routes to Erith and Dartford, did not escape, one route especially which runs parallel within 250 yards of the actual place where the disaster occurred. At this point a large number of wires were broken down and insulator cups damaged. The regulation of the routes in many places in the town suffered considerably through the excessive strain put upon the poles and stays, and in several instances brackets had to be refixed at subscribers' offices. The work of reinstating was quickly put in hand by the Engineer's Department, and there was no serious interruption to the Company's service.

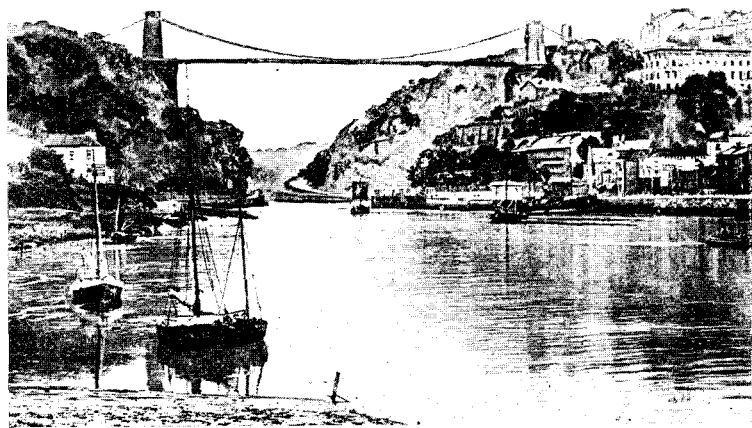
NATIONAL TELEPHONE MUTUAL BENEVOLENT SOCIETY (BRISTOL AND CARDIFF DISTRICTS).

THE first annual balance sheet of this society has now been prepared, and the dividend to each member will be 3s. 7d., which is very good, each member's total amount of subscription since the society was formed, on Aug. 11 last, being only 5s. 3d. £14 8s. 3d. has been paid out as sick allowance, and the society has a reserve fund of £10 1s., which is intended to meet cases of hardship other than those provided for by the ordinary sick benefit allowance. The dividend would have been much better but for the fact that all the promotion expenses have been charged for in this half-year.

UNDERGROUND RECONSTRUCTION AT BRISTOL.

By G. L. PRESTON, *Local Manager.*

THE drawing in and out of cables has been claiming a large amount of attention in Bristol, and a few particulars may be of interest to those who have similar work to perform. The first section dealt with was about 400 yards in length, between Clifton and Leigh Woods, across the Suspension Bridge. This necessitated the drawing out of a 26-pair 20-lb. conductor cable, and the drawing in of a 77-pair composite cable. Clifton and Leigh Woods are residential localities, and are in two different counties, Somerset and Gloucester; they are linked together by the Clifton Suspension Bridge, shown in the accompanying photograph. The work was carried out in the daytime without interrupting the service. The old cable across the bridge was taken out of the wooden troughing sufficiently to permit of the new cable taking its place. When the underground pipes were reached on the Clifton side of the bridge, it was decided to draw the new cable in over the old one. This was done, and the subscribers were transferred without the slightest hitch, thus saving a joint and preventing the cutting off of the



THE CLIFTON SUSPENSION BRIDGE.

subscribers; and at the same time providing a length of nearly one-quarter of a mile of cable without a joint.

The next section dealt with was one of 1,435 yards, where 1,356 yards of 102-pair 20-lb. conductor cable was replaced by a 250-pair composite cable, and 79 yards of 52-pair 20-lb. conductor cable by a 150-pair composite.

This work was commenced on a Monday at 6 a.m. The ground had to be opened in fourteen places, and the cables tapped at four branch joints and the working circuits numbered. Ten cable drums, three sets of gear and all tools had to be carted from the stores, a distance of about two miles. This was completed, and everything was ready for cutting the cable by 6 p.m. The old cable was drawn out and the new cable drawn in by 2 a.m. on the Tuesday. Thirteen jointers were then set to work, and the working lines gradually joined up, with the result that the majority were through by 10 a.m. on the Tuesday, thus creating a record for this centre for the drawing out and in of long sections of cable during a single night. Only 55 men were employed, including thirteen jointers and 2 plumbers. The actual cost of the drawing out and in of the cable was exactly 2d. per yard, a very reasonable figure, which is accounted for by the fact that double time was not payable, thus suggesting that as little cable work as possible should be carried out on a Sunday

OBSERVATION SERVICE TESTING.

By G. R. HILL, *Hull.*

The purpose of service observation seems to be misunderstood by some who are not familiar with traffic work, it being frequently described as the method by which the operators are checked. The present system of service testing provides a means by which the districts are enabled to judge the quality of their service, the observation department obtaining "samples." From these the value of the service, both as to speed and accuracy, is known.

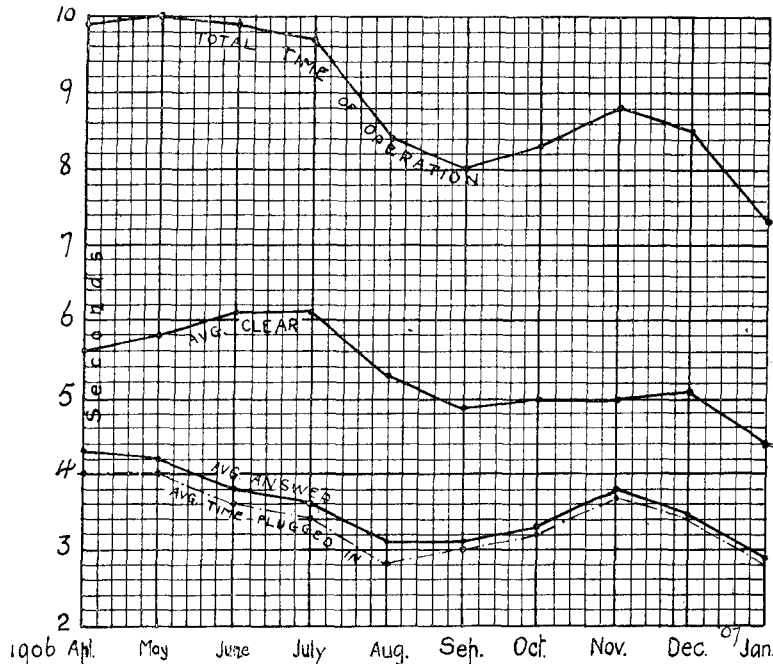


FIG. 1.

Further, being supplied with full details, exchange managers are enabled to analyse the results of their own work.

The necessary apparatus is fitted in a separate room free from interruption. It is mounted on a table, and for common battery working is equipped with from 30 to 50 jacks and line lamps and two pilot lamps. The connections of the observation table are arranged so that when a call, either inward or outward, occurs on

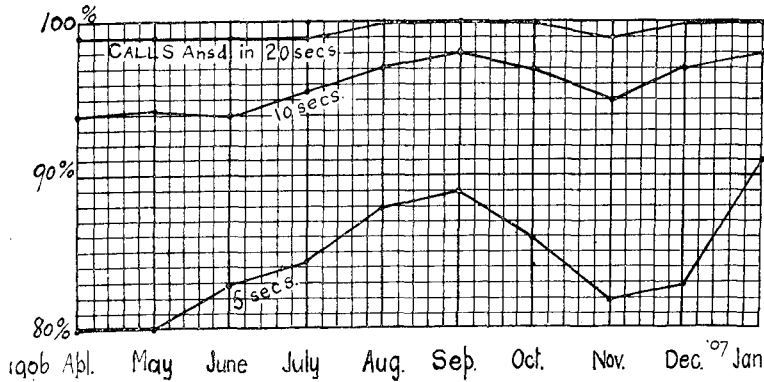


FIG. 2.

one of the lines under observation a line lamp lights. The connections are made at the intermediate distributing frame by means of cords and special clips. When a subscriber calls he operates the signal at the table at the same time as at the switchboard, and the observation clerk, plugging into the corresponding jack, lights the pilot lamp "A." When the operator plugs into the line the lamp "B" is lighted. The two lamps are extinguished by the subscribers replacing their telephones and the operator withdrawing the answering cord respectively. When a line under

observation is called the operations are repeated, only that the "B" lamp is the first to glow. The observer also receives an intimation when the call is correctly registered. For magneto exchanges the connections are made at the testboard.

Provided with a split-seconds stop-watch the observer times each step of the call, and records the times in seconds on a special form. From these daily forms weekly and monthly summaries are made, a copy of the latter being sent to the Engineer-in-Chief, who issues a table giving the figures of each exchange. This collection of records of the work of several exchanges is looked upon with interest and emulation, although varying local conditions render strict comparisons impossible.

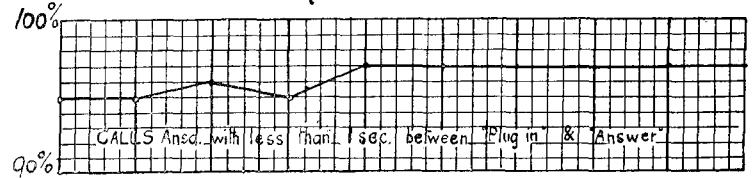


FIG. 3.

The lines under observation are chosen so that as far as possible the whole switchboard is represented in the test, and are changed at least every day. For the test to be of value a large number of calls must be correctly recorded, and the clerk alone must know the numbers under test.

It will be seen that when examples of exchange working are thus reproduced exchange managers have in concrete form a guide as to what the service appears to outsiders, and the details provide means by which service may be studied from every point of view.

Therefore the work of service testing does not end when the forms have been filled up and summaries made. The records contain information which is followed with a view to discovering

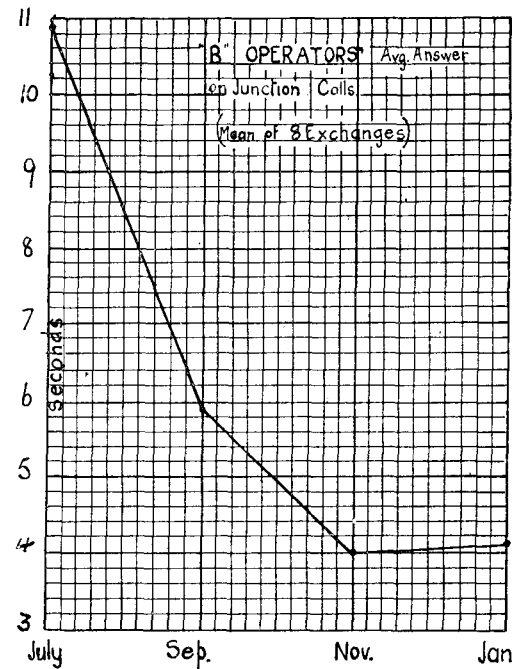


FIG. 4.

and removing difficulties which impede quick operating. The possibilities of a minute study of these particulars is apparent, but a watch can also be kept on the fluctuations of the chief points by means of curves plotted weekly and monthly. Fig. 1 shows, in addition to the average time of answer and disconnection, the extent to which team work is observed among the operators by the average time between "plugged in" and "answered." Fig. 3 also illustrates this by showing the percentage of calls on which the "answer" and "plug in" are practically simultaneous.

In judging the speed of a service the average answer is considered together with the percentage of calls answered within a given time. What may appear a good average may contain a number of calls answered in perhaps 30 seconds, the average being kept down by a large proportion of calls answered in less than two seconds. This is not so satisfactory as a service which keeps more or less consistently at five seconds, *i.e.*, with no very slow answers. The average may be only slightly affected by the actual length of the delays, but a few unduly slow answers are a weak point.

The aim in dealing with the observations is not to discover individual operators at fault. Team work amongst the operators renders this impossible, even if it were desirable, which it is not; it is also obvious that the quality of a service does not depend entirely on the operators. The work performed by the operating staff may be assisted or impeded by the conditions under which the work is done, and the records are analysed with this in view. A

junction calls, where both-way ringing junctions are in use, the average time of disconnection is necessarily longer than on a local call. The "A" operator does not receive the clearing signal until the distant exchange has cleared the junction, while the disconnection is timed from the moment both telephones are hung up. For local reference in Hull, the clearing is tested separately on junction and local calls, and taking December, 1906, for example, the local call is cleared in 4.8 seconds average, and the junction call in 8.1 seconds.

A system of order-wire observation is also provided. In busy telephone areas a large proportion of traffic is controlled by order-wire, which renders a systematic test of this branch of exchange working of great value. On these circuits calls are being passed and received by trained operators exclusively, and this fact alone makes the records of value as a criterion of the existing conditions.

The forms provide for a record of each call passed during a

	JULY.				AUGUST.				SEPTEMBER.			
	Per cent. of calls answered in 5 secs.	Average answer, secs.	Average clear, secs.	Average total operation.	Per cent. of calls answered in 5 secs.	Average answer, secs.	Average clear, secs.	Average total operation.	Per cent. of calls answered in 5 secs.	Average answer, secs.	Average clear, secs.	Average total operation.
Flat rate	86.6	3.3	6.1	9.4	88.5	3.0	5.3	8.3	89.3	2.9	4.9	7.8
Automatic box	82.2	3.9	4.9	8.8	80.0	3.9	3.7	7.6	88.9	3.4	6.0	9.4
Party line (unlimited)	78.3	3.9	6.8	10.7	84.4	3.3	5.7	9.0	84.7	3.0	5.5	8.5
Party line (recording)	75.0	5.5	5.8	11.3	91.2	3.1	5.6	8.7	87.9	3.3	6.2	9.5
Party line (box)	100.0	2.1	5.3	7.4	93.8	2.5	5.9	8.4	86.6	3.7	5.8	9.5

SUMMARY OF SERVICE TESTS, HULL, 1906.

delay in the time of an operator's answer does not necessarily indicate inattention on the part of the operator who answered the call. The records show when and where the delay occurred, together with particulars, and investigation often results in removing difficulties of a general nature. It is here that the operator benefits by service observation. The following examples illustrate this:—

At Hull, in May, June and July, 1906, 1 per cent. of the calls took longer than 20 seconds to be answered, though the average answer for the same period was only 3.9 seconds. It was noticed that on calls to sub-exchanges the time until the distant operator answered was abnormally slow. This led to a test being taken for speed of answer on outgoing junctions. It was found that in passing calls to sub-exchanges the "A" operator was unduly delayed until the distant operator attended. This test is continued and a weekly summary, comparing the work of each exchange, is issued and copies are sent to the exchanges concerned. An interest was awakened and keenness was promoted which improved the speed of answer, so lightening the work of the "A" operators, and at the same time the local service at the sub-exchanges has not suffered. Figures 1 and 4 show how the two combine in producing the improvement.

An analysis of the service given on the various classes of lines can be easily produced at the end of the month, if the necessary particulars are taken out daily. An examination of the particulars found at Hull will show that in the case of twenty-party lines the answer was not so good as on the other systems. The resulting investigation of the extra work in operating, recording and other difficulties met with on these lines led to a redistribution.

The extension of Post Office record working is entirely due to service observation, which indicated the extent of the difficulties involved by the extra work to the Company's operator in handling trunk calls on the old method and the liability of error due to the call passing *via* a third person.

In considering the time taken to disconnect it is found that on

given time, together with a note of all irregularities. An exact indication of the quality of this branch of the work is thus obtained. Each call and irregularity is recorded in the space allotted as it occurs, by a stroke. The result is a record of the number of calls passed during the time at which the test was made, and of the proportion of each kind of irregularity. These are summarised monthly, and transferred to two forms, showing the work of "A" and "B" operators respectively. The method of dealing with these records is entirely the same as in the other branch of service observation, *viz.*, the object is not to trace errors to individuals, but to remove general difficulties indicated by the irregularities noted.

COST OF POWER AT A SMALL COMMON BATTERY EXCHANGE.

MR. GEORGE A. WHITTAKER sends the following interesting data on the cost of power at the Derby Exchange, which was equipped with common battery plant last year. From April 10, 1906, to April 10, 1907, the exchange used 3,409 units, supplied from the town mains at the power rate of 1½d. per unit; total cost for current, £17 15s. 1½d. The lines connected at the beginning of the year were 783, and at the end 880, say, a mean of 830, giving an average cost per line for power of 5.1d. a year. Dealing with the cost of current per call, Mr. Whittaker says that in a week of November, 1906, there were 33,524 effective calls and the current consumed was 65 units, at a cost of 6s. 9½d., equivalent to 412 calls for 1d., or at the rate of 2.43d. per 1,000 effective calls. These figures, of course, relate only to the cost of current for running the power plant, and do not include the maintenance and fixed charges of the power plant; the inclusion of these would materially increase the figures for cost of current delivered at the switchboard circuits.

THE WORST WAY TO TELEPHONE.

In a certain town in the South of England, where there is competition in the telephone business, the following conversation was overheard:—

"I've been trying to telephone you all the morning. I wanted to get you the worst way."

"What telephone did you use?"

"Why, the Municipal, of course."

"Well, you certainly did try the worst way. Why don't you use the National?"

THE SIGNIFICANCE OF BEAMS.

"It's this way, sir—my father did it and I see no reason to change. What suited him and the business will suit me."

I had dropped into a sawmill in T—, where I knew the proprietor and occasionally chatted with him on the merits and otherwise of the electric drive. The above was his answer when I had got the length of pressing him into finally deciding whether his old beam engine should be given a long rest while a brand new electric motor had a turn at the load.

"Why did your father put that knuckle-jointed, knock-kneed engine into the mill?" I asked, pointing to the beam and parallel motion rhythmically pulsating above our heads.

"Of course, it was before my time," he replied, "when the old engine was bought, but my father told me that an engineer one day made some calculations, and showed on paper how the work would be done quicker and better by steam than by hand——" "And the old man had the beast put in," I concluded for him.

"Beast, eh! That's not the right word. 'Beauty' was his expression, specially when he got 'em bad."

"Got 'em bad," I queried, "I thought he was a strict——"

"So he was, the way you mean, but that engine just intoxicated him, and I have seen him gazing at the swinging beam and links for an hour on end, absolutely asphyx—transfixed, I mean, until he was bound to tear himself away to get something done."

"Quite a profitable occupation for a self-respecting master," I said, though hardly knowing what I did say, for my eye had been following that confounded beam while he was speaking, and I was becoming fascinated, too. In fact, I set to calculating in my mind what would happen if the piston rod broke, or the big end came loose, and several other things which might come about one day. I must have been there some time or I had not heard my companion speak. I turned round only to find him laughing at me.

The old man took me by the arm and forcibly dragged me away from sight of the engine, though not out of sound of its bumping thud.

"Now you have felt a little of what the old gov'nor used to go through before the days of high-speed engines and electric motors," he said sympathetically as we took a turn in the yard. "That engine was his deity, and he couldn't resist worshipping it. He fell into the wheel pit one day when a real bad fit took him."

"Have you caught the fever," I asked, "or are your nerves proof against such trifles?"

"I'm no engineer," he answered, at once, "and should never rave over beams and links on that or any engine; but I can't forget the old man's affection for it, and that's why I keep it going."

"But electric supply mains have lain outside your gate for three years or more, and if they could would rise up in judgment against you."

"Yes, I know, but I shan't stop the old engine while I live, for the sake of its old associations," was his emphatic answer.

"But if your respected parent had lived in these times he would have gone into extasies over the electric motor and its remarkable achievements," I suggested, though not without my doubts.

"Don't make any mistake; my father was as slow and steady as that old beam engine; the thought of 1,500 revolutions, as you call it, in an engine, would have been beyond him. In a saw it would have seemed natural, but in an engine—his engine! Think of his dismay in endeavouring to crowd those other 1,450 turns per minute on to that old crock!"

He had surpassed himself. On previous occasions I had never been able to draw him about his real reasons for keeping that engine. I was compelled to sympathise with him, and I left wondering how many more there were like him in this old country of ours within sight and sound of an electric power house.

W. E. W. in the *Electrician Supplement*.

QUERIES.

CAN any reader of the JOURNAL suggest an idea for fixing directories securely at unattended busy call offices. Various methods have been employed in our centre from time to time with the same result, the directory nearly always being found on the floor of the cabinet. I think this trouble is a common one throughout the country, and therefore should be pleased to hear what has been done to prevent the trouble in other districts.—F. QUINN, Chief Inspector.

THE BROADER VALUE OF THE CLERK.—II.

BY EUSTACE HARE.

"Ah, take the Cash in hand and waive the Rest."—OMAR KHAYYAM.

IT sounds heretical, but unless history misleads us there was a time when the world went very well without the aid of electricity as a subservient force—to say nothing of steam and the penny post—but that there ever was an age when there was neither commerce nor cash—or its equivalent—is unthinkable. Cash and commerce have evolved the clerk, but whether they have been instrumental more in accelerating than in impeding the march of science and invention; whether the scientist is more indebted to commerce than commerce to the scientist, are questions of economics too vast to enter upon here. One thing, however, is certain: the inventor cannot do without the clerk; and having once brought commerce (or finance) up to the scratch as it were, and having asked its votaries to "take the cash in hand," he leaves that part of the business in their hands gladly, with a simple faith in their ability to carry it through. For well he knows that, no matter what new discovery is impending or what is the manner of his work, the resources of bookkeeping will be equal to the occasion, ready to hand with an unfailing adaptability. There may be considerable difficulty in securing suitable men to cope with his own new methods and designs, but the clerk is always there and requires no special coaching. Sponsored by the Doges in old Venice some seven hundred years ago, his system was born full-grown, and he has found no need to change it; as yet, essentially unimprovable and immovable in its perfection, it has no rival; contemporaneously with the art of its era it has grown more valuable with age. And if, therefore, of all men the clerk is conservative, somewhat "groovy" and shy of tampering with such proved machinery, who can wonder?

In one respect at least the National Telephone Company as a commercial concern may, I think, claim to be unique; in that it possesses in every one of the larger and in many of the smaller towns of the United Kingdom an entire organisation fully equipped in every department, the concentrated completeness of each unit being necessarily as distinctive a feature of its mission as its ubiquity.

The staff of every district may be broadly divided under three heads, viz., the engineering—with which I include the electrical, these two being the great spending departments—the traffic or service and the commercial; each with a clearly defined and separate sphere of action, and yet each in many ways dependent on the others; the whole forming a perfect trefoil where each cusp is of equal value and importance, of which the district manager is the centre.

Although there is a wide difference in the character of each department's work, that of the engineering-electrical and the traffic staffs are more closely allied than either is with the commercial, for the work of the one follows as a natural sequence the work of the other. The commercial or clerical department pervades both, serves both and in a financial sense controls both; not, be it remarked, in a senior capacity, but as part and parcel of its delegated duty. This applies chiefly to its relations with the spending departments, the main work of the "office" being in fact to get in as much cash as it can and to part with no more than it is obliged; to encourage on the one side and to restrain on the other. That at odd times this element of control may seem irksome and harassing, even provoking impatience and conflict, is only to be expected, but this is no new phase of feeling between the man who has to find the money and the man who wants to spend it. Mr. SAMUEL PEPPYS, a very prince among clerks, had some experience on this head, for on Sept. 30, 1661, he wrote in his diary, referring to the needs of the Navy: ". . . and yet I do not see that the King takes care to bring in any money, but thinks of new designs to lay out money." The ways of inventors, engineers and kings are sometimes very similar.

It is in his dealings with technical departments that, to my mind, the clerk can make himself of immense value; not only in telephone work, but in all undertakings which involve the employment of a large staff, whose duty, like Mr. Pecksniff's, "is to build, not speak; to act, not talk; to deal with marble, stone and brick, not

language." Without doubt, it is of the highest importance to the Company that the technical officers should be relieved by the clerical staff of every semblance of what is purely clerical work; that all possible assistance should be rendered them in the compilation of estimates or of absolutely necessary reports; that every encouragement should be held out to make such reports as simple and brief as they can be, consistent with a plain statement of facts; and above all, that time should not be wasted in composing elaborate explanations called for in the futile hope of saving money after it has been spent. Further, this clerical assistance to the technical staff should be rendered ungrudgingly, not viewed in the light of a favour bestowed or something done to keep an uncommercial class of men "straight" in their accounts, but as a very essential part of the office work; more, in fact, as being necessary to the office than to the engineer. At the same time, though engineers, foremen, etc., should be relieved of all needless pen and ink work, they cannot be absolved from keeping a strict and watchful account of their work, and it is on this interlapping of duties that the foundation of the district's commercial success largely rests. It would be superfluous to dwell upon how much depends on the accuracy of this diary of events. I need only refer to the fact that it is on these reports, showing as they do what time has been spent on construction work and what on maintenance, etc., that the Company's balance sheet is founded, and a guess can be formed as to the extent to which the office has to depend upon the technical departments for its raw material.

In all its dealings with the other departments, the keynote of the office should be "facts"—plain, unalterable and in their proper sequence. Accuracy in electrical or mechanical work is, of course, a *sine qua non*, and it should not, therefore, be a difficult matter to make clear to a technical staff that this same virtue dominates the keeping of their accounts; and yet there is, without doubt, in some quarters a vague notion—I myself have come across it—that accounts afford legitimate scope for the juggler; that, by the exercise of some skilful legerdemain, an accountant or a good clerk can so twist up figures and facts as to make them, not merely appear, but actually become what they are not. Whether this idea arises from an erroneous impression that accounts and statistics are the same thing, I do not know, but whatever be the source, it is a pernicious notion, and tends to provoke distrust and contempt of bookkeeping and all connected therewith. To show that I am not writing without book I will cite a concrete case exemplifying "how not to do it." In order to cloak undue expenditure in a particular month certain material issued and used has been allowed to remain in the books as though still in stock until the following month. The acquiescence of the clerical staff in such looseness spells discredit to its prestige.

Statistics and curves make interesting study, but there is an elasticity about them often inconsistent with hard facts and hard cash, and I should certainly advise all clerks to be wary in the use of them. Spread over long periods they show the trend of the "has been" and, affording averages, are able to foreshadow, for what it is worth, what the future will produce if the economic conditions remain the same. Unfortunately, economic conditions are as shifting as the winds, and for real business purposes the far-seeing trained commercial mind is worth, as a guide, any amount of the tabled cobwebs of ten years or so. What concerns the guardian of money and its interests most is the day-to-day experience.

At what stage may a clerk be said to have acquired a distinct and recognisable value? This is not an easy question, but I should put it, at the moment when you would have to replace him by another man at the same rate of pay but without his experience. This may not at first appear to be a very high standard, but to be understood it must be remembered that a clerk's work ordinarily is of a routine character (not that this makes it easy), and that, therefore, the necessary qualifications are accuracy and speed. One occasionally hears this class of work spoken of disparagingly as "machine-like"; and nothing can be more unfair and misleading; the simile would be accurate only in the case of a machine which turned out, say, a thousand articles a day, each one of a different pattern; an obvious impossibility. The present is an age of "experts"—usually a self-conferred title, and not infrequently appropriated by those whose merits have missed recognition at the hands of the established degree and honour-conferring institutions—

but one has not yet come across the claim of an expert in Monotony. And yet I can imagine nothing more difficult than to continue day after day at the same class of work requiring the closest concentration of thought, without frequent lapses into error, any one of which may lead to much confusion at the day of reckoning. The work in our district offices abounds in such opportunities, and I have to confess that during my period of audit work I felt thankful every time I looked at a stores' ledger that it had never fallen to my lot to keep one.

Now, the mere repetition of the same class of work will not of itself produce habits of concentration and accuracy, while, on the other hand, it may be the means of dwarfing any small modicum of those qualifications which a clerk originally possessed; and this means that he will either maintain a dead level of efficiency, or inefficiency, or will actually recede from his high-water mark. To some, the power of fixing the attention on any subject however dreary and monotonous, comes easily and naturally, even though they have no special predilection for it; but to others it means a severe mental effort, and this, I believe, can only be remedied by the cultivation of the studious habit; of continually training the mind, by which, in course of time, instinctively, the exclusion of all subjects outside the matter in hand becomes part and parcel of the work itself. This is not such a small matter as it may at first appear, and when the enormous amount of time spent in balancing the Company's books monthly or quarterly all over the country is taken into account, much of which would be saved if every figure had been put exactly in the right place, it becomes worth, I think, a little attention; and when it is considered that it should be as easy to enter a correct figure as a wrong one, or to put it in the right as in the wrong place, it is melancholy to know that every month brings forth its crop of lapses, not through errors of judgment or want of knowledge, but from sheer wandering attention.

The leaven of a sound general education is especially serviceable to clerks in a business like ours, where the work is so varied and where the clerk gains promotion by grading in the different departments; for there is no doubt whatever that the more accustomed he is to practice his mind the quicker does he grasp new ideas. The influence of education is more powerful and far-reaching than is usually imagined and shows itself in many ways—*e.g.*, in the placing of facts clearly; in the plain question and answer instead of written demands for useless reports, such as I have sometimes seen, not couched in the happiest language; in the ability to apprehend difficult points; in well-expressed correspondence with the public and in being able to meet the public with self-confidence and on equal terms, and in many other ways where knowledge and judgment have to play a part. And it is not as though judgment is needed or even expected, only in the heads of departments; the typist who slavishly transmutes her shorthand notes into type without regard to their sense has not got beyond the use of her tools, and in proportion to her acquired practice of reasoning stands the value of her services; the stores' clerk who does not know the use of the articles of which he keeps account and, in consequence, does not know whether a particular article should or should not be used on a particular job is not in a position to detect error and, further, will find himself landed in difficulties at stocktaking; the rentals and fees' clerk who uses no discretion in applying the screw to pecuniary laggards may do considerable harm to the Company's interests; and so on through every department. It is the extent to which the reasoning powers are brought into play that marks the degree of proficiency, but it is a mistake to suppose that habits of enquiry and accuracy and of detecting inaccuracies in the work of others—which is a very important part of the clerk's work—come naturally and without training; in most cases, at all events, they have to be acquired. Of course, no doubt, a clerk by long and possibly painful experience will practice a certain amount of care to prevent annoyance and trouble, but this is quite a different thing from the man or youth who by a continuous study of new subjects learns perforce to keep his mind constantly on the alert, clear, and applied to the immediate subject; saving time and avoiding unpleasant experiences.

There has been some correspondence and an article in previous issues of the JOURNAL bearing on the facilities afforded for promotion in the clerical ranks and also on the difficulties that are met with on the way; and, in connection with this subject, some use

has been made of two terms; one "team work," which in the office work of a large district is an impossibility, and the other "watertight compartments," which is something of an exaggeration. Team work can only be practised when the whole work is of the same description, as in the case of operating an exchange. The value of a clerk to the Company lies in the speed and accuracy with which he accomplishes his special duties, and to suddenly transfer, say, a cash book clerk, in time of stress to assist the stores department would be about as hopeful as putting a bricklayer behind a plough and expecting a straight furrow. A constant interchange of duties in a large office means disorganisation and would involve an enlarged staff and additional floor space. I know of instances at Head Office where clerks have become so expert at their particular work that it would need the employment of three men, at all events temporarily, to replace them and fulfil the same output in the same time; and similar conditions no doubt obtain in some of our district offices. At the same time the departments, although self-contained, are not so watertight but that a connecting link is to be found between them in the works order: and there is nothing standing in the way of any intelligent clerk learning the whole business of the office through its means if he is so minded, and provided the chief clerk is a man of broad and sensible views.

In this matter of widening the official knowledge I refer to the influence of the chief clerk advisedly; and here I write from my three years' audit experience. On one or two occasions I came across in district offices a form of red tapeism which I have never been able to understand, and which may be summarised as the doctrine of prohibition and exclusion; that is to say, no man was to look over another man's shoulder; for anything he was supposed to know to the contrary, each clerk might imagine that in his particular crumb of work he had the whole loaf; while the chief clerk kept as much as possible in his own hands, only imparting such information from time to time as in his inscrutable wisdom he deemed expedient; and, in one instance, the book of service instructions was actually kept under lock and key in order that the office staff should only learn what their chief considered good for them, and that in dribbles. The effect of such a system is, of course, to cramp and benumb the energies of, what I can only call, its victims, and, in my opinion, it cannot be too strongly condemned. Sitting on the safety valve may be a pleasant occupation while it lasts, but it usually ends badly for the sitter. I should mention that I am writing of twelve years ago, and it is most probable that the system is now extinct, but there is no harm, I think, in drawing attention to it.

In all banks possessing branches, each with its manager, a clerk before rising to the position of manager must have "passed the counter"; that is to say, he must have satisfactorily dealt for a certain period with the actual handling of cash; and cases are not unknown of men who have not only failed in this test—not necessarily from deliberate irregularities but from incompetency or carelessness—but who have not possessed sufficient moral courage to attempt to pass through the ordeal. No such absolute stipulation has ever been made in connection with the promotion of the clerical staff of this Company, nor, of course, are there similar conditions to make such a rule necessary, but there would be less difficulty in finding good cost clerks and good chief clerks if at the start every junior were allowed to run through the entire gamut of the clerical departments to get a grip of the whole work before settling down to special duties. Our bookkeeping of necessity teems with complexities, and returns and forms, though kept down to the lowest pitch consistent with our needs, are so numerous that unless a chief or cost clerk has been intimately acquainted with the details of each at some time or other, he will never know where to look for weak points or how to help the staff in time of trouble.

It has been my intention throughout this contribution to the JOURNAL to refrain from any attempt to advise or comment on details of office work or on the advantage of any one method—of filing, for example—over another, but I should like to say a word about cards *versus* books; there being in some quarters a considerable enthusiasm for the former method of records. My view, for what it is worth, is first, that the system is so attractive that it may be easily overdone; second, that for such work as indices which are continually changing, for keeping record of things and names where no money is involved, it is invaluable; and third, that for

ledger and accounts work generally it is dangerous in the extreme. Here it seems to me the paged book is indispensable if trouble is to be avoided. There is an elusiveness about money which belongs to nothing else; every clerk knows the difficulty of balancing any book he has ever set his hand to, when for any reason he can give it should be the easiest thing in the world; and if this is true of a book where an entry once made is fixed for ever and where there can be no eliminations, how much more true will it be of cards liable to be lost or mislaid, wilfully or otherwise? Also, though perhaps a minor matter, there is a scrappiness about cards inducing a disregard for that methodical care and neatness which characterised the competent clerk of twenty years ago, and the decadence of which one cannot help viewing with a feeling of regret.

If it be a fact, and I believe it is, that the clerical work of the Company is of an unusually intricate character, liable to frequent alterations in point of detail owing to the very nature of the business, it follows that there must be an exceptionally able staff to cope with it. In the first part of my article, which appeared in the January issue of the JOURNAL, I claimed that the basis of a clerk's success is a sound general education; but I wish to make clear before dropping the subject that in no way did I intend to belittle the scientific and technical aids to commercial work; for the one is useless without the other.

In his *Economics of Industry* Professor MARSHALL makes this remark, "It is true that there is so much variety in economic problems, economic causes are intermingled with others in so many different ways, that exact scientific reasoning will seldom bring us very far on the way to the conclusion for which we are seeking. But it would be foolish to refuse to avail ourselves of its aid, so far as it will reach; just as foolish as would be the opposite extreme of supposing that science alone can do all the work, and that nothing will remain to be done by practical instinct and trained common sense." Applied to the commercial work of the Company, which is in itself an economic study, this remark briefly sums up what I have been trying to say.

"UNLIMITED."

(WHAT IS TRUTH?)

Truth from her ancient well pops up once more,
Not to proclaim new truths—absurd suggestion!
But, startled by a rumour, to explore
The telephonic measured-service question.

"What! change the dear old seventeen-pound rate
With boundless right of speech so highly treasured
(We never knew until quite recent date
How much we loved it)—for a tariff measured!"

"Have they the 'power' to do this?" (That "they"
Denotes the *National* can't be mistaken),

"If so, the only thing I have to say
Is that such powers should away be taken."

O mighty British merchants, clothed with "power"
To charge *pro rata* for the goods you barter,
Imagine, if you can, the rueful hour
When *Truth* suggests to abrogate your charter!

Seventeen pounds, thinks *Truth*, that princely sum,
Should cover service, *absolutely any*,
Whatever traffic o'er the wires may come—
A million calls a year were not too many.

Smith for two shillings buys a pound of tea
(Or one-and-nine, to view the matter closer).
But ought a payment of two pounds or three
To carry boundless credit with the grocer?

And Jackson for an annual fourteen pounds
May range at large from Waterloo to Feltham
But ought that "season's" scope to have no bounds
And take him free to Croydon, Grays and Eltham?

Of course it ought; for any charge increased
Would rank as an attempt to get more money
Out of the public—so thinks *Truth* at least,
Which would not dream of stooping to be funny.—W. H. G.

FROM FIREPOT-BOY TO FOREMAN.

By H. J. GINN, *Chief Foreman, Newport.*

IN selecting a lad to take the position of firepot-boy it should be seen that he is smart and fairly well educated and not under sixteen years of age. He should first go and assist the store-keeper for a few weeks to get a thorough knowledge of all materials used in connection with outside work, and on entering the Company's service he should be encouraged to attend some technical classes so as to obtain some electrical knowledge.

After his training in the stores he is suitable to go out with the gang. He should then be taught how to light the fire in the firepot for heating the soldering iron; care should be taken by his foreman to teach him to what heat to keep the iron, also how to clean and tin the copper; this latter point is most essential, as a dirty iron sent up to a wireman causes a great waste of time and the soldering cannot be properly done unless the solder flows freely, which it will not do with a badly tinned iron. It should also be instilled into the budding lineman that it is his duty to look after the tools and to pick up all pieces of scrap wire that are dropped. He should also be shown by his foreman how to make joints in bronze wire, and to what length the binders should be cut so as to avoid waste. After he has gained a knowledge of how to let off wire and of the various things that can be done on the ground, he should be encouraged to ascend the pole and be shown the method of binding-in and making-off wires on the insulators. None but first-class men who thoroughly understand the work themselves should be allowed to teach the beginner, otherwise he will not get the correct method and will never make a good wireman. After he has had a thorough training at running wire, making-off and binding-in, and making-off and fixing stays and arming poles, and is able to answer satisfactorily questions on the points named below, he will be competent to take the position of ordinary wireman:

- (1) Binding-in and making-off line wires on insulators.
- (2) Twisting of wires.
- (3) Making and soldering twisted and Britannia joints.
- (4) What wire to use (and how it should be fixed) for earth wires on poles.
- (5) The difference between single and metallic circuits.
- (6) The proper position of pole steps and method of fixing.
- (7) Proper position to fix arms on poles, distance apart, etc., and on which arms to fix combiners.
- (8) Direction in which pole holes should be dug.
- (9) Proper method for making-off and fixing stays.

As an ordinary wireman his duties will be to assist in fitting, strutting and staying ground poles; running out and making-off steel suspenders and running out aerial cables; running and stapling leads and earth wires at subscribers' premises, and occasionally clearing a fault on a line. After he has had a thorough training in the above and is able to answer satisfactorily some further questions he will be competent to take the position of second or first-class wireman. The second test of knowledge acquired should be on these points:

- (1) Fitting, erecting, strutting and staying poles.
- (2) The minimum permissible height of wires crossing a town street and a country road.
- (3) What stay-rods and wire to be used under various conditions.
- (4) What guides one in selecting most suitable places for poles.
- (5) How to run rotating wires.
- (6) How to run and make-off steel suspending wire.
- (7) The proper method to run out aerial cable.
- (8) How to test and number cable leads.
- (9) How to make and maintain diagrams of poles.
- (10) How to test lines with battery and galvanometer.
- (11) How to staple leads and earth wires at subscribers' premises.
- (12) How to make-off ends and distribute leads over pole.

In addition to the above a first-class wireman must thoroughly understand how to handle heavy poles with safety, and the proper position in which to fix derricks for their erection. He must also

have a fair knowledge of the breaking weight of certain ropes, so as to avoid accidents, and he should be able to take temporary charge of the gang if the foreman is away at any time.

A man with the above qualifications is competent to take the position of foreman when a vacancy occurs, but in this position he must have certain natural qualities of firmness and ability to control men, and he must know exactly how to place his men to get the maximum amount of work done by the gang, also he must have the clerical knowledge to make up his reports properly. He must see that all work done by his gang is neat and tidy and in accordance with the Company's instructions, and that the men arrive on the job and leave at the proper time, and that no time is wasted.

"TRANSMISSION" VIEWED THIRTY YEARS AGO.

THE *Zeitschrift für Post und Telegraphie* quotes from a technical journal of the year 1877 the views of Dr. GIRSCHNER, of Kolberg, on the future of the telephone. His gloomy forecast is interesting, having regard to the development to which the transmission of telephonic speech has attained.

"In the following remarks I presuppose acquaintance with this instrument and knowledge of its effects. I will only briefly remind you that the diaphragm of the transmitter when set vibrating by a sound, calls forth at each approach to the magnet a movement of the magnetism, and thereby sets up galvanic currents in the copper wire wound round it. These, again, as the wire surrounds the magnet of the receiver in just the same way, cause in the latter alternative weakening and strengthening of the magnetism, by which the diaphragm is subject to the same vibrations as that of the transmitter. Up to this point all is clear; now comes the circumstance I allude to, to which, as far as I know, no one has hitherto called attention. It seems to me to be such as to constitute an absolute bar to telephoning over long distances, even if it should become possible to maintain galvanic currents strong enough.

"Let us take the receiver. The galvanic current approaches, the magnet is strengthened and draws the diaphragm to it. But just as at the transmitter, this strengthened magnetism at the receiver will send back a current to the transmitter and cause vibrations, which will at once be reflected at the receiver, etc. In other words, the current induced at the transmitter by vibration of the diaphragm will run through its circuit several times. Certainly so long as the distance between the stations is so short that the velocity of the galvanic current to and fro is almost instantaneous, effect and counter-effect fall together. But it will be very different with greater distances over which the current takes an appreciable time. In this case new secondary currents will always arise, generally through the returning current, between the proper vibrations of the diaphragm, and cause the greatest disturbances; in fact, spoken words will be incomprehensible. An example will make the case clearer. If according to the French physicist FIZEAU, the velocity of the galvanic current in a copper wire is 16,000 geographical miles a second, it will be for one mile $\frac{1}{16000}$ second, or for 160 miles $\frac{1}{100}$ second.

"If we take a sound which makes 300 vibrations a second (a little deeper than the "A" of a common tuning-fork) and sing in a telephone which is 80 miles distant from the receiver, the current there and back will require $\frac{1}{100}$ second. During this time the diaphragm of the transmitter has completed three vibrations, requiring a $\frac{3}{100}$ part of a second; so that in this case no disturbance would ensue. But for the actual "A" of a tuning-fork (335 vibrations) such agreement would not arise, and disturbance would follow. By this example it is easy to calculate that a sound with 300 vibrations would be so disturbed in a distance of about fourteen miles that the first secondary vibration would come about midway between the first and second primary vibration and convert it to a totally different sound.

"It will thus be seen that for a defined sound there are certain distances which would avoid the disturbance, but at a given greater distance such sounds would be few; all others would be disturbed by the secondary waves arising. Much more is this the case with spoken words, with which the vibrations of the diaphragm are extremely complicated."

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[No. 15.]

LET THE TELEPHONE FLOURISH.

THE present rapid increase in the use of the telephone service for purposes for which but a few years ago many people still used telegrams and letters is a point to which we have several times referred. Official confirmation is forthcoming in the recent speech of the POSTMASTER-GENERAL on the Post Office vote in the House of Commons. MR. BUXTON, in describing the causes of the relative falling off in postal revenue, said that the picture-postcard craze was abating and that the Street Betting Act had had a restraining effect on telegraph traffic. "The chief reason, however, for the falling off in elasticity (of the postal revenue) was the very large increase in the use of the telephone by the public. This was cutting into the only profitable part of the telegraph service, the short-distance telegrams in large towns. Conversation by telephone was largely superseding the use of letters and postcards. That was a serious matter as affecting what was the sheet anchor of postal revenue—namely, the penny post."

The symptoms which MR. BUXTON describes are doubtless quite correct, and they are quite as they should be. It is inevitable that a continually growing section of the public shall discover the great superiority of telephonic communication over communication by telegram or by letter. When the telephone systems of our large cities reach the development which they are certain to reach (provided that artificial restrictions are not imposed) when practically every house, and every room of many houses, has its telephone, then hardly one person a week with a message to send from one part of the town to another will resort to the slow, expensive and limited telegram. MR. BUXTON and his successors may confidently look forward to the day when the local or short-distance telegram will be as extinct as the dodo. It stands to reason that when people can speak a message (of several hundred words if need be) in a few minutes and get the reply on the spot, at a cost of a

penny or two, they will not spend sixpence on a written message of a few words which takes ten or twenty times as long to get to its destination. The telephone message has the triple advantage of being much more capacious, vastly quicker and much cheaper than the telegram; so that the telephone message must inevitably in time almost completely supplant the local telegram. It is simply a question of rate of development of the local telephone systems as to whether the local telegram disappears quickly or slowly.

The same thing applies with almost equal force to a large proportion of local letters. Letters containing enclosures, long private letters, letters on matters which it is essential should be recorded, letters to people who are not on the telephone service will continue to go by post. But as many people are gradually realising that a telephone message is not only vastly quicker and more efficient than a letter and reply, but also actually cheaper than the average business letter, there is occurring a steady transfer of messages from the letter post to the telephone service. As the public improves its telephonic methods and manners, as the large establishments, business houses, hotels and retail stores adopt private branch equipment, and as both principals and employees learn to use the telephone more efficiently, this transfer of business from the post to the telephone will increase in volume—to the great advantage of the efficiency of the whole community, since rapid communication undoubtedly makes for general efficiency. A great deal of telephone traffic is now blocked and delayed because large users of the service do not provide themselves with telephone facilities adequate to accommodate their traffic, and because the great majority of business people do not train their employees to use the telephone service smartly and intelligently. These difficulties are gradually being corrected, and an era of great telephone development is approaching.

TELEPHONIC TRANSMISSION MEASUREMENTS.

TELEPHONE papers before the Institution of Electrical Engineers are very rare, not averaging one a session. This arises from a variety of causes, perhaps the principal being that most telephone men who know their work sufficiently well to prepare an original paper are too much occupied in carrying on that work to spare the time necessary for the preparation of a paper which will stand fire. That when a telephone paper is presented before the Institution it invariably gives rise to a highly interesting discussion, should encourage the telephone members of the Institution to come forward more frequently, both for the sake of the art with which they are associated, and for the sake of the electrical engineering profession in general. The hearty reception accorded to the paper on "Telephonic Transmission Measurements" by Messrs. B. S. COHEN and G. M. SHEPHERD, the fact that the paper and the ensuing debate filled, on two evenings at the end of the session, the Society of Arts Theatre to overflowing, and the award to Messrs. COHEN and SHEPHERD of a premium by the Council of the Institution all go to prove that in electrical circles there exists a lively interest in the scientific side of telephony. It is to be hoped that every future session of the Institution will give us at least one good telephone discussion.

The subject of telephonic transmission measurements has been for some years continuously pursued in the Engineer-in-Chief's

laboratory of the National Telephone Company, and the Company has done telephone men all over the world a valuable service by publishing in the paper by Mr. COHEN (who has made the subject peculiarly his own) the report of progress made up to date. Although the subject is an extremely difficult and complex one, owing to the large number of variables existing in telephonic lines and apparatus as well as in telephonic currents, considerable progress has been made, and it is well known that the standards of transmission set out in the Specification attached to the Telephone Agreement of 1905 were determined as a result of the transmission measurements made in the laboratory of the National Telephone Company. It is only very recently that such measurements have been possible, as, until the invention of the oscillograph of Mr. DUDELL and the barretter of Professor FESSENDEN, the means of measuring and recording the effects of telephonic currents did not exist. In the early days of telephony, telephone engineers were perforce obliged to design their systems and build their plants without the aid and guidance of quantitative measurements, and had to rely either on arbitrary qualitative standards or purely empirical formulæ. The scientific era set in at the close of the last century with the researches and inventions of HEAVISIDE, PUPIN, DUDELL, CARTY, HAYES, KENNELLY, CAMPBELL, FESSENDEN, and within a very few years, thanks to the work of those named, and to the patient investigations of COHEN and others of the National Company's engineering staff, great progress has been made in telephonic measurements and we are beginning to realise how great is the bearing of those measurements on the engineering and finance of the telephone system.

As Mr. EVERSHERD pointed out, in the discussion on Messrs. COHEN and SHEPHERD'S paper, no really scientific progress is made in any art until exact means of making measurements are available. The motto of the engineer should be measure, measure, and always measure. This is essentially true, and we have only to examine the history of any of the branches of electrical engineering to realise how vital a matter exact measurement is. In the scientific branch of our sister art of telegraphy—submarine cable construction—little real progress was made until exact methods of measurement were devised, and it is to the necessity of devising such methods in order that workable and durable submarine cables might be constructed and operated, and to the manner in which that necessity was met by the early cable engineers, that electrical engineering owes the foundation of electrical units, tests and measurements. The scientific work which was a necessity to render submarine telegraphy successful was of great aid in improving land telegraphy, which in its early years was carried on by extremely rough and ready methods. Submarine cable work has been continuously improved, by the steady pursuit of scientific investigation and invention, to such a pitch of efficiency that both for accuracy and speed the performance of the submarine cable system of the world far excels that of the overland telegraph system of any individual country. This is partly due, of course, to that superior organisation which distinguishes commercial from bureaucratic work, but it is mainly due to greater attention to scientific research.

In the discussion on Messrs. COHEN and SHEPHERD'S paper most of the speakers dwelt on the different effects of consonant and vowel sounds, and on the various methods of measurement and measuring

apparatus described in the paper. Several members thought that the authors of the paper, in coming to the conclusion that for commercial telephonic transmission volume is of greater importance than clearness of articulation, were not doing justice to the claims of articulation. On the other hand, Mr. H. LAWS WEBB, in discussing the engineering and commercial bearing of the investigations described in the paper, pointed out that speech waves are frequently much distorted in ordinary conversation, and that in the capacity of the human ear to recognise distorted and attenuated speech waves and translate them correctly to the brain a telephone administration has a valuable commercial asset; unnecessarily high standards of transmission mean unnecessarily high line costs, and the line plant represents from 60 to 70 per cent. of the capital cost of a telephone system. In this country over £13,000,000 is invested in telephone line plant. Therefore Mr. WEBB argued that the engineering and commercial bearing of transmission measurements was very great and amply justified liberal expenditure on the necessary experiments. Mr. GILL pointed out that one result of the work described in the paper and of the investigations of the other inventors referred to, had been to make us recognise the genius of OLIVER HEAVISIDE, who so long ago had prophesied and described, from purely theoretical and mathematical investigations, many of the effects which we are now proving by actual experiment and measurement. Mr. GILL also made an eloquent plea to the technical schools to give greater attention to the scientific research side of telephony.

PRIVATE BRANCH EXCHANGES IN RETAIL STORES.

IN more than one large town contracts have recently been taken with large retail establishments for private branch exchange telephone service. This is a very satisfactory sign of the times, as such contracts illustrate in the most effective manner the growing appreciation among all classes of the community of the value of the telephone service. We have left far behind us the days when the popular view of the telephone was that it was a high-class and luxurious means of communication which could be utilised only by a select group of the wealthiest business concerns of any given city. Vanished also are the days when to have a telephone in one's house marked one as an extravagant and somewhat eccentric individual, almost as rare as the owner of a balloon. To-day the business house without telephone service of some kind is confessedly out of date—though many large business houses have not yet provided themselves with the class of service they require to carry their telephone traffic efficiently—and telephone communication has taken such a place in social and domestic life that the telephone in the private house is at least as frequently seen as the motor car in the private stable. There are growing indications that the day is not far distant when we shall no longer have to look across the Atlantic for examples of thoroughly practical and up-to-date installations of telephone service. The British business man shows signs of becoming, in the phraseology of politics, a "whole hogger" in telephone service, and what the British business man once adopts he sticks to; so before many years have passed we shall probably see the public of this country as keen and wholesale users of the telephone service as the Americans have been for some time.

Among the most promising indications of the growing appreciation of the telephone service among the business public of this country is the adoption of the private branch exchange by large retail stores. By dint of persistent education a fair number of large business firms have been brought to see the advantages of properly designed private branch exchanges, and without exception they have found that the increased facilities for handling a large volume of telephone traffic so provided have made an immense improvement in the efficiency of their telephone service. As the managing director of one big firm succinctly put it: "Before we had telephones; now we have *service*." Even a fair number of hotel managers have been convinced that a private branch exchange, with a telephone in every room and with a reasonable charge per call, is correct hotel telephone practice, although the average British hotel manager is as rooted in his belief that telephone service ought to be given away as he is in the belief that "attendance" and other extras should form part of every hotel bill. But the retail store private branch exchange, with telephones on the counters and telephones in convenient cabinets for public use (at a payment per call) is a ray of light through a bank of gloom that has hitherto been impenetrable.

It is true that a few large retail establishments have telephone order departments, for the most part so badly organised and so incompetently served by casual boy clerks that if you order a bar of soap you are quite likely to get a cauliflower or a bottle of blacking, but the private branch exchange, designed, equipped and operated so that the customers of the establishment may get a smart and efficient service both to and from the establishment, is a different thing altogether. That the customers of large retail stores will avail themselves of such facilities there is little doubt, and the concerns which have the enterprise to adopt complete private branch exchange service will certainly reap a rich reward in improved trade with both old and new customers. Up to a short time ago it seemed a hopeless task to convince the managers of large retail stores of the efficacy of private branch exchange service, with a liberal allowance of telephones in the various departments and on the various counters, so as to put customer in direct touch with salesman. Now that the telephone is being so widely adopted in private houses the retail store private branch exchange is becoming a necessity to the stores, and, since a beginning has been made, we may expect before long that many stores will admit the necessity.

REVIEWS.

The Electric Theft; A Story. By Neil Wynn Williams; 311 pp., 7 $\frac{1}{2}$ by 4 $\frac{3}{4}$, cloth bound. Published by Greening & Company, Limited, London. Price 6s.—It was inevitable that applied electricity should find its way into romance. In various stories we have read and plays we have seen, the telephone plays a subsidiary and sometimes an important part. Indeed, a modern play, or a novel of West-End life is not up to date without a free allowance of telephones, bridge and motors. But the *Electric Theft* is the first long novel we have come across in which electricity is the main motive and sustains the interest, either high tension or low, throughout the story. The hero is an electrical engineer; the father of the heroine, an electrical financier; the principal villain an electrical anarchist, of Russian birth and pan-European activities, for he is chief of a highly organised band, whose main work is to rob European central stations of their electricity, and sell the stolen energy in the best market—London. The electrical engineer hero, Reginald,

is appointed to take charge of an electric light station at Athens. On his way to Greece he meets Blanche, rescues her from a truly awful railway accident situation, and of course falls in love with her. The course of true love could not be expected to run smooth in an electrical story, but in this one it runs as rough as we have ever known it. Reginald's station is being robbed of its electricity by the anarchist gang. He is prevented from discovering the robbing process because Blanche and her father, the electric financier, create a diversion by being carried off by brigands; naturally, Reginald has to rescue them, which he does, in spite of the express disapproval of the British Minister at Athens, by scaring the brigands away by the aid of a wonderful electric megaphone—the great invention of Reginald. Reginald tracks down the brigands, thunders at them with the megaphone and the band disperses in quite justifiable panic. Arrived back at Athens, Reginald is clapped in a Greek prison, convicted, through the machinations of the Russian anarchist, of having stolen the coal from his own central station. If we were hypercritical we might urge that this seems rather a crude way of getting rid of Reginald; but he is not got rid of for long, as he makes his way from the Greek prison to—of all places—the very ship in which the anarchist band are carrying the stolen Greek electricity to the London market! Reginald has a distinctly uncomfortable voyage home as a stowaway, but even safe back in London his trials are by no means over. Blanche's father, after the coal episode, has gone back on Reginald, and forbids him the electrical financial palace in Park Lane. The Russian anarchist is still going strong; he discovers, through the falling-in of the building where are stored the accumulators charged with electricity stolen from all over Europe, a wonderful *earth current*, deep down in underground London, and, by winding a submarine cable round the foundations of St. Paul's, creates a mammoth buzzer or interferer which paralyzes all the electrical industries of the world's capital. This not only knocks out Reginald's electric megaphone, which had just begun to startle the East End, but sends the electrical shares in which the millions of Blanche's father are invested tumbling down to waste-paper value. Things look black indeed for a time, but in the course of a few intensely thrilling chapters the anarchist is defeated, London's electrical balance is restored, Blanche's father's bank balance likewise, Reginald's electric megaphone finds its thunderous voice again and Reginald presses passionate kisses on Blanche's responsive lips—papa now approving, having been reduced to quite a humble frame of mind by the violent oscillations of his numerous electric shares.

In this breathless story there is an electrical sensation in every chapter, a galvanic thrill on every page. Electrical men will find their favourite subject woven in with the threads of romance in the deftest manner. There is much which we would like to quote, but space forbids. A short extract, revealing the method by which the continual thefts of electricity, the main plank of the story so to speak, were executed, will serve to show both the thrilling style in which this romance is written, and the scrupulous regard for technical accuracy and detail. The scene is the central station on the outskirts of Athens; the band have their mules and empty accumulators outside, and confederates within:—

"'Lay hold here,' Stavinski said, motioning the muleteer to the hole in the roof, and guiding his hands to a wooden bar, 'Now, together—lift!'

"In a trice a cunningly constructed trap-door was raised and turned with its cover of tiles silently back upon the roof. The rope ladder was lowered through the orifice, and its upper end made fast. Stavinski began to descend, passing through a black network of iron girders, then by a wheel with a tire flashing in its revolutions like silver, afterwards by the swiftly travelling bands of the leather belt, swaying giddily among the glare lower and lower till he reached the floor.

"The robbery which now took place was executed very methodically under Stavinski's direction. There were nineteen dynamos in the hall. Numbers 1 to 18 were running, but 19 had been swung out that afternoon, and was not in use. The accumulators, with which the nine mules had been laden, were presently raised by means of ropes from the

wood to the roof, to be re-lowered through the trap-door. Work was begun upon Number 1 dynamo, and its current tapped and turned into the first accumulator sent down. The theft effected, the men moved to Number 2, and the first accumulator being returned full, another empty one was lowered. The advantage of the method was evident. In the case of an alarm, there was never more than one accumulator to be despatched swiftly out of sight.

"The thieves worked from Numbers 1 to 10 without interruption. They were about to begin with Number 11 when Niko gave warning that someone was approaching the building. An accumulator had not yet come down for Number 11. Stavinski hurriedly mounted the rope ladder. It was drawn up after him, and the trap-door closed.

"Ten minutes passed before the alarm was proved groundless. The theft was then continued. Thirteen, fourteen, fifteen, sixteen and seventeen were all successfully tapped. Eighteen lay by itself in an angle of the hall close to where nineteen should have been running, but was not. The position necessitated a carriage of the heavy accumulator along a narrow gangway. Stavinski moved forward to superintend the operation, stationing himself at first by the iron railing immediately beneath which Dhokos was standing in the green shroud of the tarpaulin. Presently the men were close upon him, carrying the weight of the oblong accumulator awkwardly between them, and Stavinski shifted farther away to the side of the dynamo that they were about to tap. The wall now confined him so that he could not clearly see their manipulation of the machine's terminals, and he began to clamber across the machine to work round to their other side. It was a feat that should not have been dangerous with a careful placing of the hands and feet, and Stavinski's head had risen about the highest curve of the machine, when suddenly he seemed to slip, giving a piercing cry. In a moment a terrific convulsion seized upon his body as it came into contact with the electric current.

The accident had scarcely happened when one of the two men busy with the accumulator stopped the dynamo; and Stavinski rolling over, legs and arms intermingled, fell heavily from the machine upon the iron grating. He lay like a dead man."

Stavinski, however, recovered. For what else he did the reader is referred to the book.

We don't much like such phrases as "the machine's terminals," a slip which occurs pretty often, but not EDISON himself would quarrel with the electricians of this remarkable story.

Telephone Principles and Practice. By George Walker Wilder, Ph.D., Assistant Professor of Electrical Engineering, Armour Institute of Technology, Chicago; 445 and vii pp., 7 $\frac{3}{4}$ by 5, with 373 drawings and diagrams. Published by the Cantwell Printing Company, Madison, Wisconsin, U.S.A. Third Edition, 1904. (Sold in England by Rentell & Company, Limited, Maiden Lane, London, W.C.) Price 8s. 6d.

—The title of this book causes something of a disappointment; it leads one to expect an original treatment of the subject of telephony, with useful dissertations on the principles and practice of the telephonic art. The book does not satisfy such expectations, as it is in the main a re-writing of the familiar telephone book, which begins with elementary electricity and magnetism and runs a well-trodden course through telephonic apparatus of all sorts, fetching up with the Wheatstone bridge and the loop test for the "location of a ground." The author makes a rather ponderous apology in his preface, as follows:—

"The stupendous growth of telephone business during the last decade has resulted in a remarkable development in the application of scientific principles to the design, manufacture and installation of telephone apparatus and exchange systems. The mechanical difficulties necessarily incidental to the successful operation of this branch of electrical engineering have gradually been overcome, so that now, in agreeable contrast to the chaotic conditions which formerly prevailed,

certain lines of development are now capable of being standardised, and thus enabled to assume definite forms more in accord with the progress of the times.

"Connected with this development and rapid growth, which have been due to better engineering and to experience, a demand has arisen on the part of those who are about to engage in, or are already interested in, the telephone business for greater knowledge of the principles of telephony and their application to the problems encountered in practice. The old prejudice, widely entertained, that telephony presented problems too complicated for the comprehension of the ordinary layman has long since been dispelled, and the present time sees millions of capital invested in a business the success of which depends upon men who, like others who have become successful in life, have obtained their special knowledge through observation, experimentation, and the application of good, common sense to their work.

"Fortunately, the comprehension of ordinary telephone apparatus, and the management of small exchanges, require no special education; energy and intelligence are the chief requisites for the would-be learner. The complete subject of telephony, however, is broad, and the acquirement of a thorough knowledge of all the details would necessitate a good technical training, supplemented by years of practical experience. It is needless to state, therefore, that so extensive a subject cannot be treated in a single volume, since several might be written upon any of its numerous phases."

Happily, this style is not maintained throughout the book, which, in the main, is clearly written and well arranged—illustrated, too, with the clear and well-executed diagrams which are such a grateful feature of American technical literature. In this case excellent paper and printing do full justice to the illustrations.

The book is divided into four sections:—Fundamental Ideas, Telephone Apparatus, Systems of Communication, Construction and Equipment. The first section embraces "those principles of physics and electricity essential to understanding the construction and operation of telephone circuits." The second relates to the details of subscribers' instruments. The third section treats of party lines and the management of small magneto exchanges. The fourth section deals with the construction of small exchanges, party and toll lines, their electrical properties and their protection against lightning. This explanation of the scope of the book, which is the author's own, and the extracts quoted above show that the work is addressed to those telephone men who find themselves, without much previous telephone training or experience, in charge of the construction and working of small "Independent" exchanges, of which we believe there are a great many now working in rural America. The author deals very clearly with "fundamental ideas" and with telephone apparatus; on construction and equipment he is not quite so happy, and with the actual management of exchanges he deals hardly at all. We get some insight into the standards of construction which obtain in American "Independent" telephone circles from the following extract from the section on construction and equipment:—

"Galvanised iron wire is more extensively used than any other wire for telephone purposes. It has the advantage of greater tensile strength than copper and is also cheaper, the latter being the principal factor which determines its use. Although it offers about seven times the resistance that copper does, it is found that in exchange work on short lines the service is just as good as when copper is used. Only in long toll and party lines does the service become considerably impaired, owing to the high resistance of the iron; it is evident that copper should always be used for these lines. Since iron corrodes very easily when exposed to the weather it is necessary that telephone wires of this metal should be well galvanised, and even then the life of the wires is short compared to copper or aluminium."

The book is carefully compiled, and contains a quantity of useful information on American country exchange practice. A welcome instance of care in compilation is the illustration of the early Bell iron box receiver, which has been re-drawn with the

diaphragm straight; in nearly every other telephone book the wood-cut of 30 years ago, erroneously showing the diaphragm bent upward, is slavishly copied.

Telephone Principles and Practice, although it hardly touches "telephone principles" in the proper sense of the term and dwells little on "telephone practice" in the proper sense of that term, will be a useful though not essential addition to the British telephone man's library. The title of this book impels us to record the impression that there is a distinct field for a telephone book which would take it for granted that there are hundreds of books which describe elementary electricity and magnetism, scores which describe the solid back transmitter, the spring-jack, the magneto, the wooden pole and the dry-core cable, and, taking all those things and many others as readily obtainable, would confine itself to the principles and practice of telephony as an industry, or as an art, whichever way you choose to regard it.

"IRON UP, BILL!"

By E. HARPER, *Local Manager, Bournemouth.*

How often does the man up the pole, when he is voicing his requirements to Bill, the firepot-boy down below, or to his mate Jack on the next pole, remember there may be people in the near neighbourhood with rather sensitive nerves, to whom his loud-voiced demands may be very objectionable? Not so often, I am afraid, as he should.

This note has been called forth by a recent wayleave difficulty, which largely arose owing to a gang working near the house of a gentleman who took strong exception to the choice vocabulary sometimes used by our wiremen in the execution of their duties.

I venture to address these remarks, therefore, to all foremen in charge of gangs, and to their men.

The motto of a gang when at work should be "silence," and it is almost as imperative that this should be observed when working up poles as when working in the switchroom.

The Company's business is so largely dependent upon private wayleaves that no pains should be spared to give the grantors as little trouble as possible. It is of even greater importance to retain a wayleave already enjoyed than to obtain a new one, because the withdrawal of even one permit may necessitate a large route removal, which is so much dead loss.

The case above-mentioned is typical. The main route from one of our small exchanges runs past the house of a gentleman who disliked, on æsthetic grounds, the appearance of the line in front of his house. He did not control the wayleave, however, at this point. Being near the exchange, it was necessary frequently to run additional circuits over these poles, and on a few occasions the foreman did not observe my motto of "silence."

"Iron up, Bill," "Pull up, Jack," sometimes interspersed by a few adjectives, frequently floated through the morning air and through open bedroom windows.

Instead of making a complaint, however, the gentleman referred to made copious notes in a diary, and at the earliest opportunity gave notice to remove an important pole we had from him a little distance away. Fortunately the exercise of a good deal of tact and persuasion resulted favourably; had he insisted upon the removal the consequent alterations could not have been carried out under £30.

Another case in point was a distributing pole in the garden of a well-known author, whose study window was quite close to the head of the pole. Here, again, any shouting was most objectionable.

Especially in residential districts should the motto of "silence" be kept constantly in mind. Wayleaves in such neighbourhoods are always difficult to obtain; the duties of the wayleave officer, and wayleave charges, can be made appreciably lighter if all the staff take their share in reducing any inconvenience to the public to a minimum.

CORRESPONDENCE.

A PARTY LINE OPERATING TROUBLE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MAY I occupy a small space with reference to party lines. In our exchange at Plymouth we have both flat and message rate subscribers working on the one line, and as we have no automatic boxes on our message rate party lines, we record all calls. Consequently, when the flat rate subscriber rings up he is always put to the inconvenience of giving his own number; if he fails to do so voluntarily, the operator has to ask, "Your own number, please," which not only gives the subscriber trouble but very often detains the operator several seconds more than need be, thus causing a delay in answering other subscribers. Not only do we experience a difficulty in this way, but also from transfers of party line subscribers from one class of service to another. In the case of a flat rate direct line which has been discontinued the line, or at any rate the switch-board number, is held spare until the publication of the next Directory, but this practice, I understand, is not followed with party lines. For instance, if 6Y3 is disconnected or transferred, a new subscriber may be given the number 6Y3 in perhaps a month's time, or even less; the consequence is that at first he is continually rung up for the old subscriber, who may either be working on another number or have given up the service altogether. Of course, when we get knowledge of this trouble we take precautions against ringing the new subscriber in error; but there are times when the trouble eludes prevention, at the busy times of the day, or through a relief operator who may not know of the facts. In this way a lot of bother is caused to the calling subscriber, to the called subscriber and to the operator. I hope this is clear to all who may read it, as I think anyone interested in party lines will agree that there is room for an improvement in the method of handling party line changes and transfers.

Plymouth, April, 1907.

L. BARON, *Party Line Operator.*

A UNIVERSAL TARIFF.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

"ENTHUSIASTIC'S" letter in the April JOURNAL must have been a surprise to many members of the staff, especially to district managers and contract agents; the latter, I think, are fully cognisant of the rates for their particular district, and alive also to the numerous causes which militate against the adoption of a universal tariff.

Your editorial must have gone far to satisfy your correspondent as to the impracticability of "Universal Tariff," but in addition to the excellent explanations there given I would draw attention to the fact that rent, rates, taxes, wages, etc., are not universal in the Company's extensive field of operations, and these are important factors to be considered.

A universal tariff, when we get such varying conditions as exist in our business, is out of the question. Just as well suggest that "A" and "B" travelling by rail and journeying two and twenty miles respectively should be charged the same fare. The upkeep of the means of locomotion regulates the tariff in such cases, and the same rules apply to the telephone service. So much for "Universal Tariff."

I now come to what I consider the most important point of "Enthusiastic's" letter—namely, his reference to the Contract Department, and I am glad that he refers to the "practice prevalent in Liverpool," as I believe that if that practice were universally adopted it would go a long way to promote the prosperity of the Company at a minimum of trouble and a big saving of time to members of the staff generally. Possibly also it would best please the eventually secured subscriber. And the practice I suggest for "universal" adoption is this:

Let every member of the staff, be he engineer, electrician, wayleave officer, inspector, collector or otherwise, after meeting with a prospective subscriber, instead of running the risk of quoting a wrong rate and thereby causing worry and bother to the Contract Department, simply obtain the name and address of the possible subscriber, and in a few courteous words promise him or her that he will instruct the business representative (otherwise canvasser) to call as soon as possible. This done, it is a simple matter to convey the name and address to the contract agent, and from what I know of the "practice in Liverpool" very little time will elapse before that possible subscriber is waited upon by the canvasser working the district. Our business representative, with a full knowledge of the rates and aided by the aforesaid introduction, carries on the negotiations without fear of mistakes, and having, as is his mission, educated the prospective subscriber to the numerous advantages of the service, is ready there and then to complete the contract without any "bother or worry."

Such is the system advocated and as far as possible carried out in Liverpool, and if it were universally adopted not only should it work smoothly and add to the Company's reputation for quickly attending to the public requirements, but its practice by members of the staff would afford some proof of the prevalence of that "real enthusiasm" so much desired and so essential for the advancement of the Company's business, as well as for the promotion of those who give some evidence of the fact that they are imbued with it.

Therefore, I say, let every member of the staff follow "the practice in Liverpool."

Liverpool, April, 1907.

J. J. CURRIE.

EMPTYIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

Now that an illustrated method in dealing with above has been given a place in your last issue, a few brief remarks as to how empties are looked after in Dublin district will not, I trust, bore your readers.

All empties are returned every Tuesday, a numbered delivery note is made out for each lot, which is sent to the suppliers and returned signed by them when the empties are received. This is pasted in numerical order in the duplicate book here, another delivery note made out for the railway company, the original of which is kept by them, and the duplicate signed by the carter.

This system, I think, cannot be improved upon without an extra amount of labour, as when a demand for empties is received from Head Office it states the requisition on which the goods were supplied. A glance at the requisition summary book will then tell you when the goods were received, and you can refer to the delivery book for the date on which the empties were returned. Knowing the delivery note number you can easily find the railway company's signature, as both numbers correspond.

This method has worked admirably for the past eighteen months (which is as far as my experience goes), and during that time only two demand notes were received, both referring to Messrs. Rylands Glass & Engineering Company's empties. On one of these occasions the suppliers signed the delivery note and the Head Office demand was received on the same day, which shows how prompt this firm is in regard to the return of their empties.

If the centres in the Chester and North Wales District adopted the system referred to above, the demand notes would eventually become *null*, and the three elaborate returns illustrated in the February JOURNAL would no longer be required. On the other hand, if Mr. Tulloch's system was universally adopted, the amount of time spent in keeping these books would far exceed the value of the empties which might go astray, and would be rather an unwelcome introduction to the store's clerks in general, most of whom I venture to say are already fully occupied.

Dublin, February, 1907.

C. J. PURCELL.

SWITCHBOARD MAINTENANCE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH regard to Mr. Pulford's able article, I think he makes quite clear the importance of upkeep in detail, but if the cost per station for exchange maintenance only could be given, also the time taken by the three men in testing keys, cords, etc., each morning, it would provide useful data for those who are responsible for the maintenance of small and large switchboards.

Plymouth, May 7, 1907.

W. E. WALTON.

STORES LEDGER—TOOLS ACCOUNT.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

IT has struck me that under the present system of bookkeeping not sufficient check is kept upon the respective tools a linesman or an instrument inspector holds. To send in to the district office periodically the Tools Account Book is not of much importance, as no cash amounts are shown therein and the entries do not help one in trying to keep down a high average of tools in the district.

Each class of tools has a separate account, and in the account are tools belonging to, say, eight officials in the centre; another account has a similar record, and so on. Tools are condemned from time to time, but there is nothing in the ledger to guide one as to how long a given tool has been in use, owing to the fact that the history of that particular tool is lost in obscurity. What to my opinion should be done is this: Each officer having need for tools should have an account in the ledger under his name with a record of each tool, date received, cost, etc., entered under one account. When a man is transferred to another centre his tools are checked and his successor's name is added to the account. If the transferee, however, takes his kit of tools with him the whole can be debited *en bloc*, instead of one having to turn to about twenty or more accounts before the debit can be sent. The same remarks apply to a kit of tools received from another district. Of course my remarks apply only to tools held by individuals and not to tools common to all.

I do not see what ultimate good is to be obtained under the present system, for it is no advantage to be told there are eight chisels in the centre. What one wants to know is who holds them and if sufficient use is made of them. I trust that my suggestion may evoke others from other readers with a view of getting reform upon this matter.

Coventry, May 16, 1907.

W. H. OLIVER.

"THE NATIONAL TELEPHONE COMPANY'S EMPLOYEES' SICK AND DIVIDEND SOCIETY, BIRMINGHAM DISTRICT," is the title given to a club which was started in Birmingham on April 13. The first meeting was held on that date, under the chairmanship of Mr. Warwick Bagley, supported by Messrs. R. U. Tucker and S. Wood, to confirm a code of rules, which had been drawn up by a temporary committee elected for that purpose, and to elect officers, committee, etc.

A good muster of intending members gave encouragement to the promoters, as also did the announcement made by Mr. Tucker that Messrs. A. Coleman, A. E. Cotterill and G. Hooper had given their patronage to the society.

The following are the appointments made by the meeting:—Mr. Warwick Bagley, president; Messrs. F. C. G. Baldwin and R. U. Tucker, vice-presidents and trustees; Mr. Stephen Wood, secretary; Mr. W. Lambourne, treasurer; Messrs. Young and Langley, auditors.

The following were elected to serve on the Committee:—Messrs. A. Barker, J. Hughes, J. Lane, A. Bayliss, F. Brown, J. Newton, A. Cross, C. H. Turner, A. Morvan. A capital start was made, with over 80 members joining. A savings bank is attached to the society which has already been well patronised.

HOSPITAL SATURDAY FUND.

IT is gratifying to note that the staff of the National Telephone Company (as represented by the Head Office and Metropolitan Province) is again third on the list of those institutions making regular weekly contributions to the above fund, its total of £435 14s. 11d. for the year 1906 being only exceeded by the Royal Arsenal and the General Post Office, both with far larger staffs than that of the Company's Metropolitan area.

This is especially satisfactory at the present time, when the recently established benevolent society has made new calls upon the purses of the staff, and the cheerfulness with which both these institutions are supported bears evidence to the liveliness of their charitable instincts.

HIC ET UBIQUE.

WHEN we find anything about the telephone in a paper of the "Bits" type, we know we can always rely on some sumptuous and sustaining reading matter. *P. T. O.* has something to say on "The Telephone's Popularity." It begins: "The telephone system in Berlin is about to undergo a transformation. Until recently, magnets, switchboards and subscribers' apparatus have been in use in Germany." One imagines that nothing less than wireless telephony is coming; but no, we merely learn that "within the last three or four years common battery switchboards and central battery instruments have been introduced." After some general figures of the annual telephone increase in Germany, we are told that the telephone instruments in Kehl are manufactured by the Government in Berlin. But why are we left in suspense as to where the instruments used at Appenweier, Offenburg, Oos, Dinglingen and Kenzingen are made? Touching lightly on Chemnitz and Weimar, Spain and Japan, we are finally regaled with the early trials of Mr. GRAHAM BELL, whom, happily, we leave at the end of the article turning millions away.

WE are informed of an authentic case of a lady who hearing burglars in the house at night naturally enough bethought her of the telephone. In her panic, or possibly remembering that the telephone policy of Scotland Yard is erratic, she remembered that to call the fire brigade it is only necessary to ring the exchange and cry "Fire," without troubling about the search for a number. This she did, and with characteristic promptitude several fire engines appeared on the scene. The unhappy burglar soon found himself confronted with a perfect battery of hoses, and if he remembered his history must have thought, "After me, the deluge!"

The story seems to have its practical application, and points to the value of a brief, easily remembered signal for use in emergency. In a case of urgency much valuable time may be lost in searching for a number, and, having taken this trouble, to find that the police are not even connected must be most disheartening. It is surely not an unattainable ideal to set up that one should only need to go to the telephone and cry "Police" in order to be connected at once to the nearest police office.

SOME singular letters reach the Company's offices at times. One lady asks: "When do you propose sending compensation money to Hammersmith Police Court for abduction, cruelty, injury to health, assault and insult, loss of money, etc.?" She had lost £32 during the last two years "through your machinery having been put on me."

Another writer who desired the telephone installed baffled our linguistic experts. We can guess at the meaning of "We have told your mans not to fix the pohn privetly," but what a "Kool cisis" is we cannot imagine.

METROPOLITAN STAFF BENEVOLENT SOCIETY.

AT the monthly committee meeting held on April 3 the secretary announced the following donations had been received:—R. J. Payne, Esq. (president), £1 1s.; F. Gill, Esq., £2 2s.; W. W. Cook, Esq., £1 1s.; C. J. Phillips, Esq., £1 1s.; C. Elliott, Esq., 10s. 6d.; H. Davis, Esq., 5s. (second amount); F. M. T., 5s.

Applications for assistance from members of the undermentioned departments were received and dealt with:—(1) Maintenance Department.—It was agreed that this was not a case for the society to deal with. (2) Engineers—(a) A grant of £2 was voted to meet the immediate necessities of this case and the matter to be further considered at next meeting. (b) A grant of 15s. per week for four weeks was voted in this case. (3) Traffic.—A grant of £4 was agreed to in this case. (4) Head Office.—A further £2 was granted in this case which will be brought up again at the next meeting.

BRIGHTON BENEVOLENT SOCIETY.

THE Brighton staff have inaugurated a benevolent society which has made an admirable start with about 250 members. Mr. F. W. Taylor, the district manager, is president, the vice-presidents being Messrs. F. W. Roberts, L. Parsons, F. J. Frost, J. G. A. Ewing, H. Hatton and C. F. Moorhouse. Mr. Taylor and Messrs. Roberts and Parsons are the trustees, and the committee includes Miss Trott, Miss Cook, and Messrs. Knight, Ewing, Farrow, Dowman, A. Faithfull, Langridge and E. J. Clarke. Mr. A. Thompson is secretary, Mr. Lindfield treasurer, and Messrs. T. Williams and O. S. Flower auditors. A useful career is confidently expected.

WHAT THE COMPANY IS DOING.

SEVEN new exchanges have been opened since those shown last month. They were Sharrow (Sheffield), Ackworth (Mid Yorks), Topsham (Exeter), Parbold (S.W. Lancashire), Samares (Jersey) and Borough Green and Horsmonden (West Kent). The total number now open is 1,307; 4,053 new stations were added during April, bringing the total to 421,486.

LONDON.—*Waldorf Hotel*.—Instructions have been received for 80 additional stations in connection with the private branch exchange.

Hotel Great Central, Hotel Russell, Euston Hotel and Portland Hotel.—Orders have been placed for private branch exchanges at all these hotels.

Selfridge and Waring's Stores.—An agreement has been signed for a private branch exchange, 250 stations and twenty junctions.

LIVERPOOL.—Six additional private branch exchanges have been opened in Liverpool during the past month. The largest of these is that installed for the Mersey Docks and Harbour Board. The equipment consists of three standard pattern 200-line common battery sections, each fitted at present for 60 lines, and there is provision made for twenty junctions. The actual number of lines now being joined up is 169 external and internal extensions, and ten junctions. Power is supplied from the Central Exchange over twelve pairs of wires in the underground cable, and there is a balancing battery of chloride cells at the private branch exchange. The switchboard will be worked by three of the Company's operators during the daytime, and a male operator will be appointed to look after the night traffic. The new office of the Mersey Docks and Harbour Board is one of the largest and finest buildings in Liverpool, and the room set apart for the private branch exchange leaves nothing to be desired. The Company have also secured the contract for supplying and fixing synchronising clocks in the new building.

Mossley Hill.—The following underground work has been carried out:—3-in. pipes laid, 2,983 yards; 1-in. pipes laid, 774 yards; 3-pair cable laid, 28 yards.

In the *Cressington Park* scheme for direct distribution by means of lead-covered cable the following has been laid.—13 yards of 153-pair, 420 yards of 150-pair, 870 yards of 15-pair, 282 yards of 50-pair, 1,082 yards of 25-pair, 204½ yards of 1-pair, 42 yards of 10-pair, 50 yards of 70-pair, 197 yards of 3-pair, or 2,260½ yards in all. Direct distribution has been laid to 27 houses, but has not yet been brought into use.

Vauxhall Road.—Cable laid, 36 yards of 50-pair, 760 yards of 400-pair.

Garden City.—The contract for the laying of pipes has been let to Messrs. John Aird & Sons; 50 yards of 25-pair, 825 yards of 50-pair, 100 yards of 100-pair, 125 yards of 300-pair, 26 yards of 40-pair are to be laid.

NOTTINGHAM DISTRICT.—The Company has sanctioned an exchange being opened at Draycott, on the borders of Nottinghamshire and Derbyshire. An accumulated amount of underground work is now being vigorously taken in hand in Nottingham, several of the jobs have been in abeyance for some little time. A beginning is also being made with the Lincoln underground work.

DUNDEE.—Good progress is being made with the private branch exchange service. The largest retail drapery establishment in the town has just had installed three junctions and 21 stations, a number of table instruments being distributed over the different counters for the use of customers. Since then four other retail establishments have signed contracts for this service, totalling nine junctions, 39 stations. At Perth an order has just been signed for a private branch exchange of two junctions and twelve stations.

BRADFORD.—Seven private branch exchange agreements have been taken, with twelve junctions and 52 stations.

BEN RHYDDING.—It has been decided to fix a measuring point at this place, and to connect the subscribers to the Ilkley Exchange.

ISLE OF WIGHT.—Sanction has been given to open an exchange at Brading, and underground schemes have been put in hand for Cowes and Ventnor.

SUSSEX.—Hastings, Eastbourne and Chichester areas have been added to the jurisdiction of the Brighton contract manager, Mr. C. F. Moorhouse.

CHATHAM.—A new 300-line section of switchboard has been fitted at this exchange, and there is now a total equipment for 630 direct lines and fifteen party lines. A relay and condenser rack has also been fitted.

THAMES VALLEY.—Pipes have been laid at Maidenhead, and cables drawn in at Ascot. Estimates have been passed for an aerial cable alongside railway between Eton and Slough, for a short section of underground work at Wokingham, and for relief cables in Woodstock Road, Oxford. Estimates have been submitted for extension of underground work at Egham.

BRISTOL.—The work in connection with the establishment of exchanges at Bitton and Saltford is being rapidly pushed forward. Estimates for exchanges in this same area at Long Ashton, Flax Bourton, Nailsea and Yatton have been sanctioned, and the work will be proceeded with as soon as the wayleaves, which are now being obtained, are completed. These new exchanges will add about 70 new stations to the Bristol centre, and a very large increase of junction wire mileage, Yatton being twelve miles from the Bristol Exchange, through which connections will be made to all other subscribers in the Bristol area.

SOUTHAMPTON.—The Contract Department has been successful in securing a private branch exchange from a large shipping firm, with 23 stations, four junctions, and 17,000 calls, and special arrangements for the typists to use headgear apparatus for dealing with letters; also a private branch exchange from another shipping firm, with seventeen stations, two junctions and 8,000 calls. Table instruments are to be fitted, and the operators in each case are to be supplied by the Company. The Port of Southampton is now getting very busy with proposed transfer of the White Star Line from Liverpool.

MANCHESTER.—The White City, an amusement park on a big scale after the American principle, was opened in Manchester on May 20, and the telephone is playing an important part in it. A private branch exchange has been fitted, consisting of a 30-line board, with extensions to the various offices, and to pay stations in the grounds. Private telephones have also been fitted in connection with the "Fairy Fountain," "Miniature Railway," etc.

Another order has been signed for a private branch exchange installation on the measured rate basis of 96 stations, twelve junctions and 67,500 calls.

NEWS OF THE STAFF.

Mr. C. H. SIBLEY, District Manager at Dublin, has been appointed District Manager at Nottingham. Mr. Sibley entered the service in 1879 and was successively local manager at Sheffield and district manager at Hanley, Leicester and Dublin.

Mr. E. WILLIAMSON, District Manager at Nottingham, has been appointed District Manager at Birmingham. Mr. Williamson entered the service in 1881. He was appointed district manager at Hull in 1893 and transferred to Nottingham in 1898.

Mr. P. F. CURRALL has been transferred as District Manager from Plymouth to Dublin. He entered the telephone service in 1886 and has been, successively, chief inspector, Birmingham, 1889, local manager, Coventry, 1894, Wolverhampton, 1895, and Birmingham, 1899, and district manager, Plymouth 1902.

Mr. G. HOOPER exchanges the District Managership of Birmingham for that of Plymouth. Mr. Hooper entered the service in 1890 and was made local manager at Middlesbrough in 1892. He was successively district manager at Canterbury 1893, Cardiff 1894, Edinburgh 1900 and Birmingham 1904.

Mr. A. G. HOBBS, Canvasser, Nottingham, has been promoted to be Contract Agent at Derby.

Mr. A. J. BARKER, Canvasser, Nottingham, has been promoted to be Contract Agent at Lincoln.

Mr. J. W. DEANE, Canvasser, Hull, has been promoted to be Contract Manager, Warrington.

Mr. F. LUCAS, of the Contract Department, Durham, has been promoted to be Contract Manager, Wolverhampton.

Mr. E. J. LEANEY, Contract Agent, Southampton, has been made Contract Manager, Coventry.

Mr. F. D. GEORGE, Contract Agent, Bournemouth, has been made Contract Manager for the Hants and Dorset district, with offices at Southampton.

Mr. H. HIGGINS, Canvasser, Portsmouth, has been promoted to be Contract Manager, Bolton.

Inspector BARNSDALE, Nottingham, has been transferred to Lincoln as Inspector.

Lineman-Inspector TILLET, Lincoln, has been transferred to Nottingham as Inspector.

Miss KEARSLEY, Senior Operator, has been promoted to be Supervisor at the Manchester Central Exchange.

Miss LILY THOM and Miss GERTIE CHRISTIE, Operators in the Aberdeen Central Exchange, were, prior to their leaving for New York, presented with gifts from the Aberdeen operators. To Miss Thom was given a silver brush, comb and mirror, and to Miss Christie a silver button-hook and shoehorn. Miss Scott, chief operator, made the presentations at a highly successful social evening held in the Richmond Café.

Miss F. DURANDU, Senior Operator, has been made Monitor at Royal Exchange, Liverpool. She entered the service in February, 1896.

Mr. A. GERRARD, Instrument Inspector, Liverpool, has been transferred to Bolton.

Mr. G. DALGARNO, Post Office Fees Clerk, Liverpool, has been transferred to Birkenhead as Wages Clerk. On his transfer to Birkenhead he was presented with a Gladstone bag as a small token of esteem from his colleagues in the district office.

Mr. A. HEATH, Inspector, Leicester, has resigned from the service to take up a position in the States. He was presented with a sum of money by the Electrical staff on his departure.

Miss MARY GLASS, Senior Operator, Central Exchange, Edinburgh, has left the Company to become Operator in the exchange of the North British and Mercantile Company's Head Office in Edinburgh. The staff of the Central presented her with a dressing case and solid silver manicure set.

Miss M. DOUGLAS, one of the Senior Operators in Royal Exchange, Glasgow, left the Company's service on May 16, and is going to Canada. She was presented with a gold bangle and small book.

Miss FLORA BARRETT, one of the Senior Operators in Tron Exchange, left the service on May 2. The staff presented her with a gold neck-chain and pendant, which they asked her to accept with their best wishes.

Mr. JOHN FULLARTON, who has been a Collector for some four years, has been transferred, on promotion, to the Contract Department, Glasgow, to combine clerical work with supervision of sales.

Miss M. B. WATSON has left the Central Exchange, Newcastle, to take up position as Chief Operator at Messrs. J. Abbott's Works, Gateshead.

Mr. C. RATCLIFFE, Switchboard Inspector, Newcastle-on-Tyne, has been appointed Inspector-in-Charge at the new Jesmond Exchange.

Miss V. SAUNDERS, late of Walton-on-Thames Exchange, has been promoted Operator-in-Charge of Weybridge Exchange.

Miss E. A. ARNOLD has been promoted to the position of Chief Operator at Guildford Exchange.

Mr. H. J. LITTLE, Fault Clerk, Woolwich, Metropolitan (Southern) district, was on his resignation from the service, presented with a fountain pen, brief bag and umbrella by the members of the various staffs in the Woolwich area.

Mr. J. G. CROCKER, Belfast, who has left the Company's service for Canada, was presented with a travelling bag and purse of money from a number of the telegraph staff, Mr. Broomhead making the presentation. Mr. Crocker carries with him the good wishes of the staff for his future welfare in the country of his adoption.

Miss GERTRUDE RICHARDS, Clerk-in-Charge, Manchester, has been appointed to the position of Matron for the Manchester district.

Miss ANNIE WRIGHT, Senior Supervisor, has been appointed to the position of Clerk-in-Charge, and Miss MINNIE REILLY, Supervisor, to the position of Assistant Clerk-in-Charge.

Misses A. PARROTT, K. FROST, E. WHALLEY, M. NAPIER, M. KENNEDY and B. WRIGHT have been promoted from Supervisors to Monitors.

Misses C. APPLETON, E. SEDDON, A. RITCHIE, A. CHAPMAN, S. HARRISON, E. WILLIAMSON and M. BRIGGS have been promoted from Senior Operators to Supervisors.

Glasgow.—The results obtained by the members of the Glasgow staff who attended classes during the past winter, have now been ascertained, and they are very satisfactory. The undermentioned are worthy of special mention, the list including only the names of those members who gained over 75 per cent. of marks at the Technical College, or over 90 per cent. of classes held elsewhere.

Traffic Department:—W. McPhail, Telephony, Course 2, Honours; T. Kerr, Drawing.

Electrical Department:—Thomas Bell, Telephony, Course 1, 1st prize; Mitchell McPhee, Telephony, Course 1; George Hale, Telephony, Course 1; H. H. Bastable, Telephony, Course 1; Henry Wilson, Telephony, Course 1; Robert Hutton, Telephony, Course 1, A. H. Brown, Telephony, Course 1; Thomas Haveron, Telephony, Course 2, Honours (1st prize); Melfen Beattie, Telephony, Course 2; A. S. Colston, Telephony, Course 2; D. C. Baillies, Telephony, Course 2; Neil McKinnon, Telephony, Course 2; James Forrester, Telephony, Course 2; A. G. Sutter, Telephony, Course 2; Thomas Brown, Telephony, Course 2; T. R. Shankland, Telephony, Course 2. A. G. Sutter, Electrical Engineering, Course 1; James Dinwoodie, Electrical Engineering, Course 1; T. H. Macarthur, Electrical Engineering, Course 1; A. S. Duncan, Electrical Engineering, Course 2, (1st prize); Robert Brough, Electrical Engineering, Course 2. Ian, McLean, Magnetism and Electricity, Course 1; Donald Graham, Magnetism and Electricity, Course 2; Neil Ferguson, Instrument Making and Adjusting; Raphael Isaacs, Elementary Mathematics; Wm. Inglis, Elementary Mathematics.

Clerical Department:—Gilbert Taylor, Magnetism and Electricity (Lectures) with creditable results also in Laboratory and Mathematics; George Miller, Magnetism and Electricity (Lectures and Laboratory); Alex. McLean, Magnetism and Electricity (Lectures), creditable result also in Laboratory; John Murray, Advanced Arithmetic, 2nd place; John Murray, Advanced Mathematics, 1st prize; James Paton, Junior Mathematics; James Paton, Junior Shorthand, 1st prize; Robert Trenwith, Practical Mathematics, 1st prize; Andrew Gibb, Elementary Magnetism and Electricity; Andrew Gibb, Elementary Mathematics, 2nd place; Miss T. McGilp, Elementary Shorthand; John P. Hamilton, Advanced Arithmetic; John Hay, Intermediate Bookkeeping.

Engineering Department:—Mr. Maclean, Telephony, Course 2. A. Keid, Electrical Wiring and Fittings.

Institution of Electrical Engineers.—Mr. J. R. GALL, of the Engineer-in-Chief's Department, has been transferred to M.L.E.E.

The following have been elected Associate Members as from April 18:—H. GREEN, Manchester; J. J. WOLFE, Engineer-in-Chief's Department, and W. G. I. POPE, late of Engineer-in-Chief's Department.

London.—Traffic Department.—Promotions and transfers:—

Miss E. HARRIS, Senior Supervisor, London Wall, to be Senior Supervisor-in-Charge, Stratford.

Miss M. JAMIESON, Supervisor, Gerrard, to be Senior Supervisor, London Wall.

Miss H. SPEARING, Supervisor, Operating School, to be Supervisor, Gerrard.

Miss P. MÜCKE, Supervisor, Kensington, to be Supervisor, Holborn.

Miss A. ADDY, Supervisor, Hammersmith, to be Supervisor, Kensington.

Miss E. M. JOHNSON, Operator, Kensington, to be Supervisor, Hammersmith.

Miss J. ANDREWS, Operator, Avenue, to be Supervisor, London Wall.

Miss H. SOMERS, Supervisor, Paddington, transferred to the Metropolitan Contract Department.

Miss M. V. COWARD, Operator, Brixton, transferred to the Metropolitan Contract Department.

Metropolitan Staff Changes—

Foreman J. HARWOOD promoted to be Faultfinders' Overseer.

Foreman E. MILAM, promoted to be Walking Foreman, City.

Foreman R. JOHNSTON, promoted to be Walking Foreman, East.

MARRIAGES

Miss M. T. RAMSAY, Typists' Office, Edinburgh, has left the service to be married. She received a silver dessert frame from her friends on the staff.

Miss FRANCES SCOTT, Correspondence Clerk, Aberdeen, having resigned in view of her approaching marriage, the district office staff together with a few others presented her with a silver kettle and spirit lamp.

Miss C. M. BROWNE, of the Cardiff district office staff, who left the Company's service on March 18 to be married, was presented with a silver teapot and sugar tongs. Miss Browne, who has been in the service for the past ten years, carried with her the best wishes of all the staff for her happiness.

Mr. H. WILCOCKSON, Order Clerk, Nottingham Factory, was recently the recipient of a set of cutlery and carvers subscribed for by the factory and test-room staffs on the occasion of his approaching marriage.

Miss F. TERRY, Notts Factory, received a handsome eight-day clock from her fellow-workers on the occasion of her marriage after ten years' service.

Miss ALICE HAMER, late Senior Supervisor, Manchester, whose marriage was reported in last month's JOURNAL, was presented with a number of handsome presents by her fellow-workers on her retirement. Miss Hamer, who has faithfully served the Company during the years she has been in the service, was highly esteemed by all with whom she came in contact.

Mr. H. COOK, Inspector, Bridgeton area, was on April 22 the recipient, on the occasion of his approaching marriage, of a handsome timepiece from his colleagues of the Maintenance staff, as a token of their good wishes for his future happiness.

Miss M. B. STUART and Miss A. J. CARVERHILL, Senior Operators, Central Exchange, Newcastle-on-Tyne, have left to be married.

Miss KIRK, Correspondence Clerk, Belfast, who has been in the Company's service for twelve years, and who is leaving for China to be married, was the recipient of a very handsome and suitably engraved silver-mounted toilet set in case, as a token of the esteem in which she was held by her numerous friends in the service. Mr. Gilmour, who presided, referred to the many excellent qualities which Miss Kirk possessed, and expressed the good wishes entertained by the staff for her future welfare and happiness.

Mr. H. E. HARROP, Wages Clerk, Sheffield, was presented by the members of the staff with a timepiece on the occasion of his marriage on April 29 to Miss K. PINDER, Operator, Sheffield. The presentation was made by the chief clerk.

Miss M. RENNISON, Operator, Sheffield, has left to be married.

London Traffic Department.—The following are resigning to be married:—

Miss E. KING, Operator, North Exchange.

Miss E. DEALL, Operator, Croydon Exchange.

Miss E. GUTHRIE, Operator, Gerrard Exchange.

Miss L. CHESTERMAN, Operator, Avenue Exchange.

Miss J. ECOR, Operator, Gerrard Exchange.

Miss F. BILLINGS, Operator, Gerrard Exchange.

Miss H. CLEMENTS, Operator, London Wall.

OBITUARY.

Foreman EDWARD ALLEN, Oxford, died on Good Friday after a serious illness. He had 22 years' service with the Company in the Thames Valley district, having started as an operator in the original Reading Exchange.

Mr. GEO. WOLLOFF, Storekeeper, Leicester, died on May 15 of heart disease. He joined the service in 1898 as night operator and inspector, and was appointed storekeeper in 1900. Much sympathy is expressed with his family.

We regret to record the death of Miss BLANCHE WALLACE, an Operator at London Wall Exchange, who died on May 17 after an illness of a few days' duration.

STAFF GATHERINGS AND SPORTS.

Swansea.—The annual staff dinner was held at the Philharmonic Hotel on April 20, the chair being taken by the district manager, Mr. Waite. Upwards of 100 were assembled, among those present being several guests from Swansea including the district manager. After the dinner a most enjoyable musical programme was gone through. The toast of "The Company" was proposed by Mr. Waite, who referred to the growth of the telephone system in Cardiff and the comprehensive underground scheme which had been arranged. He also spoke of the loyal support he had always received from all sections of the staff. The remaining toasts were "Our Visitors," given by Mr. W. H. Kirk and Mr. C. Hooper, and "The Chairman," by Mr. James (Cardiff local manager), which was supported by members of the staff and enthusiastically received. The dinner was also in the nature of a wind-up to the Cardiff Telephone Society's session.

Edinburgh.—Ampere Golf Club.—Mr. J. D. W. Stewart (district manager), as first president, has presented the club with a medal for annual competition. Conditions of play and handicaps for this season were arranged at a committee meeting held on April 11. The match will be played on May 18 over Gullane Course.

Ampere Golf Club.—The final of the first foursome (hole and hole) competition was played on Saturday, April 27, when Messrs. A. G. Marshall and D. Gordon (—6) defeated Messrs R. G. Richardson and R. Blaikie (—5) by 3 up and 2 to play. The first competition for the medal presented by Mr. Stewart to the club was played on Saturday, May 18, over Gullane (new) Course. Mr. R. G. Richardson took first place with a score of 95 less 5, and as winner of the medal, which he will hold for a year, receives also a silver badge. Prizes presented by Mr. T. Cornfoot, electrician, and Mr. Robert Wilson, chief clerk, were won by Mr. W. Knox, 103—10 and Mr. A. Robson, 100—15. The best scratch score (Mr. R. Allen, 100), was rewarded with a driver.

Leeds.—The annual dinner of the Mid Yorkshire staff was held at Powolny's on April 27, the chair being taken by the district manager. After the dinner a very enjoyable smoking concert was held, songs being contributed by different members of the staff and by friends. The chairman drew attention to the different tariffs now in force, and hoped that every endeavour would be put forward to ensure a good year. Messrs. Bullough (Head Office staff) and Tattersall (Hull) were present.

Brighton.—On May 4 a match was played between the National Telephone Cricket Club and the Brighton Commercials. The match was a good one and resulted in a win for the Commercials.

A smoking concert to close the season of the football and rifle clubs in connection with the Company's staff at Brighton, took place on April 27 at Chatfield's Hotel, Brighton, when Mr. Taylor, the district manager, presided. A good programme was gone through, those contributing including Messrs. Roberts, Haseley, Langridge, Gladman, Hudson, Dyer, Moon, Faithfull, Ware and Martin, Mr. Evans kindly acting as accompanist. Mr. Anderson was presented with a fender, etc., on the occasion of his marriage, and made a suitable response. The chairman also presented a silver medal given by the captain of the rifle club, Mr. E. Brickett, for the highest average number of shots during the season to Mr. A. W. Dalton for an average of 29 out of a possible 30. Mr. Brackley came next with 28.

The Brighton National Telephone Cycle Club, now numbering some 30 members, commenced this season's runs last month. Captained by Mr. Hatton, the members sally forth every Saturday afternoon for a peaceful excursion into the surrounding country, and it is unanimously agreed that after the hard and strenuous work at the office, a more beneficial recreation is hard to find.

Guildford.—On Saturday, April 20, the return football match with the Reading district was played on the Sports Ground, Guildford, before a large assembly, Reading again proving victorious. After the match a cold collation was served at the Railway Hotel which was attended by the combined staffs. An enjoyable smoking concert followed under the chairmanship of the district manager who was supported by about 80 members of the Company's staff, including Messrs. Hives and Garner (Reading), Rhodes (Maidenhead), Greenwood (Aldershot), Best (Weybridge), Letty and Black (Guildford).

Portsmouth.—On Wednesday, May 8, the Portsmouth Telephone Society wound up their session with a *soirée* at the Masonic Hall, Landport. The vocal part of the programme was contributed to by Miss Bennett, Messrs. Gordon Bailey, Hardwick, Welch and Pharo, Mr. Albany accompanying. Dancing interspersed with vocal numbers was kept up until 2 a.m., and a very pleasant time was spent, about 80 being present.

Bristol.—A social gathering took place on May 20. Progressive whist and an excellent programme of music made a very pleasant evening's entertainment. A presentation of a tea set and tray was made to Mr. Alfred Perkins, district manager, subscribed for by the staff of the district. Mr. R. A. Dalzell, provincial superintendent made the presentation, and spoke of Mr. Perkins having completed over 26 years' service with the Company, and of his long connection with the Bristol district. Musical honours were given, and Mr. Perl in reply was received with appreciation by the staff.

The members of the Bath local centre and the Bristol district office met each other in a whist tournament at Bath on Saturday, May 11, and a very pleasant evening was spent, with the result that Bath won the tournament by sixteen points, the scores being Bath 918, Bristol 902.

Newcastle-on-Tyne.—The Newcastle Cricket Club played their first match on May 11, *versus* Newcastle Printing Court Club, and won a good and exciting game by one wicket.

LOCAL TELEPHONE SOCIETIES.

Liverpool.—The seventh and final meeting of the session was held on April 18 at the Common Hall, Mr. K. Shepherd being in the chair, supported by the district managers of Liverpool and Birkenhead. Mr. Ferguson, exchange manager, Royal Exchange, read a paper entitled "Operating Matters." He dealt principally with the results of various observation tests, and with the aid of lantern slides showed the various forms used for that purpose by observation officers and test operators. He pointed out the great value they were in assisting exchange managers to ascertain the state of exchange attention received, etc. Diagrams were also shown relating to team work and its value, with slides also relating to "speed of answer" tests (American practice). He also made some interesting remarks on evening operating (including night operating), and submitted suggestions to improve this important night work. The discussion was interesting, and chiefly confined to criticism of the lecturer's remarks on team work and night operating. The president at the conclusion moved a hearty vote of thanks to Mr. Ferguson, and briefly reviewed the session and the excellent work being done throughout the country by these societies.

Coventry.—A meeting was held at Priory Row Assembly Rooms, Coventry, on April 29. Mr. J. Mewburn, president, presided over an attendance of 25 members. The agenda consisted of papers by Miss Read on "Helps and Hindrances to Good Operating," by Mr. A. Kelly on "Faults," and by Mr. W. W. Stewart on "Party Line Working." Each paper brought forth a considerable amount of discussion.

The last meeting of the session was held on May 13 at the same place. Thirty members attended to hear papers read by Mr. W. Dickinson, local manager at Northampton, on "Wayleaves," and by Mr. R. U. Tucker, chief clerk, Birmingham, on "Organisation of Office Staff." Under the auspices of the society the second annual outing to Aston, near Kenilworth, will take place on Saturday, June 1.

Portsmouth.—The second annual general meeting was held on April 18. The chair was occupied by Mr. Stirling, district manager, and there was a good attendance. After the presentation of the treasurer's report the officers and committee for the ensuing session were elected. A long discussion took place on the proposed syllabus, which promises to be of a most interesting and instructive nature. The committee and members are looking forward to a most enjoyable session, which opens early in October.

Brighton.—On April 15 Mr. F. W. Taylor, district manager, gave an interesting lecture on "Underground Schemes." Some good diagrams were shown illustrating the *modus operandi* of estimating for underground work. The attendance was very good, and the lecture was greatly appreciated by all present.

The concluding meeting of the session was held on April 29, when Mr. B. S. Cohen, of the Engineer-in-Chief's Department, gave a lecture on "Transmission." The lecturer pointed out in a brilliant manner the value of measurements, and explained in a clear style their object in regard to telephone business. An unique collection of oscillogram slides was shown, and also some interesting diagrams, one of which was of the thermal galvanometer. There was an attendance of about 60, including several members of the staff from other centres in the district.

London.—A general meeting was held at Salisbury House on April 24, at which 65 were present, the president, Mr. C. B. Clay, being in the chair. Mr. A. R. MacFarlane read his paper entitled "Central Battery Changing." He had prepared a number of lantern slide diagrams showing the routine from a clerical point of view, also a number of photographic slides, showing the apparatus comprising the various circuits adopted in accordance with the Engineer-in-Chief's instructions.

The following members took part in the discussion: Messrs. Greening, Carter, Bigland, Cohen, Elliott, Wright, Nicholls, Hunt, Crouch, Warner, Tattersall, Harvey Lowe, and finally Mr. Laws Webb, who highly commended Mr. MacFarlane on the able manner in which he had dealt with his subject, and further suggested that a copy of the photographs as shown, describing the various standard circuits, and printed in a small book, would be of great assistance to the Contract Departments. Mr. MacFarlane then replied to his criticism. The chairman announced the next and last meeting of the session would take place on May 27. This is to be the annual meeting, when the election of officers would take place, the balance sheet be submitted, and the prize competition held.

Leicester.—The last meeting of the session was held at the Oriental Café on May 3, when the president, Mr. John Ashton, gave an instructive paper. The subject was "Hints," and these were confined to the essentials necessary for success. The lecture was much appreciated by the 88 per cent. of the members who attended. After the paper, a really first-class musical entertainment was provided, the artists, with two exceptions, being members of the society, the president and vice-presidents contributing to the programme, and the secretary acting as accompanist.

THERE is a Camden chemist who required us to move a large pole the distance of one foot, so that from his favourite resting place behind the counter he could see the people walking up and down the street.

We are hoping that he doesn't change his point of view soon, as it is expensive to move poles.—*Philadelphia Telephone News.*

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TELEPHONE MEN.

XIV.—SIR CUTHBERT QUILTER, BART.

SIR WILLIAM CUTHBERT QUILTER is the typical cultivated English country gentleman, of world-wide interests and catholic tastes, but sheet-anchored, so to speak, to his native land and to the interests and welfare of his native corner of it. Sir CUTHBERT is East Anglian to the backbone; he was born in that part of Britain where the brine-laden wind of the North Sea blows keen, "bracing brain and sinew," and both his father's and his mother's family hail from Suffolk. His father, the late WILLIAM QUILTER, founder of the well-known firm of Quilter, Ball & Co., chartered accountants, and first President of the Institute of Chartered Accountants, was the youngest son of a gentleman farmer in Suffolk, so Sir CUTHBERT comes rightfully by his great interest in agriculture, horse-breeding, and all that pertains to the welfare of the rural population.

Sir CUTHBERT was born in 1841, and was educated privately. He early took an interest in finance, and founded the firm of Quilter & Co., stockbrokers, of which he is now senior partner, and became a member of the Stock Exchange. His activity in City life and his enterprise in fostering new undertakings which had all their future before them caused him to become a moving spirit in many large commercial ventures, and he was one of the pioneers of the telephone industry in this country, as he became a Director of the original Telephone Company of 1880, which later amalgamated with the Edison Telephone Company and became the United Telephone Company, to become in 1889, at the general amalgamation, the present National Telephone Company. Sir CUTHBERT has therefore been continuously a Telephone Director since the beginning of the telephone business in this country, and may justly claim to be a pioneer telephone man, as he is the only member of the present Board of Directors who was on the Board of the pioneer English telephone company. As may be imagined, Sir CUTHBERT'S interest in telephone matters is of the keenest.

In 1885 Sir CUTHBERT was elected to Parliament for the Sudbury Division of Suffolk, and he represented that constituency continuously for over twenty years, being defeated at the "Chinese Slavery" General Election of recent memory. Sir CUTHBERT was not a frequent speaker in the House of Commons and has

never aspired to political office. He placed principles before party, and has always upheld the old Liberal maxim of "Measures, not men." More than once he has found himself sharply at variance with the Government to which he gave his political allegiance, but being an authority on those subjects on which he did take action, and being a man of great determination, he was generally successful in such encounters.

Sir CUTHBERT is a traveller, a sportsman and an art collector. A good share of his leisure has been spent on the salt water, and for the past 28 years he has been Vice-Commodore of the Royal Harwich Yacht Club, of which the PRINCE OF WALES is Commodore. He has owned several racing yachts, the most famous being the 40-ton cutter "Britannia" and the 70-ton "Hirondelle." Among his varied travels Sir CUTHBERT has visited the West Indies for the purpose of enquiring into the Central Sugar Factory system with Sir NEVILLE LUBBOCK, twice crossed the Atlantic, visiting Mexico and the Pacific Coast, has made various yachting cruises in the Mediterranean and has visited most of the countries of Europe, as well as Egypt, Algeria and various other parts of Africa.

Sir CUTHBERT'S country home is Bawdsey Manor, at the mouth of the Deben, near Felixstowe. Some 8,000 acres are attached to Bawdsey; a considerable part of this Sir CUTHBERT farms himself, and he naturally takes a deep interest in agricultural questions and has done much, in Parliament and outside it, to further the interests of agriculture. The provision of allotments he has always advocated, and he rents much land himself for the purpose of sub-letting it in small plots to agricultural labourers, a



system he has found successful in every respect. He has a passion for horse-breeding and is a great admirer of the famous Suffolk "Punch"; as President of the Suffolk Horse Society, Sir CUTHBERT has done much to popularise this handsome and useful animal and to increase its market value.

In the world of art Sir CUTHBERT QUILTER is known as a shrewd critic and a generous patron. The collection of pictures in the gallery of his town house, 74 South Audley Street, contains many fine examples of both old and modern masters, and there is hardly a school or a period which is not worthily represented. Sir CUTHBERT believes that pictures were painted to be looked at, and he is never happier than when showing his treasures to an appreciative visitor; there have been few loan exhibitions of importance, either at home or abroad, to which he has not contributed examples from his collection. In the earlier days of the Company, when the staff was on a smaller scale than it is now, Sir CUTHBERT on several occasions entertained the London operators at his picture gallery.

Sir CUTHBERT was made a baronet in 1897. He is Justice of the Peace for Suffolk and a Deputy-Lieutenant of the county, Alderman of the West Suffolk County Council, and, besides those mentioned above, takes an active part in the management of several other important county institutions. His favourite recreations are shooting and yachting.

THE TELEPHONE AT THE BROOKLANDS MOTOR RACE TRACK.

MANY readers of the JOURNAL have doubtless seen accounts in the daily Press of the remarkable race track for motor cars laid out at Brooklands, near Weybridge, Surrey, and brought into use last month. This novel enterprise is a bold one in several respects; the construction of the course has involved numerous engineering difficulties, as the track has been carried twice across the river Wey, and at the curves the outer edge of the track has been raised 28 feet higher than the inner edge, in order to allow of the cars taking the curve at the highest speed. Also, no crossing of the track is to be allowed on the surface, so that subways have had to be built under the track in several places. The total capital cost has been upwards of £150,000, and this large amount of money has been spent, and vast works carried out which will be useless for any other purpose, in the anticipation that the British public will take as kindly to motor racing on a track as it does to horse racing. It will readily be understood that in order to secure safety under the extraordinary condition of motor racing, when cars may be expected to attain speeds of between 60 and 100 miles an hour, electrical arrangements, and especially telephone communication, will play an important part. Some of the newspaper accounts of the Brooklands race track have mentioned the complete installation of telephones, but as a matter of fact until quite recently no definite arrangement had been made as to the telephone installation and wire plant for the timing arrangements, and it was not until June 1 that the Guildford District Office was notified that the National Company's tender for the work had been accepted, on condition that the installation should be finished by June 15.

As the work required involved the installation of over 50 miles of wire and the construction of nearly four miles of pole line, carrying from 8 to 40 wires, and the provision of numerous plug boxes and other terminals at different points round the course and in different parts of the club buildings, it may be imagined that very strenuous efforts were required to do the work within the time set. Even if the construction gang had had full possession of the ground it would still have been rapid work, but as a matter of fact the construction work on the course was still proceeding actively and the contractor's light railway was doing continuous service; the telephone poles had to be erected within a few feet of the light railway track, and the foreman of each gang was supplied with a red flag and a whistle, in order to protect his gang and to prevent accidents from collisions between the ballast trains and the poles.

The outside construction work was divided into three sections, on each of which was placed a gang composed of one foreman, four wiremen and six labourers; on the last four days, when all the pole work had been done, an additional wiring gang was employed. During the whole time work was carried on continuously each day

from 6 a.m. to 9 p.m. If it had not been for the long hours of daylight it would hardly have been possible to complete the work in the short time allowed. The erection of the pole lines was considerably complicated by the large number of stays rendered necessary by the curves of the track, a large section of the line in fact being built on a continuous curve. As the track could not be crossed by open wires, it was necessary to lay cables under the concrete surface and through subways at five points, the cables thus used varying in size from 7 up to 25 pairs; this large use of cables involved a considerable amount of pot-head work, which, as is well known, is work that cannot be rushed.

The whole system of wires is concentrated at an iron framework fixed to the side of the club building. The outside wires are here cross-connected to a 50-pair dry-core leading-in cable, which is carried direct to a 40-line central battery switchboard in the official part of the building. A complete power plant has been equipped, with a 24-volt battery charged by a generator driven by a 5 horse-power Crossley gas engine which also serves to work the air compressor for the pneumatic tubes between the postal telegraph office on the course and the sub-offices in the grand stands.

Besides the various telephones at fixed points in the stands and different rooms of the club building, among which there is a room specially for the use of the KING, telephones are placed at seven sentry boxes set at regular intervals on the course, and there is a separate omnibus circuit equipped with 32 plug boxes which completely encircles the course; there is also an alarm circuit for ringing loud alarm bells in case it is necessary to stop a race in progress, and there are four circuits for automatic timing apparatus. This apparatus has not yet been installed; its purpose is to give an exact record of the moment a car passes certain fixed points on the course, thus timing the speed of a car beyond dispute.

The sentry boxes, or observation posts, are erected on platforms close to the edge of the course and have glass sides giving the observer a clear view in all directions. Each observer at these posts has a telephone desk instrument, forming part of the general system, and above is placed a large alarm bell connected in series with the rest of the alarm bells round the track. All of these alarm bells can be rung simultaneously from the central office in the event of it being necessary to stop the whole of the cars in a race owing to an accident having happened at any part of the track. The 32 plug boxes on the auxiliary circuit are an additional safeguard to enable official patrols carrying portable telephones to give notice of any accident. Adjacent to each observation post is a platform on to which a damaged car can be lifted by a breakdown gang specially trained to the work, and in this way it is proposed that cars which become disabled in a race shall be removed from the track within a few minutes after notice of an accident is telephoned to the central office.

The whole of the work of installing the lines and apparatus, of which the above notes give a very inadequate description, was carried out under the superintendence of Mr. W. E. POTTER, District Manager, and under the immediate charge of Mr. J. STUART BEST, Local Manager, Guildford, who are both to be congratulated on the energy displayed in completing such a complicated installation in such a very short space of time.

It may be added that the Company has erected a direct private line from the Brooklands racecourse to the Brooklands Automobile Racing Club office in Regent Street.

DOMESTIC SERVANTS' INSURANCE.

THE Provident Clerks' & General Guarantee & Accident Company, Limited, have agreed to give special terms to the members of this Company's staff for the insurance of domestic servants under the Workmen's Compensation Act, which operates from July 1, 1907. Full particulars and form of proposal can be obtained at any of the district offices, or from the Secretary, at Telephone House, Victoria Embankment, London, E.C.

FRICTION.

FRICTION is most harmful to the success of any business. Study to eliminate it in your relations with your fellow-workmen and with departments. Give in oftener—only fools never change their minds. We'll have to try hard, for the egotism which gives birth to friction is not easily downed.—*Philadelphia Telephone News.*

UNDERGROUND WORK UNDER DIFFICULTIES: HARRINGAY TO ENFIELD.

By J. A. HUNT, *Divisional Engineer, North London.*

THE above job included the development of five urban districts, viz., Wood Green, Southgate, parts of Friern Barnet, Enfield and Edmonton, with a total trench mileage of approximately ten miles and laying of cables ranging from 50 to 600 pairs.

Thirty manholes and 42 double junction boxes were built, 28 branches to distributing poles laid, six river and railway bridges and three culverts were crossed, for which special excavations and arrangements were necessary. Road widenings and the laying of a double track of light railway for a distance of five miles of the route were being carried out simultaneously.

The Company's work was executed under four separate contracts, and it was necessary so to arrange the work as to fit in with that of the various contractors engaged upon the Middlesex Light Railway scheme. To do this it was essential to get into close touch with the representatives of the various firms concerned, viz., Messrs. Dick, Kerr & Co., contractors for laying the rails and erecting the overhead trolleys; Messrs. Callenders & Co., for the power conduits and cables; Messrs. Clift, Ford & Co. and Whimpey & Co., for the widenings and alterations of the roads, and with gas, water, electric light and railway companies, and with the various district councils and the county council, who were each at some point or the other executing or about to execute some work in connection with the construction of the electric tramways.

In eight short sections, when the works were begun, the arrangements for the purchase of private properties required had not been concluded, and in some portions the levels of the road were not finally settled. These sections had to be skipped for the time being by our excavators, and gangs were sent back at later dates to complete them as the opportunities arose. On a few of the properties (in some cases the grounds of private residences) the purchase was completed, but the boundary not being thrown back at the time, arrangements were made to excavate and lay the ducts or pipes through shrubberies, across lawns, or small suburban villa front gardens at such a level and in such a position—arranged with one or other of the above-mentioned contractors—that when the road was finally made our work should lie as nearly as possible in the position that had been specified by the authorities, viz., approximately 4 feet 6 inches from the outside edge of the kerb and occupying the same relative position throughout the route to the electric light, gas and water mains. It is needless to state that to this desirable state of affairs it was not always possible to attain.

The ducts crossed under the tramways at six places, and at three points it was necessary to lay them across the old road at a level low enough to be clear of the concrete bed for the rails in the new road when laid. Four manholes were built in pathways which eventually were to form part of the roadway, it being necessary for the time being to fill up with gravel over the cover, or on the pathways surrounding the cover, as the case might be, to form a level for foot passengers until the road widening took place.

Notwithstanding the difficulties and the great amount of uncertainty it has been necessary to alter only about 60 yards of duct; one manhole cover has had to be slightly altered to allow more room for a return kerb and channelling, and about 100 yards of trench had to be abandoned.

The contractors started work about three weeks before Christmas last and the whole of the ducts and pipes, including branches, was completed during the first week in May.

As soon as a sufficient length of pipe or duct had been laid and tested, requisitions were forwarded for cable, and by the time the contractors had completed the whole of the excavations two and a half miles of cable had been drawn in and one and a half miles jointed, and a few days after final completion by the contractors, the whole of the cable necessary was either laid, in stock, or on order.

A similar method was adopted with regard to the reinstatement of surfaces. When reasonable lengths, or, according to circumstances, certain definite sections of paving were ready for the paviors, vouchers giving the measurements of the different classes of paving were forwarded to the local authorities concerned, to

enable them to proceed with the reinstatement and, as far as possible, to follow up close upon the heels of the contractors.

In some places at the outset the light railway contractors were proceeding ahead of our excavators with the new paving, but by closely watching along the route day by day and also keeping in friendly co-operation with all other firms engaged, and, above all, by studiously avoiding any possible chance of giving them cause to complain that we in any way impeded their work, we were able to squeeze our work in, in conjunction with theirs; and after the first few weeks all hands were working harmoniously, advising and receiving advice of proposals, alterations or progress of any work likely to affect that of another.

Many other engineers may have carried out similar work under similar conditions, and they will, I believe, agree with me that such work, although at times disappointing, is at others exciting and always interesting; the element of uncertainty and the difficulties met with impart the charm which is inseparable from work under such conditions. Each difficulty or obstacle overcome gives encouragement and impetus for successfully wrestling with its follower, and at the end of the job, if no one pats the engineer on the back with "Well done," he has the satisfaction of shaking hands with himself.

THE DOOR-TO-DOOR CANVASS.

By J. S. CHRISTIE, *Glasgow.*

I WAS much interested by Mr. GEO. W. LIVERMORE'S article in the June issue of the JOURNAL. It suggested to me one or two considerations to which I should like to draw attention.

The expression "door-to-door canvass" at first blush would appear to indicate to a shade of precision the policy of "Thorough" as applied to canvassing. But does it in reality indicate such a policy? For instance, in centres where, for a longer or shorter period, telephone service has occupied a prominent position in the armoury of business weapons, it is obvious that a door-to-door canvass would result in a waste of time and an attenuated contract list. For telephone canvassers do not enjoy the advantage of receiving "repeat orders." Every contract obtained by a canvasser narrows his field of operations. Consequently, if ambitious of success, the canvasser, besides possessing Mr. LIVERMORE'S requisites—knowledge and confidence—must be equipped with discretion, and exercise it. It is all important to know where to go. It is of scarcely less importance to know where not to go.

Even in the case of virgin soil—unsullied by the foot of the telephone canvasser!—is this door-to-door canvass really the ideal system it is held out to be? In breaking new ground it is doubtless good to divide the map of the district among the canvassers and to require at the hands of each a report of his interviews with all the occupants in his special area. That is the door-to-door system in its pure simplicity. But this area will contain professional men and traders in many lines of life. Their interests will be many and divergent, and equally varied and numerous, consequently, will the canvasser's arguments require to be. Would the better system of canvassing not be to leave the map undivided, and to allocate the Trades and Professions Directory among the canvassers? A should be accountable for the butchers; B for the bakers, and C for the candlestick makers, etc. Each man would then be a specialist, with arguments for the trade or profession with which he was dealing. The arguments, like muscle, would become more powerful by use; and each additional subscriber's name would render them more efficacious. *Ceteris paribus*, trade-to-trade canvassing will show better results than the door-to-door system.

There is one other point in Mr. LIVERMORE'S contention to which I would refer. He suggests as a good argument a comparison of the cost of postal and telephonic communication. No doubt it is. But the answer to it is equally effective. Postal communications remain in the receiver's hands long after a telephone message has been lost on the viewless winds. Besides, telephone service must be paid for annually in advance. These are two stumbling blocks in the path of the aspiring canvasser. They cannot be lightly thrust aside. A man may know how many loaves of bread he will consume in a year; but the practice is to buy them as they are needed, not in bulk. So with postage stamps. Not so with telephone service on its present basis.

CHARACTER CURVES.

By JOHN SCOTT, *Manchester.*

RULE of thumb methods have happily fallen into disrepute in almost all departments of our technical and practical work, and there seems no good reason why they should be continued when we come to deal with ourselves as workers.

Even those with very limited experience know how aggravating it is to ask for definite information on some point and to have the reply given in the most vague and general terms. The trouble arises from what may be called slovenly habits of thought, resulting in want of clearness and definiteness in our conclusions. I am convinced that many miss their mark because they will not discipline themselves to think out the problems which confront them to a clear and definite issue, and I am sure that many of our inter-departmental worries at least will disappear if we set ourselves to amend our ways in this direction.

In the very instructive and interesting paper on "Telephone Engineering," which is reproduced in the first two numbers of our JOURNAL, Mr. J. J. CARTY shows most convincingly that a definite plan, even if full of errors, is better than no plan at all, or than a haphazard plan based on general impressions.

I desire to apply the same line of argument to estimates of character as Mr. CARTY does to estimates of telephone equipment.

Character is that quality or set of qualities which distinguishes every man and woman from every other man and woman, and it is all-important that our character should impress our fellows favourably. There is a sense, of course, in which character, if good, is its own reward and makes one independent of others' opinion of it, but in the ordinary workaday world we all form opinions of one another's character, and our success or failure is largely dependent upon how our characters impress others, whether these others be superiors, equals, or subordinates.

In a large organization like that of the National Telephone Company, the fitness of particular individuals for specific posts can only be judged by the General Manager on the reports submitted to him as to their characters. To say that the character given to any individual will vary according to the character of the individual making the report is only to state a truism, and in the absence of any standard or details of how the opinion given is arrived at, the door is open to misrepresentation, and even to injustice.

I am of opinion that some form of character curve is an efficient help to those who have to make reports, and is a very decided safeguard of the interests of those reported on. For instance, a chief engineer may be asked to report upon one of his men. He may reply in general terms that "so and so is good in some respects, but very weak in others," or that "so and so is not satisfactory." If, however, he is compelled to give a value against detailed headings similar to those referred to later, a much clearer view is obtained of the character under reference, and any bias, intentional or unconscious, upon the part of the man making the report is revealed, and the officer who receives the report is in a much better position to form a fair opinion.

Fully a year ago, a colleague and I were discussing character curves, and were agreed as to their value. To put the matter to a practical test, an experiment was resolved upon. My friend gave permission for me to write to a dozen other colleagues who knew him more or less intimately, requesting them to give in confidence their opinion of him on a form supplied. I, of course, undertook that in no case should any individual opinion be communicated to the subject of the experiment. He also agreed to make out a curve of his own opinion of himself. A copy of the most detailed form I could get was taken and redrafted with some additional headings, and is reproduced herewith. As will be seen, it is divided into three main divisions: Character, Education, and Technical Knowledge and Experience. Against each item under these heads five values were possible, viz., excellent, very good, good, fair, and indifferent. To try to get a common working basis, the following note was added at the foot of the form:—

"In this case the standard set is to be a high one, so that 'excellent' against an item will mean that the man reported on is as good on the particular point as is the best man you know in the

Company's service on the same point, and so on, the other marks being graded in proportion."

(In the case of junior staff or special grades, this would be modified to comparisons with junior staff or with the particular grade affected).

"For items on which you feel that you have no direct knowledge please do not give the man the benefit of the doubt and put down 'excellent,' but from your general knowledge of the man, whether that be great or small, make yourself form an opinion as to his grade on each point, and put it down."

A dozen forms were sent out to as many individuals, and the replies were interesting and instructive. One good brother was of opinion that "mental and moral qualities could not be reduced to the rule of three." Another thought "it would be a bad day for the staff when any such scheme was adopted," while a third jocularly excused himself from "helping a Scotsman to dissect the character of an Englishman," and so on. Unconsciously, of course, the replies revealed a good deal as to the character of the writers, both in the case of those who filled up the form and those who excused themselves from doing so.

It is worth noting in passing, that one of the peculiarities of character curves is that they give as much index to the character of the one making the curve as of the one to whom the curve refers. I have used for more than a year a very simple curve, with only some half-dozen headings, in connection with our apprentices. Each man under whom an apprentice has been working fills up a curve form when the apprentice finishes his course in any department, and after one has six or seven character curves of the one apprentice by as many different men, their use and value become more apparent.

In the final result I got six sets of character curves fully filled up on the lines desired, and the comparisons of these curves with one another and with the subject's own curve of himself were full of interest and instruction.

With a view to showing the comparison graphically the first column of the curve given contains:

(1) The subject's own opinion of himself, shown by a solid black line.

(2) The composite opinion of six colleagues of the same man, shown in black and white line.

To enable the composite curve to be drawn, a numerical value was given to the values before mentioned, as follows:—Excellent 5, very good 4, good 3, fair 2, indifferent 1.

Several attempts were made to arrive at a fair comparison. At first the total numerical value of the six sets of values was shown against each item, the highest marks against each being thus 30. This involved multiplying each item of the man's own estimate of himself by 6, and the result was so to exaggerate each point that the view was entirely distorted.

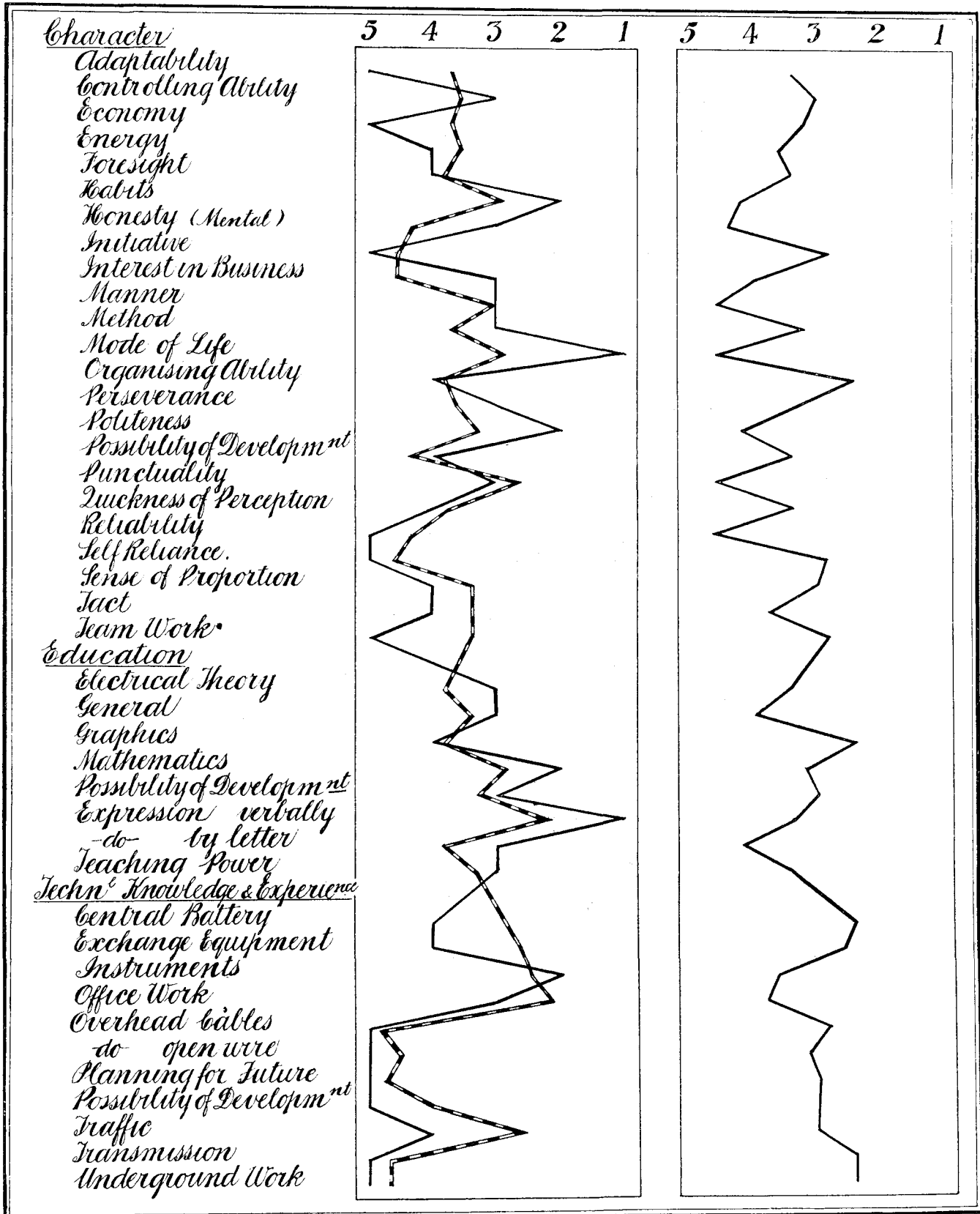
The opposite method has been adopted in the curve given. The man's own opinion of himself is exactly as he put it down, while the total values of the six sets of opinions have been divided by six and superimposed upon the other. It is obvious, of course, that the nearer to a straight line, on the left-hand side, the curve becomes, the more nearly perfect the character described is thought to be. A ruler or some other straight edge placed in the centre of the column will at once reveal whether the opinion given is generally favourable or the reverse, under the various main divisions.

Taking the case given, it can be clearly seen that under the head of character, the man's colleagues give him on the whole the degree "very good." If the very evident intentional bias or mock modesty of the man's own opinion under the headings of "Habits" and "Mode of Life" be eliminated, it will be seen that his opinion is in general agreement with that of his colleagues.

Under the head of "Education" the general verdict is "good," and is better than the man's own.

Under "Technical Knowledge and Experience" the general opinion is less favourable under all heads than the man's own verdict. Personally, I believe that in this case the individual opinion is the truer; and in actual practice such a verdict as the joint one could not be given without bias or ignorance being revealed. The opinion would be personal and not composite; and it must be remembered that no one is asked to report upon another

PRIVATE & CONFIDENTIAL REPORT ON MR...



who is not familiar with the man all round, and whose own views and experience are not known to the officer to whom the report is made.

The particulars given, against which values have been put, are almost self explanatory, but perhaps a word or two may be permitted regarding two or three of them. The order in which they come has been determined alphabetically, and is probably capable of improvement. There is room for much difference of opinion as to what ground should be covered, but I am personally in favour of considerable detail being gone into. The more unusual items are "Economy," "Habits," "Mode of Life," and "Mental Honesty."

By "Economy" is not meant that "bang went saxpence" theory which so many Englishmen cherish as being fully descriptive of a Scotsman, but the quality, say, in an engineer, which will enable him to do good work with a due regard both to the capital and revenue charges involved; or in an accountant which will prevent him, while insisting upon adequate details and safeguards, from loading up the working departments with paper work, much of which may be superfluous.

"Habits" and "Mode of Life" may seem to some unnecessary, or at best, as having little to do with a man's business life. My conviction is that you cannot separate a man's life into two compartments. A man of bad habits or loose mode of living cannot help these from interfering with his working efficiency—at least for long—and so they are important items in judging of a man's fitness for promotion.

"Mental Honesty" is to be distinguished from "Moral Honesty." The latter prevents a man from putting his hand into his neighbour's pocket, or stealing his employer's time or goods, and is assumed to exist in us all. If it does not, and we are found out, the remedy, if drastic, is easily applied. Mental honesty is much rarer, and means the ability of a man to look at any subject from every available point of view, and come to a conclusion from the facts as he knows them, even if that conclusion be entirely contrary to his own preconceived notions, or what is harder still, contrary to the ideas of some superior whom he respects and would gladly propitiate. It also involves the ability to say "I was wrong" if fresh light shows this to be the case. So far as I know there is no remedy for the absence or deficiency of this quality.

One could go on with much detail, but I forbear, and leave the ideas suggested with my readers to form their own conclusions, and to put them to the test as may seem best to them. It should be borne in mind, of course, that a character curve is a tool, and facility in using it, as with all tools, comes with practice.

The curve given in the second column is a composite curve of five opinions of another colleague who was good enough to agree to the experiment, but whose modesty forbade him passing an opinion on himself.

THE LADY CANVASSER.

By J. R. BROWN, *Contract Manager, Glasgow.*

WITHIN the last decade the emancipation of women from their exclusiveness in sport, recreation and business has made rapid strides forward, and many spheres which at one time were man's special preserves have been invaded by woman.

Man is usually sarcastic when referring to woman's stone-throwing abilities, yet it is well known that in shooting she makes a very fair average of hits; in golf, hockey, cycling, hunting, motoring, she acquits herself quite creditably. It is not, however, woman's prowess in these fields, but the woman in business—and especially the lady canvasser in the telephone business—that concerns us.

It goes without saying that for some spheres woman is more adapted or perhaps more adaptable than man, and where she falls into a congenial occupation, an occupation in which she can maintain her womanliness and exercise her charm, her success is certain. There is always, however, this to contend with—that her service is temporary. A man settles down to his life work and it is to his interest to fit himself for that work; but a woman—ah! well, she hopes to get away from it, if not soon, *some day*, and she

has not the same incentive as the man who knows he must work to live. Woman always hopes to get a man to work for her, and she will live for him.

It seems to me that the position of lady canvasser in a business such as ours is one that commends itself to women of good education, and is a position that offers good scope for women of intelligence and energy. Some years ago we tried the experiment with three ladies, and we have not regretted it. It was found in Glasgow, as it has doubtless been found elsewhere, that there was a difficulty in men getting interviews at private houses. They got no further than the door; the maid could do nothing, and the mistress would not see them, simply because they were men.

As I have just said, the experiment began by engaging three ladies of good education, pleasing manner, and capable of grasping thoroughly the rudiments of the telephone business and service. They were instructed in Contract Department work in the regulation way, and they showed from the start a very quick perception in mastering details; indeed, some of them could soon have given the men information on details that the latter had never grasped. When the lady canvasser presented herself at first she was looked upon with suspicion. She was a novelty to the maids as well as to the mistresses, and when she did get an interview, and had left, there was a feeling that it would be advisable, if not to count the spoons, at any rate to see that there was nothing missing. That soon wore off and within a short time the "telephone lady" was well known in the district and her visits were appreciated. The result was that houses which were closed against all interviews to men were opened to women and the education of the ladies of the houses was only a question of time. Our lady canvassers worked hard, liked their work, enjoyed the interviewing. Every week gave them increased experience and in a short time they amply fulfilled the highest hopes of their success.

While the primary duty of the lady canvasser is to visit private houses and interview the ladies, it will be readily understood that it cannot end there. The house visit is mostly one of education, telephonically, as in very many cases the need of a telephone had never occurred to the folks at home. The tradesmen call for orders, they have seldom required a doctor and they have never as yet had any cases of emergency. The lady canvasser has a good field here, and one or two visits carefully timed and tactfully worked win over the good lady. The first duty of the lady canvasser is to convince the *mistress* of the house that she needs the telephone service, and once the mistress wants a telephone (or anything else) she usually gets it. There are cases, however, where the wife wants the telephone and the husband does not, and in that case the lady canvasser has to go further afield and beard the lion in his den.

With the good wishes of the wife at her back the lady canvasser, if she knows her business, has not usually much difficulty in getting the husband to take a correct view of the situation. A man calling at the office might be refused an interview, but a lady calling, if the future subscriber has time at all, he will, out of common courtesy, at least hear what she has to say. There the lady canvasser scores. I have known of men calling off and on for years, getting interviews too, but failing to do the business; the lady canvasser pulled it off at the first effort.

Private residences in Glasgow and its suburbs are well telephoned, a state of affairs which would yet have been distant had it not been for our lady canvassers.

At the present moment we have six ladies on our Contract staff and their results in orders secured compare favourably with those of our best men, while in the matter of expense to revenue secured the palm for last month falls to the gentler sex.

AN HONOUR FOR THE NEWCASTLE DISTRICT MANAGER.

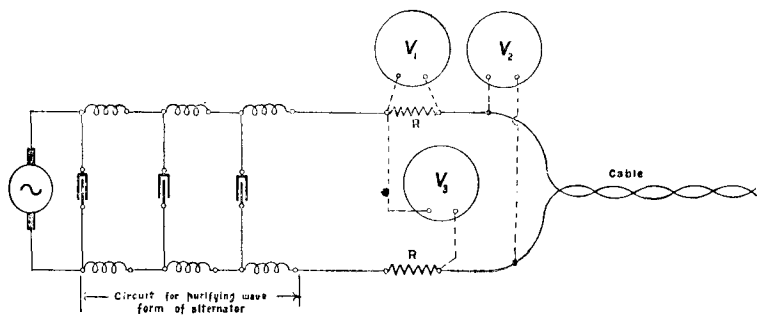
MR. A. L. E. DRUMMOND, A.M.I.E.E., the District Manager at Newcastle-on-Tyne, has been appointed Vice-Chairman of the Newcastle branch of the Institution of Electrical Engineers. We congratulate him on receiving this honour, and upon being the first of the Company's Staff to whom it has been extended.

TESTING TELEPHONE CABLES BY ALTERNATING CURRENTS.

BY G. M. B. SHEPHERD, *Head Office.*

THE ordinary methods of determining the electrical qualities of cables at the factories, or after laying, are well-known to everyone concerned with the wire plant, and without doubt these tests furnish valuable information respecting the fitness, or otherwise, of the cable for telephonic transmission.

When, however, one examines the question critically, with a view to applying the theory of wave propagation to everyday problems in the speaking efficiency of lines, it is obvious that the data available is not all that might be desired. The tests tell us that the cable has a copper resistance of so many ohms, some fraction of a microfarad capacity, and so many megohms insulation per circuit mile; these figures one and all being the results of observing the effect of a steadily applied battery voltage upon a galvanometer connected in some manner with the line under test. Nothing is to be inferred regarding the self-induction of the wires, which may or may not be an important factor (consider, for instance, a cable loaded with Pupin coils), and we are obliged to assume that the same values for capacity and insulation also hold good for the rapidly alternating currents in telephony. The correctness of such an assumption being decidedly open to question, efforts have been made to carry out the required measurements by means of alternating currents of the same order of frequency and magnitude as those passed over the line for talking purposes. In a recent paper given to the Institution of Electrical Engineers by Mr. COHEN



and myself, there is a brief account of such a method, and the results arrived at.

As this system of testing is highly interesting from the mathematical standpoint, and seems likely to become important in practice, it is worth while to give a more detailed description.

I am uncertain as to the originator of the method. About the earliest mention of anything bearing on the matter is to be found in the German *Electrotechnische Zeitschrift*, March 9, 1899—an article by Dr. BREISIG, of the Imperial German Post Office, who refers to the work of Dr. FRANKE in 1891, and gives particulars of tests on aerial junction lines of considerable length with good results.

The method is as follows:—The sending end of the circuit is connected to a suitable source of sinusoidal electro-motive force, e.g., a small alternator producing frequencies ranging from, say, 250 ~ to 1,000 ~ per second, and measuring apparatus is inserted between the line and machine of such a nature that both the magnitude of the outgoing current and its phase relatively to the impressed electro-motive force can be observed.

Two readings are then taken, first with the far end of the line open, and second, with it looped, the magnitude of the current and its phase being noted in each case.

There is not much practical information to be had concerning the manner in which BREISIG effected these measurements. It would appear that he used an alternator with two armatures, which could be adjusted to any desired relative phase displacement, and a balance was then made using a telephone receiver as a zero instrument to indicate absolute equality between the potential difference across a shunt traversed by the cable current and the electro-motive force from the second armature. Having thus

specified the two currents with the far end open or closed, completely as vector quantities, and knowing the impressed voltage, the corresponding impedances at the sending end, which we shall call Ξ_s and Ξ_r , are determined. From these two quantities all the line constants in terms of the mile or other unit may be extracted.

It is a very pretty piece of mathematics and is here given in full—

Let R, L, C and S have the usual signification for the constants per mile.

Let l = length of line.

a = the complex attenuation constant defined by

$$a = \sqrt{(R + j p L) (S + j p C)}.$$

$$\Xi_s = \sqrt{\frac{R + j p L}{S + j p C}} \text{ also a constant.}$$

$$j \text{ being } \sqrt{-1} \text{ and } p = 2 \pi \sim.$$

It is then known that when the distant end of the loop is free the apparent sending end impedance

$$\Xi_s^* = \Xi_s \coth. (l a) \quad \dots \quad (1)$$

also when distant end is shorted

$$\Xi_s - \Xi_s \tanh. (l a) \quad \dots \quad (2)$$

Tanh. and coth. being the hyperbolic tangent and co-tangent of the quantity $l a$. Consequently from (1) and (2)

$$\Xi_s = \sqrt{\Xi_s \Xi_s^*} \quad \dots \quad (3)$$

$$\text{and } \tanh. l a = \sqrt{\frac{\Xi_s}{\Xi_s^*}} \quad \dots \quad (4)$$

$$\therefore a = \frac{1}{l} \tanh.^{-1} \sqrt{\frac{\Xi_s}{\Xi_s^*}} \quad \dots \quad (5)$$

Tanh. $^{-1} \sqrt{\frac{\Xi_s}{\Xi_s^*}}$, or the quantity whose hyperbolic tangent is

$\sqrt{\frac{\Xi_s}{\Xi_s^*}}$, may be calculated from the formula—

$$\text{Tanh.}^{-1} (x + j y) = \frac{1}{2} \log. \sqrt{\frac{(1 + x)^2 + y^2}{(1 - x)^2 + y^2}}$$

$$+ j \left\{ \pi - \tan.^{-1} \frac{1 + x}{y} - \tan.^{-1} \frac{1 - x}{y} \right\} \quad \dots \quad (6)$$

a and Ξ_s having thus been evaluated, all that remains to be done is to write down the following identical equations:—

$$a \Xi_s = (R + j p L) \quad \dots \quad (7)$$

$$a = (S + j p C) \quad \dots \quad (8)$$

and the four constants R, L, C and S can then be separated out by ordinary algebra.

All this looks rather intricate, but the writer doubts very much whether, granted a proper table of tanh. functions, together with quickly manipulated measuring instruments, this test would be more cumbersome than the common capacity, C R and I R tests are, and, apart from that, it furnishes information which the latter cannot approach, viz., the working data of the line for any desired frequency of current.

In the aforesaid Institution paper a few results of actual tests were given, which may be repeated here. The method used in the Engineer-in-Chief's laboratory for determining the two impedances and their phase angles, was to measure the power in watts (or rather a small fraction of a watt) given to the line, by the familiar three-voltmeter test (see diagram). The current being also derivable from the same set of readings, the power factor and hence the angle of lag of the current, that is to say the angle of the apparent impedance, is obtained.

EXAMPLES OF TESTS.

Line.	Impedances.		Ξ_0	α	R	C	S	L	~
	End open.	End closed.							
10 miles 20-lb. low capacity cable	495 ^o ·54 20	657 ^o ·29 18	570·41 49	145·46 4	82·4 ^o 054	7·12 × 10 ⁶	00145	750	
10 miles artificial cable	498·51 ^o 28	644·36 ^o 6	566·43 ^o 47	167·44 ^o 30	94	0624	...	0002 750	

This is all very well for a laboratory experiment, but something simpler and handier is required if this system of cable testing is to be generally adopted. I would suggest a dead-beat thermal-ammeter reading to milliamperes, but calibrated in ohms for a constant alternator electro-motive force, in fact a species of ohmmeter, having a phase-meter in conjunction with it: or perhaps an instrument of the dynamometer type could be constructed which would fulfil the functions of both ohm and phase-meter, but this needs working out.

The entries in degrees and minutes in the above table represent the phase angles of the several quantities concerned. There is a slight reduction in the capacity of 20-lb. cable as compared with the ordinary static tests. Insulation resistance is lower to a very marked degree. There is less difference in the case of the artificial cable: capacity is about the normal value, owing no doubt to the constancy of mica condensers; resistance appears higher, due perhaps to inductive action by the spools: while leakage and inductance have very small values, as was to be expected.

THE CARE OF SECONDARY BATTERIES.

By ERNEST WIGLEY, *Northampton.*

As secondary batteries now take such a prominent part in our business, a few lines relating to the proper care of accumulators may be useful. Great care should be taken when starting to charge to insure that the current flows through the cell in the proper direction, which should be from the positive pole to the negative, *i.e.*, in the opposite direction to the discharge current. In other words, the positive pole of the dynamo should be connected to the positive pole of the battery and the negative to the negative. Before closing the charging switch the dynamo must be run up to the required voltage, which may be calculated as follows:— Assuming the battery has twelve cells and has been discharged to the allowable minimum, *viz.*, 1·85 volts per cell, and if the internal resistance of the whole battery is ·125^o, and the charging current 8 amperes, then volts required to force 8 amperes through ·125^o will be $\cdot 125 \times 8 = 1$ volt. Now, as each cell will offer a back pressure of 1·85 volts, the total back pressure will be $1\cdot 85 \times 12 = 22\cdot 2$. Therefore, the total voltage required equals $22\cdot 2 + 1 = 23\cdot 2$ volts. The resultant pressure tending to force the current through the cells will be the difference between the back pressure and the applied pressure, which in this case is 2 volts. Now, during charge, the back pressure or battery voltage is continually increasing and this necessitates a continual alteration of the dynamo voltage, which must be such as to keep the charging current constant until the charge is nearly complete, when it may be allowed to fall a little. When the cells are fully charged, bubbles of gas will rise from the plates; this gives the acid a milky appearance, and any cell that does not gas (or "milk" as it is often termed) with the others, should be examined. The fault will probably be due to a short circuit inside the cell, which may be caused by pieces of paste, scale, etc., lodging between the plates. The cause of the trouble should be carefully removed, and the cell charged separately until the "milky" state indicates its recovery. It can then be again charged and discharged in the same manner as the rest of the battery. When a cell is fully charged, the voltage should be 2·2 after the charging current has been switched off and the specific gravity of the acid about 1·210.

During discharge, the voltage of the individual cells should not be allowed to fall below 1·85 volts nor the density of the acid below 1·175.

New cells should be filled up with dilute acid having a specific gravity of 1·190, and should then be charged for about 40 hours without intermission. The charge must be started immediately the acid is put into the cells. The acid should be kept about half an inch above the tops of the plates, and when liquid is required to make up the loss by evaporation, only distilled water should be added to the solution. Sometimes the plates become coated with a white sulphate; this is detrimental to the cell, and may be remedied by prolonged overcharging. A battery should never be allowed to remain in a discharged or partly discharged condition, but should be charged up to the "milky" state at least once a week. When a cell is fully charged and in good condition, the positive plate should be of a clear reddish brown or chocolate colour, and the negative a bluish grey.

On no account must the battery be short-circuited, as a very heavy current is set up, which is very injurious to the cells. The maximum rate of discharge must never be exceeded, as this also tends to shorten the useful life of the battery. The battery switch must always be opened before the dynamo is stopped.

A space of 1 inch should be left between cells in the trays, and a small space between each tray. The glass sheets on the top of the plates must not be left off during charge, as the liquid in the cells will be wasted by the escape of gas, which should be arrested and condensed by the sheets. The sawdust in the cell-containing trays should be changed occasionally when it gets wet. When taking hydrometer readings, care should be taken to see that the hydrometer is not touching the sides of the cell or the plates, or the reading will certainly be very far from correct.

TELEPHONE POSSIBILITIES.

A MANAGER of a large business house in Camden, N.J., recently had occasion to go to New York. While there he left in a Pennsylvania Railroad cab a 25 dollar umbrella. He had only two minutes in which to buy a ticket and catch a train to Elizabethtown, N.Y., but in that time he threw down a half-dollar in front of a Bell Telephone pay station operator and said: "I left a 25-dollar umbrella that was presented to me, in a Pennsylvania Railroad cab here. I'm going to Elizabethtown and will be there several hours. See what you can do for me. My name is — —." After about three hours' work in Elizabethtown he returned to the station to leave for New York City and found his umbrella there ready for him. He had thought that the description given would be too vague for results, but the knowledge of the operator was instantly available, and his prompt action accomplished the desired results. It is almost needless to say that the telephone possibilities and the courteous work of that operator have been frequently told by the manager to his friends.—*Philadelphia Telephone News.*

A POINTER FOR DEPARTMENT STORE WORK.

AN important point in department store soliciting is the *fire alarm* value of the telephone.

Strawbridge & Clothier's telephone system makes their store one of the best, if not *the* best, protected store in the city.

Every one of their employees is in easy reach of a Bell telephone, and an emergency call from any instrument will place a fire alarm call in the Electrical Bureau in a moment's time.

Christmas shoppers dread shopping above the first floor in big stores, and the fear of fire no doubt keeps many away. It has been suggested to the larger stores that they emphasise their fire protection in their newspaper advertising.—*Philadelphia Telephone News.*

TELEPHONE WOMEN.

I. — ELLEN MARIAN RALPH.

As the first Clerk-in-Charge of the first Telephone Operating School in the world, it appears appropriate that Miss ELLEN MARIAN RALPH should be the subject of the JOURNAL'S first biographical sketch of those women who have gained distinction in the world of telephony. This is the more appropriate since in March last Miss RALPH completed 25 years in the telephone service.

Miss RALPH is a Londoner by birth, and was educated at a private school in Blackheath, leaving there in July, 1878. It was not, however, until March 12, 1882, that she entered business life by joining the United Telephone Company as an Operator at the Avenue Exchange.

During 25 years Miss RALPH has naturally witnessed remarkable developments, not only in the actual system of operating, but in the general conditions of the telephone service. When "learners" first entered the London service in those days they received a list of the exchanges showing the numbers allotted to each exchange; at that time there was only one set of numbers for the whole city and the names of the exchanges were not used in the subscribers' list; armed with this information, new operators were placed at the switchboard and told one or two necessary details of the work, and thus they started on their career. As to the names of the apparatus, Miss RALPH states she learned only *two*—"indicators" and "pegs"—so that the technical instruction of those days was very different from the elaborate and careful system she is now called upon to instil into recruits of the operating staff.

For seats, in these bygone days of the beginning of the telephone service, there were high office stools with no backs, and the short operators had to perform gymnastic feats to reach their seats. As to "traffic," they considered themselves busy if they completed 40 calls in a day! To obtain connections, either local or on the junction lines ("trunks" as they were then called), the operators had to shout to each other, and apparently those with the strongest lungs were, under the peculiar conditions, able to make the quickest connections. The equipment was indeed primitive. At the only exchanges where the "engaged test" was employed, testing was done by a thimble worn on the finger.

When electric light came into use, considerable interference occurred through the induction, which caused a hum on the line almost as intense as our "busy-back" of to-day.

The hours for operators from 1881 to 1886 were from nine to six and ten to seven; after this came twelve to eight, and later twelve to nine. Subscribers who wished specially for later service, such as the Press, were left connected by special switches, and woe betide the responsible operator if she forgot them. On one occasion, Miss RALPH being that unfortunate person, dreamed one Saturday night that she had not turned them, and went to the exchange on Sunday to see if this was true; luckily it was but a dream. A less fortunate girl at Westminster actually did forget a particularly troublesome subscriber, and went to the exchange at two o'clock in the morning to put matters right, having to ring up the night watchman.

Each operator was allowed 1s. weekly, in addition to her salary, for tea, but as no lunching arrangements existed, the girls brought their own food and cooked it over an open fire in the exchanges. It will be understood that while this was going on, with the varied *menu* that may be imagined, the olfactory organ suffered. Miss RALPH has many a humorous anecdote to recount of those days.

In 1897 the Company first founded the dinner clubs by supplying exchanges with utensils and paying a woman to do the cooking, but no definite system for meals was instituted for another two years.

As an operator Miss RALPH was transferred from Avenue to Eastcheap and then to Hop, and in the year 1884 was made Clerk-in-Charge at Deptford. She subsequently held similar positions at Hop, Avenue, Bank, Central, and again at Avenue, and for a short time was employed on special duty in the Office of the Traffic Superintendent.

The first Operating School was opened at 58-9 London Wall in 1899 with 30 learners, and Miss RALPH was placed in charge, assisted by two supervisors. In 1902 the London Wall Exchange, in the adjoining building, was burned out, and Miss RALPH and her staff were rapidly transplanted to a temporary school at Head Office, Telephone House. This "temporary" school existed, however, until September, 1906, when the present splendidly equipped building was brought into use; a full description of it has already appeared in previous numbers of the JOURNAL. During this time the average number of learners had increased to 75, with a staff of ten supervisors as assistants to Miss RALPH, and up to the end of last May no less than 3,369 pupils have passed through the school,



2,783 having been transferred to the exchanges. It is interesting to note that two of these past pupils are at present employed in the school as supervisors.

As a worker Miss RALPH is indefatigable; she takes a real interest in each individual pupil passing through her hands, and her conscientious work, her ability to impart to others her knowledge of telephone technicalities, and her extreme good nature and cheery disposition have won for her the sincere esteem and regard of all with whom she has been brought into contact. Of this, the presentation made to her on May 24 in celebration of the completion of 25 years' service and the large gathering of the staff to do her honour on that occasion, is ample proof. Of this interesting event we give a report in another column.

Don't bother with past successes—they're over and have been paid for—your record *to-day* is all-important—the past can't be changed—the present and future are yours. What will you do for yourself and Company?

KIOSK PUBLIC TELEPHONES.

By C. J. REMINGTON, *District Manager, Blackburn.*

A FEW months ago an interesting article appeared in the JOURNAL on "Street Call Offices," accompanied by an illustration of a kiosk call office on a railway station in Portsmouth. The idea is hardly novel, for in the north we have many of the ordinary cabinets in railway stations; but, in my opinion, the cabinets generally in use are too small for use in railway stations, where the user is often hampered with umbrellas, wraps and parcels, and difficulty is experienced in looking up a subscriber's number as well as in getting the necessary coin out of the pocket. There is lacking a place to put the articles with which one is often encumbered while turning over the directory, and the cramped space does not add to one's pleasure in using these cabinets, especially if in a hurry to catch a train. I hope soon to see a cabinet of larger size, which will greatly conduce to the comfort of using the telephone from railway stations.

The accompanying illustrations show a kiosk of a somewhat picturesque type which was fitted up some time ago on the outskirts of Blackburn, and has proved an excellent revenue earner, besides being a good educator for the telephone service. As shown in one of the illustrations it is placed at a corner of four cross-roads



(at the terminus of the Preston New Road tram section), and it is, therefore, in a most favourable position to catch the public eye. The idea of putting a call office at this place originated with the

late Mr. ELI HEYWORTH, but the estimated cost of the original design, some £80, was considered far too high, and the matter would have dropped had not Mr. CLAXTON suggested a "rustic arbour," such as are often used in gardens. This was bought for



some £20; the thatched roof was replaced by wooden ribs to represent red tiles, and made thoroughly weather-proof. It is placed at the bottom corner of a piece of private ground abutting on the road, for which privilege the Company pay a small annual rent. The clock is the property of the Blackburn Corporation, and is placed there, by permission of the Company, for the use of the tramway officials for timing and regulating the tramway traffic at this terminus. The police have a key of the door and are allowed to speak free from the call office to the police station; in return for this facility, they keep an eye on the kiosk. The public enter by placing one penny in the automatic box on the door. The door closes automatically, and when inside the public pay for local calls at call office rates, the fees being placed in the usual automatic box attached to the instrument. The kiosk has lately been lighted electrically, the light being switched on by shooting a bolt on the door from the inside when the caller enters; arrangements are now being made for exhibiting advertisements, from which the Company will secure some additional revenue. The inside measurements of the kiosk are 6 feet 6 inches by 5 feet 8 inches, and the roof is 8 feet from the floor in the centre, so it will be seen that it is quite a roomy call office. When first brought into use the table and seats bought with the kiosk were left in, but on the first Sunday four men were discovered by the police inside smoking and playing cards; consequently the facilities for this amusement were withdrawn and the trouble ceased. Indeed, the police look after this kiosk so well that, though far out of the town, we have no trouble with it.

INSTRUMENT FITTING.

By R. E. BRUMBY, *Hull.*

FIRST and foremost as to the fitter himself. He should not be a mere boy—for a fitter's duties are at any rate equal in importance to those of an inspector—nor need he be a qualified inspector, but he should know how best to test an instrument or to clear a simple fault.

Secondly, as to fitting. In large centres, where a good deal of fitting is constantly going on, a considerable saving of time is effected by sending several instruments out to subscribers' premises on a handcart, the fitter following round and fitting the instruments as he comes to them. This method obviates the necessity of the fitter returning to stores with his tools each time for an instrument. He simply carries his tools and wire from place to place and can do far more work per ordinary working day than he otherwise could.

Arrived at a subscriber's premises, the fitter should, before starting work, carefully look round and settle on the best way of

doing the job, seeing where the instrument had better be fitted as regards its utility, ease of access for inspection and obtaining good light; also noting where and how best to run the wire, bearing in mind to keep the wire out of the way of other objects, out of reach of children where possible, and out of sight where practicable.

In inside wiring the greatest care should be used in stapling. Staple over one wire only, and be certain that the covering of the other is not pierced, as should this occur a fault will develop at this point sooner or later (sooner if the walls are damp), especially on the common battery system.

In private houses an extremely neat job may be made by wiring in the beading of skirting boards, as this often saves the wire having to be carried *in sight* over decorated walls. Where this cannot be done, the wire may with advantage be run at the back of picture moulding, if such exists.

When wiring has to be carried though wall or floor, much trouble will be saved if the wires are threaded through a length of pipe; the ends of the pipe to be effectually plugged with warm ozokerite tape. This prevents the wires from being soaked when house cleaning is going on. If a piece of pipe cannot be used, then the wires should be carefully wrapped with two layers of ozokerite tape, the taping to be continued for 3 inches on each side of the hole through which the wires pass.

On the common battery system, office wire Nos. 1, 3 and 8 leave a great deal to be desired, and it is much safer and will give greater freedom from faults if inside wiring is done with vulcanised indiarubber 20/12 or 22/15, especially if the premises show any signs of damp whatever. All 10-party and omnibus stations should be wired with vulcanised indiarubber, thus saving a large number of wire faults.

In particularly damp situations, such as close to docks and rivers, it has been found in this centre that even 20/12 did not last long, and twin vulcanised indiarubber cable has had to be substituted; even this—in at any rate one case recently—has broken down under the action of fumes of spirits of salts.

The window terminal is a very necessary piece of apparatus and calls for as much care, in its way, as the instrument itself. This should be placed out of reach of other articles, window blinds, and of children or even grown-ups with a thirst for electrical knowledge, but yet it must be easily accessible to the inspector, who should always inspect this as well as the other apparatus. It is well to make a point of rubbing the window terminal over with a greasy rag before fitting; this precaution delays corrosion if it does not entirely prevent it.

Wires, both vulcanised indiarubber and office wire, are better made off at this point with a short spiral or helix of, say, six turns, as when it is necessary to disconnect wires for testing a fracture of the wire is frequently unavoidable.

All vulcanised indiarubber covered wire will prove to give better results if at the ends the outer braiding and lapping be stripped back off the rubber for an inch or so, as in damp places this outer covering appears to attract moisture and, becoming damp, lowers the insulation of the line.

When an instrument has to be fitted on a bad wall, or on lath and plaster, the fitter must be very sure that all is "O.K." in the way of plugs holding firm before leaving. If any difficulty is experienced, a backboard, considerably larger than the apparatus to be fitted, had better be fastened to the wall and the instrument fastened to this, so as to distribute the weight as much as possible.

All automatic boxes (if of metal) are better fitted on a wooden backboard, and wired with 22/15 vulcanised indiarubber, as should the box gather any earth from the wall a serious fault is caused, the automatic box frame forming part of its connections.

In fitting large iron-cased trembling bells in outdoor situations it is better to have a small painted wood shelter made for them; they last much longer thus protected than when fully exposed to the weather. Avoid nickel-plated domes for exposed bells and carefully grease the dome and all metal parts before fitting.

In this centre we have found that a great saving of time and trouble is effected by taking no piece of apparatus to be "O.K." Everything is proved, and, as far as possible, proved under working conditions; so that as a general rule, on arrival at a subscriber's premises, the fitter merely has to wire up and fix the instruments, all adjusting having been done before they left the depot.

A few "don'ts" for fitters:—

Don't forget to grease all screws put into wood.

Don't think a hole half an inch deep sufficient for a wall plug.

Don't drive staples down too hard.

Don't put apparatus up anyhow.

Don't forget to place a battery card in instrument with date of fitting thereon.

Don't leave loose staples, pieces of wire, etc., in instruments.

Don't waste time arguing politics with subscribers, but

Don't forget to give courteous replies to a subscriber's questions.

Don't forget that *careful* as well as *careless* work is seen and noted.

Don't keep your tools in bad condition; it pays to clean them.

Don't put ozokerite tape, compound and candles amongst your battery and instruction cards.

Don't run wire in loops, but pull it straight when stapling.

Don't force in screws so deeply as to break the head; the screws may have to be drawn again.

Don't run wire in places where it may be used as a towel rail or memorandum rack, and

Don't forget to enter particulars of material, etc., correctly on stores slips and works orders.

On completing his work the fitter should clear up all wire ends and rubbish, leaving all as tidy as he can.

In conclusion, a fitter should never leave an installation which he has completed without first obtaining a test from the test operator or from the test clerk, proving all "O.K."

FIRST CONVINCING YOURSELF.

POINTS FOR TELEPHONE MISSIONARIES.

IF you have first convinced yourself of the need that the prospective subscriber has for service it will almost surely follow that you will be able at once to convince that person (1) that his present need for service is imperative. The prospective subscriber should be made to feel that every day he is without service is a loss of so many dollars to him, either through a closed door to customers or through the loss of his own and his clerks' time. In residences it means possible sudden illness without service through thoughtlessness on the part of the head of the house in allowing his family to be without service when in business such a condition is impracticable. (2) Its cost is in reality a saving. The more freely telephone service is used the greater is the saving. If it is a saving in time and car fare to use the public telephone in a single case it should take but few words to prove a greater saving by more frequent use. (3) Our service is the best, because it reaches the most subscribers both locally and otherwise. For this reason the quality of the service which you are offering makes its intrinsic value too evident to be refused even temporarily. Thousands of present subscribers, with daily gains of hundreds more, should remove the last doubt in the mind of a prospective subscriber.

But to be able to show any or all of these things the enthusiasm born of knowledge is absolutely essential. Lack of it will leave room in your mind for fear of a "turn down" or of some question which you are unable to answer satisfactorily, doubt of the prospective subscriber's real need for service, doubt as to the fair price of it and—what is more to be guarded against—doubt as to your real ability and fitness for the work chosen. Probably this was the cause of your last failure. At any rate some of your failures could be traced to one of the above causes.

Prepare for the overcoming of all obstacles by carefully informing yourself of each question that arises. Keep memoranda of these points and be satisfied only with the best answer obtainable. Look up all complaints with care, and the information will come with the replies which you will give to the subscribers. In other words, be conscientious and earnest. Approach no prospective subscriber unless you have first convinced yourself that he needs service now.—*Philadelphia Telephone News.*

The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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Vol. II.]

JULY, 1907.

[No. 16.]

WILLIAM EDWARD LOUIS GAINÉ.

THE past month has been fraught with tragic interest for National telephone circles. The Annual Meeting of Officers, the Meeting of Contract Managers and the Fourteenth Annual Staff Dinner were to have been held in the middle of the month, and all concerned were looking forward to these events, inspiring landmarks in the year's work as they are, with keen anticipation. On the 10th Mr. GAINÉ was struck suddenly down by an attack of pleurisy, which developed with great rapidity and in spite of all medical aid turned to pneumonia, and on the morning of the 18th he became unconscious and passed away shortly after noon of that day.

Words fail to express the loss which the National Telephone Company has suffered by this tragically sudden removal of its leading spirit; and the grief, sincere and deep, of all who during these past fifteen years have been brought in personal contact with Mr. GAINÉ, will, we believe, be shared by every member of the Staff up and down the land, for everyone must have felt that at the helm of this great Company's affairs there was not only a captain of great ability and strength of purpose, but a man who was honest, just and kindly in his dealings with his fellow-men and women. No greater praise could be given to a captain of industry, and no less is the due of our departed CHIEF.

Those at headquarters who from their long and close association with Mr. GAINÉ had come to find in him a personal friend, as well as the sure and alert guiding spirit in all branches of our work which he eminently was, are profoundly affected by this great affliction and by the awful suddenness with which it has fallen. It is difficult to realise that the rapid, decisive step will no more echo through the corridors of Telephone House, and that the keen, clear voice of our General Manager is forever stilled. It is with

the deepest and most heartfelt sorrow that these few lines of tribute to the memory of him who such a short time ago was a living moving force among us, the mainspring of the vast and incessant activities of our great Company, are penned.

It is but a year ago that the JOURNAL published a biography of Mr. GAINÉ—the first of the series of illustrated sketches of "Telephone Men"—and there is little to add. The past year has simply been another year of strenuous and unremitting work, a year in which new problems and accelerating rate of development have but increased perplexities and added to the weight of responsibility. There is no doubt that the unsparing way in which Mr. GAINÉ has worked during the past fifteen years at the many difficult problems arising from the various new and difficult conditions imposed on the telephone business through political agitation undermined his health to such an extent that he had not the requisite reserve of strength to resist a serious illness.

The deepest sympathy of all National workers will go out to Mrs. GAINÉ, her son and daughters, in their great bereavement. That their grief is shared by many thousands will be some consolation to them.

THE CHIEF IS DEAD.

The Chief is dead.
Pause then awhile and think
That he who ruled
Has stood upon the brink
Of Death, and found
The River calm, and crossed,
And we are left
To think of what is lost.

EMILY M. BUCKLAND.

THE FUNERAL.

ON Thursday, June 20, a large number of friends assembled at the Crematorium at Golder's Green, Finchley Road, to show by their presence the esteem and affection in which Mr. WILLIAM EDWARD LOUIS GAINÉ, the late General Manager of the National Telephone Company, was held. A large number went down from Telephone House, the relatives and more intimate friends following the coffin from Mr. GAINÉ'S residence at Hans Mansions. The latter included Mr. H. H. Gaine, Mrs. Laws Webb and Mrs. Edwards (who represented, by special request, Mrs. Gaine and her daughters), Col. Jennings, Mr. Leonard Stokes, Mr. Schidrowitz, Mr. Willett Ram, Mr. H. Laws Webb, Mr. Pollitt, Messrs. G. Franklin, W. A. Smith, G. H. Robertson and S. H. Sands, Mr. S. J. Goddard, Mr. A. Anns, Mr. F. Gill, Mr. A. M. Ogilvie (Assistant Secretary, General Post Office), Mr. R. H. Claxton, Major O'Meara (Engineer-in-Chief, G.P.O.), Mr. Gavey (former Engineer-in-Chief, G.P.O.), Mr. W. W. Cook, Mr. C. J. Phillips, Mr. Okell (representing Sir Robert Hunter, Solicitor of the G.P.O.), Mr. Tahourdin, Mr. Wm. Forbes (General Manager, L.B.S.C.R.), Mr. Fox (Town Clerk of Leeds), Sir William Coddington, Mr. C. Edwards, Mr. H. S. J. Booth (Electrophone Company), Mr. J. E. Kingsbury (Western Electric Co.), also representing the Institution of Electrical Engineers, and Mr. Max Byng. John Tuckey (Mr. GAINÉ'S personal attendant for many years) also followed.

Sir Cuthbert Quilter, Lord Harris and Sir Albert Rollit (Directors) had gone directly to the Crematorium, and waiting with

them when the funeral *cortège* arrived were Mrs. Blockley (Mrs. Gaine's sister), Mr. N. L. Blockley, Sir Wm. Henry Hornby (one of Mr. GAINÉ's oldest Blackburn friends), Sir John Cameron Lamb, Mr. Ardron (lately of the Post Office), Mr. Forbes Lankester, K.C., Mr. Roskill, K.C., Professor Sylvanus Thompson, Mr. Jeeves, Mr. Duckworth, Mr. A. N. Bromley, Mr. F. H. Payne, Dr. Grosvenor, Mr. Alfred Powell, Mr. W. J. Bryan (Chief Engineer of the Metropolitan Water Board), Mr. Basil Ellis (of John Aird & Son).

The following had arrived in motor carriages from Telephone House:—Messrs. C. B. Clay, A. Coleman, J. C. Chambers, R. Shepherd, F. Cowley, F. Douglas Watson, R. A. Dalzell, F. Swarbrick, V. Alsop, F. T. Rushton, R. Aitken, W. Barnett, G. Bean, W. R. Bold, J. G. Brien, B. S. Cohen, C. W. L. Carter, J. W. Champion, P. Cole, P. Chester, H. M. Darville, A. Dearle, H. Davis, J. F. Edmonds, H. Elliott, S. C. Foster, W. M. France, F. W. Francis, J. R. Gall, W. H. Gunston, P. Hammarskjöld (of the British L. M. Ericsson Company), E. Hare, F. C. Hawker, H. P. Houghton, E. E. Ironside, F. G. A. Kiff, E. A. Laidlaw, H. D. Littlewood, Harvey Lowe, W. J. Miller, W. A. Miller, W. Napier, G. Nicholson, J. Poole, P. H. C. Prentice, G. F. Preston (Post Office Telephone Service), C. W. Salmon, F. E. Sims, C. H. Summers, D. Stuart, W. F. Taylor, H. H. Thomson, W. E. Weston, A. Watts, C. G. Wright. The operating staff were represented by Miss Ralph, Miss Ashmead, Miss Smith and Miss Richards. There were also present Messrs. C. Peacock, N. McLeod, J. Watkins, W. Fray, J. C. Witherby, A. F. Simpson, F. Graves, F. Hill, R. P. Payne, S. Hardstone, J. H. Jenkins, J. W. Sandell, W. Winfield, J. G. Crowe, J. R. Waters, J. H. Knights, T. Caparn, J. King, L. H. Lewis, G. Anderson, Winfield, W. Cullum, A. S. Wallis, H. Cope and H. L. Moody from Head Office; and Messrs. A. Bascombe, F. W. Holder, J. R. Brown, F. Bick, C. W. Appleby, J. A. Hunt, C. E. Tattersall, C. G. Ransley, W. C. Knapman, W. E. Stiles, J. M. Smith, J. A. Hunt, J. P. Ryall, E. M. Wright, F. Hall, Grover, W. Benham, Dover, Naughtin, Greening, Warner, Widdup, Wild, Joyce, Mills, Maher, Hudson, G. White, T. C. Walker, A. Drabwell, A. Gray, J. Bryson, W. J. Gilmour, A. T. Waller, Reiman, Brandreth, W. V. Pegden, Arrowsmith, Wilkinson, Foreman Bush, Hart and Dowdall, and Misses Mobley, Lind, Evans, Fusedale, Willett, Millard, Woodcraft, Acheson, Wild, Nicholson and Mrs. Burroughs, of the Metropolitan staff.

The floral offerings were many and beautiful: the coffin was entirely covered with wreaths sent by relations and friends, and a separate carriage contained many other beautiful floral designs. Amongst those who sent flowers were the Board of Directors, the officers and staff of Head Office, the Nottingham Factory, and of each of the eight "provinces," representing the whole staff of 16,000, Mr. & Mrs. Stokes, Mr. & Mrs. Schidrowitz, Mr. & Mrs. Willett Ram, Mrs. Hammerton Edwards, Mr. Gerald Pollitt, Sir Henry & Lady Fowler, Lord & Lady Harris, Mr. & Mrs. Rowland Dalton, Mr. & Mrs. George Franklin, Sir James Woodhouse, Mr. Forbes Lankester, Mr. & Mrs. Harcourt Clare, Mr. & Mrs. H. Laws Webb, Mr. Henry Fedden, Mr. J. Roskill, Mr. & Mrs. W. B. Bryan, Mr. & Mrs. C. B. Clay, Mr. & Mrs. C. M. Bailey, Mr. R. L. Grosvenor, Mr. & Mrs. F. H. Payne, Mr. Elvy Robb, Mr. Wm. Towle, Mr. & Mrs. Bullough, the National Society of Telephone Employees, the British L. M. Ericsson Manufacturing Co., Aktiebolaget B. M. Ericsson & Co. of Stockholm, Mr. & Mrs. Basil Ellis, Mr. & Mrs. John Thompson, Mr. W. H. Thorley, Mr. & Mrs. Wm. Thompson, Mr. & Mrs. Max Langemann, Mr. & Mrs. Max Byng, the Directors of the Electric Light Co. and others.

Mrs. Gaine sends the following message to the staff:—

DEAR MR. GODDARD,

Will you please explain to all the members of the Staff that I am quite overcome by the deep expression of sympathy received from all, and ask them to accept my most sincere thanks and gratitude.

Yours very sincerely,
ADA GAINÉ.

Among the many letters of condolence received the two following, from the Postmaster-General and the Secretary of the General Post Office, will show the high esteem in which Mr. GAINÉ was held in official circles:—

DEAR MR. GODDARD,

May I be allowed to write you a line, as representing the National Telephone Company, to say with what very great regret I heard of the death of Mr. GAINÉ.

He will be a very great loss to the telephone service of this country, for he devoted to it exceptional knowledge, energy and business qualities.

I should like to say that we also much regret his loss here. The friendly personal relations which subsisted between Mr. GAINÉ and the Secretary and other members of the Post Office materially assisted the development of the telephone service on lines advantageous to the country as a whole, and tended towards the smooth working of the rival systems.

Yours very truly,
SYDNEY BUNTON.

General Post Office, London,

June 20, 1907.

DEAR MR. GODDARD,

I am most grieved to hear of Mr. GAINÉ's death. I have been brought so much into contact with him in recent years that I had many opportunities of appreciating his very great abilities and also his personal qualities. His loss will be deeply felt by the Company, and also, I may say, by the Post Office: for in all our relations we always felt that we could rely on his straightforwardness and good faith.

I wish that I could mark my feelings of regard and esteem for him by attending the funeral to-morrow; but I am sorry to say that I have official engagements which render this impossible.

Yours very faithfully,
H. BABINGTON SMITH.

General Post Office, London.

June 19, 1907.

Lord Kelvin writes:

DEAR MR. GODDARD,

Will you express to the Directors of the National Telephone Company my deep sympathy with them in the great loss we have sustained in the death of Mr. GAINÉ.

Yours truly,
KELVIN.

15 Eaton Place, S.W.

June 21, 1907.

Letters were also received from the following amongst others (many of the writers speaking of their long acquaintance with Mr. GAINÉ both as Town Clerk and General Manager, and expressing a deep sense of their loss):—Sir James Woodhouse, Mr. J. Roskill, K.C., Mr. Harold Boulton, Messrs. Ingledew, Sous & Phillips (Cardiff), Mr. Donaldson Rawlins, K.C., Mr. W. H. Talbot (Town Clerk of Manchester), Mr. R. Cory, Mr. Alderman Thompson, Mr. J. E. Kingsbury, Mr. T. W. Pim, Mr. T. A. Welton, Mr. John Aird, Mr. A. Rolit (Hull), Mr. John Gavey, Sir J. C. Lamb, Mr. W. Dillon, The Comptroller and Accountant-General of the Post Office, Mr. John Ardron, Sir John Craggs, Mr. F. H. Glynn Price, Mr. C. C. Connor, Mr. E. R. Pickmere (Town Clerk of Liverpool), Mr. J. M. Hayton (Town Clerk of South Shields), Messrs. Felten & Guillaume (Cologne), the Institution of Electrical Engineers, Mr. Henry Field (Town Clerk of Huddersfield), Mr. Frank Glover, Mr. A. N. Bromley, Mr. Geo. Ashton, Mr. T. H. Ellis (Town Clerk of Liverpool), Mr. Roger Wallace, K.C., Sir Wollaston Knocker (Town Clerk of Dover), Mr. A. Lockett (Town Clerk of Middlesbrough), Mr. G. W. Bailey (Town Clerk of Bournemouth), Mr. F. M. Bowey (Town Clerk of Sunderland), Mr. E. Laverack (Town Clerk of Hull), Sir R. B. Finlay, K.C., and Mr. W. Judd (Chief Engineer, Eastern Telegraph Company).

TRAINING OF CLERICAL STAFF.

By J. M. ANDERSON.

It may strike the clerical man, at first blush, that our present arrangements are quite adequate, and that no special need exists for any scheme of training for clerical staff. It is certainly true that this need is felt at a much earlier stage in departments whose members are employed outside, where the constant active supervision of superior officials is impossible. Nevertheless, this stage must eventually be reached by inside departments also; a fact which has had to be recognised in the case of operating staff, by the establishment at some of the larger centres of schools for teaching the work.

I have attempted below to forecast the increase of clerical staff. The data at my command has been very limited, and all figures quoted in the paper have had to be worked out in a very roundabout fashion. While they are at best, therefore, only approximate, I believe they are near enough to justify the conclusion that the time is ripe for consideration of the systematic training of clerks.

Throughout the districts we have at present a staff of some 1,059 district office clerks. Assuming an increase of 10 per cent. per annum (as against 16 per cent. increase in stations), by the end of 1911 we should have 1,789. That gives a nett increase of 730. Allow another 5 per cent. per annum for replacements caused by promotions, etc., and we find that in this period we shall bring 1,095 new members into the staff of district office clerks.

To bring these figures nearer home, the office which now employs twenty clerks will (assuming the rate of progress stated), at the end of 1911, have 34, and will altogether have passed 21 new people through its hands.

How is each unit of this army of 1,100 men to become a clerk thoroughly equipped for the Company's work? Clearly, chance cannot be allowed to play so large a part in the game as it has in the past. A definite scheme of training is an obvious and an urgent necessity.

With the object of taking one step towards the institution of such a scheme, I have pleasure in submitting the following notes. The scheme outlined cannot pretend to be more than a hastily-prepared first impression. I trust it may serve the useful purpose of an original sketch-plan, even if the fabric, when complete, bears little resemblance to it.

CHOICE OF NEW STAFF.

Here lies the crux of the subject—"First catch your hare." To ensure that only thoroughly suitable recruits are taken on, much time and trouble must be taken. It has been my experience on several occasions to pick 20 or 30 of the likeliest written applications for an office boy's situation out of a much larger number, to interview all of those who called when requested, and to reject the lot. The cause of rejection in most cases has been inability to pass an arithmetical test. The average boy leaving school appears to be lamentably deficient in this particular, and is, therefore, quite unsuitable for our purpose.

There should be no difficulty in attracting to the Company's service the very best class of boy, and we should insist upon obtaining the best. The Company's service offers better prospects than most other business offices, as the scope for promotion is great and varied, and the steady growth of the service ensures permanent employment to the efficient worker.

I suggest the following rules for the selection of new staff:—

(1) That only boys fresh from school be engaged; all higher positions being filled by promotion.

(2) That a prime condition be that the boy must have at least two years' higher grade education—*i.e.*, two years beyond the elementary course, which takes up to the sixth standard.

(3) That the applicant be subjected to a careful examination; a standard examination form to be supplied, and a high percentage of marks required.

No. 1 may not always be possible, but should be carried out as far as circumstances will permit.

It may be objected to No. 2 that schooling is not everything, and that such a rule, had it always existed, would have debarred the engagement of some excellent servants now on the staff. I do not lose sight of either fact; but I suggest that we should be equally particular to secure lads with the *other* necessary qualities, making this an *additional* condition. Further, the standard of education has gone up; no difficulty should be found in getting lads to fit the rule, and no one will gainsay that they are better with the prescribed standard of education than without.

As regards No. 3, the examination might extend over these subjects: Composition, writing from dictation (these cover handwriting, spelling and punctuation) and higher arithmetic. From my own experience, I should recommend special stress being laid upon the last-named. I have it also on the authority of a school teacher of long experience, that "a boy who can do his sums can do anything."

SCOPE OF APPLICATION.

It is clearly impossible to devise any training scheme which will meet the needs of districts of all sizes. So far as the information at my command goes, I understand that the number of district office clerks mentioned in the introduction is divided thus:

(A) London	...	...	...	...	185
(B) Eleven districts with twenty clerks or over					438
(C) Forty-four " " under twenty clerks					436
					1,059

It is in classes "A" and "B" that the need for systematic training will be chiefly felt; but the suggestions here made are designed specially to meet the needs of "B." Whether they could be applied to London, it is not possible for me to judge. Perhaps each great division of the Metropolitan staff could be considered as a separate entity, and the scheme applied in order to give the junior an all-round knowledge of the work of his own division.

There remains the large class "C." I expect that within two years, three at least of the districts there included will, owing to expansion, have joined the "B" class. The others are more difficult to provide for. Hard and fast rules cannot be laid down for them, since staff alterations must be ruled largely by special local circumstances. In this class, however, it is common experience that the clerk has, without any pre-arranged system, a much better chance of acquiring an all-round experience than his colleague in the larger office; every opportunity should be given him to do so when staff changes are being made, and in this way the spirit of the scheme outlined may be applied to offices of the "C" class. The rules suggested as to the choice of staff, classes and examinations might, I assume, be made to apply to all offices.

There remains a large body of clerical staff outside of district offices—*viz.*, local office, engineer's and other clerks. These I have not attempted to deal with. In some districts it may be convenient to fit in junior positions in such offices with the scheme. Where that is not the case, I suggest that they should be dealt with quite separately.

COURSE OF TRAINING.

The principal object to be served is, to my mind, to provide the clerk with a better opportunity than he now possesses of acquiring a working acquaintance with the whole accounting system, so that he may better appreciate the relation of the cog to the wheel, of the wheel to the whole machine. The value of equipping every clerk with this knowledge goes without saying. The difficulty of its accomplishment under present conditions will have been generally felt.

It is from that groundwork that the following proposals have been evolved:—

I suggest that the first four years of a clerk's service be devoted to a systematic course of training, covering the various branches of the work, and that, for this purpose, the time be divided into eight periods of six months, each to be devoted to a different branch. In practice the periods would be regulated by the speed with which positions could be found in a higher grade for the clerks as they completed their training. I believe, however, that the half-year period could be adhered to, at least, approximately.

In starting such a scheme, the junior positions in an office would have to be divided into cycles of eight positions each,

graduating from the simpler to the more responsible work. Of course, the scheme could only be applied to an office which had at least that number of *junior positions*. Let us take as illustration an office with that number exactly, consisting of

- (1) Office Boy.
- (2) Stores Slips Clerk.
- (3) Fees Clerk.
- (4) No. 2 Clerk.
- (5) Pay Roll Clerk.
- (6) Cash Counter Clerk.
- (7) Collector.
- (8) Works Order Clerk.

Grade these positions in the order named. Assume that each half-year it is possible to promote the works order clerk to a senior position. The process, then, would be to shift each of the others up a point and engage a new office boy.

This is beautifully simple until the time arrives when more than eight junior clerks are required. When a ninth position has to be created we must construct a new cycle, and let each subsequent new junior position created represent a different period of that cycle.

Assume, for ease of illustration, that the need for extra assistance is earliest felt at the office boy's desk, and a second boy has to be appointed. Scope for his promotion cannot be found on the existing cycle without keeping him and his successors back. We, therefore, consider this new position as period 1 on a new cycle.

Six months later, assistance is found necessary for the works order clerk, and a position called "costs slips clerk" is created. It becomes period 2 of the second cycle, and to it is promoted the boy from period 1, a new boy being engaged.

Again, in six months, it is found that the rentals clerk has more work than he can get through, and an assistant is given him. Call that position period 3, promote the lads in the two lower periods and again engage a boy, and so on until, when there are sixteen positions, we have two cycles.

The second cycle would give the junior clerk to complete a round of the branches as the first, but he would take them in a different order. The complete second cycle might, for example, appear as follows:—

1st period	...	Office Boy
2nd "	...	Cost Slip Clerk
3rd "	...	Assistant Rentals Clerk
4th "	...	Assistant Outstandings Clerk
5th "	...	Correspondence Clerk
6th "	...	Wayleave Clerk
7th "	...	Petty Cashier
8th "	...	Ledger Clerk

In both cycles the positions named are imaginary, and are simply used for illustration. In practice they may not fit any given office.

It is to be understood that each cycle would have to be carefully graded from simple to difficult work, and that the juniors of different cycles would strike the same branch of the work at different periods, taking duties suited to their experience. Thus, in the first sample cycle, the junior acquires his experience of stores work in his second period, dealing with the simplest of the work, in the capacity of stores slip clerk. In the second cycle he acquires it in the eighth and last period, taking the more important work of ledger clerk.

This proposal, to a certain extent, follows up that made by Mr. HARE in his paper at the officers' meeting, 1903. Mr. Hare further suggested that the course of training should follow the course of the works order from its issue to the payment of the rental. This arrangement would greatly enhance the value of the scheme, and should be kept in view in grading the positions. I fear that it will not be found possible to apply it generally.

In offices with a large number of existing junior positions, it will probably be found difficult to grade these so as to form complete cycles. For example, Glasgow furnishes

- One complete cycle.
- One with third and fourth periods missing.
- One with fourth and fifth periods missing.
- One with second, third and fourth periods missing.

These missing periods can, I suggest, be gradually filled up as new positions are created.

Should any reader fear that the work would be likely to suffer through these frequent changes, I would point out that with careful grading, the earlier periods can consist of jobs the simplicity of which would protect them; and as for the later stages, the junior should, by the time he reaches these, have acquired sufficient experience to ensure satisfactory execution of any work he may be required to handle.

Having started the fledgeling clerk upon the first period of one of these cycles, I propose to let him complete his four years' round without the aid of any elaborate machinery for training. Should he possess the proper intellectual equipment, he may be safely left in the hands of the seniors under whom he will work. The clerk is under constant supervision, and can always avail himself of that best of all aids to the acquisition of knowledge—the asking of questions.

I would only direct attention to these three points:

(1) Keep ambition red hot. A healthy ambition adds enormously to the value of any worker. As each new period is begun, explain to the rising clerk all the splendid possibilities that exist for the lad who makes the best use of his time.

(2) Give him every chance of getting acquainted with the Company's whole accounting system. A chart might be kept for each period, showing fully the routine of that branch of the work with which it is immediately concerned, and this could be explained to him and always kept within his reach.

(3) Make obligatory the attendance at evening classes. Subjects recommended—higher arithmetic, mathematics, bookkeeping, and the Civil Service subject known as "Precis writing (including indexing and digest of Returns)." Creditable passes in these subjects to be made a condition of retaining place on staff, and special performances to be recognised by bonus additions to salary.

Here let me say that I have intentionally omitted technical classes. Let the lad by all means take advantage of the correspondence or other technical classes if so disposed. That may be left to his own inclination, and need not form an integral portion of the scheme.

Our primary object is to train up efficient accountants, and if we succeed in turning out as many as will be required our hands will be quite full enough. This proposal is not intended to interfere in any way with the existing apprenticeship scheme.

SALARIES.

Throughout the four years' training period I suggest that salaries be paid at a fixed scale, and that they should be sufficiently liberal to attract the best class of boys. I am of opinion that the value of an intelligent junior clerk appreciates by not less than £10 per annum.

The annual increment might be divided into two equal portions, and given at the end of each period. As suggested above, the salary might be subject to bonus additions for special performances at evening classes.

PROMOTION.

Before promotion to the senior staff the junior clerk might be made to undergo an examination directed to establish:

First.—That he had acquired a working knowledge of the whole accounting system.

Second.—That he knew how to deal with problems which he would be liable to meet in some of the branches of the work through which he had passed.

Third.—That his general education had been improved to a certain standard.

Once he has been drafted on to the senior staff I propose to leave the clerk to work out his own career as is done at present. In the higher stages it will be preferable to leave full scope for individuality and to grant promotion purely on merit.

EXPANSION.

I suggest that before the end of each half-year a report of the number of the clerical staff as existing and as required for the new

half-year should be presented to Head Office. This report to show:

1. The number of existing staff, seniors and juniors, giving details of the cycles of the latter, showing filled and blank periods.

2. The estimated increase of senior and junior clerks for coming half-year based on the estimated increase of stations; the juniors to be detailed to show the blanks to be filled in existing cycles, and the periods of new cycles to be created, in both cases indicating the work to be attached to the new positions. (*Note.*—The ratio of senior to junior clerks from half-year to half-year should not alter violently, but it will probably be found that the proportion of the latter is gradually growing, and this could be allowed for in the estimates.)

The object of these reports is to ensure that the whole position be overlooked periodically. They would take the place of the "proposal form" (Schedule No. 1,058.)

These proposals being sanctioned, the new positions could be created as they became necessary; new positions on the senior staff as well as replacements due to promotions, transfers and resignations being filled by the juniors who had completed their training.

In conclusion, having worked out such a scheme, the natural query is, "This sounds very plausible, but will it work?" I have considered the difficulties likely to be met with, and now state them with my replies:

(1) Can positions be found for the juniors as they complete their training? If not, the whole cycle will be kept back.

This difficulty will only arise where the increase of business is not maintained. Where that occurs a compromise might be effected by setting work aside for an intermediate class, awaiting appointments. The more likely difficulty is, I think, that juniors will not be trained quickly enough to meet the demand, and a senior position may have occasionally to be filled from outside, which will be regrettable.

(2) If, from resignation or other cause, a clerk be withdrawn from one of the cycles, is not the whole cycle disarranged?

This, no doubt, is a serious difficulty, but it can be met either by promoting the lower members of the same cycle before their time or by bringing in an outside junior.

(3) In the gradual construction of new cycles it is assumed that the fresh positions will turn up, properly graded, each six months as they are required. Is the assumption justified?

Quite possibly not. Much depends upon the development of the business. It is quite possible that the earlier members of new cycles may be kept longer than the regulation six months in the lower periods. This difficulty should gradually disappear as the cycle nears completion.

(4) After the clerk has gone the round suggested, is his knowledge of the work complete? In the two sample cycles given, is every branch included?

No; but to make the course absolutely complete would necessitate a much longer period than four years, and the inclusion of work which cannot be given to any but a senior clerk. The fact remains that the course proposed gives the junior a certainty of acquiring a fairly complete general knowledge of the work.

"THE NEW CHUM."

By FRANCES M. GABB.

THE newcomer from the Mother Country is affectionately greeted in our Colonies as "the new chum," which implies that the Colonials are ready to welcome the stranger as one of themselves, and make his path as pleasant as they can by showing him how to avoid the various pitfalls which beset the unguided in a new country, and by giving him the benefit of their experience, often bought at bitter cost.

At the present time, when new positions on the operating staff are opening up so rapidly, it seems opportune to speak of the newcomer in the switchroom, and of our manner of greeting her. The stranger in this case may be either the learner from the operating school sent to an exchange to practise, or the probably more advanced operator on probation, and these are practically in a new land when they pass from the operating school to repeat "Number, please?" to an often impatient subscriber, whose manner and tone are far removed from those of the helpful and sympathetic school supervisor. It would therefore be gratifying to know that these strangers are welcomed at an exchange by their future colleagues in the spirit that the words "new chum" suggest.

Of course it is not necessary or politic that a newcomer should be *filed* on her arrival, and perhaps later as inconsiderately dropped in fickle haste, but there are so many little ways in which she can be made to feel that she is welcome as a possible "chum." An experienced operator can do much to make the way of the beginner easier, both in the switchroom and in the time off duty, figuratively taking her under her wing until the exchange and its work have become more familiar and she has found a congenial companion among her fellow-workers.

How many operators can look back now and remember the mingled feelings they experienced on their first entry into a real exchange? Only those who remember vividly those first impressions can realise the state of mind of an operator on probation, fresh from her five weeks' training, transferred to one of our larger exchanges and become a solitary unit among hundreds—fresh faces on every side, and perhaps never a kind word or friendly smile until weeks have passed and time has broken down the national barrier of British reserve.

There have been cases where the covert sneer or sarcastic smile have brought the blood tingling to the face of a sensitive girl, and others where the enthusiasm which is cultivated in the school has been looked down upon and decried as a species of bad form, until it seems almost a crime to the newcomer to show any interest in her work whatever.

It is wonderful how the objection to talking "shop" has crept into our modern life; surely it is better to wax enthusiastic over one's work if well done, than to be indifferent either to praise or blame.

This then would seem to be the time to cultivate the spirit of the "new chum," and under these conditions it would soon be considered bad form to be otherwise than friendly towards the beginner, who would then feel that she had become a member of a great family, and that it was incumbent on her to put forth her best efforts so as to be worthy of the esteem and friendship proffered her.

This spirit would, I believe, promote a bond of unity throughout each particular exchange, and a healthy rivalry among all.

The influence of the seniors in any exchange is naturally very great, and if they will show the example the juniors will most assuredly follow their lead; who can estimate the lifelong friendships which may thus be promoted, that will prove a blessing to each one concerned, perhaps for long after active service at the switchboard has ceased.

ITALIAN TELEPHONE CONDITIONS.

IT is reported in the Italian newspapers that the Italian Government is about to take over the systems of the Telephone Company of Northern Italy and of the Italian General Telephone Company. The plant of these companies includes both local exchange systems and interurban lines, and with the transfer the practical monopoly of telephony in the kingdom will pass to the Italian Government, as the two companies named have hitherto done most of what little telephone business there is in Italy. It is to be hoped that the Italian Government will do better with the telephone service than it has with the railways, which by all accounts have been in a demoralised state ever since the Government took over the railway companies. There is certainly a great opportunity for telephone development in Italy, as in the whole country, with a population of over 33 millions and many large cities, there are only 37,500 telephones.

THE STOMBAUGH GUY ANCHOR.

By A. MAGNALL, *District Engineer, Manchester.*

SOME time ago the Engineer-in-Chief gave me the privilege of testing a few of the Stombaugh guy anchors, and, as the results of these tests may be interesting to the readers of the JOURNAL, I give the details below.

Those who may not have seen the Stombaugh guy anchor I would refer to Fig. 1, by which it will be seen that the anchor is a rod of iron, with an eye on the top and a screw helix at the base which is screwed into the solid ground, as shown in Fig. 2.

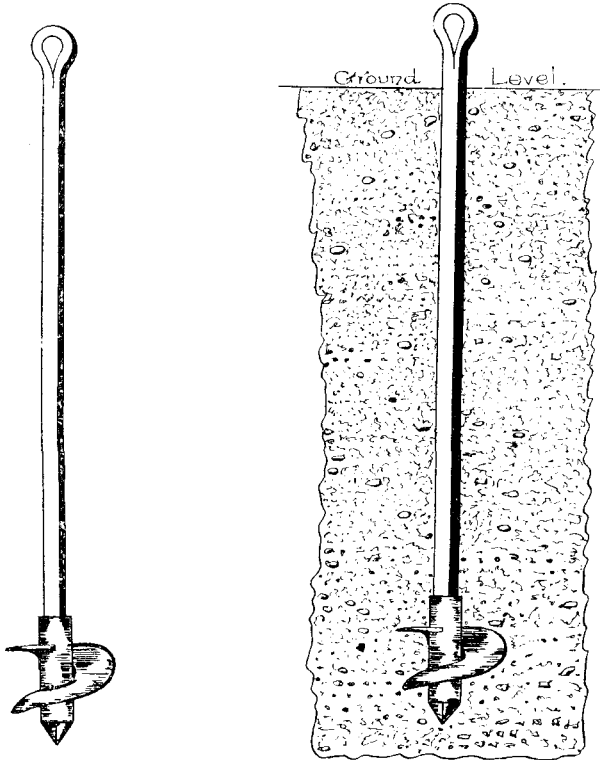


FIG. 1.

FIG. 2.

The apparatus used to obtain the lifting power for testing the holding power of the anchors was a large lever 16 feet long, fitted with a carriage for weights; the formula for same being

$$W = \frac{P \ A \ F \times \ p \ C \ F}{B \ F}$$

When W = load at equilibrium.

P = pressure, depending on W.

A F = distance of P from fulcrum = 11 feet 5 inches.

p = weight of beam = 3 cwts.

C F = distance of p from fulcrum = 5 feet.

B F = distance of W from fulcrum = 3 feet.

See sketch Fig. 3.

A decided result was obtained in each experiment, and the results given below may be taken as correct.

Experiment No. 1.—At Manor Street Yard. Anchor with 6-in. base, No. 603 R. At the first attempt the helix would not bite, merely churning up the ground. A fresh position was selected, and with four men the rod was sunk 4 feet 10 inches in thirteen minutes. The base of this guy smashed in pieces when a pull of 8,073 lbs. was applied, the ground being undisturbed.

On examining the ground it was found that the surface was completely solidified by old brickwork foundations (the base of the guy had just passed the brickwork), below there was gravel, and, finally, clay.

Experiment No. 2.—At Manor Street, anchor with 10-in. base, No. 1,000.

Would not bite in the cindered surface of ground; had to open ground a little.

Full time taken to obtain a depth of 3 feet 6 inches only, with four men, 30 minutes.

With a pull of 9,791 lbs. this anchor was lifted out of the ground; the radius of the ground broken was 3 feet 9 inches.

On examining the ground, it was found that the reason the anchor could not be sunk further than 3 feet 6 inches, was that the base had come in contact with a stone boulder about 12 inches long, which was in an upright position immediately in front of the screw base.

The nature of the ground in this case was cinders, gravel and clay.

A cylindrical hole 18 inches deep was made by the base of this anchor before the ground generally lifted.

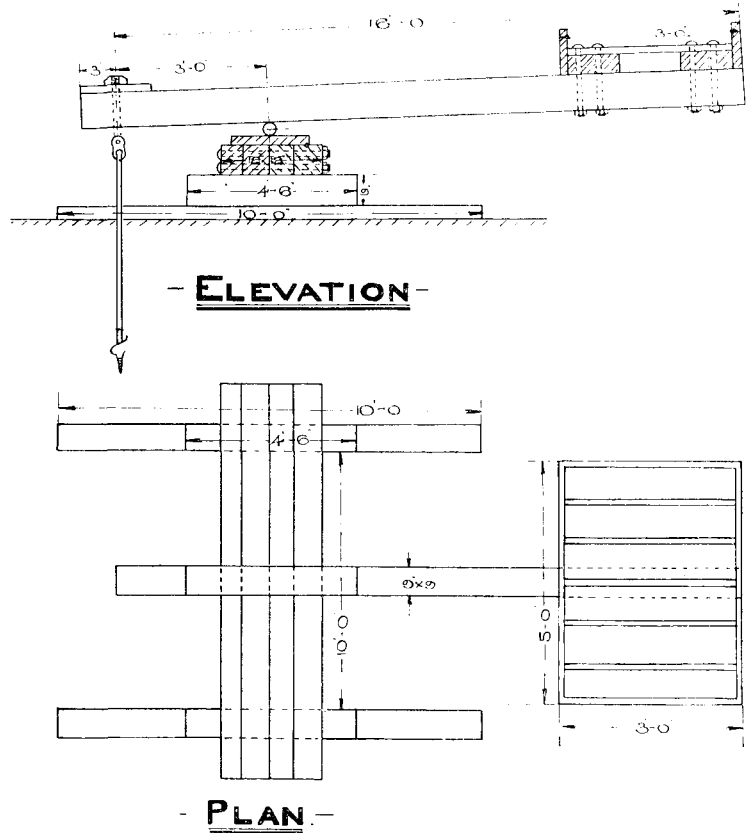


FIG. 3.

Experiment No. 3.—In open lands at Moss Side. Anchor guy with 6-in. base, No. 603 R, sunk 5 feet. Lifted out of ground with a pull of 5,497 lbs.. Radius of ground broken, 1 foot 6 inches. Nature of ground, hard clay.

Experiment No. 4.—Conditions as in No. 3. Anchor with 10-in. base, No. 1,000. Sunk 5 feet. Lifted out of ground with a pull of 12,796 lbs. Radius of ground broken, 2 feet 10 inches.

Experiment No. 5.—Conditions as in No. 3; 10-in. base, No. 1,000. Sunk, 5 feet 1 inch. Lifted with 14,084 lbs. Radius of ground broken, 2 feet 6 inches.

Experiment No. 6.—Conditions as in No. 3. Anchor with 6-in. base. Depth in ground, 4 feet. Lifted at 3,350 lbs. Ground disturbed, 1 foot 6 inches.

I next buried an ordinary 8-ft. rod and block in a hole made during one of the above experiments, simply laying the block flat at the bottom of the hole and well punning the ground in. The depth in this case was 5 feet 6 inches.

On testing this the ground broke at the surface with a pull of 7,000 lbs. (approximate).

Before actually drawing out, the rod gradually lifted as weights were applied; on examining the ground after the rod was taken out a hole the size of the block and 2 feet deep was found to have been cut in the puddled clay.

Another 8-ft. rod with ordinary block was placed at a depth of 5 feet 6 inches; in this case, however, the ground was undermined, in accordance with the Company's engineering instructions, and

the ends of the block worked under the solid undisturbed earth. The ground was then filled in in the usual manner, and with all the weight available, viz., 35,551 lbs., *not the slightest impression was made.*

During these tests a $\frac{7}{8}$ stay wire was broken at 13,225 lbs. Although the results obtained are not so satisfactory as those mentioned in the illustrated catalogue, these guy anchors have a remarkable holding power, and prove the advantage of being able to get hold of undisturbed ground. I felt compelled to report against their use by the National Company for the following reasons:—

(1) They are far more costly than the rod now in use; see Table No. 1 (B).

(2) They are not applicable, generally, for use in this country. In towns we are obliged to place our stays in corners and against walls, and in the country we have to place them close to the fences, therefore we are unable to use the handle of the wrench. They are more fitted for railway work or for work in the open country, which we do not get.

(3) The present standard rod and block are superior in holding power when properly fixed, and there is not the slightest reason why they should not be properly fixed in all cases.

TABLE NO. 1.

(A) Results of Tests on Stombaugh Guy Anchors.

Size of guy.	Depth in ground	Holding power.		Radius of broken ground.	Nature of ground.
		No. of 56 lbs. at end of lever.	Calculated holding power.		
6-in. base	4 0	10	3,350	1 6	Sticky clay, 21 inches from surface.
10 "	5 1	60	14,084	2 6	Do.
10 "	5 0	54	12,796	2 0	Clay 10 inches from surface (hard clay).
6 "	5 0	20	5,497	1 6	Do.
6 "	4 10	32	8,073	Nil.*	Gravel, sand and clay.
10 "	3 6†	40	9,791	3 9	Do.

* Blade smashed. Ground bonded with brickwork on surface.
† Could not sink deeper owing to obstructions.

(B) Cost of Fixing Guys in Ground.

Size of guy.	Depth in ground	No. of men.	Time		Total Cost at 5 ^s . 5 ^d . per hour.		Cost of guy.	Average total cost.	
			mins.	hours.	d.	s. d.		6-in. base.	10-in. base.
6-in. base	4 0	3	8	0.4	2.2	9 2.5	9. 6	47. 5	
10 "	5 1	3	12	0.6	3.3	46 10.5			
10 "	5 0	4	14	0.93	5.1	46 10.5			
6 "	5 0	3	11	0.55	3.1	9 2.5			
6 "	4 10	4	13	0.87	4.9	9 2.5			
10 "	3 6	4	30	2.0	11.0	46 10.5			

Note.—21s. 3d., cost of wrench for 6-in. guys, not included. A swivel is also needed, the cost of which is not included.

(C) Cost of Fixing ordinary 8-ft. Stay Rod and Block.

Time digging out hole for stay block 6 ft. 6 ins. deep.	Filling in and punning.	Cost (labour) material.				Total cost.
		Time.	Wage.	8-ft. rod.	Block.	
hrs. mins.	hr. mins.	hrs. mins.	s. d.	s. d.	d. s. d.	s. d.
2 25	1 5	3 30	1 7.25	3 3	11 5. 9.25	

THE FIRST CLERK-IN-CHARGE OF THE FIRST OPERATING SCHOOL.

ON May 24 a very successful "At Home" was held at the Operating School, London Wall, on the occasion of a presentation to Miss RALPH, the Clerk-in-Charge, on the completion of 25 years' service in the united companies.

The School, Lecture and Examination rooms, etc., and the Observation Office were open to inspection from 7 to 10 p.m., and during those hours a very interested company, numbering about 400, kept the Traffic Manager, Miss RALPH and her supervisors very busy explaining the apparatus and methods of tuition. At 7.30 an entertainment was commenced in the sitting-room, the arrangements for which reflect great credit on that section of the committee responsible, and thanks should be accorded to Miss DOROTHY BERRY and Messrs. COLLINS and TAYLER, who kindly gave their services and whose fine singing added much to the enjoyment of the evening. The songs by Miss LIDDELL and Miss TRINGHAM's recitations were much appreciated, and Miss G. BERRY, who acted as accompanist, also played several pianoforte solos. At eight o'clock the London Wall dining-room, where the event of the evening took place, was filled to overflowing. Among the guests were Mr. C. J. PHILLIPS (Southern Provincial Superintendent), Messrs. FRANCE and STUART from the Engineer-in-Chief's Department, and Mr. HARVEY LOWE, the Chief Accountant.

In his introductory speech Mr. EDMONDS said that although he could not claim 25 years' acquaintance with Miss RALPH he could testify to her unflinching courtesy and kindness to all with whom she came in contact.

The Metropolitan Superintendent, who made the presentation, spoke of the exchanges and methods of operating which existed during Miss RALPH's early days in the Company, giving amusing instances of "faults" which sometimes occurred, and primitive operating and apparatus in use. In her present position it is interesting to note that she is the first Clerk-in-Charge of the first Operating School in the world. Mr. CLAY then asked Miss RALPH to accept the beautiful present which had been subscribed for among her past pupils and friends in the Metropolitan and Head Office staffs. This consisted of a handsome inlaid Sheraton book-case, with silver plate bearing a suitable inscription and brass blotting book.

Miss RALPH in expressing her thanks said: When the idea of an "At Home" in the school was first mooted she little thought it would develop into so large an assembly or that she should find herself there as a guest. Although naturally a little overcome at first, she made an excellent speech and gave some very laughable instances of the lighter side of the Operating School and the strange answers received to the test papers.

Miss REEKIE, the Senior Supervisor of the School, proposed a hearty vote of thanks to Mr. CLAY for his attendance, and to Miss MINTER for organising the evening's arrangements.

Miss RALPH, being unable to personally thank all those who contributed to the presentation and the success of the "At Home," desires to take this opportunity of expressing her deep appreciation of the honour conferred on her.

HANDLING AND FILING CORRESPONDENCE.

By MATTHEW CULLEN, JUN., Glasgow.

THE large number of interesting letters which have been written on this subject show that Mr. DALZELL has started a topic in which keen interest is taken. After carefully going over the various views expressed, I find nothing more surprising than the fact that the writers all advocate systems other than filing in alphabetical order. Some file in chronological order, and others introduce a special code of numbers, to be used purely for filing purposes. Both of these systems have the disadvantage, as compared with alphabetical filing, that before you can get almost any letter required, you must consult an index of some kind to guide you to the place where it is filed.

After full consideration, I am strongly of the opinion that any advantages which these systems offer cannot compensate for that

It seems to me that the code number system, for example, will facilitate your search for one letter out of 100, and seriously hinder you with regard to the other 99. No system can, I think, be more simple than an "Amberg" or similar cabinet, supplemented by the usual transfer cases, all arranged in alphabetical order.

The stock argument against the alphabetical system is the difficulty of choosing subject-headings, and the vagaries of one's correspondents on the subject. I am inclined to think that so much has been thought, said and written on this subject, that an attack of "*subject-headingitis*" has been engendered. The employment of ordinary intelligence on the part of the filing clerk will effectually exorcise this bogey. If a correspondent is liable to misquote your subject-heading, either from accident or deliberately (because he conscientiously believes that he knows better than you what subject-heading should be used), is he not equally liable to misquote an elaborate reference consisting of seven or eight numbers broken up by a dash here and there and a selection of letters of the alphabet?

A short description of the alphabetical system in use in Glasgow may be of interest. It may be stated that this system was adopted after careful consideration of the merits of others (and especially of the code number system), that it has been in successful operation for practically three years, and is used in the handling of 160 inward letters daily. Before proceeding with the description, I wish to touch briefly on a few points raised in the course of the correspondence.

One writer suggested that inward letters should not be registered. I am afraid the premises from which he started—viz., that the registration of an inward letter fulfils the same function as the copying of an outward letter, is not correct. I am quite convinced that no system could possibly be a success which did not provide for the registration of letters as received.

The system which Mr. PRENTICE described is most ingenious, and the description very interesting. While it no doubt admirably meets the needs of the Engineer-in-Chief's office, I think it is unnecessarily elaborate for the provinces.

These other points have suggested themselves to me in reading the correspondence.

No file should be subdivided, putting one class of correspondence in one place and another elsewhere. Whatever the nature of the index used, whether alphabetical, numerical or chronological, letters from all classes of correspondents should get together. One writer states that he "progressed" from an alphabetical system to one of code numbers, making some comments on the former which are rather misleading. His difficulties were not inherent to the system, but were due rather to the subdivision spoken of.

A feature of some of the systems described is that a portion of the letters is kept in a temporary fashion in a basket or similar place. This is neither safe nor handy. A cabinet is the correct thing, and probably, as Mr. PRENTICE tells us, of cabinets the best is the vertical.

I now beg to submit a description of the salient features of our filing system:

Three Letters Received Registers are used, for "cash," "service," and "general" letters respectively. All three are indexed, and the two last-mentioned are numbered consecutively from the 1st of each month. The indexes are so seldom referred to that the question of abolishing this portion of the work is under consideration.

On receipt of a letter, it is stamped, registered, numbered and booked out. After dictating reply, the writer quotes date of reply in the space provided, initials below the date stamp, and passes to the file clerk. Before filing, carbon copy of reply is attached, filing date shown in register and the date stamp cancelled with blue pencil.

The cabinet is an "Amberg" of 75 drawers. Over 60 of these the alphabet is spread. Service letters are filed under the subject-heading, and others, generally, under the name of the correspondent. The exceptions to the latter rule are all letters which directly bear on a subject under which a batch of letters exists or may be anticipated. Thus, on the subject of "Cambuslang underground

work," in addition to the Engineer-in-Chief, Superintendent for Scotland and other Company officials, we may be in correspondence with local authorities, local subscribers, solicitors and others. All these letters should get together.

Where such departures are made from the rule of filing outsiders' letters under the name, a note should be placed in the file where, but for the departure, it would have gone. Thus a letter from the Lanarkshire County Council is placed in the "Cambuslang underground work" batch. Under "L" is placed a slip saying "Lanarkshire County Council (date) see under 'Cambuslang underground work.'"

The remaining fifteen drawers are divided into small subsections, each having a complete alphabetical index to itself. These subsections are "private," "pending," "special statements," etc. Into the "pending" section are placed all letters awaiting replies from correspondents. It is the duty of the file clerk to consult this file at least twice a week and draw the attention of the officer concerned to cases in which the correspondents' replies are overdue.

In order to secure early return of letters to the file, the following system of reminders is used:—

After four clear days a first notice is sent.

After seven clear days a second notice is sent.

Any letters still left form an insignificant portion of the total, but they must be carefully followed up. This is done by sending about the 20th of each month a third notice covering all the letters received during the previous month and still outstanding. The final stage is the entering of pending letters two months old into a "Letters Outstanding Book," from which they are watched until cleared.

When the cabinet drawers become full, the letters are transferred to transfer cases, which are numbered, and the numbers, together with the periods covered, recorded on tables gummed to the back of the cabinet drawers.

When filed letters are given out on loan, the transaction is registered in a foolscap book and initialled by the borrower. The top letter of the batch is stamped as follows:—

Lent from file
Returned complete
Certified
File Clerk.

These papers on loan are followed up in much the same way as unfiled letters, as described above.

I would suggest that Mr. DALZELL, who raised the discussion, should be asked to adjudicate on the various schemes in operation, as it would be an advantage to have a uniform system, at any rate for the provinces.

CORRESPONDENCE.

THE SLIDE RULE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to the article on "Use of Decimals in Estimating," by Mr. J. S. Terras, I think Mr. Terras' suggestion that the smaller items should be shown in decimals of a pound is going too deep down in the matter. May I suggest to him that the better idea would be for all articles to be shown in the Price Stock List at so much each, and that the smaller items be priced with the corresponding decimal of a penny immediately above; for instance, if an article cost 1½d. that might be shown as 1.5d., if ¾d. as .375d. I believe that if this method were adopted much valuable time would be saved.

With regard to the use of the slide rule. There is no doubt that this is of considerable use to cost clerks, and I believe that many of them use the slide rule in the course of their duties; but are the multitudinous uses of the rule known, or have they been pointed out to those of the clerical staff who could make the greatest use of it? It seems to be the opinion of many clerks that a slide rule is only for the use of the Engineering Department. This is quite a fallacy. In working out costs for the 149 or 213 Forms, and in fact all averages and proportions, the slide rule is invaluable. For working out lengths of wire the Engineer-in-Chief has recently issued a table giving yards in decimals of a mile, and it is stated that he accepts these figures for all information supplied to his department. If the slide rule is properly used in getting out the annual mileage for the Engineer-in-Chief, I venture to think that much wearisome work will be obviated. It would be no doubt interesting to know if the results arrived at by means of a slide rule are accepted by Head Office for Returns such as the 149, 296 or 104.—[The reply is in the affirmative.—ED. N.T.J.]

In conclusion, may I state that the adoption of the slide rule by the Company's staff is only another form of enthusiasm, as the study of it is most interesting, and when a moderate amount of efficiency has been attained much valuable time is saved to the Company with, of course, a corresponding increase of work disposed of.

Nottingham, May, 1907.

P. R. COCKREM.

THE CONTRACT OFFICE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

IN Mr. Nicholls' article in the June JOURNAL there occurs a remark which will awaken a lively interest in other Contract Departments. In following the course of the new contract Mr. Nicholls says: "The copy is simultaneously passed to the typist for a covering letter directing the subscriber to the proper quarter for any enquiries regarding completion."

I have always held that the Contract Department is the proper quarter for such enquiries, as it seems to me only reasonable that a subscriber should look for the due performance of the contract to those with whom he has placed his order.

The practice here is to deal with all such enquiries in the Contract Department, and particular care is taken to give the anxious subscriber as reassuring a reply as possible and to convince him that we are just as anxious to get the line completed as he is to have it. I gather from Mr. Nicholls' article that other practices prevail, and I should be glad to learn the views of others on this point. With Mr. Nicholls' concluding remarks I heartily concur.

Manchester, June, 1907.

HENRY ELLIOTT.

SECURING CALL OFFICE DIRECTORIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

IN the June JOURNAL Mr. F. Quinn asks for some information on the methods of suspension of call office directories.

The method employed at one time in London was to bore a hole through the top left-hand corner of the book, to pass a brass ring through this, and to suspend the book by a chain. This method was a good one, but resulted in much time being spent in fitting supplementary lists and in dealing with new lists. A better method was sought, and the possibility of providing metallic tape binding was considered, but abandoned on the score of expense. Eventually, in collaboration with Messrs. McCorquodale, the publishers, the steel clip shown in the sketch was evolved. It consists of a piece of steel wire, bent to the shape shown; this is passed down the centre of the book so as to grip the back binding and clipped in position, the action being similar to that of the safety pin. A piece of ordinary brass chain completes the outfit, the total cost, including chain, being 2½d. The chain is securely attached to the cabinet. All that is necessary when a new issue of the directory is distributed is to spring the clip open, insert the new list, and then spring the clip together again.



The supplemental list is fitted in the centre of the main list and is therefore quite secure. A label bearing the following notice is stuck on the cover of the main list:—"For latest additions and alterations see supplemental list in centre of this directory."

There is a tendency for this form of clip to tear the back of the directory under rough usage; to prevent this a small metal disc should be slipped over the end of the clip to take the weight of the book.

Generally speaking, though, it is found the books are renewed before they get into a very bad state.

London, June, 1907.

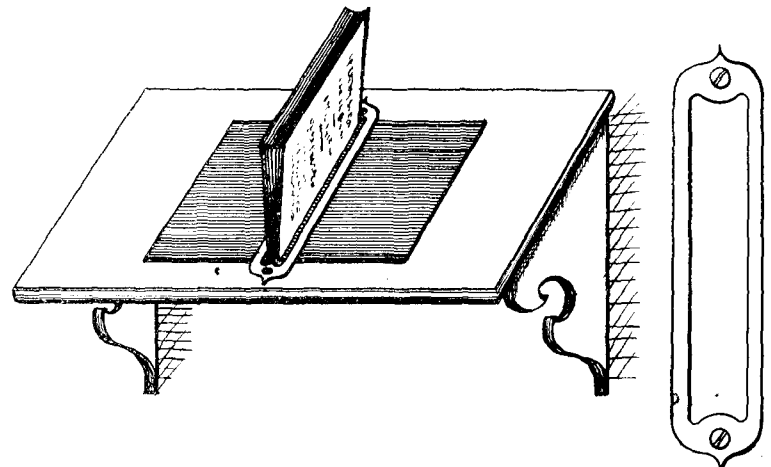
G. GREENHAM.

A DIRECTORY HOLDER.

BY A. WILSON, Chief Clerk, Maidstone.

IN the June JOURNAL, under "Queries" on page 54, Mr. F. QUINN asks what the various districts are doing to provide a Directory always in its place for the caller at unattended call offices? I am afraid that I cannot recommend the method I have seen adopted, which is to bore a hole through the book and to put a chain through it, fastening the other end to the wall. I can, however, suggest something which occurred to me when reading the JOURNAL and should prove at once simple, cheap and effective.

The rough sketch shows a metal binder to be passed over the leaves of the book and clamped down over the cover, the binder to be screwed at top and bottom to the shelf. The book



would then be quite free to turn over for reference, but it would be impossible to remove it by fair means. The sketch shows the suggested arrangement complete.

HIC ET UBIQUE.

THE Company, like other firms who advertise, casts its bread upon the waters in the hope of finding it after many days. A picture postcard, however, descanting on the advantages of the telephone, which was sent to a lady in the north of London, produced the following discouraging reply:—

Sirs,—Thanks for P. C. telephone, etc., but as I am about to enter a nunnery such worldly things have ceased to interest me.

"ENGLISH as she is wrote" is a favourite subject in the humorous columns of newspapers. The offender is generally a Babu, and occasionally a small continental hotel-keeper endeavouring to entice British custom. The undermentioned specimen, however, comes from a Welsh correspondent, and was addressed to the Company's Swansea office:—

Messrs. Managers.—Please allow me to ask you,, secretly,, if there is at yours,, Established,, Electric Machineries,, Cable,, can speak a person,, Some Gentleman has got me to this Machine very strange,, when I was not been told,,

Explanation not given to me,, where to apply,, Welsh speakers in Charge of,, are doing wrong duty purposely on me every Minute,,

I am doing Applications in search,, With hope to find,, for,, to look over Cable Lock..

UNHAPPILY, it is in human nature to be more ready with blame than praise. When we feel that we have been badly dealt with there is a certain solace in sitting down and writing a neatly worded, stinging letter of complaint or upbraiding, but when, on the other hand, we have cause to be well pleased with some public service, our gratitude rarely rises to writing point. We content ourselves with a sort of suppressed, inward gratitude. It is, therefore, with pleasure that we print the following letter, received from a Dublin doctor:—

I have to thank you for the promptitude and efficiency of your staff in repairing my telephone. The wire got broken on Sunday evening. I reported the matter at once. Although the next day was Whit-Monday, the repair was completed by 10 a.m. This I consider most satisfactory, and beg to thank you.

SWANS are the most "fearful kind of wild fowl" which ever get into difficulties with our telephone wires, but in America it seems that young mountain lions cause trouble. We hear that a telephone message was received at Big Hole River to the effect that a pole was on fire. The foremen and his men repaired to the scene and looked about for the cause of the pole-consuming fire. Fragments of a half-grown wild-cat were discovered tangled in the wires, and it is supposed that either through fright or curiosity this cat (elsewhere he is a "young mountain lion") had climbed the pole and on the crossarm had either created a short circuit or received a severe shock during a storm of lightning. The bolt (says the American journalist) had put the animal out of commission and

ignited the pole. We seem to remember reading in our youth in some book on "Parlour Science" that you could get lots of electricity out of a black cat with a serviceable hairbrush.

RECENTLY the King's Lynn Corporation, in an economical frame of mind, discontinued four of their telephone lines. Shortly afterwards there was an outbreak of fire in the town at midnight, and when the fire brigade turned out they had to search for the scene of the conflagration, as the telephone to the fire station had been removed. After searching half round the town the fire was located. Two of the telephones have been reinstated, and it is expected that the fire station line will follow suit.

That the Dublin Corporation appreciate the telephone as a useful adjunct to the fire brigade, the following extract from the 44th annual report will show:—

TELEPHONES.

All the fire stations have direct telephone communication with the Central Station, and the department is connected by duplicate lines with the telephone company's exchange, where attendants are on duty all night, so that alarms of fire or ambulance calls may be sent direct at any time. No number required. Ask for "fire brigade."

During the year the service was maintained in a satisfactory manner, and I am pleased to say there was no instance of failure to get proper connection when required; 154 alarms of fire and 1,675 ambulance calls were received through the telephone company's exchange, and twenty alarms and fourteen ambulance calls from the street fire-alarm boxes. These alarm points, which have worked satisfactory, will be extended on the south side of the city, and connected with the new Central Station during the coming year.

WHAT THE COMPANY IS DOING.

NINE exchanges have been opened during the month, bringing the total up to 1,324. They are Laurence Kirk (Dundee district), Saul (Gloucester), Charing (East Kent), Narborough and Birstall (Leicester), Plumpton (Sussex), Llanberis and Christleton (Chester and North Wales), and Kilnap (Cork); 3,434 stations were added during May, making a total at the end of that month of 424,920.

SUSSEX.—In addition to the exchange opened at Plumpton (Brighton area), considerable progress has been made towards opening new exchanges at Eastergate and Siindon in the Chichester area.

The new joint measured rate tariffs have now come into operation in the Brighton area, and, in the course of a few days, intercommunication between the Company's subscribers and those of the Post Office will be established.

A new junction line has just been opened connecting up the towns of Lewes, Newhaven and Sleaford, thus obviating the necessity of calling in the services of the Post Office trunk lines to obtain communication between those places.

MID-YORKS DISTRICT.—Twenty-two private branch exchanges have been recently added with 49 junctions and 88 stations. There are also five orders unexecuted for five private branch exchanges with eleven junctions and fifteen stations.

GLoucester DISTRICT.—In addition to the new exchange which has just been opened at Saul in the Gloucester area, the work in connection with the opening of new exchanges at Fairford, Lechlade, and Highworth in the Cirencester area, Westbury-on-Severn and Drybrook in the Lydney area, and Bartestree in the Hereford area, is being pushed on with. Estimates for a new exchange at Burghill, Hereford, have also been approved, and when these exchanges are established it will make up a total number of twelve new exchanges opened in the district within the past year.

PAISLEY.—The work in connection with the underground scheme is well under way. All the cable, with the exception of a length of 77 yards 600 pairs for leading into the exchange, has been run out, representing a total of 12 miles 986 yards. The work of jointing has begun, and it is expected that the whole of the south side route, which takes in eighteen distributing poles, will be joined through and working metallic circuit by the end of the current month.

BRIDGE OF WEIR.—An estimate has been passed for fitting an additional 50-line section at this exchange.

KILBARCHAN.—Estimates have been passed for opening a new exchange at this place, and the work is to be put in hand at once.

FARNWORTH.—Work has now been commenced on the underground scheme approved for this centre; 3,140 yards of pipes and 1,250 yards of three-way blocks have been laid. New exchange premises have also been secured in which switchboards of double the present capacity will be erected.

BURY.—A start has been made on the underground extension scheme here. The estimated cost is £2,432 and covers the building of 2 miles 932 yards of duct, and the laying of 3 miles 1,193 yards of cable.

ROCHDALE.—The underground extension scheme is now in hand. The Company is building 3 miles 158 yards of duct and laying 5 miles 1,746 yards of cable.

MAIDSTONE.—Sanction has been given to reconstruct the system at Maidstone (replacing overhead by underground wires) and to fit up a common battery exchange. The outside work has commenced on May 6. By June 15 the following work had been accomplished:—Trenching, 4 miles 361 yards; pipes laid, 5 miles 151 yards; manholes built, 7; jointing chamber, 1; distributing poles erected, 17; cables drawn in, 25-pair 136 yards, 50-pair 278 yards, 102-pair 260 yards, 204-pair 252 yards.

STAFF GATHERINGS AND SPORTS.

Glasgow.—The annual picnic took place on June 1, the destination being Rothesay. The number present was close on 300, and these were comfortably provided for on the journey by special train and steamboat. The city was left at 2 p.m., and on arrival at Rothesay tea was served in the Burgh Hall. Unfortunately the weather was dull and showery during the afternoon. The heavy rain in the early part of the day also compelled the outside sports to be abandoned. Telephone employees, however, are never downhearted, and the time was enjoyably spent in dancing in the hall, musicians having been engaged before leaving town to provide the music. The party returned at 8 p.m., reaching Glasgow shortly after ten o'clock.

Coventry.—On June 1 the staff of the South Midland district went by train to Kenilworth and walked thence through the fields to Ashow. Unfortunately rather inclement weather prevailed, but still a most enjoyable time was spent amidst the shelter of the beautiful cluster of trees which makes Ashow so renowned. Tea was served in two sittings indoors, after which games were indulged in.

Edinburgh.—For their annual picnic the Edinburgh district staff drove on June 8 to Hopetoun, the beautiful seat of the Marquis of Linlithgow. A party of considerably over a hundred included the district manager and Mrs. Stewart and other friends. A very enjoyable afternoon was spent in cricket, football, tugs-of-war, etc., and the few heavy showers proved insufficient to destroy the general enjoyment. An *al fresco* tea was declared decidedly better than the more formal method.

Amfere Golf Club.—Two representatives of the club were successful in entering the third round of the Lady Cranston Medal Competition, played over Saughton Course by clubs frequenting it.

Durham.—The district cricket team played the Cleveland Asylum Club on May 25 and won by 67 runs to 60. The match with Cowpen Bewley on June 8 also resulted in victory, the staff team scoring 62 for 8 wickets against a total of 35 runs for their opponents.

Portsmouth.—A *Big Hit*.—Whilst playing for the National Telephone Cricket Club at Portsmouth in their match against St. Bartholomew's, Mr. H. Shannahan hit a ball for eight runs "all run." It was a clean drive, and it took two good throws to return the ball to the wicket-keeper. The above-mentioned club is doing well in this its first season and has only been beaten once up to date. It heads its division in the Portsmouth and District Cricket League. The secretary would be glad of lists of football fixtures for the coming season of clubs run by the Company's staff, in order if possible to arrange matches, especially with adjacent districts.

Bristol.—A cricket match, District Office and Contract Office *v.* Electricians and Local Office, took place on May 25 at Abbots Leigh. The result was a win by 15 runs for the Electricians and Local Office. The opportunity was taken of making a picnic which was well attended.

Cardiff Annual Staff Dinner.—It is regretted that in the last issue of the JOURNAL that the paragraph relating to the annual staff dinner of the Cardiff district was headed "Swansea" in error.

LOCAL TELEPHONE SOCIETIES.

Southern (London).—The monthly meeting of the society was held at the Hop Exchange offices on May 23, a most interesting paper being read by Mr. F. M. Ward entitled "Common Battery Exchange Faults." The lecture was illustrated by lantern, the slides used being very good.

Plymouth.—The session was brought to a close on April 26 with a dinner followed by a smoking concert at the Globe Restaurant, Mr. P. F. Currall presiding. A splendid selection of songs were given both by the staff and by some well-known artistes. The company broke up at 1 a.m. with thanks to the chairman and committee—who were Messrs. Bennett, Evans and Walton.

NEWS OF THE STAFF.

Mr. ALBERT ANNS, who has been Secretary of the Company since 1890, completed 25 years' service on June 18 last.

Mr. C. H. ANDERSON, District Office Clerk, Liverpool, has been promoted to take charge of the Bootle Local Office clerical work.

Mr. T. H. GREEN, Local Office Clerk, Bootle, has been transferred to the Contract Department, Liverpool. Mr. Green was presented by the Bootle staff with a case of pipes on his transfer.

Mr. R. J. FERGUSON, Exchange Manager, Royal Exchange, Liverpool, has been transferred to the Metropolitan Centre. Mr. Ferguson was given a presentation on leaving the Royal Exchange.

Miss A. J. BROWN, Chief Operator, Walton Exchange, Liverpool, has been promoted to be Supervisor, Bootle.

Miss E. SHEPPARD, Senior Operator, Central Exchange, Liverpool, has been promoted to be Chief Operator, Walton Exchange.

Miss E. M. JONES, Senior Operator, Royal Exchange, Liverpool, has been promoted to be Schoolmistress, Operators' School, Royal Exchange.

Mr. P. F. CURRALL, District Manager, Plymouth, was presented with a handsome silver-plated tray by the whole of the staff prior to his transfer to the District Managership of Dublin.

Inspector A. E. DAVIDSON, Fraserburgh, has been promoted to the post of Chief Inspector at Inverness.

Lineman HUTCHISON has been promoted to fill the vacancy caused by Inspector Davidson's transfer.

Miss G. BORG, Birmingham, has been promoted from Supervisor to Monitor.

Miss M. HADLEY, Birmingham, has been promoted from Operator to Supervisor.

Mr. A. RICHMOND has been appointed Switchroom Clerk, Birmingham.

Miss M. A. BROWNHILL has been promoted from Teaching Supervisor, Leeds, to Supervising Operator, in place of Miss Rhodes resigned.

Miss M. B. WATSON has been promoted from Operator to Supervisor, and Miss G. A. ROBERTS to be Teaching Supervisor at Leeds Central Exchange.

Mr. G. F. VICKERMAN, Stores Clerk, Hull, has been transferred to Bradford, and Mr. E. B. MAINPRIZE replaces him at Hull.

Miss EVELYN COLLIER, Senior Operator, Cardiff, has been promoted to the position of Junior Supervisor, vice Miss Eastabrook resigned.

Miss M. CAMERON, Senior Operator, Bristol, was on June 6 presented with a dressing-case on resigning her position after four years' service.

Miss D. DAVY has been promoted to be Supervisor, Plymouth Exchange.

Miss FLORENCE PARIS was presented on June 18 by the Brighton staff with a travelling rug and steamer trunk on the occasion of her leaving the Company's service prior to her departure for New Zealand. Miss Paris had been in the Company's service a good many years, first as operator, and then as call office attendant at the Hotel Metropole, Brighton.

Miss E. COMPTON, Senior Supervisor, Cardiff, completed ten years' service with the Company on May 7, 1907. Miss Compton joined the service May, 1897, as junior operator; made senior operator on Jan. 1, 1901; was promoted to be junior supervisor on April 20, 1904, and was further promoted to the position of senior supervisor in January, 1905.

Miss COURTNEY, Belfast, has been promoted to the position of Supervisor, and Miss M'CRACKEN to that of Assistant Supervisor.

Miss GORDON, Larne, has resigned from the Company's service to go abroad.

Mr. H. J. PORTER, Lineman, Canterbury, was on June 8 the recipient of a handsome silver-mounted walking stick together with a tobacco pouch, from a number of his fellow-workers on the outside staff. The presentation was made by Foreman G. Brimms. Prior to coming to Canterbury, Mr. Porter has seen service in London, Chatham and Northampton. He has been in the Company's employ nearly 25 years.

Miss ISA GREY, Senior Operator, Central Exchange, Edinburgh, was presented by her friends of the Central with a Gladstone bag and a number of toilette requisites on the occasion of her transfer to Stirling district.

Miss E. K. WORLEY, General Manager's Office (Typewriting Department), was presented with a handsome dinner service by her colleagues on the occasion of her resigning to be married.

Miss E. J. WHITE, Service Department, London, has been transferred to the Contract Manager's Office, in place of Miss Leahy, resigned.

Sheffield.—The following members of the Sheffield staff have been successful in passing the Sheffield University Technical Department examinations in the following subjects:—

E. S. BYNG, 3rd Year Electrical Engineering Lectures, 3rd Year Electrical Engineering Practical Laboratory, 3rd Year Alternating Current Calculations, 2nd Stage Mathematics (Practical); all first class.

C. MARSDEN, 2nd Year Alternating Currents, 2nd Year Electrical Circuits, 1st Stage Practical Mathematics; all first class.

A. H. GRINDROD, 1st Year Telegraphy and Telephony, 94 per cent. marks; 1st Year Electrical Engineering, 92 per cent. marks; 1st Year Electrical Engineering (Tutorial), 93 per cent. marks; 1st Year Electrical Engineering (Practical), 87 per cent. marks; all first class.

A. PODMORE, 1st Year Electrical Engineering, 100 per cent. marks; 1st Year Electrical Engineering (Tutorial), 88 per cent. marks; 1st Year Electrical Engineering (Practical), 91 per cent. marks; all first class.

W. H. ROBERTS and E. MANNING, Telegraphy and Telephony, 1st Year, second class.

S. B. TOWNSEND, Electrical Engineering, 1st Year, first class, 91 per cent. marks.

E. CHAPPEL, Electrical Engineering, 1st Year, Lecture and Tutorial, second class in each.

London Traffic Department.—Promotions for June—

Miss EDITH WEBB, Operator, London Wall, to be Supervisor, Holborn Exchange.

Miss FLORENCE JENNINGS, Operator, Bank, to be Supervisor, Paddington Exchange.

Miss CELIA COLEMAN, Operator, Paddington, to be Supervisor, Kensington Exchange.

Miss WINIFRED ETHEREDGE, Exchange Clerk, Avenue Exchange, to be Clerk, Traffic Office.

Miss FLORENCE REID, Learner, Operating School, to be Clerk, Examining Matron's Office.

Miss LILLIE PHILLIPS, Operator, Hop Exchange, to be Clerk, Service Office.

Miss RUTH BOCKING, Operator, Hop Exchange, to be Clerk, Traffic Office.

Metropolitan Staff Alterations—

Mr. W. COURT, Foreman, Eastern, to Walking Foreman, Western.

Mr. H. WILSON, Wayleave Officer, North, to Assistant Engineer, North.

Mr. J. TAYLOR, Exchange Manager's Clerk, London Wall Exchange, to Exchange Manager, Battersea.

Mr. J. CHURCHMAN, Local Engineer, Ealing, to Local Engineer, Lee Green.

Mr. J. JONES, Assistant Engineer, Gerrard, to Local Engineer, Hammersmith and Ealing.

Mr. C. APPEGATE, Wayleave Officer, Deptford, to Assistant Engineer, Western.

MARRIAGES.

Miss M. WEBSTER has resigned her position as Monitor, Central Exchange, Birmingham, after thirteen years' service, and is leaving to get married. The operating staff have presented her with a handsome dinner service.

Miss RHODES, Supervising Operator, Leeds, was married on June 15. The staff presented her with a set of cutlery, as a mark of esteem. Miss Rhodes had been in the Company's service twelve years, three years as supervisor.

Miss M. A. PADGETT, Operator, Roundhay Exchange, has resigned, after five years' service, to be married. The staff presented her with a pewter rose bowl as a mark of esteem.

Mr. J. T. HART, Inspector, Bolton, was the recipient of a handsome oak timepiece on the occasion of his marriage. The district manager made the presentation and expressed the good will and best wishes of the staff for Mr. Hart's future welfare.

Miss E. P. MARTIN, Senior Operator, Aberdeen Central Exchange, who is leaving for Canada to be married, was presented with a silver cake-basket by the operating staff. The presentation took place in the Richmond Café, where an enjoyable evening was spent prior to Miss Martin's departure. Miss Scott, chief operator, made the presentation.

Mr. L. W. HUNT, Chief Inspector, Ipswich, was presented by the district and local staff, on the occasion of his marriage, with a handsome timepiece. The presentation was made by the local manager, Mr. F. Summarsell.

Miss MAY EASTABROOK, Supervisor, Cardiff, left the service on June 6 in view of her approaching marriage. Miss Eastabrook joined the Company's service as an operator on Jan. 1, 1897, was promoted to be senior operator on Jan. 1, 1901, and further promoted to be supervisor in January, 1905, which latter position she has filled in a very satisfactory manner. Prior to leaving Miss Eastabrook was presented by the switchroom staff with an electro-plated tea service and sugar tongs.

Miss GERTRUDE HILL, Post Office Fees Clerk, Liverpool, has resigned to be married. Miss Hill on leaving the service was presented by the district office staff with a pair of bronzes.

Mr. GEORGE M. BROWN, Exchange Inspector, Charing Cross Exchange, Glasgow, and Miss AGNES R. SMELLIE, Senior Operator, of the same exchange were married on June 7. To mark the event a social evening was held in the Academy Rooms, Partick on May 30, and in the course of the evening Miss Smellie was presented with a dinner set and Mr. Brown with a case of pipes from the staff as tokens of esteem.

Miss M. HYSLOP, Senior Operator, Argyle Exchange, Glasgow, has resigned to be married. The staff presented her with a gold curb bracelet.

Miss A. THOMSON, Argyle Exchange, Glasgow, has also resigned to be married.

Miss DANIELINA ROBERTSON, Senior Operator, Tron Exchange, Glasgow, resigned to be married on June 13. The staff presented her with a standard lamp.

Miss MAY POWER, Cardiff, who left the service in April last through ill-health, is about to be married, and was presented on June 4 by the switchroom staff with an electro-plated tea service and teaspoons.

Miss B. LEASK, Chief Operator, Fraserburgh, has resigned in view of her approaching marriage with Inspector BAILLIE, Peterhead.

Mr. J. H. WALL, Solicitors' Department (General Manager's Office), was presented with a set of cutlery on the occasion of his marriage on May 15.

London Traffic Department.—Resigning to be married—

Miss E. S. CURRAN, Supervisor, Kensington Exchange.

Miss H. L. HUGHES, Operator, Holborn Exchange.

Miss E. COOMBS, Supervisor, Holborn Exchange.

Miss M. DEAKIN, Operator, Gerrard Exchange.

OBITUARY.

Foreman HARRY PARVIN, Middlesbrough, died on June 16, following severe injuries caused by a fall from a 50-ft. pole on June 10. He fell on a wall and fractured several ribs. The deceased was an old and respected member of the staff, and his fellow-workmen have shown sympathy with the widow and family in a practical manner.

We regret to record the death on May 22 of Miss G. BULBROOK, an Operator at Gerrard Street, from scarlet fever. She only entered the service on Jan. 18 last.

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No. 17

TELEPHONE MEN.

XV.—STANLEY JAMES GODDARD.

MR. GODDARD was born in London in 1863. His father was Mr. JAMES GODDARD, for many years a tea broker in Mincing Lane, and very well known in connection with the China trade of those days. After spending some years at a preparatory school at Rottingdean, Mr. GODDARD went to Uppingham, which he left in 1879. He subsequently spent a year abroad, principally in Paris. In 1880 he went into the offices of Quilter, Ball & Co., at 5, Moorgate Street, E.C., as a pupil to Mr. WELTON, who was auditor to the National Telephone Company. With this eminent firm of chartered accountants Mr. GODDARD gained very considerable experience of general mercantile work, and in 1888 he was sent to New Zealand on a special investigation. A few years before this he had been admitted an Associate of the Institute of Chartered Accountants. Later he was elected an Associate Member of the Institution of Electrical Engineers

Curiously enough, soon after Mr. GODDARD first went to 5, Moorgate Street, one of the earliest tasks allotted to him under the liquidator was the liquidation of the old Edison Company, and he subsequently spent a lot of time at 36, Coleman Street, then the head office of the United Telephone Company, which in those days had no accountant of its own, its ordinary books being written up by Quilter, Ball & Co. This, of course, was before the days of Mr. ANNS. Later on the audit of the accounts, both of the National and United Companies, was undertaken by Mr. GODDARD, and carried on by him practically up to the time of his entering the Company's service in September, 1892. His knowledge of the vicissitudes of the National Telephone Company and of the companies out of which it grew was therefore pretty extensive, as he had also been engaged on the task of finding a basis for the amalgamation of the Lancashire and Cheshire, the National and the United Telephone Companies, which took place in 1889. On this occasion

Mr. WELTON was made liquidator and Mr. GODDARD was responsible for getting in the share certificates of the shareholders of the old companies and for the corresponding allotment to them of shares in the new National Telephone Company.

On entering the Company Mr. GODDARD was appointed the head of a newly created Audit Department, formed for the purpose of getting the accounts of the various amalgamated companies into uniformity; up to that time each district, although making its returns on a common form, kept its individual accounts just as seemed good in its own eyes. The work of placing all these accounts up and down the country on a uniform basis was one which took considerable time, and what is practically the existing system of returns, books and accounts was gradually introduced. In 1893 Mr. GODDARD took up the arduous work of Assistant to the General Manager, a position involving constant attention to an unceasing stream of details of all degrees of magnitude.

During the fourteen years not only have the affairs of the Company grown tenfold in volume, but the plant has been reconstituted, many methods, both technical and commercial, have been radically altered, and the general conditions surrounding the business have so largely changed as to introduce many difficulties unknown in the old days.

With many of the special episodes in the history of the National Telephone Company Mr. GODDARD has been most closely identified, perhaps more so than would naturally be inferred from his position in the Company. In all the Parliamentary and other inquiries, in the various agree-

ments with the Post Office, and in many of the most important negotiations he has done sterling work. On the great question of measured rates he is an authority, and many of our readers will remember the recent meetings he held in various parts of the country at which the



principles and details of the measured rate tariff were expounded.

Keen, clear-sighted and able, he is of course an enthusiast on the question of telephone development, and is an ardent believer in the possibilities of the service and in the powers of the staff to bring that service to a higher and still a higher grade of efficiency and usefulness to the public. An unruffled, even an imperturbable temper, good health, no "nerves" and an entire absence of any tendency to panic are among the characteristics of our sketch. His recent appointment as General Superintendent after the lamented death of the late General Manager is thoroughly popular throughout the service. He requires plenty of work from others, but this is no more than he gives himself, and he believes in keeping fit by means of plenty of exercise. Mr. GODDARD lives in the country, having a charming home on the edge of Stanmore Common, and is a great lover of horses, his favourite recreations being riding and driving.

THE INDISPENSABLE TELEPHONE.

WE are constantly receiving from correspondents accounts of the manifold uses of the telephone as a time, money and life saver in all parts of the realm. Some of them will no doubt prove of interest to our readers. Our Reading correspondent writes:

On May 25 the house of a leading resident in Tilehurst Road, Reading, was broken into in the early hours of the morning. The householder was roused by the noise, but the burglar promptly made his escape. The householder then telephoned at once to the local police station. Officers were immediately despatched on bicycles, in various directions, and a little later the burglar was caught some miles down the Bath road, and all the stolen goods, the value of which was considerable, recovered. When charged with the offence at the police station, the burglar said, "I have made a nice mess of it. *I knew I should be caught as soon as I saw the telephone.*" There is no doubt that had not the householder been able to apprise the police by telephone at once of what had taken place, his chance of recovering his stolen property would have been very small.

OUR Sheffield correspondent sends the following:—

A few days since I was the spectator of a serious accident to a volunteer artillery non-commissioned officer, whose horse fell on him and kicked him, inflicting shocking injuries. A doctor was upon the scene within three minutes of the accident and the famous fast-trotting Sheffield ambulance arrived within seven minutes, having come a distance of one and a quarter miles. The quick arrival of the doctor and ambulance was due to the telephone, and once more clearly demonstrated the benefits to be derived from its use.

THE district manager at Jersey writes:

As showing the advantage of an exchange connection when a medical man is urgently required, I had occasion recently to call for a doctor, and noted the time taken by him from the receipt of the telephone call to his arrival at the house (which I may say was distant from his residence some six hundred yards) and found that it was exactly three minutes, thus showing what can be done by means of the telephone plus a motor car.

FROM a Glasgow newspaper we take an account of a town council meeting conducted over the telephone:

As the most progressive municipality on earth, Glasgow has long borne an unrivalled name. Yet in one or two respects it seems to lag immeasurably behind certain townships in the United States. For example, a large town in Massachusetts has been conducting the meetings of its council over the telephone. They had evidently been experiencing weather something like that suffered in our own regions recently, when snug indoors the mayor was suddenly struck with the sparkling idea of conducting the civic business by telephone. He at once rang up officials and council members, and his suggestion being enthusiastically adopted, reports were read, appointments made, and other necessary business transacted in record time across the wires. The question, of course, arises—How would telephone town council meetings do in Glasgow? There is little doubt they would kill loquacity, and emphatically prevent all "scenes." For whenever a speaker grew the least obstreperous the provost could simply give orders to have him—disconnected.

Mr. F. A. S. WORMULL, late district manager, Newcastle-on-Tyne, has recently invented a new aluminium splint. This has received the approval of Sir Frederick Treves and of the Queen, with whom Mr. Wormull has had the honour of an interview.

THE PRIVATE BRANCH EXCHANGE.

By F. ALBANY, *Contract Manager, Portsmouth.*

THERE is probably nothing in the telephone world commanding more attention than this great labour-saving and time-economising device, and it is with a view to placing before the telephone users of this country a few brief arguments in favour of what may be termed the acme of commercial telephony—the private branch exchange—that these remarks are offered.

If we can convince the telephone-using public that we can save them time and labour and enable them to conduct their business with greater facility, we may justly claim that they are bound to give this question their serious consideration.

It is not at all difficult to show any business man that it is the only system whereby he can keep in touch with all departments of his business without the annoyance of messengers, who are never able to carry information quickly and satisfactorily.

The great convenience of being in a position to talk with outside parties when in any department cannot be over estimated as a time saver, both to the party called and to the caller.

The everyday misunderstandings and losses sustained through orders being misconstrued, and even going astray, are entirely eliminated by the use of the private branch exchange, as all calls are at once assigned to the proper department, and thus the responsibility is placed on the proper person.

Experience has shown that it is the minutes saved that tell in the conduct of any business, small or large, and that the firm which has the greatest facilities at its command is the better equipped to render satisfactory service to its clients, and thereby increase its reputation and business.

If any business man will take the trouble to figure out how much is actually thrown away in loss of time and what it amounts to in the course of twelve months, the result will be somewhat astonishing. A half-hour lost per day means more than a day per month; multiply this by the number of departments and it will soon be found that it is no trifling matter when expressed in £ s. d. When some definite figure has been arrived at, compare that with the cost of private branch exchange service. The result will be surprising.

The important question to bear in mind is not what such a system is going to *cost*, but what it is going to *save* by making the transaction of business more expeditious, and by giving the head of a big concern absolute control over every department.

You cannot add to the minutes in a day, but you *can* economise so as to make good use of them all. To run your business without needless interruption, to secure prompt service, to be in instant touch with all your business organisation means a great saving of time.

To save time saves worry; it saves energy that can be applied to some useful purpose and otherwise would be wasted.

Modern methods and the demands of the present-day business world make the utmost economy of time imperative. The telephone is the greatest time saver of the age. What the long-distance telephone does for the world at large, the private branch exchange system does for the business man on his own premises, in the bank, the counting-house, the factory, the large stores, the hotel, in fact, everywhere where two or three departments are gathered together under one head.

THE MANIPULATION OF TRAFFIC.

By E. J. JOHNSON, *Sheffield.*

It is only of comparatively recent date that the transmission of telephone messages in bulk, the manipulation of telephone "traffic," has been studied in detail and has received the persistent attention which the importance of the subject deserves. If we are to attain efficiency with economy in this branch of our work—practically the only branch of our work about which our customers care two straws—constant study of a host of details is absolutely essential.

This subject naturally divides itself into the following heads:—
The Load, Manipulation, Supervision, Management.

If the load is not ascertained it is not possible to get good results, as unless the operators are in correct proportion to the load an even and reliable service cannot be obtained.

Having ascertained the load for each half-hour, the next point is to determine how many calls an operator can handle in the half-hour. The standard load of 100 valued calls per half-hour is generally speaking a safe one, provided the percentage of junction calls is not high and that the service at the sub-exchanges, especially on ringing junctions, is quick and reliable. If any doubt exists on this point a thorough observation of the time taken to complete junction calls should be made, and if this is found to be excessive due allowance should be made when valuing calls.

The adoption of measured rates also has an influence on the load; it is obvious that recording the calls on tickets and getting "engaged" calls through add to the work. One measured rate call is about equal to one and a half flat rate local calls.

Having valued the load, it is plotted on squared paper and the number of operators on duty arranged to fit the load line. As this has been described in a previous issue of the JOURNAL I do not propose to go further into this, but would refer anyone interested to page 158, Vol. I.

The manipulation of the load is the all-important point, and every effort should be made to obtain uniformity of handling. The three essentials of a good telephone service should also be rigidly insisted on, namely, politeness, accuracy, speed. While speed is in every way desirable, it should not be obtained at the cost of erratic working, that is, by some calls being answered in two or three seconds and others in 20 to 30 seconds or even longer. An even service, though the average time of reply is slightly longer, will give more satisfaction, as the subscriber knows what to expect and is ready when the operator says, "Number, please"; while with an erratic service he is sometimes answered before he gets his receiver to his ear or is ready to give the operator the number, and in another case has to wait until his patience is tried and he complains of slow answering.

How is uniformity of service to be attained? Attention to the following points will go a long way towards securing this:—(1) Not overloading the operators. (2) Seeing that good team work is done. (3) Efficient training of new operators.

An overloaded operator is bound to give an erratic service, as she will have rushes of calls; when several calls are made at the same moment one of these calls will be answered immediately and the others will have to wait their turn; the next operator will probably not be able to assist as she is busy also; the service is therefore erratic, and the subscriber does not know what to expect. If the operators are properly adjusted to the load they will not be so liable to rushes of calls and will also be in a better position to assist each other, as when one operator is busy one of those on each side of her is likely to be relatively free, and therefore able to help her. Team work must be insisted on, both for answering and for clearing.

Uniformity in telephonic expressions is also very desirable, and every endeavour must be made to secure this.

The necessity for politeness and accuracy is so obvious that no remarks are necessary, other than that no opportunity should be lost of impressing the operator with the importance of invariable politeness, and that every case of rudeness or curt speech should be taken up with the operator who is at fault. As to accuracy, operators should hardly need teaching that the right number a little slowly is better for all concerned than the wrong number given ever so quickly.

The efficient training of new operators is a most important point, but is one which does not appear to be followed up in the provinces as it should be. Instead of a would-be operator being sent to a school and thoroughly trained, she is usually handed over to the tender mercies of a senior operator, who gives her instruction at the switchboard, to the disadvantage of the service and often to that of the learner, as if the senior operator does not take an interest in the learner the latter does not get well trained. As a general rule a supervisor cannot be told off to do this work effectively and thoroughly without disorganising the system of supervision; the monitors or clerk-in-charge also have their regular duties to perform and cannot be spared.

A school on the lines of the London school is out of the question in all but the largest of the provincial centres, but I think it would be to the advantage of the service if in all large centres, where there are about 60 operators in the central exchange and several more in the sub-exchanges, a suitable person were set apart to train learners.

In such centres there will nearly always be a few learners, and at times there will be sufficient to make a sizeable class. The person appointed to train learners should also visit candidates in their homes before it is decided which to engage; this would ensure that the new staff come from clean and respectable homes. When there were no girls in training this person could be very usefully employed in observing the service, listening on operators' head sets, and in making full observations on particular operators and noting their methods of work.

A room, which need not be a large one, should be set apart as the school and should be provided with diagrams of the switchboard, of a typical subscriber's line, of junction lines, and of other essential features of the system, also with a small switchboard and two or three instruments, in order that the operation of a call may be thoroughly explained before the learner attempts to do work at the exchange switchboard. Learners should be instructed and examined on similar lines to the London school, after this course of training they would not approach the switchboard ignorant of what it is and of what to do.

Having ascertained the load and obtained the necessary staff to deal with it expeditiously and efficiently, the staff must be supervised. Efficient supervision is one of the most vital points; strict and intelligent supervision will tend more than anything else to keep the service uniform. The supervisors must see that the operators under their charge answer calls promptly, do efficient team work, see that the operating rules are strictly carried out and be ready to assist the operators when necessary. The provision of quick and intelligent supervisors is most important and will go a long way towards establishing a good service.

As a part of the general supervision there should be frequent listening on operators' head sets in order to ascertain that the correct expressions are used and that no unnecessary conversation is indulged in; also that the correct tone of voice is used. The operators should be encouraged to cultivate a cheerful and pleasant voice; anything approaching an irritable or careless manner must be at once checked.

If it can be arranged it is a good plan to allow supervisors to listen to operators in their own teams and to fill up an observation form; by this means each supervisor will know the weak point of her own operators and will be in a position to deal with them. Listening on an operator's head set is the most satisfactory way of correcting irregularities in an operator's manner, tone of voice and use of phrases.

Supervisors must be on the look out for irregularities of any and every description and deal with them at the time. The load must also be watched, and any operator who appears to be overloaded must be assisted; in some cases it will be advisable for the supervisor to take the operator's place for a few minutes and get the position straight before allowing her to take charge of it again.

The clerk-in-charge and exchange manager must exercise a general supervision and see that there is no neglect of duty; have records of junction traffic taken at intervals to ascertain that the number of junctions is sufficient for the traffic; provide the contract manager with records of lines frequently reported "engaged," in order that the subscriber may be approached and induced to have additional lines. Every effort must be made to reduce the number of lost calls, due to subscribers' lines or to junctions being "engaged," as these are an absolutely unremunerative part of the traffic, indeed, a cause of waste of work and of annoyance to the public.

The service observation records should be watched with care, and any falling off in speed of answering or clearing, or any increase in the irregularities, should be carefully gone into, the cause ascertained and the remedy applied. If this is not done the service observation records are of very little practical use.

The complaints made by subscribers should be tabulated and counted up at regular intervals, say, once a month; these totals will show which class of complaint is most numerous and therefore most desirable to get reduced. Where dockets are used, each fault

or difficulty reported should be tabulated on a sheet ruled in columns headed with the docket codes, a stroke in the proper column for each complaint will be sufficient. If these are totalled up once a month it will be at once evident which class of complaint is most numerous, and consequently where it is most desirable to effect an improvement.

CURVES.

By W. W. COOK, Assistant Engineer-in-Chief.

EVERYONE should be grateful to Mr. HARE for his valuable articles on "The Broader Value of the Clerk." and it is only because it seems to me that one little paragraph in his paper will, if followed too literally, tend to narrow instead of broaden that value that I venture to say anything which may be misconstrued as depreciating the value of the paper.

The paragraph to which I refer occurs on page 55 and is as follows:—"Statistics and curves make interesting study, but there is an elasticity about them often inconsistent with hard facts and hard cash, and I should certainly advise all clerks to be wary in the use of them . . . for real business purposes the far-seeing trained commercial mind is worth, as a guide, any amount of the tabled cobwebs of ten years or so. What concerns the guardian of money and its interests most is the day-to-day experience."

I know that Mr. HARE did not intend to disparage the use of curves, and his concluding paragraph is sufficient evidence of this, but I think the words I have quoted will be taken by many of his readers as advice not to use curves at all.

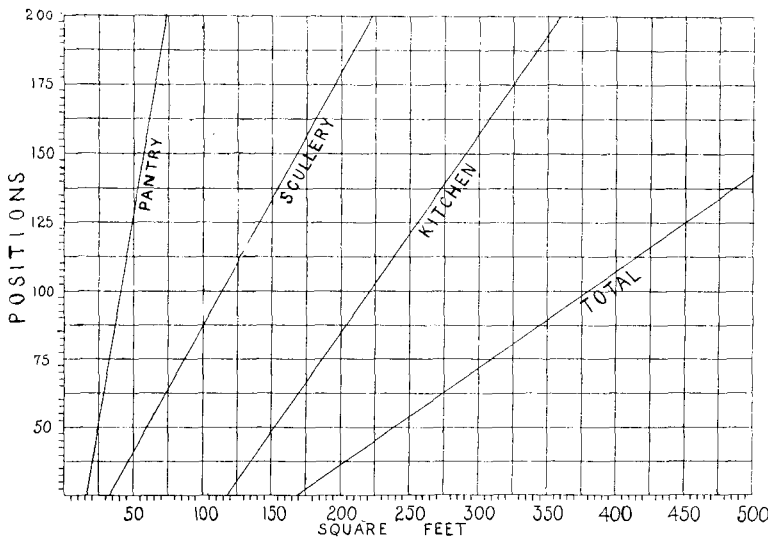


FIG. 1.

If a cabinet-maker were advised never to use a chisel because men had sometimes been observed to produce with it some entirely unlooked for and incorrect result I think he would see that the advice, however well intentioned and although founded on well-established facts, was really based on a false deduction.

One of the most useful tools that a clerk or anyone else can possess is the ability to make use of curves, and anyone who neglects such a tool is like the cabinet-maker who prefers to shape a piece of wood entirely by means of a file and glass paper. It is such a slow process that the man who can use better tools will inevitably earn more money, even if he occasionally use the chisel where it would have been better to have used glass paper.

Forecasting the future helped by "tabled cobwebs of ten years or so" is not to be entered on lightly and is of course subject to considerable error, but if the successful carrying on of a business depends, as does ours, on providing in advance for future requirements anyone who neglects any means of getting a glimpse, however shadowy, into that future will make far larger errors through this very neglect.

This, however, is only one aspect of curves.

Perhaps the simplest use of a curve is in place of a tabular statement.

The above curve (Fig. 1), derived from three plans prepared by Miss MINTER, shows the floor space required for kitchen, scullery and pantry for exchanges varying from 25 to 200 positions, allowing three operators on duty at one time for every two positions and providing for one-third of the staff dining at one time.

The same information could no doubt have been given in a table, but

- (1) It would have been necessary to make more plans.
- (2) It would have needed an elaborate table.

In addition, the shape of the curve gives a good deal more information than is likely to be observed in any table.

The fact that the points lie in a straight line shows at once

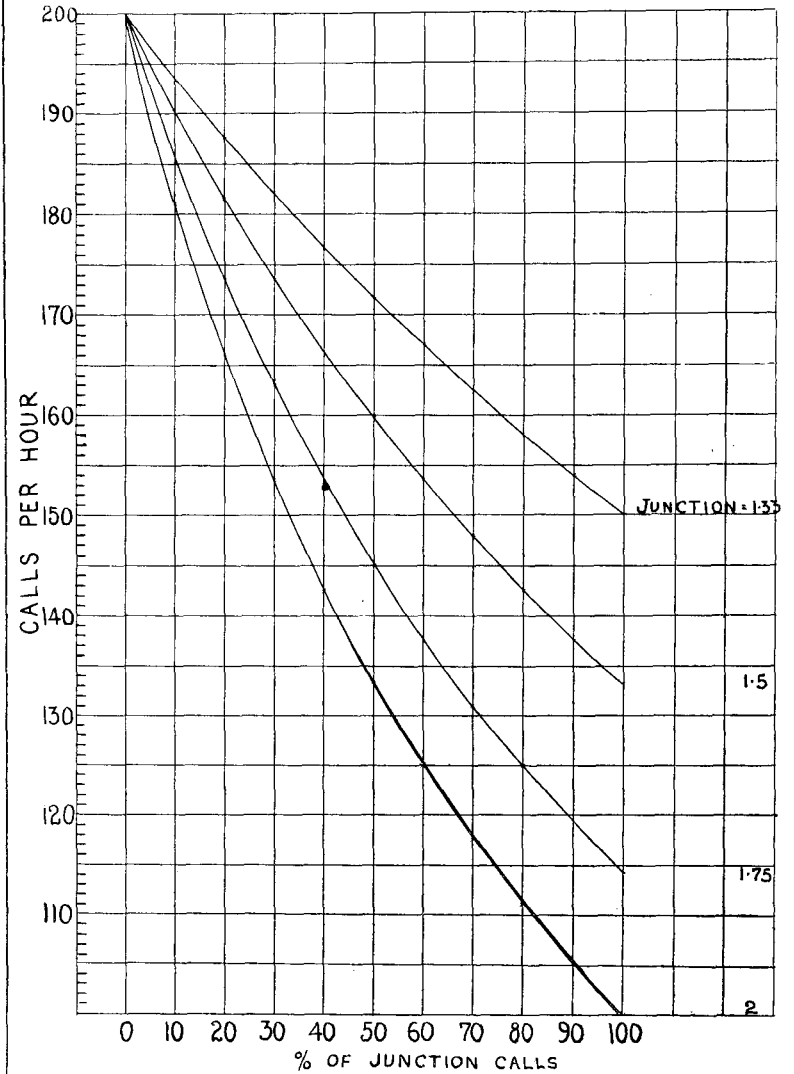


FIG. 2

that the increase in floor space per position is constant, and by taking any two points and dividing the difference in floor space by the difference in positions the law of the curve can be obtained.

Take the curve of the total:

125 positions require 450 square feet.
 25 " " 168 " "
 ∴ the difference for 100 positions = 282 " "
 " " " 1 position = 2.82 " "
 and as 25 positions require 168 " "
 and 25 × 2.82 = 70.5 " "
 the law of the curve is 97.5 square feet + 2.82 square feet per position.

The next curve (Fig. 2) shows the number of actual calls an operator can handle with varying values for a junction call, assuming the proper load as 200 if all calls were local.

If it were attempted to give all the information on this curve in the shape of a table I am afraid the moral of the curve would be missed in the mass of figures.

The law of a curve such as this is more complicated than a straight line, but anyone who thinks in curves can by trial and error generally discover it.

In this case, of course, the data given shows the construction.

In plotting any results in the form of a curve which follows any law it is easy to detect errors, as any incorrect result will prevent a regular curve cutting all the points.

The point I want to emphasise is that curves are not cabalistic phantoms only used for unpractical purposes, but that they are a method of recording results which enable these to be utilised to the best advantage and with minimum labour, and that as a means of expressing definite numerical ideas they are superior to any other method.

If this is correct then it follows that they cannot be ignored by anyone, even by the "far-seeing trained commercial mind."

Suppose the Company is about to purchase land on which to erect a building which incidentally is to house the district office, and the chief clerk is consulted as to the space which will be required for certain specified periods for which the building is to be planned.

The first question is to decide the number of clerks to be accommodated at the dates in question, and it will depend on the type of chief clerk as to what assistance will be obtained from him.

One man will point out that just as there have been changes in the past, such as the introduction of the message rate, which have altered the ratio of clerks to stations, etc., etc., it is quite impossible to correctly forecast the number of clerks in the future.

This is of course quite true, but in the meantime the architect is waiting to know the size of the future district office; someone has to instruct him, and chief clerk No. 1 has not helped matters much.

Another will produce a figure in five minutes, but on cross-examination says he has taken the size of the present office and added 50 per cent. The architect could have done this himself.

A third man says that as every district office he has known has been far too small, he hopes no such mistake will be made in this case, and thinks the new office should be "as big as possible." On being pressed for something more definite he says he wants "every bit of space he can get."

Perhaps the best answer to this gentleman would be to instruct him to negotiate the purchase of the property which he thinks will suit, but this may be considered too expensive a way of eliciting the information. Other types may be left to the imagination, and I will only mention one more.

This one ascertains the number of clerks in the district office for as far back as figures are available and plots these against what he considers the proper unit—say, stations, and then, having obtained from the proper quarter the estimated number of stations at the dates required, he projects his curve.

He then weighs all the factors he can think of which may influence the result, and after probably plotting several other curves to ascertain possible limits of error, he makes a definite selection and records how it was obtained.

If he has been asked to give the result in terms of floor space he probably makes some enquiries as to standard provision of space per clerk and then, to decide which of the varying figures given him is correct, he will probably make a sketch of an office for, say, 10, 20 and 30 clerks, allowing each his appropriate desk room and providing space for filing cabinets and other furniture.

After plotting these results he will be in a position to give a figure for any number of clerks between 10 and 30, and probably for more and less.

Having decided on his figures he is in a position to give in his information in a shape which will cause his name to be venerated for ever afterwards, and he will have gained an amount of knowledge which will enable him to live up to his reputation on these subjects.

TELEPHONE WOMEN.

II.—MARY GERTRUDE RICHARDS.

As the newly appointed Matron for the Manchester District, it is fitting that Miss RICHARDS should have an early place in our series of "Telephone Women."

Her whole business career has been spent in the telephone service, and like all who come under that wizard's spell, she is an enthusiast in her own department.

Miss RICHARDS entered the service of the Mutual Telephone Company at Manchester in March, 1891. The business of this concern was taken over by the New Telephone Company, and finally the latter was absorbed by the National in 1896, and the subject of this note was transferred with the rest of the staff. The Post Office immediately afterwards took over the working of the trunk lines, and a considerable number of senior operators from the National entered the Post Office service, thus opening the way to more rapid promotion for those who were left. Appointed Senior Supervisor in February 1897, Clerk-in-Charge in July 1900,



and Matron in May 1907, Miss RICHARDS' experience has been very varied. She has served under five district managers, three chief electricians, four exchange managers, and three clerks-in-charge, and has been shrewd enough to learn something from all. During her service she has had three different systems of working to deal with, and while Clerk-in-Charge went through all the worry of a change-over from the "call-wire" system to "lamp calling ring-through" system, and did much by her tact and ability to minimise the difficulties with subscribers which always attend such a proceeding.

As a disciplinarian and organiser Miss RICHARDS takes high rank, while her absolute fairness has gained for her the respect and esteem of the whole of the large staff over whom she has control. This was evidenced by the enthusiasm displayed on the evening of June 5 last, when she was presented with a handsome gold bangle by the operators of the Central Exchange at Manchester.

Miss RICHARDS' opinion on any subject affecting operating or operating staff is valued by her chiefs, and any recommendations she makes are always accorded serious consideration.

Reading is the only hobby to which she will plead guilty, and her well-stored mind gives evidence that her time is not wasted.

It is everyone's duty to do his part in moulding public opinion favourably. In dealing with a subscriber, "put yourself in his place," "answer as you would be answered," "do to him as you would be done by."

SOME EARLY TELEPHONE COMPLAINTS.

BY L. E. WILSON.

TWENTY-TWO years ago the brass door-plates had been cleaned, the district manager was away clearing contacts, and the manager's towel was drying the acting manager's hands, when one of our 25 subscribers came into the office and shouted out what was destined to be my first telephone complaint:

"Are you the young man that sometimes answers my telephone calls and sometimes does *not*?"

When it was my turn to speak and something had been swallowed that ought to have been said, he was told that a fallen tree was the cause of the trouble, but he left me thinking of the many other things suitable to the occasion that might have been said.

Later on in life, when the system became more universal and complicated, the "irate" subscriber became a recognised institution (unofficially) in the service, and our experience expanded accordingly. Capricious destiny altered my sphere of usefulness, and it was a new experience to meet difficulty in assuring the uninitiated that the expression did not necessarily mean "high rate" subscribers.

To return to the subject of complaints, the next one really needed more self-control than the first. It was from a man who would set his alarm for three o'clock in the morning so that he could call the resident operator out of bed and communicate the time of day when the spirit moved him. This is what he had to say:

(1) *Copy of Letter to the Manager.*

"Dear Sir,—If you have a man who can put my telephone in order please send him up at once, and when we have finished with him we will put him under a glass case.—Yours truly, —."

There was another man who was given to say things about the telephone. He had two telephones and it is said that there was trouble once over a lady who called up. The office boy told him there was a lady on the telephone. "Which one?" says he. "I don't know, sir," says the office boy, "but I think it is your wife."

This is how he was given to write to us:

Copy of Letter to the Manager.

"Dear Sir,—As it is your usual practice never to attend to a complaint until I have written three times, I herewith enclose you the three complaints to save time and annoyance."

Letter No. 1.

"Dear Sir,—My telephone is out of order.—Yours truly, —."

Letter No. 2.

"Dear Sir,—My telephone is still out of order.—Yours truly, —."

Letter No. 3.

"Dear Sir,—When the devil are you going to put my telephone in order?"—Yours truly, —."

Another time nothing seemed to go right. It started with the girls wearing their best frocks, because they thought the General Manager was coming to visit the exchange; however, an alarm of fire upset everyone just as much, and left many frocks torn into the bargain. Then it was rumoured that the clerk-in-charge was going to get married after 21 years' service, and the girls were trying to fit in the length of service with her reputed age and wondering if her intended would get sugar in his tea after he was married.

Then the following letter arrived and things settled down a bit:—

Copy of Letter to the Manager.

"Dear Sir,—Really your telephone is an abomination. I must write to advise you of this, otherwise I shall head a mob to sack your premises, or burst. Your operators reply "engaged" when I ask for a number. Then the thing, owing to its everlasting indulgence, refuses to do any more work on the Saturday, and so it is on strike. I hope the coming pantomimes will reflect credit on your performances as well as on the romantic truthfulness of your Central's replies, which I fear sometimes represent a person whose name rhymes with repliers. Anyway, shouting down a rainspout is better than all your science."

COMPLETION QUERIES.

BY W. F. TAYLOR, *Contract Manager, London.*

MR. ELLIOTT of Manchester, in last month's JOURNAL, asked for some particulars of the London method of dealing with the above. I will therefore try to give a rough outline of the system that prevailed about a year ago, and that which now prevails, as I feel sure this important subject will prove of interest to the staff generally.

Questions of completion, or to be more correct non-completion, were under the old system dealt with by a special staff in the Contract Department under the control of the contract manager. The members of the staff numbered five—one chief, three men and one boy. This on the face of it looks a large staff, but when it is pointed out that something like 250 to 300 papers were dealt with every day, as well as telephone and counter calls to the number of 40 a day, the reason for such a large number becomes more apparent. The routine in dealing with a query from a subscriber was as follows:—

A message was received from a subscriber by letter, telephone or call; the clerk who received the message rang up the local engineer concerned and gave him the necessary particulars to enable him to trace the order. There are 25 local engineers in London scattered at different points of the compass. The engineer, after looking into the matter, gave the reason of the delay in completing the line, or, if required, the probable date of completion, and the clerk in turn informed the subscriber by telephone, letter, or simply by speaking to him at the counter if he called.

Papers in connection with the case were then filed away, to be produced again at the end of a week; a form was then sent to the engineer asking how the matter now stood, to which he replied giving full details. A similar form was sent out every week until the line was finally completed. If, in the first instance, the details obtained from the engineer showed that there would be considerable delay owing to special wayleave difficulties, awaiting the completion of underground, etc., the papers would be diaried up for a month instead of a week, and so on.

All this, as will be imagined, proved extremely cumbersome and could not stand close scrutiny—it was therefore discarded. Such a system or something like it, on a smaller scale of course, exists I think in most districts to-day. That is, to put it in a simple form, the subscriber applies to the Contract Department, which in turn applies to the engineer, who gives information to the Contract Department, which then advises the subscriber. In some cases I believe the routine is even more roundabout; the works order clerk seems to be completion officer, and is wedged in between the Contract Department and the engineers. The following points strike one as being the worst feature of such a system:—

(1) Waste of time, as information has to be given by two people, or it may be three, when one would serve.

(2) Trouble is caused through inaccuracy, due to the details passing through so many hands.

(3) Delay in getting answers, owing to the engineer concerned being out and no one in his office being in a position to give the details required.

(4) The use of the junction lines on service work during the busiest hours of the day.

(5) If the subscriber is at the telephone or the counter the probability is that when the clerk gives him the details he will want more, and a further message to the engineer is required.

These reasons could be multiplied, but they will suffice to show that some other method for dealing with this important problem is required. A very great improvement is noticeable in London since we introduced the new method of dealing with these queries, which is as follows:—

With the copy of the agreement sent to the subscriber is a letter stating that the copy is enclosed and giving the address of the divisional engineer—of whom there are seven in London—who will be responsible for the construction of the line and will deal with any queries in connection with it until completed. Thus it will be seen that we give the subscriber the information necessary

for him to get in touch with the man or his representative who knows all the ins and outs of the construction of the line, and from whom he is certain of getting accurate information at first hand and with a minimum expenditure of time and labour.

In each divisional engineer's office someone is now responsible for seeing that the queries are answered, and if a promise has been made that it is carried out. It has been found that in only two of the seven divisional engineers' offices has it been found necessary to provide a special completion officer, thus cutting down the staff employed on this work straight away from five to two, which reduction is simply the result of the engineer dealing direct with the subscriber, and that only one man instead of two is carrying messages to that subscriber. Such, without going further into the details of the system, is our present method of dealing with completion queries, and it is satisfactory to both the subscriber and the Company, and I think it might well be adopted in other districts, for while their cases will not look quite so exaggerated as the London one, I think it is a fact that valuable money is being wasted by two men carrying out work which could quite well, and indeed more satisfactorily be carried out by one.

It is only a question of training the subscribers to apply to the proper department for information required. I think it is a fact that the subscriber only applies to the Contract Department because he only knows that department, and has never had any dealings with any other department, but in accordance with the above method we tell the subscriber to which department to apply and he usually follows the advice, with the result that the queries coming into the Contract Department are now fortunately few. When one does come we, of course, give it every attention and see the matter through.

A point in favour of the adoption of the system outlined above is that any promise given to the subscriber by the engineer has a much better chance of being fulfilled, as the engineer knows if it is not the blame will fall on his shoulders, and it will not be possible to transfer it to the shoulders of the works order clerk or the Contract Department.

Mr. ELLIOTT says in his letter that he holds that the Contract Department is the proper quarter for such queries, as he thinks that a subscriber should look to the department to which he has given the order for its due fulfilment. I do not think this is at all necessary, so long as the subscriber is advised to which department he should apply for information, and I think that the Contract Department might as well be asked to look after the rendering of the account to the subscriber, the collection of the cash, the attention to the subscriber's complaints, and generally to nurse him during his life as a subscriber; every item of our work has, I think, some bearing on the due performance of the contract.

The duty of the Contract Department is clearly defined as being to secure new business and to retain and extend existing business. I feel sure that the less it has to do with completion and other matters which can be better dealt with by someone else, the more time it will be able to devote to its legitimate work, and the better will be its results and the lower its expenses; which I believe is what every contract man with the interest of his department at heart is doing his level best to aim at.

SPEED OF ANSWER TESTS.*

By R. F. FERGUSON, *Exchange Manager, Liverpool.*

THESE tests are of more value to the exchange manager than perhaps at first sight they would appear to be; but when it is remembered that in the ordinary course of events he does not know for thirty days how his staff are working, it will be appreciated that any means whereby he can be kept in daily touch with the service rendered, and immediately pick out any weak points, is of a decided advantage. These tests are made by the testing operator (where one exists) from the end of the multiple, by means of her plugging

*Extract from a paper on "Operating," read before the Liverpool Telephone Society, April 18, 1907.

into a disengaged number, and dropping the calling indicator with the current, taking the time from the depressing of her key until the answer of the operator. The cost of taking these tests is practically nil, as the testing operator's position is an essential one, and the

SPEED OF ANSWER TESTS

POSITION N^o 106 TO 116.

DATE	MON: 9 ¹⁵	TUES: 10 ¹⁵	WED: 11 ¹⁵	THUR: 12 ¹⁵	FRI: 13 ¹⁵	SAT: 14 ¹⁵	AYER PER HOUR
TIMES	ANS. IN SECONDS	ANS. IN SECONDS	ANS. IN SECONDS	ANS. IN SECONDS	ANS. IN SECONDS	ANS. IN SECONDS	
9-10.							
10-11.							
11-12.							
12-1.							
1-2.							
2-3.							
3-4.							
4-5.							
5-6.							
TOTAL							
AVERAGE PER DAY							

SUMMARY

PER CEN OF CALLS ANS IN 2 SECS. OR LESS.

" " " " " " 3 " " "
" " " " " " 4 " " "
" " " " " " 5 " " "
" " " " " " 10 " " "
" " " " " " 20 " " "

AVERAGE ANSWER PER WEEK.

FIG. 1.

speed of answer tests can be made by her on the lines under test. It is generally regarded that about 500 such calls per month is sufficient to base an average upon. It will therefore be seen that very useful information can be obtained at practically no cost, and the advantage derived is that the exchange manager sees daily the standard of speed of his exchange, and is in a position to remedy a weakness which by the end of the month might have shown very

SUMMARY SPEED OF ANSWER TESTS

WEEKLY RESULTS FOR 190

WEEK ENDING DATE	MONDAY NO OF CALLS BY ANS	TUESDAY NO OF CALLS BY ANS	WEDNESDAY NO OF CALLS BY ANS	THURSDAY NO OF CALLS BY ANS	FRIDAY NO OF CALLS BY ANS	SATURDAY NO OF CALLS BY ANS	TOTAL FOR WEEK CALLS	SECONDS
TOTAL								

TOTAL CALLS MADE. AVERAGE ANSWER. SECS.

FIG. 2.

badly in the observation officer's results. When these tests were being made at the Royal Exchange, I got out some forms for the tabulating of results, which I will now describe.

Fig. 1 is the form used by the testing operator to record the

the official shutters are put up when the clock strikes six o'clock, or, for those very fortunate metropolitans, 5.30.

Quite apart from what I have referred to above, some of our best ideas come to us when walking to or from the office and in odd unoccupied moments: a good plan is to make a note at the time of these thoughts, so that they are not forgotten when we reach the office. The best way to remember these is to have a note pad always handy, so that ideas can be jotted down whenever they occur, and the slip can be put in a pocket in which one is always putting one's hand; as we seem unfortunately to be always spending money the best plan is to put the slips in the money pocket.

Now to come back to the main subject. The co-operation should start with the canvasser. The canvasser should always be very careful to approach the intending subscriber in such a way as to give the impression that the Company he represents is thoroughly

canvasser should consult the subscriber as to the pattern and position of the instrument; this is most important in residences, and correct advice generally on this point is vital to the fitting department. It is annoying to the chief inspector to have his arrangements upset because the fitter returns with a wall set saying that a table set is required; besides that, it is a wicked waste of time, which, as we are always telling the public, is money. The canvasser should find out whether the bell would be heard if the instrument is to be fitted in the position which the subscriber suggests for it: if not, he must endeavour to get an order for an extension bell, as prompt answering, or otherwise, by the subscriber has far-reaching effects. If the ring is not attended to immediately the operator's time is wasted in repeatedly calling the subscriber, other subscribers cannot be properly answered, the victimised calling subscriber gets the impression that the service is slow, and



THE OPERATORS' TELEPHONE SOCIETY AT SWANSEA.

businesslike, with charges that are in every way reasonable, and in order to do this he must really make a study of the rates and the various services, so that he can talk intelligently and with a complete knowledge of his subject. This study will thoroughly repay him, as increased knowledge brings increased confidence, and without confidence no man can adequately present his case. Moreover, the potential subscriber does not feel disposed to "buy a pig in a poke," which is what he would be doing unless the details of the service are thoroughly explained to him before he gets it.

In this thorough explanation comes part of the canvasser's co-operation, as unless the subscriber knows actually what to expect he will cause trouble later to the other departments by disputing the charges, or complaining that the engineers or electricians have not carried out their work thoroughly, or that the operators will not do something for him that he expected to have done. Then the

as a consequence the Company gets a bad advertisement. In addition to all this, if this delay occurs in calls for which junctions are used the Company may be forced to run new junctions, which would be unnecessary if the calls were properly answered and disposed of.

The canvasser must also very carefully explain to the subscriber the extra charges for Post Office, trunk and junction facilities, and the advantage of making a deposit to meet these charges.

The next link in the co-operation chain is the contract office. When orders are received they must be dealt with promptly, the works order issued quickly so that the revenue may be earned as soon as possible. This also means that the subscriber will get his service as promptly as possible, and it must not be forgotten that the subscriber, having signed his agreement, wants his service at once. It does not matter how long he has been in making up his mind; having done so, he wants the service right away.

The contract manager must also be very careful to see that the canvasser reports accurately any special instructions that the subscriber may have given, and he must transmit these instructions to the district office so that they may appear on the works order; then the engineer or electrician or rentals clerk can carry out the subscriber's wishes.

The works order clerk is a very important official, though I am sure most of them are too modest to think so, because on his accuracy depends everything. If the works order is wrong, then everything is wrong. He, of course, can only make out an accurate works order when he is in possession of the fullest information; therefore there should be the closest co-operation between the contract office staff and the works order clerk.

When the works order reaches the local office it is "up against" that office to do its best also. I am not, by the way, suggesting that any one person purposely does not do his or her best. The local office can really actively co-operate with the contract office in many ways. The wayleave officers, engineers, fitters and inspectors are in exceptional positions with regard to possible new subscribers. The fitters and inspectors have glorious opportunities of getting orders for additional apparatus, or at least of enabling the contract office to do so. The public will listen to the advice of a technical man because his advice does not convey the impression that he is only wanting to increase his commission, which, I am afraid, is what is sometimes thought of the canvasser. The fitter can urge the necessity of extension bells in private houses, can point out the time to be saved by using an extension station, and can even introduce that best of all our services—the private branch exchange. The inspector can do all this and more. He comes in touch with the practised subscriber who knows the value of the service, and consequently he can mention the private house, and of course the private branch exchange. They—fitters and inspectors—need not bother about actually securing the contract; the canvasser will do that quickly enough if there is a ghost of a chance of doing business. The engineer, the fitter, and the lineman can all co-operate by pandering—so far as is consistent with the company's interests—to the subscriber's fads. Does he want the wires brought down the back of the house—then bring them down the back, and so on, *ad infinitum*.

There is one very important way in which the local manager or engineer can co-operate, and that is by keeping promises. The promises I refer to are those made to the contract office as to dates of completions. We know that wayleave difficulties and other troubles sometimes prevent these promises being fulfilled, but our promises should be treated as most sacred, and if accidents prevent their being kept, the subscriber should be informed of the circumstances, and his forbearance asked. A reputation for unreliability is so easy to gain, and so hard to live down.

The rentals clerk can also help by avoiding the use of that "red notice." A minute's tactful conversation will often bring in the money without leaving behind the injured feelings that the notice usually causes—quite unjustifiably in most cases, of course. The man with injured feelings is an enemy to our progress, consequently the aim of all of us should be to keep the subscriber happy.

The operator is the next step, and she, poor girl, must be getting tired of being told to cultivate the cheerful voice and the rising inflection. The operator is continually "turning the other cheek" to the public, and until the millenium is reached she must continue to do so. Nowadays the operator must be ambidextrous, must have the memory of a DATAS, the temper of an angel, and the speed of lightning. All these things she must have to give a good service, but if the contract office, and construction and maintenance staffs, and the district office have not done their work well most of her efforts are in vain. Unless she does give a good service we shall not go ahead.

Now I have gone so far, it occurs to me that all I have said might have been more eloquently expressed in the words, "Do your best." If we all do our best we shall nearly satisfy the subscriber; we shall never quite do so, but if we *nearly* satisfy him he will, I think, speak well of us, and if we are well spoken of the battle of the Contract Department is half won. The Contract Department can do more than win half a battle, but it is cheaper to have only a half to fight instead of the whole.

AWARDS FOR INVENTIONS, SUGGESTIONS, ETC.

The following is a list of awards made by the Company since Feb 23, 1906, for the encouragement of inventions and suggestions for improvements in plant or methods of working:—

	£	s.	d.
R. Bowie, Glasgow, alteration to channel iron arms .. .. .	..	..	..
A. Warner, London, cross connecting ring for main frame	1	0	0
J. H. Stewart, London, attachment of busyback interrupter	1	0	0
J. W. Foy, Edinburgh, improvement of Sinclair-Aitken cups	3	0	0
R. Porter, Glasgow, alteration in form of wall spike	2	0	0
C. Hughes, Head Office, testing subscriber's register	2	0	0
J. Lewin, Norwich, extension switch	2	0	0
W. J. Dawson, Head Office, prolonging the life of rubber-covered cables	1	0	0
J. Cruickshank, London, portable pole steps	0	10	6
P. R. Cockrem, Nottingham, store administration	2	2	0
H. R. Hircoe, Leeds, stamp duty book	2	2	0
W. H. Fraser, Head Office, testing pot-head joints	2	2	0
W. E. Babridge, Bristol, testing and clearing faults on party lines	2	2	0
H. Legg, Portsmouth, improvement in handcards	2	2	0
J. W. Warnock, Glasgow, lead clip for fastening pot-heads	2	2	0
H. Hatton, Brighton, party-line clearing signals	2	2	0
G. Roberts, London, common battery extensions	2	2	0
T. M. Inman, London, zone test for permanent visuals for Battersea	0	10	0
J. Parry, Liverpool, combination party-line desk sets	2	2	0
J. Johnson, London, lineman's tapper for common battery instruments	1	1	0
C. W. Appleby, London, lead clip for twin leads	1	1	0
T. Parker, Birmingham, terminal open wire fixing iron	2	2	0
F. T. Isaac, Exeter, method of fixing earth wire on arrester plate	2	2	0
J. Whiteside, Brighton, bottle for soldering solution	2	2	0
L. Thorpe, London, leading in with Sinclair-Aitken insulator	2	2	0
A. S. Blundell, London, spanner for common battery pedestals	2	2	0
J. H. Langly, Warrington, shutter for screened test jacks	2	2	0
D. Baldwin, Head Office, spanner for insulator bolts	1	1	0
J. W. Atherton, Bradford, prevention of cord twisting	2	2	0
G. H. Bryant, London, grant for obtaining bronze medals	3	0	0
J. B. Salmon, Nottingham, grant for obtaining silver medal	4	0	0
D. C. Dunnett, Liverpool, wiring internal extensions	2	2	0
P. Joncke, London, spring terminal on private branch exchange fuse panels	2	2	0
H. S. Peck, London, tool for holding key shelves open	3	3	0
W. Garrard, Leicester, splicing tool for stay wire	2	2	0
G. Wallace, Dublin, number plate for operators' telephones	0	10	0
J. Hayes, London, wiring condenser on common battery cordless switchboard	2	2	0
J. McShane, Dublin, message rate party-line cords	1	1	0
W. S. Brown, Birmingham, party-line cords	1	1	0
G. E. Bewick, Head Office, number socket and disc	0	10	0
J. R. Milnes, Head Office, instrument for setting out switchboard sections	0	10	0
C. S. Wolstenholme, Liverpool, cable supports in manholes	3	3	0
T. Pettigrew, Glasgow, party-line transfer junction circuits	1	1	0
W. Bagley, Birmingham, split pipe indicator	2	2	0
A. C. Godfrey, Liverpool, local order book	2	2	0
A. Batstone, Head Office, clip for ticket for recording calls	2	2	0
A. N. Entwistle, Bolton, post office and junction fees combining journals for accounts and receipts	3	3	0
C. J. Purcell, Dublin, revised requisitions for stores for foremen	2	2	0
R. S. Graham, Glasgow, pole roofs	2	2	0
H. Goodman, Liverpool, improvement in draw vice insulator	2	0	0
G. J. Drysdale, Liverpool, method of cleaning battery jars	2	0	0
H. S. Peck, London, test set for observation circuit	0	10	0
F. C. Baldwin, Birmingham, bracket for light structures	2	0	0
J. E. Collins, London, new type of observation connector	3	0	0
A. R. MacFarlane, London, template for stamping number discs	2	2	0
W. H. Pilbrow,	2	2	0
O. C. Crouch, London, circuit for outgoing order wire jacks	2	0	0
H. White, London, distributing head for cables	2	0	0
J. M. Anderson, Glasgow, telephone messages to replace letters	5	0	0
J. H. Watkins, Head Office, cable slings	0	10	0
N. McLean, Glasgow, cable slings	0	10	0
H. J. Futter, Ipswich, improved connection for 666 cells	1	1	0
F. H. Copeland, Canterbury, improved connection for 666 cells	1	1	0
R. Anderson, Brighton, soldering lamp	1	1	0

NOTICE.

CONTRIBUTORS forwarding reports of the Company's progress, items of Staff News, etc., should note that the use of such abbreviations as C.B., D.P., sub., pr., D.M., P.S. and the like cause unnecessary work in the preparation of such reports for the press. The words "central battery," "subscriber," etc., should always be written in full.

WHAT THE COMPANY IS DOING.

A LARGE number of exchanges were opened in June, the majority of them after the July number of the JOURNAL had gone to press. In all 32 new exchanges were opened, which almost constitutes a record for a month's work, and is only exceeded by the 35 opened in July, 1899, under special circumstances. They were: Plumpton (Sussex), Llanberis, Christleton, Rossett (Chester and North Wales), Kilnap, Spa (Cork), Birstall (Leicester), Bawtry (Sheffield), Fochabers (Aberdeen), East Ham (London), Sedgley (Wolverhampton), Radlett, Harlow (Herts and Beds), Whaley Bridge, Stockton Heath (Oldham), Drybrook, Westbury-on-Severn, Bartistree, Fairford, Lechlade, Highworth (Gloucester), Chandler's Ford (Hants and Dorset), Whixley (Mid Yorks), Rocester (Hanley), South Queensferry (Edinburgh), Minster-on-Sea (West Kent), Bridge (Canterbury), Ripley (Guildford), Long Ashton (Bristol), Shoberyngness (Ipswich), Woodfoot (Border), and Greystones (Dublin). In addition the following were opened in July up to the time of going to press:—Saltcoats (Ayrshire), Bexley Heath (London), Grassington (W. Yorks), Pollokshields (Glasgow), Croston (Preston), Tyn-y-Groes (Chester), North Walsham (Norwich), Brading (Portsmouth and Isle of Wight), and Saddleworth (Oldham), making a grand total of 1,351. The number of new stations added during June was 3,770, making a total of 428,703.

LONDON.—An agreement has been completed with Messrs. W. H. Smith & Son, 186, Strand, for a new private branch exchange system centralising their services. The installation will consist of six junctions and 41 extensions.

Great Eastern Hotel, Liverpool Street.—A contract has been signed for a private branch exchange with six junctions.

Piccadilly Hotel.—An agreement has been obtained by Mr. C. H. Brandreth, providing for a private branch exchange with 362 stations.

EDINBURGH.—Since the introduction of the private branch exchange rates considerable progress has been made with this service in Edinburgh. Up to July 18th 67 orders had been secured, representing 133 junctions, 342 stations and an aggregate of 240,400 calls.

Among the orders taken may be noted one from a retail drapery store for three junctions and 23 stations, to which one additional junction and three additional stations were subsequently added, an operator's services also being hired from the Company; one from a firm of iron merchants for four junctions and nine stations; one from a purveying establishment for three junctions and eight stations—one additional station being afterwards secured; one from a firm of building trades' merchants for three junctions, ten stations and 6,000 calls; and one from a paper manufacturing company for three junctions, seven stations, and 9,000 calls.

In addition to these, negotiations which had for a long time been in progress with several concerns have within the last few weeks resulted successfully. The proprietors of the *Scotsman* signed for four junctions, eighteen stations and 11,000 calls, while a contract with a large co-operative store provides for four junctions, 25 stations and 6,000 calls—three instruments to be specially allotted for public use and fitted with auto boxes. A firm of coal merchants have contracted for four junctions, twenty stations and 17,000 calls, the installation including the provision of five typists' dictation sets; while a firm of publishers, whose installation is expected to be considerably increased, have hired the services of an operator.

MIDDLESBROUGH.—The following works have recently been completed:—An extension of the switchboard at Middlesbrough Exchange by one 240-line subscribers' section; a 2,000-line new pattern testboard has been fitted. New 50-line switchboard sections have been fitted at Whitby and South Bank Exchanges. Ninety-seven miles of additional junction circuit have been erected.

IPSWICH.—Four sets of accumulators with the necessary charging apparatus have been installed and brought into use to replace primary cells.

CLACTON-ON-SEA.—An additional 50-line switchboard has been fitted at this exchange.

CHELMSFORD.—The work of fitting an additional 50-line switchboard and an additional 120-line testboard is now in progress at this exchange.

DUBLIN.—An agreement has been signed by the Dublin and South-Eastern Railway for a private branch exchange, consisting of three junctions, eleven extensions and 6,000 calls.

A raised platform for the purpose of supervising the operating has been erected in the Central Exchange.

The two new sections of the switchboard for 200 party and 400 direct lines will be opened at an early date, and two junction positions are about to be re-wired for lamp and grid clearing. A new fuse panel is being fitted in the test-room, the old power circuits being re-wired.

Estimates for laying underground conduits in Rathmines district have been sanctioned and tenders are now being obtained for 7,000 yards of trenching.

PEMBROKE.—The Urban District Council has granted permission for building 2,500 yards of underground work.

GLASGOW.—The new equipment has been brought into use in Langside Exchange, the transfer from the old board having been successfully made on the morning of June 23.

EASTBOURNE.—Some seven miles of 3-way duct and pipe have been laid in connection with the extension of the underground work, and about five miles of cable have been drawn in.

HASTINGS.—About eight miles of pipe have been laid and seven and a half miles of cable drawn in, in connection with the extension of the underground scheme.

BENHILL.—One and three-quarter miles of pipe have been laid and cables are now being drawn in, in connection with the underground scheme here. A new 500-line test frame and an additional 100-line switchboard are being fitted at the exchange.

LLANELLY.—An agreement has been completed with the Llanelly Council for underground facilities. The work of laying ducts will be put in hand very shortly.

NEATH.—The underground system here is well under way; 3,650 yards of cable have been drawn in and will shortly be brought into use.

SWANSEA.—No less than 4,543 yards of aerial lead-covered cable have been erected and brought into use. This has necessitated the virtual reconstruction of the pole routes.

FOREIGN INTELLIGENCE.

Belgium.—On Jan. 1, 1906, the number of exchanges had increased to 162 from 144, eighteen auxiliary local systems being opened during the year. The number of subscribers increased from 20,875 to 23,292, and the total number of stations was 26,008. The length of local telephone wires increased from 89,952 kilometres to 110,216 kilometres, and of trunk wires from 13,764 kilometres to 14,806 kilometres. The grand total of wires in use for telephone purposes in Belgium was 136,218 kilometres (84,500 miles).

Switzerland.—From the official report for 1906 it appears that the number of local systems increased from 366 to 384, and the subscribers from 50,333 to 53,711. The length of lines increased during the year from 16,318 kilometres to 16,980 kilometres, and the length of wires from 252,235 kilometres to 273,162 kilometres. The telephone stations increased from 56,092 to 60,380. The largest systems were Zürich with 8,342, Geneva with 5,752, Basle with 5,008, Berne with 3,252, Lucerne with 1,634, Lausanne with 2,530, La Chaux-de-Fonds with 1,328 and St. Gall with 2,260. The local conversations rose from 29,914,161 to 32,389,341, and the interurban from 6,339,195 to 6,956,995.

"DO LIKEWISE."

A MEMBER of the district office staff in Edinburgh intimated to the contractor his knowledge of a subscriber's contemplated removal to larger premises, with the information that the subscriber was considering the installation of intercommunication telephones. As a result of this timely hint, says our Edinburgh correspondent, a private branch exchange contract was secured for two junctions, seven stations and 4,000 calls.

To members of the staff in all districts this incident may be commended.

The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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VOL. II.]

AUGUST, 1907.

[No. 17.]

MEASURED RATES.

THERE has been during the past month or two some little discussion in one or two of the Chambers of Commerce and in various provincial newspapers on one feature of the measured rate tariff. Such arguments and illustrations as have been brought forward by the critics of measured rates have been solely in support of the hard case of the well-to-do large user, who finds at last that he has a great bargain in the old flat rate, and not unnaturally wants to hold on to it. He would be a cold and phlegmatic person indeed whose sympathy remained untouched by the tribulation of the great firm doing a yearly turnover of tens of thousands of pounds when suddenly confronted with the idea that a year's telephone service might be worth more than a ten-pound note! The anguish of wealthy men of business at such a prospect is keen, and not unnaturally, because one of the privileges of wealthy men is to get all but luxuries at cost price or under.

However, no matter how deeply we may be affected by the plaintive cry of the wealthy big user, we cannot altogether ignore the case of the small user. The small user is not usually in business on a big scale; not usually the occupant of a lordly mansion; not usually able to dictate his own terms and beat down prices to the uttermost farthing. In short, he is a person of no importance from a sensational point of view. But he is numbered by the tens of thousands, and he must have telephone service on cheap terms or not at all. He does not need the unlimited amounts of service that the wealthy big trader requires, and he cannot pay the flat rate which the latter finds cheap enough. The measured rate scheme—a moderate charge for a moderate amount of service—suits the small user, the professional man, the small trader, the private householder—in other words, the greater proportion of the community.

The reason why the discussion has been hitherto entirely one-sided, directed solely towards airing the grievance of the

wealthy big user, is sufficiently simple. The big user, the wealthy trader, is accustomed to proposing resolutions at meetings of all kinds and to appearing in print, and when in trouble of any sort has no difficulty or hesitation in speaking out. The small user, although he is greatly in the majority, has no facilities for making himself heard. One of the peculiarities of this particular case is that although he potentially exists in large numbers he does not actually exist to any extent at the moment, therefore the chance of his making himself heard is small indeed. Perhaps the principal argument out of a whole armoury of arguments in favour of measured rates is that they are certain to extend the benefits of the telephone service to hosts of people of moderate means who now make no use of the telephone because they find the flat rate too high.

There are a few questions, if we were engaging in a serious discussion with those who cling with such fervour to the flat rate principle, which we should like to put to the speakers and writers who so summarily condemn the measured rate tariff for telephone service. Do they believe in the principle of payment in proportion to service rendered? If the answer is "Yes," then they agree with the principle of measured rates. If the answer is "No," then they agree with none of the ordinary principles of business. Do they believe that payment should be in proportion to the quality and amount of facilities supplied? The dilemma is the same. Do they believe that rates or prices should be framed in the interests of the small class of large consumers and against the interests of the large class of small consumers? Another dilemma. Do they believe that if measured rates had been established, say, fifteen years ago, and the telephone service were now developed to ten times its actual stage of development, serving a very large number of small users at low rates, there would be any widespread demand for a reversion to flat rates? The question answers itself.

EUROPEAN TELEPHONES AND AMERICAN REVIEWERS.

To see ourselves as others see us is always entertaining and sometimes instructive, if we do not take it too seriously. Sometimes we get candid criticisms which it is impossible not to take seriously, though often they are mixed with a sufficient quota of loose deductions and careless statements of "fact" that the leaven of amusement shall not be absent. No European would look to the United States for moderate or sympathetic criticism of European institutions. To the average Yankee everything European is "effete"—with the possible exception of the European motor car. In every other line of mechanical endeavour America considers that she leads the procession. But if there is one thing European for which every American who has crossed the water professes a profound, illimitable, unadulterated and (in polite language) inexpressible contempt, it is the European telephone.

There is some justification for this. Principally because in America the telephone has always been purely a "business proposition," and for other powerful reasons, the general and technical development of the telephone there has reached a stage which we are still far from approaching here. The American has long been accustomed to a uniform style of equipment, to very complete underground work, giving a stable service, to uniformly rapid operation both of local and of long-distance lines, to an exchange

telephone in every department of a business establishment and in every room of an hotel, and to a public telephone at every railway station and at every street corner. Consequently, when the American comes to Europe and finds all sorts of methods of operating the telephone, finds that many business firms either have no telephone or try to make one do the work of twenty; finds that the long-distance call usually takes an hour or two to work through; finds that railway companies will not allow public telephones on or in their stations, and big hotels think themselves well equipped with one or two cabinets in some dark and inaccessible corner; finds, in short, that telephonic facilities are not 5 per cent. of what he has been accustomed to, he naturally curses European telephone conditions lock, stock, and barrel.

We have often heard him do it, we have read his more measured written comments, and we sympathise with him and assure him it is not wholly our fault. We are doing our best—17,000 of us as far as Great Britain is concerned—to convert the business man, the householder, the railway manager, the hotel manager and many others to a proper understanding of what constitutes adequate telephonic facilities. Signs of progress are not altogether wanting. During the past few years there has been a noticeable awakening in many circles to the importance of liberality in telephone equipment. The American visitor of 1907 will find not a few business establishments with well-designed private exchanges, he will find a fair sprinkling of hotels as completely equipped telephonically as the palaces on Fifth Avenue, and he will even find occasionally a public telephone at a railway station. The bird is on the wing, though it has a long flight yet before it.

The text of these remarks is taken from a full-page article on telephony in Europe published in the New York *Sun* of recent date. Among New York daily newspapers the *Sun* is conspicuous for the excellence of its foreign news and for its sober handling of business questions. In the article before us it publishes despatches from its staff correspondents all over Europe, dealing with the status of the telephone service in the various European countries. The general story told in these despatches, with very few exceptions, is that the telephone equipment is inferior and old-fashioned, the service poor and the development very low. America, it is stated with pardonable pride, has ten times as many telephones in proportion to population as Europe.

The London correspondent of the *Sun* sums up the situation, and gives the reasons for it, as follows:—

This amazing preponderance is not easily accounted for on first inquiry. The flattering explanation which first suggests itself is that this is the measure of American alertness in utilising quickly every new facility which science puts at the disposal of mankind. But this assumption, while it contains a germ of truth, would be seriously unjust to the people of the Old World. Englishmen and Germans and Frenchmen most of all have been as prompt as the Americans to develop the still newer automobile industry.

The telephone is now more than 30 years old. Why is it not in almost universal use on this side of the Atlantic as it is on the other?

The answer is to be found in the practical working of one of those principles of political economy or statecraft, and it furnishes one of the most striking object lessons which modern history can furnish. It is public authority, the bureaucracy, the State, which has hampered and crippled the introduction of this great invention, just as it hampers

and cripples the development of every industry which it touches.

So strikingly true has this been in England, and so important is the general principle involved, that the European management of the *Sun* has collected data bearing upon the subject from the *Sun's* correspondents in all the capitals of Europe. Every student of politics, every man in the street, will find in the replies a warning against the modern tendency to municipalise or to governmentalise industry which ought to carry conviction.

Visitors.—The following gentlemen called at Telephone House during July with a view to studying the Company's plant and methods:—Herren SCHWENSKY (Imperial Postal Councillor), MENNY (Postal Privy Councillor), FRANZ GUTZMANN (Imperial Telegraph Engineer), and ERNST FEYERABEND (Imperial Postal Inspector, Hamburg) from the German Imperial Post Office; and Herren Dr. REDING and K. HOHL from the Swiss Telegraph Administration.

HIC ET UBIQUE.

OUR interesting contemporary the *Zeitschrift für Schwachstromtechnik*, which devotes a good deal of its space to telephone matters, gives a translation of Mr. W. ALLAN'S article on "The Training of Staff for the Electrical Department," published in the January issue of the JOURNAL. In an editorial on the subject the human voice, confined to the restricted path of a telephone wire, is described as an elusive demon ready to break out at any point of its compulsory way. "In the struggle with this monster," says the *Zeitschrift*, "the man who runs the wires and installs the instruments, inspects them, prevents and rectifies faults, plays an important role, and on his efforts depends to a great degree the amount of despair which the said demon can awake in the hearts of subscribers and responsible officials. The question, therefore, of the most effective manner of educating the technical staff has become a burning one for the public telephone service."

THE doubtful economy of dispensing with the telephone service to the fire station, on which we commented last month, has been clearly demonstrated in a recent outbreak of fire in King's Lynn. According to a local newspaper "the fire escape, tender and steam engine arrived on the scene after some difficulty had been experienced in locating the outbreak. This was due to the fact that telephonic communication has lately been discontinued between the police and fire stations, and the first contingent of the brigade on passing through Norfolk Street came to a standstill while enquiries were being made by means of the telephone at Fiddaman's Hotel. The steam fire engine also dashed past the road leading to Wood Street, and had to be called back by people who had ascertained where the fire was."

ONE would think that at this time of day the fundamental distinction between the telephone and electric light would be known to the humblest intellect. Yet two different stories reach us this month of prospective subscribers who give orders for the installation of the telephone under the impression that they will obtain light from it.

"I think it ought to be in every house," said a lady, "it is so much cleaner than gas—and, besides, gas is so destructive." One cannot quarrel with the golden truth of these statements. The telephone *ought* to be in every house; it is cleaner than gas; and it is destructive of nothing but distance and isolation. At the same time the light it yields is inward and moral rather than optical.

HERE is one way of dealing with a reconstruction problem: At Middlecreek, Illinois, the patrons of the Will H. Smith Telephone Lines held a meeting with reference to improvement of the system (consisting of six lines). "The Western Telephone Company donated \$30, others donated logs, and others are sawing the lumber free," says the *Plymouth (Ill.) Scribe*, "and the new central office building will soon be erected to the joy and satisfaction of all the people."

THE COMPANY'S CORRESPONDENCE CLASSES, 1906-7.

On July 16 the Engineer-in-Chief issued a circular letter, which, as it contains a report on the working and results of the past session of the classes, will, we think, be of interest to many of our readers. We therefore publish it below, excluding only reference to the schedules of marks, certificates, etc., which were issued with the circular.

CORRESPONDENCE CLASSES, 1906-7.

Variation in Membership.—There was a considerable increase in the membership of the classes, the total members being 3,027, or 27.3 per cent. in excess of that of the previous session. As compared with the latter the membership in the different courses varied in the following manner:—

Course—"A."	"B."	"M."- "N."	"C."	"D." New Course.
Increase.	Increase.	Increase.	Decrease.	
8.3 per cent.	7.9 per cent.	84.7 per cent.	64.0 per cent.	

It will be noticed that the increase in membership was principally in the Mathematics Courses (the figure 84.7 representing the percentage of increase in members of the "M" and "N" Courses combined as compared with the membership of the previous session's "M" Course). Of the total members in the "M" and "N" Courses 77.4 per cent. took the Elementary, and the balance or 22.6 per cent. the Advanced Course.

Certificates.—Although 645 certificates have been awarded in respect of this session as against 417 last (an increase of 54.8 per cent.), yet as regards the percentage of those who have qualified in the classes this has fallen away considerably. With the exception of the Mathematics Courses this decrease has been very marked and distinctly unsatisfactory in the "A," "B" and "C" Courses, and as regards the "D" Course, which was quite a new one, the percentage of those who qualified, 24 per cent., is very poor.

The following statement shows the percentage of class members on the total staff:—

Year.	A. No. of staff.	B. No. of class members.	C. Percentage of B on A.
1902	11,464	1,072	9.35
1903	12,797	875	6.84
1904	13,844	1,450	10.47
1905	15,702	2,378	15.13
1906	16,310	3,027	18.56

Members dropping Classes.—In my Circular Letter 370 of June 22 of last year I referred to the way men took up a course in the classes and then dropped out altogether, and the way they dropped answering the questions after the first paper or two. In the session just ended, while there has been some improvement in this respect, on the whole the matter is not anything like satisfactory. In my circular letter referred to I gave some figures showing what students did in one session and what became of them in the next.

With the same object the following figures were obtained from again taking ten representative districts:—

Out of 183 members who entered the "A" Course, 1905-6, these were accounted for in the following Session 1906-7 as under:

38.3 per cent.	dropped classes altogether.
25.1 "	joined "B" Course.
11.4 "	" " other Courses.
25.2 "	rejoined "A" Course.

100.0 per cent.

Analysing the 38 per cent. or 70 men who dropped the classes, the record of their answer papers in the Session 1905-6 is:

38.5 per cent.	did not answer any papers.
47.2 "	answered half or less. *
14.3 "	" " more than half.

100.0 per cent.

Out of 84 members who entered the "B" Course, 1905-6, these were accounted for in the following Session 1906-7 as follows:

44.0 per cent.	dropped classes altogether.
22.7 "	joined "C" Course.
20.2 "	" " other Courses.
13.1 "	rejoined "B" Course.

100.0 per cent.

Analysing the 44 per cent. or 37 men who dropped the classes, the record of their answer papers in the Session 1905-6 is:

78.4 per cent.	did not answer any paper.
10.8 "	answered half or less. *
10.8 "	" " more than half.

100.0 per cent.

Out of 154 members of the "C" Course, 1905-6, these were accounted for in the following Session 1906-7 as under:

29.3 per cent.	dropped classes altogether.
53.8 "	joined "D" Course.
15.6 "	" " other Courses.
1.3 "	rejoined "C" Course.

100.0 per cent.

Analysing the 29 per cent. or 45 men who dropped the classes, the record of their answers in the Session 1905-6 is:

80.5 per cent.	did not answer any papers.
4.0 "	answered half or less. *
15.5 "	" " more than half.

100.0 per cent.

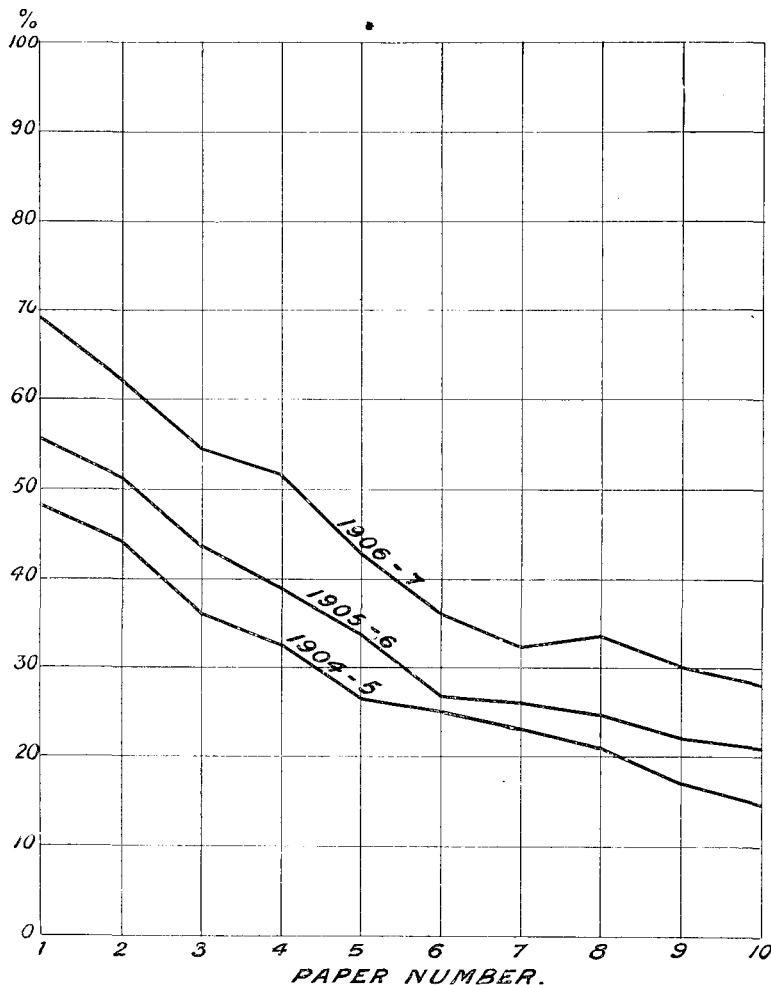
The foregoing analyses may be taken as typical of the general state of affairs, and the large percentage of those in the first instance not answering the question papers and in the following session dropping the instruction altogether is very unsatisfactory both in the interests of the students and the Company.

It will be noticed that the worst falling off was in the "B" Course where out of 84 men in the one session only 47 continued their studies in any course in the following one.

In the "A" Course with 183 students in one session only 113 continued their work in the next. In the "C" Course out of 154 students only 109 continued their work in the following session.

This taking up of the classes and dropping them promiscuously is most regrettable, and I should be glad if District Managers would endeavour to look specially into this matter when sending in names for the next session.

If a man has done well in one course he should be encouraged to take the next, if he has not, he should try again.



Falling off in Answering Questions.—As regards the gradual falling off in the answer papers sent in during the session, I drew attention to this matter last year, and while, as shown by the curves above, there has been some improvement

* This excludes those who had given notice that they did not intend to send in answers.

in this respect, we ought to look for something better still than a maximum of 69 per cent, which rapidly falls away to a minimum of 28 per cent. Here, again, an endeavour should be made to encourage, if possible, the students to maintain their interest and not to drop answering the questions after the first paper or two.

Member with Best Results.—R. B. Rae, of Edinburgh, is worthy of mention as having obtained 96 per cent. of the total possible marks in the "A" Course, 91 per cent. in the "B," 99.6 per cent. in the "M," and 98.3 per cent. in the "N." This is quite an unique position amongst the members of the classes.

Operators joining Classes.—In my circular letter dealing with the Session 1905-6 I referred to the fact that a number of operators in London had joined the classes.

In the session just closed operators from many parts of the country joined, the total number exceeding 100—a very large increase on the figures for the previous year. A number obtained certificates, some doing very well indeed.

Next Session.—The Session 1907-8 of the classes is due to start about the end of September next.

First Five Places obtained by Members in each of the Various Courses.

				Per-
				centage.
"A" COURSE.				
1st place	.. Pearson, S. G. ..	.. Manchester ..	..	96.0
	.. Rae, R. B. ..	.. Edinburgh ..	..
2nd ..	.. Friday, F. W. ..	.. Head Office ..	..	92.1
3rd ..	.. Crane, L. H. ..	.. Manchester ..	..	91.0
4th ..	.. Grieve, T. ..	.. Glasgow ..	..	89.9
5th ..	.. Butterworth, F. C. ..	.. Hanley ..	..
	.. Garrard, A. W. ..	.. Leicester ..	..	88.8
"B" COURSE.				
1st place	.. Bishop, H. G. ..	.. Head Office ..	..	97.0
2nd ..	.. Locke, J. ..	.. Manchester ..	..
	.. Satchwell, W. A. ..	.. Manchester ..	..	94.1
3rd ..	.. Rae, R. B. ..	.. Edinburgh ..	..	91.0
4th ..	.. Booth, W. ..	.. Manchester ..	..
	.. Whittle, J. G. ..	.. Birkenhead ..	..	89.4
5th ..	.. Hopps, F. ..	.. Nottingham ..	..	88.8
"C" COURSE.				
1st place	.. Myers, W. ..	.. Manchester ..	..	95.8
2nd ..	.. Akester, A. ..	.. Hull ..	..
	.. Price, L. ..	.. Leicester ..	..	95.0
	.. Sutherland, A. E. ..	.. Birkenhead ..	..
3rd ..	.. Hambleton, J. W. ..	.. Head Office ..	..	93.4
4th ..	.. Balle, R. G. ..	.. Exeter ..	..	92.6
5th ..	.. Honick, H. R. ..	.. Notts Factory ..	..
	.. Johnston, J. ..	.. Birkenhead ..	..	91.8
"D" COURSE.				
1st place	.. Schofield, T. H. ..	.. Hanley ..	..	99.2
	.. Watkin, H. ..	.. Hanley ..	..
2nd ..	.. Goulden, W. ..	.. Brighton ..	..	98.5
	.. Langridge, P. C. ..	.. Brighton ..	..
3rd ..	.. Akester, A. ..	.. Hull ..	..
	.. Duncan, A. ..	.. Glasgow ..	..	97.7
	.. Frost, J. ..	.. Hanley ..	..
	.. Gresswell, F. ..	.. Hanley ..	..
4th ..	.. Bagshaw, H. M. ..	.. Birkenhead ..	..	97.0
5th ..	.. Stewart, J. H. ..	.. Met. Maintce. Elect. Dept. ..	..	95.4
"M" COURSE.				
1st place	.. Woodyatt, T. M. ..	.. Hanley ..	..	100.0
2nd ..	.. Rae, R. B. ..	.. Edinburgh ..	..
	.. Robbins, E. H. ..	.. Met. Maintce. Elect. Dept. ..	..	99.6
3rd ..	.. Carter, J. ..	.. Edinburgh ..	..
	.. Davis, W. ..	.. Cardiff ..	..	99.1
4th ..	.. Anderson, C. ..	.. Liverpool ..	..
	.. Hamilton, S. J. ..	.. Liverpool ..	..
	.. Main, H. V. ..	.. Edinburgh ..	..	98.7
	.. Smith, H. G. ..	.. Canterbury ..	..
	.. Stradling, W. A. ..	.. Met. Maintce. Elect. Dept. ..	..
	.. Whittle, J. G. ..	.. Birkenhead ..	..
5th ..	.. Davey, J. ..	.. Birkenhead ..	..
	.. Hamilton, M. ..	.. Manchester ..	..	98.2
	.. McLachlan, Miss D. J. ..	.. Blackburn ..	..
	.. Mantle, A. L. ..	.. Nottingham ..	..
"N" COURSE.				
1st place	.. Pinnock, A. E. ..	.. Hull ..	..	100.0
	.. Sutherland, A. E. ..	.. Birkenhead ..	..
	.. Woodyatt, T. M. ..	.. Hanley ..	..
2nd ..	.. Byng, E. S. ..	.. Sheffield ..	..	99.5
	.. Grindrod, A. H. ..	.. Sheffield ..	..
3rd ..	.. Bishop, H. G. ..	.. Head Office ..	..
	.. Myers, W. ..	.. Manchester ..	..	99.1
	.. Pascall, E. ..	.. Met. Maintce. Elect. Dept. ..	..
	.. Warnock, J. W. ..	.. Glasgow ..	..
4th ..	.. Edmondson, J. W. ..	.. Hull ..	..	98.7
	.. Glenny, W. ..	.. Met. Constn. Elect. Dept. ..	..
5th ..	.. Goulden, W. ..	.. Brighton ..	..
	.. Lawrence, T. W. ..	.. Head Office ..	..	98.3
	.. Rae, R. B. ..	.. Edinburgh ..	..

THE LIFE STORY OF A TELEPHONE INSTRUMENT.

By A. K. MURRAY, Contract Manager, Hull.

THE furthest back I can remember was when I was jammed in a wooden case along with some other brand new brothers.

From that day for nearly a week I was thrown about, and if I had not been so securely fixed in my box I am afraid I would not have lived to tell this tale. When, after considerable wrenching, I was released and able to see daylight again my senses must have been dulled, for I could not understand a single word of the language spoken around me as I was hustled up on a shelf in what I afterwards learned was a store; it was some time before I took courage to look about me.

From then on I must have learned the English language quickly, as I can recollect distinctly a young man saying to the storekeeper, "I'll just take this one with the key," and with these words I was banged on to a counter and a wrap rolled round me. The next minute I was hoisted up on to the youth's shoulder and away we went. Arriving at an office the wrapping was undone, and after a few preliminaries I was screwed up on a wall.

For a time all went well with me, until a young lady came to work with us in the office, and when she was left in charge I was kept continually going. Oh, the things I had to say and hear! I did not object so much to the extra work, but this young lady had a nasty habit of jabbing me with her pencil point, with the result that my complexion was soon entirely altered and I was bruised almost beyond recognition.

I felt bad about this, but worse was to come, for the boss came in one day, and evidently he had a liver, because when I took a little extra time in making the usual connections he banged me with the directory and called me wicked names.

Another day he was in a hurry, and pressing my knob sent the handle round furiously, with the result that I got a severe shock and something went wrong with my internals. After this I had to undergo a slight operation at the hands of a telephone man from the repairing department. "There was not much wrong," he said, and evidently there was not, for I was O.K. a few minutes later. You would have laughed if you had seen the boss when he asked the inspector what was the trouble, in such an innocent tone, too.

Shortly after that, another instrument, which I termed a sister (a poor effeminate-looking thing), was fixed up alongside me and good fun we did have, as sometimes we got our wires mixed, with the result that we could talk for hours together. I did not see the reason for the boss getting so furious over it, but he certainly let his tongue run riot when these incidents occurred, and called telephones and everything connected with them "perfect swindles."

It was not long after that a boy came into our office, and, taking a screwdriver, went diving into my inside "with a view," he said, "of renewing my batteries." He gave me a dust up, at the same time giving me a drink of some white sweets, and when finished he remarked to the chief clerk, "You'll not have a vacancy in your office that would suit me?" Whereupon the clerk enquired if he was dissatisfied with his present employment. "No," replied the lad, "but the Telephone Company are going to instal the C. B. system, which means the sack for me, as the batteries will then all be worked from the exchange."

You can bet your last shilling that this news set my nerves tingling, and oh! how I worried myself as to what a C. B. was. The only "C. B." I had heard of was an eminent statesman, but I was not aware that he was in our line.

Time passed, however, and I had nearly forgotten all about "C. B.," when into the office came a man with a small delicate thing like a silver flower vase with a trumpet and an old-fashioned receiver affixed. Alas! my pride was indeed humbled. The delicate thing was my successor, and I was to be superseded. I felt inclined to kick and scream, but controlled myself, thinking, perhaps, that I might get a better position; but no; they popped me into a box and addressed me "Factory."

Just fancy me, in the prime of life, labelled "Factory!"

Worse was to come, though, for on my arrival at the factory they cut away my key and mangled me generally. I felt that my days were numbered, and, sure enough, they were, as after laying about the factory a year, I heard an employee remark, as he pointed to me, "I think we should cut this old thing up and make it into a bell for a C. B. set."

The moral in this tale, my brothers and sisters, is to the effect that, when being manufactured, you should try to get your makers to shape you so that you can be fashioned to new ideas.

I hear everywhere around me talk about "measured tariffs," "private branch exchanges" and "rural rates." It makes me dizzy. I must be getting old. Perhaps I am. Should I ever be resurrected, however, I will let you hear from me again, but I fear the days of the magneto set and the flat rate are past.

Meanwhile, may old time deal gently with me and mine and thee and thine.

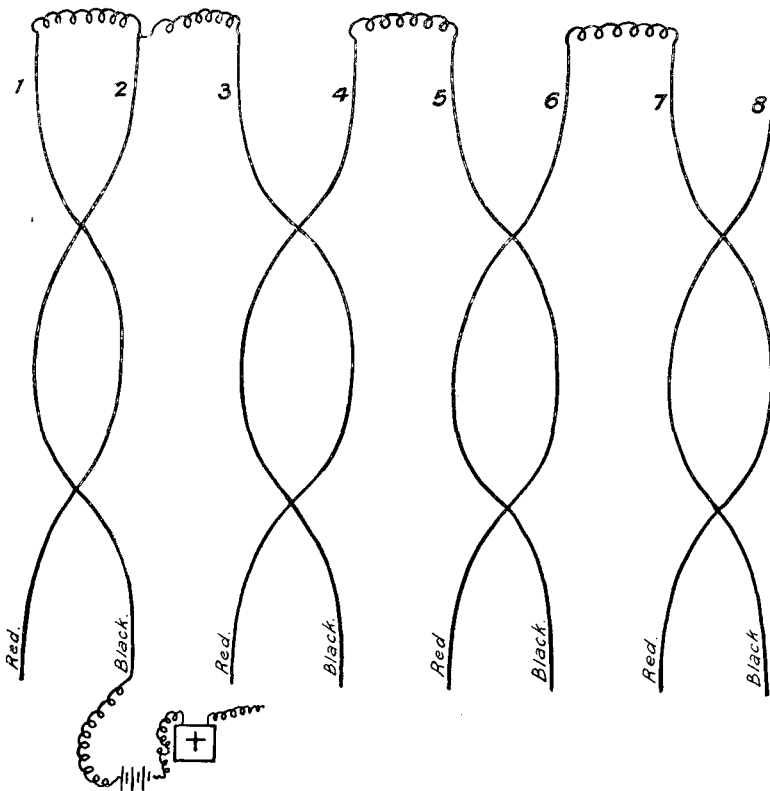
NUMBERING CABLE CONDUCTORS.

BY ROBERT CHAMBERS, *Burnley.*

THE following, which I have not seen described, and which may not be generally known, is a useful method which allows of a cable being numbered through from end to end by one man.

Numbered sleeves are first affixed to one end of the cable, some order being observed, such as odd numbers on significant leads; next, numbers 1 and 2 are looped at the numbered end, and then number 2 is joined to number 3, 4 to 5, 6 to 7, and so on.

An ordinary detector and a few cells are used at the non-numbered end, and the pairs tested until the loop is discovered. This gives 1 and 2, and the significance observed enables the odd and even numbers to be known and marked.



One of the test wires is now twisted with number 2, and the free test wire tried among the spares until a circuit is obtained. The wire which gives the circuit is number 3, and number 4 is twisted with it. The test wire is now moved to number 4 and 5 found in the same way and so on.

The accompanying diagram will perhaps assist the description.

VARIOUS VIEWS.

The Skilled Canvasser.

MR. W. V. PEGDEN points out that the idea that anyone can become a telephone canvasser in a moment is not tenable. . . . Anyone can try, but to be successful requires skill. Mr. PEGDEN thinks that the foundation of this skill is a thorough mastery of knowledge of the details of telephony as practised. Not a mere theoretical knowledge of its principles, although that has its value, but an acquaintance with the business of telephones as in general operation in this country. . . . It is from steady practice that the skill chiefly springs, and thus it is the representative who is always at work, always in advance and always piling up orders is ever the ablest, most powerful and most effective. He is ceaselessly endeavouring to do some little towards the development of the business, therefore he is always in advance. He has constantly business ahead of him, operating for the future as well as the present.

The skilled canvasser is an adept in the art of putting things in the right way, and it is surprising what a difference it makes in the telephone business how things are put.

The trained man will present the subject of telephones in a manner quite new to the prospect, because he is trained in the ways of urging it with the greatest effectiveness. It is therefore open to every worker in the Contract Department to become a skilled canvasser. By studying the subject with an intelligent, practical mind, and steadily working to acquire business, in a short time the skill will be accomplished.

Encouragement.

MR. W. F. TAYLOR's article in the April JOURNAL has called forth a good deal of comment. Mr. CHAS. S. LIVERMORE thinks that if it were carefully digested by chiefs of departments the ultimate results would be beneficial both to the working and welfare of the Company. Chiefs generally fear, in Mr. LIVERMORE'S opinion, that they lower their position by giving praise and develop conceit in the person praised. More sociability might be shown within and without doors, and all grades of the staff should act in unison and endeavour to help those who are trying to get on.

Mr. STERKER GASSIOT HARE, on the same subject, thinks that our forefathers would declare that the British man is degenerating, and he points to the many founders of great businesses who started penniless, and succeeded without any encouragement. It would be a fallacy to say that one does not appreciate or wish for encouragement, it is only natural for every man to have the same desire, and seek for it in order to stimulate fresh endeavours. At the same time, we must not forget that encouragement must not be one-sided; if we desire or expect it we must also give it, and he feels sure every conscientious and right-thinking individual will after due consideration come to the conclusion that encouragement can only be distributed conditionally.

If a man takes an interest in his work and has ambition to succeed and prosper, to give satisfaction to those in authority over him, avoiding if possible giving cause for complaint, what is the result but an increase of salary and promotion in due time? In other words, he has given encouragement and is rewarded, by which he is encouraged with renewed vigour to push on. If, on the other hand, he works week in, week out, year in, year out with no other object in view but to receive his wages, doing his work with no interest beyond the pay attached to it, and having no sympathy with the doings of the Company and the staff, is he to be pampered and met with applause? or, if he does not obtain encouragement, become morbid and disappointed?

Mr. HARE thinks operators as a class deserve the most encouragement and have the least lavished upon them. He says, in conclusion, that as a business man Mr. TAYLOR advocates encouragement judiciously given; if this is adhered to, well and good; but if misplaced, instead of strengthening a man an overdose will prove injurious to him.

Mr. J. W. MARSHALL seems to think with Mr. LIVERMORE that chiefs have a rooted idea in their minds that to give praise or show appreciation entails a corresponding lack of dignity. He maintains that this is a pure myth, that encouragement can be given without loss of dignity, and that it serves to put masters in a better and clearer light, besides stimulating the staff to work more cheerfully and energetically.

Mr. GEORGE W. LIVERMORE says that all will admit that Mr. TAYLOR not only preaches but practises. He is, at the same time, of opinion that encouragement doled out indiscriminately is apt to be dangerous, and whilst to one man it acts as an incentive, in another it conduces to "swelled head" and that disregard of detail which is the precursor of failure. It is often argued that praise for what is done well should be given in the same measure as blame for what is done badly. This is sheer nonsense. A man is employed by the Company to perform a specific task; it is understood that in the exercise of his duty his best endeavours will be used. The recognition of such duty well performed lies in his continuity of service, and in the payment for services rendered. The more intelligently that duty is performed, the more chance for recognition and promotion. Thus, praise is a gratuitous offering to be bestowed on those who are plodding on to better things; human nature is alike the world over, and no man has his own future advancement before him who has not the Company's interests at heart. Every man who wishes to merit encouragement must try to do better than he is doing now, however well his present task is performed. It is to these plodders whose minds are centred on a perhaps far-off goal that the word of encouragement should go, helping them on step by step.

Dictating and Typing.

IN reference to Mr. J. R. THYNE'S article, Mr. T. A. CROWTHER (chief clerk, Leeds) writes questioning whether the tying of letters direct from dictation is a workable method. He points out that many correspondence clerks cannot deal with their letters during specific hours. He considers the number of words typed by the Glasgow correspondence department.

exceptional, and, whilst congratulating them on their ability, thinks there must be circumstances to be taken into consideration which the article does not disclose. The question of wasting the time spent in typing a letter half through, and then having to re-type the whole because the dictator makes an important alteration, has also to be considered. Mr. CROWTHER has no doubt that other chief clerks would be glad of further particulars from Glasgow as to the method adopted to get their typewriting department to such a pitch of efficiency.

Public Appreciation of Call Offices.

IN Mr. T. W. JOWETT'S view the general public are not as yet fully cognisant of the utility of the public call office, and the Company's sign does not convey to the casual observer any idea of the great facilities that are provided. Nor do merchants who send out representatives fully grasp the value of a call office to those representatives to order goods expeditiously, to vary orders in hand, and sometimes to save a journey back to town. The householder has not been educated to take advantage of the call office in his locality, and the housewife does not realise that she has close at hand a means of communication with her husband in cases of emergency, with the doctor, the tradesmen, and also with many of her relatives. Mr. JOWETT is of opinion that where canvassers cannot secure an order from small tradesmen, they should endeavour to bring to their notice the utility of the call office, not only to secure revenue to the Company, but also as a means of educating the non-subscriber in the benefits of the telephone service. The inhabitants of smaller towns do not recognise the value of the call office as a means of communication with the larger centres for the disposal of their produce. Finally, when a call office is opened in a new locality Mr. JOWETT thinks it should be well advertised by a circular setting out its advantages and the charges payable. Call offices induce the telephone habit, and those who use them often can generally be prevailed upon to become subscribers.

THE NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY.

At the monthly committee meeting the secretary announced that the following donations had been received:—Mr. Dudley Stuart (chairman), £1 1s.; Mr. Albert Anns, £1 1s.

Applications for assistance from members of the undermentioned departments were received and dealt with:

- (1) *Engineers*.—(a) A further grant of 15s. per week for four weeks was voted in this case. (b) A grant of £3 was agreed to. (c) A final grant was made of 15s.
- (2) *Traffic*.—(a) A grant of 10s. was made. (b) A grant of £5 was made.
- (3) *Maintenance*.—A grant of £3 was made.
- (4) *Head Office*.—A grant of £6 was made in this case.

The secretary reported that over 2,250 members were on the register.

AN AMERICAN OBSERVER ON TELEPHONE DEVELOPMENT IN LONDON.

MR. FROHMAN, the American theatrical *impresario*, said recently in London: "Two-thirds of the communication in London that two or three years ago was settled by correspondence or calls is now done by telephone. The result is a man's work is more concentrated and he gets more time. In perhaps one hundred or more engagements I might have during the day, half are settled by telephone, even to engaging actors and listening to musical lyrics. I have decided more stage questions this year this way than by correspondence or personal meetings. In fact I have engaged two star actors and made agreements with three authors for plays without having ever met them."—*Electrical World*, New York.

TELEPHONY IN CHICAGO.

MAYOR DUNNE, of Chicago, has been dealing with the vexed question of telephonic competition in that city, and in a recent message to the city council on the application of the Illinois Manufacturers' Association for an ordinance remarks: "In my judgment the telephone service of a city is essentially a monopoly and until the city is empowered by law to undertake the giving of telephone service to its citizens it should be performed by one company, and that company should be compelled to give efficient, modern, up-to-date service at just and reasonable rates, which rates should be much below the rates hitherto imposed upon the citizens of this city. I would, therefore, respectfully recommend that the matter of determining what are just and reasonable rates to be charged the city of Chicago for telephone service should be referred to some appropriate committee or to a special committee constituted for that purpose, and that the said committee be empowered at once to secure the assistance of competent telephone engineers to ascertain and determine what are just and reasonable rates for telephone service in this city, and, having ascertained what these rates should be, to formulate a policy which will secure efficient modern service at just and reasonable rates, which policy should reserve to the city the right to operate a municipal telephone plant when empowered so to do by the legislature of this State."

"INDISPENSABLE IN EMERGENCIES."

INSTANCES of physicians called by telephone at night are not uncommon, but this one is unusually interesting. The wife of Mr. Weber, of Centre Point, Pa. (Norristown district), was taken suddenly ill with a pulmonary trouble at two o'clock the other morning. There was no one to send, nor could she be left alone, for it was a serious case. The farm linc all-night service solved the problem, and the physician came within a few minutes in his automobile. Such an emergency had never occurred to this subscriber, but he now thinks a telephone a necessity.—*Philadelphia Telephone News*.

ENGLAND'S NEGLECT OF SCIENCE.

MANY of our readers have doubtless read a great deal under the above heading, and possibly it has not been quite clear what has been meant by science and a scientific spirit. The following extract from an article which recently appeared in the *Westminster Gazette* defines the scientific spirit so well that we are glad to reproduce it.

It will be seen from this that the scientific spirit can be applied in all branches of the Company's business, and is not an attitude which should be confined to the engineering side only.

And what is science and the scientific spirit? Science is not so much any definite achievement or discovery, the finding of a new planet or element, the tracing of a disease or the determination of a physical law: it is rather a method, an attitude in the face of any problem a man may be called on to confront. It is the persuasion that in every matter there is such a thing as the truth, that everything beside the truth is false, that the truth must be got at, not by a lucky guess, but by carefully ascertaining and weighing every fact in the case under investigation; and, with all this, the determination that we will rest content with nothing but the truth. The scientific spirit is truth at all costs in all things. And that is just why we want it. Such a method, such an attitude, no one can afford to dispense with. Our mistake as a nation is that we regard science, not as a method applicable to all problems and indispensable for all men, but as some mysterious process taking place in a laboratory, and veiling its indecencies under an obscure phraseology. We restrict science to the investigation of nature, forgetting that the business of the politician or the economist, as of the biologist, is to search, each in his own department, for truth; that the procedure is precisely the same in all branches of inquiry, the conscientious ascertainment of facts and the scrupulous weighing of them; and that the man who has the scientific spirit will attack his subject, whether it be the housing problem, the nervous system of a frog, or the trade of the Yangtse Valley, in a conscientious and effective manner; while the man who has not that spirit will be a slipshod bungler. We must learn to regard science as a method indispensable to every member of the community who is going to be an efficient member of it. For the best fire is not composed of a few very dry sticks and a great number of very wet ones, but is one where all the sticks are dry and all able to burn together.

GRANTS MADE BY THE COMPANY TO TELEPHONE SOCIETIES SINCE FEB. 23, 1906.

Name of Society.	Session.	Amount.
London Telephone Society	1904-5 ..	£5 0 0
"	1905-6 ..	5 0 0
Glasgow & West of Scotland Telephone Society ..	1905-6 ..	5 0 0
Blackburn Telephone Society	1905-6 ..	4 0 0
Hanley Telephone Society	1905-6 ..	3 0 0
Manchester Telephone Society	1905-6 ..	5 0 0
Liverpool Telephone Society	1905-6 ..	5 0 0
Sheffield Telephone Society	1905-6 ..	5 0 0
Brighton Telephone Society	1905-6 ..	5 0 0
Chester Telephone Society	1905-6 ..	3 0 0
Swansea Operators' Telephone Society	1906-7 ..	5 0 0
Swansea Telephone Society	1906-7 ..	4 3 6
Manchester Telephone Society	1906-7 ..	3 18 6
Glasgow & West of Scotland Telephone Society ..	1906-7 ..	4 15 6
Plymouth Telephone Society	1906-7 ..	4 8 6
Hanley Telephone Society	1906-7 ..	3 19 6
Blackburn Telephone Society	1906-7 ..	5 0 0
Dublin Telephone Society	1906-7 ..	4 7 6
Bristol Telephone Society	1906-7 ..	5 0 0
Birmingham Telephone Society	1906-7 ..	5 0 0
Portsmouth Telephone Society	1906-7 ..	5 0 0
Sheffield Telephone Society	1906-7 ..	4 7 6
Newcastle Telephone Society	1906-7 ..	5 0 0
Coventry Telephone Society	1906-7 ..	5 0 0
Liverpool Telephone Society	1906-7 ..	5 0 0
Chester Telephone Society	1906-7 ..	4 1 0
Leicester Telephone Society	1906-7 ..	4 18 6
Cardiff Telephone Society	1906-7 ..	4 14 6
Brighton Telephone Society	1906-7 ..	4 11 0

FIRE AT GREENHILL EXCHANGE.

A FIRE broke out on these premises at 4 p.m. on May 2. The first intimation the Company received was at 5.8 p.m., when immediate steps were taken to rectify the damage done (which included the burning of the lead-covered cable and damage to switch and testboards by water). A new switchboard was promptly despatched by Head Office, which was placed in position, and communication was restored to Gravesend at 9.30 p.m., and at 10.40 p.m. the same evening all subscribers were working.

CORRESPONDENCE.

A "UNIVERSAL TARIFF."

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I FEEL I must acknowledge the Editorial and Mr. Currie's remarks on my letter in the April JOURNAL. I fully recognise the importance of Contract Departments and quite appreciate the measured rate services, which I thoroughly agree with. The main point of my letter was to enquire if three or four rates would not be sufficient, and for them and other charges to be made more known to the staff generally through the columns of the JOURNAL.

Fixed charges have been made for most of our removals, and a standardisation of rates, materials, instruments, etc., should—after 30 years' experimenting—be made.

I have to thank the Editor for his remarks, and, in conclusion, I again venture to suggest that the JOURNAL might be made a little more instructive.

Liverpool, June 8, 1907.

ENTHUSIASTIC.

STORES LEDGER—TOOLS ACCOUNT.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH regard to Mr. Oliver's letter in the June issue, the chief points appear to be

- (1) That sufficient check is not kept upon tools held by individuals.
- (2) A desire to keep down the average.
- (3) That there is nothing in the ledger to indicate how long a given tool has been in use.
- (4) That by having a detailed account in the ledger of tools held by each individual, it would facilitate the sending of a debit to another centre in the event of a man being transferred and taking his tools with him.

Dealing with the points *seriatim*—

(1) When a tool is handed to an individual it is entered in his own Tool Account Book. Date received; number; description of tool. If a tool is returned it is entered on the other side. Date returned; number; description. All tools are signed for by the person receiving them and the book is also signed by the storekeeper. This book therefore forms a very complete record of all tools held at any moment. The men are periodically called upon to produce the tools entered against them. During the time I filled the position of stores clerk this proved to be quite sufficient check.

(2) The storekeeper should not requisition for more than are likely to be required in the near future, and no requisition, either for tools or stores, should be passed by the stores clerk until he has turned up that entry in the ledger and satisfied himself that they are actually required. This is the key to the whole question of keeping down averages. It is not a matter of price which has to be considered, as this is not under local control; it is a matter of quantity.

(3) If it is desired to know how long a tool has been in use, this information should be obtainable in most cases from the Tool Account Book, wherein the date of issue is recorded, and at the time a tool is condemned this date should be referred to ascertain if its life has been reasonable.

(4) By having accounts as suggested in the ledger it would certainly take less time to send a debit if a man were to be transferred to some other district and take with him his tools, but my experience is that this seldom happens. It is the usual practice for a man to leave his tools for his successor. Mr. Oliver, in his desire to minimise the entries in the ledger, appears altogether to have lost sight of the fact that when tools are condemned it would mean turning up more accounts and making a greater number of entries. For instance, under the present system, if ten pairs of similar pliers were condemned belonging to ten individuals, only one entry in the ledger would be necessary; but if there were ten separate accounts a corresponding number of entries would have to be made in addition to the proper entries in the Tools Account Book, which means duplication of work, and this the Company's system throughout aims at avoiding. Less tools are transferred than condemned, so the suggested alteration has the balance of labour against it. Again, it would be more troublesome at stocktaking time, as the tools in the various accounts would have to be collected so that only one quantity would appear on the Stock Sheets in the column headed "Stock as per Ledger," which figure is very readily obtained from the one account under the present system.

To know exactly how many of each class of tool there are in a district is not so important as knowing who is in possession (to know one is to know the other), but Mr. Oliver has again apparently overlooked the Tools Account Book.

June, 1907.

O. T.

EMPTYES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. GOLDSMITH, in his letter describing the method adopted in his own district, refers only to empties which have already gone back. How about inquiries for cases which have *not* gone back? The Delivery Note Book will not afford any help in this instance, and if a supplier asks about a case which has been returned some time within, say, two months of the inquiry, does Mr. Goldsmith have to wade through 400 to 500 delivery notes to trace the information desired?

Of course if every case goes back as soon as it is received no entry would be made here on records Nos. 1 and 3, but the delivery note would be entered in record No. 2. Mr. Goldsmith's method I am sure could not obtain in a provincial district where any and every kind of empty is dealt with by one individual, and where the district office has five or six sets of delivery notes passing through its hands. A record of these should certainly be kept. I think I can also safely add, on behalf of the majority of districts, that cases are frequently taken out by the gangs into the country, perhaps for days and weeks together.

It is of course understood that the carrier's signature is obtained for all

consignments, and is given on the counterfoil of the consignment book supplied free by the carriers.

Mr. Goldsmith appears to have overlooked the following important point:—How do storekeepers know whether empties are returnable or not? A recent circular from the head storekeeper revealed the fact that some districts had been spending money needlessly in returning empties which were not required by the supplier. A proper control over "returnables," etc., would have prevented this.

To give further instances where the storekeepers will be completely in the dark without information from the district office: Messrs. F. Smith & Co.'s wrappings, in addition to those of other firms, and J. W. Lench's bags, articles which Mr. Goldsmith would not perhaps have to deal with, appear to be quite worthless things, and yet the stores clerk knows that the suppliers require them to be returned. (It may be stated in passing that such articles here are kept on hand until a sufficient quantity has accumulated to warrant their return at a moderate cost for carriage.) To quote the two firms mentioned—the requests are or were gummed to the duplicate invoices—Smith & Co.'s was to the effect that the cost of these wrappings was becoming a serious item, and that they should be returned. Lench's states that "Bags are not charged, but remain our property, and should be returned to us as early as possible."

With regard to Mr. Goldsmith's last paragraph, I am not in a position to compare the staff of this district with that of others, but as the man at each centre dealing with the stores also deals with his own particular return the question of staff numerically does not appear to affect the subject. And as regards having time to carry out this "elaborate" system, I know from experience that many things are done throughout this district not by *having* or even *finding* time, but by *making* time, and I have no doubt but that we here have often essayed a trip through the Suez Canal while others have been content to stay at home.

Chester, May, 1907.

JNO. TULLOCH.

DICTATING AND TYPING.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THE Glasgow typewriting department is to be congratulated on their courage in making such a new and radical departure from stereotyped methods, but why not go farther?

In many commercial circles talking machines are used for dictating correspondence into, with invariable and complete success, where properly managed.

The only drawback has been the fact that a word once spoken could not be corrected in time to prevent its being typed. But, as Mr. Thyne states in his own case, this knowledge teaches the dictator to choose his words and sentences very carefully, and has been found, in the case of talking machines, excellent training in speed also, as of course each pause of the speaker means a slight waste of the cylinder.

The advantages of the system are numberless and would soon repay the initial cost of a machine, complete with a good supply of blank cylinders and a "shaving" knife.

The letters can be dictated at any time, the machine being always ready to receive, and so the presence of a shorthand clerk is not necessary. With a good supply of "blanks" a letter can be dictated on to one cylinder, the record and correspondence sent out, and while this is being typed another letter can be dictated on to another cylinder.

A cylinder will take from three to four minutes' speech, according to the rate at which the words are spoken. A good dictator can say a great many words in this time, and with the correspondence kept in the order in which the letters are dealt with on the record the typist, with the ear-tubes on, can type away at any speed he or she likes or is capable of, as of course the speed of the machine can be regulated.

A shorthand note is often readable only by the one who has written it, but with a "letter record" anyone who could work a typewriter would be able to deal with correspondence in an emergency.

When any of the words on the record are not to be typed, but are intended as instructions for the typist, such words are preceded as a rule by the word "stop," and typing is resumed when the words "go on" show that the words which follow have to be typed.

There is a fascination about this system which commends it to all concerned, even to the office boy who has to "shave" the record. This "shaving" is carried out by means of the knife already mentioned, the knife being fitted on the machine; when the machine is set in motion it takes a thin layer of wax off the record and leaves a smooth "blank" ready to receive another batch of letters.

The life of a carefully "shaved" cylinder would surprise the uninitiated; the cylinders are found to be cheaper in the long run than shorthand notebooks.

I recommend the system to Mr. Thyne's careful consideration, and any proofs of its advantages not mentioned in this letter will be supplied by all the leading talking machine makers.

Chester, May, 1907.

INTERESTED.

SWITCHBOARD MAINTENANCE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

IN reply to Mr. W. E. Walton's query *re* cost per station for maintenance only, it is somewhat difficult to arrive at this in the absence of any definite regulation as to what the maintenance actually covers.

The time taken by the men testing the cords and keys for the purpose of the record is three-quarters of an hour each morning.

Belfast, June, 1907.

A. R. PULFORD, Chief Inspector.

CHARACTER CURVES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. SCOTT'S article in the July JOURNAL was very interesting, and so far as this idea makes for a closer analysis of facts, and consequently greater exactitude in our conclusions, the plan is admirable.

It seems to me, however, that the scheme suffers from over-elaboration, and that too many refinements have been attempted, the idea apparently not being

to see how few headings could be worked to with efficiency, but how many. For example, take the headings "Habits" and "Mode of Life." There may be some latent, subtle distinction between these two headings, but in ordinary English the terms are synonymous. This fact apart, however, I cannot conceive a man with bad habits living a good life.

I would further submit that the idea of appraising a man's private life is open to question. Firstly, so long as a man faithfully fulfils all the requirements of our service, is his mode of life a matter for us to inquire into? I doubt it.

I am assured that the man who spends his own time legitimately is far more likely to give efficient and faithful service than he who is more or less crooked morally, but unless the private life interferes with the business life I think we cannot logically take cognisance of it.

Secondly, assuming a right to inquire into the man's private character, how are we to set about it? I would unhesitatingly say that ordinarily the Company's officials know nothing at all of their subordinates' lives outside of business hours. Can they therefore judge their private lives only from that limited knowledge. It may be some index certainly. Guicciardini in his *Hours of Recreation* says that "it is a singular and sure way to acquire a knowledge of the inner nature and character of a person if one diligently observes the kind of society he most frequently keeps," and we may, so far as this goes, form a shrewd guess as to a man's private character, but on the whole I fail to see that we can have that knowledge which would warrant our plotting out the points given a man for his mode of living in an official curve.

Then again, assuming we have the knowledge, is there the due ability (especially with a composite scheme such as mentioned by Mr. Scott) to judge the private life?

As to whether a man is excellent or indifferent in mathematics, underground work or traffic, these points are capable of almost exact determination, but when one sits in judgment on a man's mode of living, etc., to "truly and indifferently minister justice" is anything but a simple matter. So much depends on the individuality of the judge and the amount of his mental and moral light that, unless the greatest care were exercised, the curves, however composite, might be quite incorrect.

In conclusion, I consider the character curve might be exceedingly useful providing the headings were kept down to a minimum, say, half the number in the suggested scheme, and that the curve be issued normally by one officer only and not be a composite one.

London, July, 1907.

P. H. C. PRENTICE.

PARTY LINE TRANSFERS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

In the June JOURNAL Miss Baron mentions a subject which until recently gave a lot of trouble at Portsmouth, and I should think would be felt in most centres where party lines are in use. Our difficulty was with incoming calls. We received complaints frequently from subscribers who were transferred from 10 to 2-party line that their correspondents were being continually told that they would not answer. On investigation it was found that it was next to impossible for the operator to remember these constant changes, so the difficulty was overcome by placing a small white dot over the number in the party line multiple. The dot was made by drilling a small hole in the ebonite and filling it with a composition of white lead and gold size. A card with all the party line transfers written carefully up to date is placed within reach of all party line operators; seeing the dot on the jack of the number asked for, the operator refers to the card at once to verify any transfer that might have taken place on that line. This of course lowers our speed of connection, but produces fewer lost calls, gives a better service and reduces complaints. When operators are acquainted with the changes, or a new list is printed, this dot can easily be effaced by filling the hole with lamp black and gold size. Of course the whole difficulty could be overcome by adopting the same system with party lines as with direct lines, but this would be expensive as it would entail much valuable outside plant lying idle. In the case of a direct line the number is easily changed, but to change a party line main number means running a new wire into the exchange.

Portsmouth, June, 1907.

S. J. PHARO, Traffic Manager.

"THE BROADER VALUE OF THE CLERK."

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

In common no doubt with the rest of the clerical staff of the Company, I was much interested in Mr. Hare's article in the January and June issues of the JOURNAL on the above subject, and, whilst agreeing with Mr. Hare in the main, perhaps my remarks will not be out of place.

It is a well-known fact, in spite of the increased facilities for education, it is a not unusual thing for the modern youth to have completed his "education" and yet be a long way from being fully equipped for either a business or a professional career. Now, the fault is not always with the youth, and it is beginning to be recognised that in the best of schools there is something lacking. The general scholastic curriculum does not tend to develop or bring out individual tendencies, and it is of more benefit to specialise and to really know something than to have a miscellaneous smattering of a host of subjects.

To this cause, therefore, may the "unpreparedness" of which Mr. Hare writes be ascribed. It may be as he states, that the business man does not know what he wants, or that school does not form a good training ground for business. Perhaps the latter, or why should there be "business academies," or schools of memory training, which have become in latter years so much in evidence. Evidently there is a demand for such institutions or they would not flourish.

Mr. Hare has instanced the case of the clerk and the engineer, and we must admit his remarks to be true. In nine cases out of ten, with equal chances, the latter will outdistance the former, because an engineer has a definite course mapped out for him. Apart from this, the necessary qualification for success is ambition, and there are, broadly speaking, more inducements in the engineering profession than are held out to the average clerk. I am not writing in a pessimistic spirit, but only as things appear to me.

Now to turn to the subjects which Mr. Hare mentions as being the requisites of the competent clerk. Without doubt they are comprehensive without being too numerous. The study of logic, for instance, is a groundwork I am told for the study of almost any other subject, but is not I think a usual item in the ordinary school life and was certainly not mentioned in the schools I attended. Again, Mr. Hare recommends the study of company law, banking and economics. All these are very useful, but it is not within the reach of all to get a grasp of these. No doubt it is everyone's duty to try and better himself after business hours, but there are times when the humour for study is absent, and the faculties are usually more retentive in youth. Were the aforesaid accomplishments general in the clerical profession it would have a high significance. As yet, however, the career of a clerk is not looked upon with favour in the majority of cases and I take it anyone with a knowledge of the foregoing would be equal to the position of a secretary to a limited company. I am by no means disparaging knowledge; I am aware that opportunities come to all, but it is only the ready ones who are able to profit by them. For instance, when shorthand first came into vogue it was the one who had the winged art at his finger ends that came into prominence. In this city could be cited more than one instance of a shorthand writer blossoming into a shareholder. Obviously one cannot know too much, but what is necessary first is not merely learning, but the faculty of concentrating the thoughts and the acquiring of methodical habits.

Coming to the question of the necessity for the clerk, there is not much fear that he (or she) will soon be displaced, although it might be too much to say that the clerk will endure for all time. Let it suffice for the present, he is indispensable, and we may consider that in the work of the Company he is an important factor. How then, the question arises, can his services be of most benefit to the Company? We have considered his qualifications, but they would be of service to any commercial house, and, as Mr. Hare has pointed out, the completeness of the organisation is indeed unique and would therefore demand special requisites.

The numerous dealings of the Company render a close observation necessary, particularly with regard to the expenditure. First and foremost a growing business is essential, but this is primarily the work of the Contract Department although other departments could assist in a variety of ways. At the same time, expenditure must be regulated to the rate of income, and it is not exactly profitable to spend elevenpence to produce a shilling. Good book-keeping will show things as they are, but an eye to detail will regulate things as they should be.

With regard to the question of curves and statistics, perhaps their use is not essential, but in some degree they point out abnormal differences which need enquiring into, and the explanation could be marked in the margin thereon. Perhaps for comparison with former years they are of little value and unreliable when the various circumstances are taken into account. Fluctuations in the price of material will affect the cost of maintenance.

Respecting the matter of the stage when the clerk has a distinct and recognised value this might be answered, "When he knows his work." But this answer is hardly sufficient; in addition to this there must be added an interest in what he is doing and the method of doing it. Zeal is a preventer of monotony.

I cannot give an opinion on "watertight compartments." Doubtless no harm would be done by a clerk having some knowledge of the work of other departments than his own, but in every department there is scope for each one's talents, and one who has adopted the best way of doing his own work will not be long in picking up other knowledge, if required. As for promotion, what I have said about opportunity I repeat, and may we of the clerical staff be ready when it offers.

Hull, June, 1907.

A. H. SERGEANT.

THE DOOR-TO-DOOR CANVASS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I AM glad to see that my remarks on the above subject have provoked criticism, as I am convinced (and I am not alone in this conviction) that the door-to-door canvass is one of the most important items in the Company's programme of development. Consequently I am compelled to disagree with the bulk of Mr. Christie's "considerations." I do not know on what centre Mr. Christie has based his contentions, but I would ask him to take any street where the telephone service is occupying "a prominent position in the armoury of business weapons," deduct the percentage of subscribers, and it will be quite obvious that a canvasser would be well employed in that street. The door-to-door canvass is the only satisfactory method of dealing with the case, and I would suggest that extension stations and other additional facilities obtained from existing subscribers are not to be despised.

In the case of soil "unsullied by the foot of the telephone canvasser" (I trust the canvassing staff will not take Mr. Christie's phrase too literally), experience in the Metropolitan area, at all events, has shown the door-to-door canvass to be very effective, perhaps not on the first round, but seed thus sown is certain to take root and grow, to the advantage of the Company; and I must mention that even in London the average canvasser is possessed of sufficient discretion to exercise his persuasive powers in the larger houses rather than in the cottage whose windows display the legend "Mangling done here."

The statement that every contract taken narrows the canvasser's field of operations I unhesitatingly combat. In nearly every case it is possible for the canvasser, by judicious endeavour, to get at least two or three names of the new subscriber's private or business friends who are not on the service. What if the addresses are not in the canvasser's own district? The same will happen elsewhere, and thus there is constantly a *quid pro quo*.

Mr. Christie's idea of one canvasser one trade is indeed Utopian. One shudders to think of what would happen if the butcher's canvasser, his muscular arguments grown powerful by butchery eloquence, should happen to be confronted by a greengrocer. The idea reminds one of a cart-wheel continually running over the same ground until it gets into a rut from which it is nearly impossible to extricate it.

My suggestion as to the comparison of cost between postal and telephonic

communication I adhere to. The importance of the postal communication "remaining in the hands of the receiver long after the telephone message has been lost on the viewless winds" loses its value when the relative time occupied in transmission is taken into account.

Then the telephone service must be paid for in advance. "A man may know how many loaves of bread he will consume in a year, but he buys them as they are needed." This is his practice. But what would be his practice if he knew that by contracting in advance for his annual consumption, and drawing on his loaves contracted for as they were needed, he could get them at half price? He would be a quaint business man who did not take advantage of the terms.

London, July, 1907.

GEO. W. LIVERMORE.

DIRECTORY HOLDERS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

REFERRING to Chief Inspector Quinn's query in the June JOURNAL soliciting ideas for a secure telephone directory holder, I beg to suggest the following:—

That a plain wooden shelf and bracket (the size of the directory when open) be fitted on the wall of the cabinet, the right-hand side of the directory cover to be screwed down to the shelf, broad metal washers being used under screws to hold the back firmly.

I believe if this simple arrangement were made it would remove the difficulty of keeping directories in a clean and usable condition in unattended call offices. The advantages are these:

1st—The directory being screwed down cannot be taken away, as often occurs at present.

2nd—The book cannot be thrown carelessly on the floor for the next person who comes in to walk on.

3rd—It does not matter whether the directory is left open or shut on the shelf, so it is less liable to damage.

4th—A directory fixed to a shelf is more secure than one hung on a chain or cord, which is liable to be pulled off.

5th—The directory in the position recommended lends itself to quick consultation, thereby accelerating the service.

The cost, which would be small, would be fully compensated for by the acceleration of the service.

I think it must be very annoying to walk into a call office and find no directory. In such a case, before one can call the number required, one must consult the "Enquiry," which entails delay both to the public and to the Company, two operations being needed where one would suffice.

There are two other designs in my mind which are more elaborate, and I am afraid they would not meet with approval on the ground of expense. Both are folding directory holders, one made of wood and one of wire.

My idea is a shelf and bracket similar to that described above, but divided in the middle by spring hinges which would automatically close the holder when not in use, one side of directory to be screwed down as in the first suggestion. My two suggested holders are practically the same except one is made of wood and the other of wire, the latter having a strong wire spring in the middle.

In call offices where the light is bad I would suggest fixing the holder below the glass panel *outside* the cabinet.

This question of having directories properly fixed is an important one, as we should encourage the public in every way to use the call offices, they being a source of revenue and a great public convenience.

Dublin, June, 1907.

A. E. CRAMOND.

REGISTERING AND FILING CORRESPONDENCE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. CULLEN, jun., suggests in his article in the July JOURNAL that as I started a discussion on the subject of "Registering Correspondence" I should be asked to adjudicate on the various schemes which have from time to time been referred to in the columns of the JOURNAL.

I can only express my personal opinion, which is that for the requirements of an ordinary district or local office no better system has yet been brought before my notice than that outlined in my letter which appeared in the JOURNAL for June, 1906, and which is in operation throughout this province.

I propose further simplifying this by omitting the number of the file opposite the entries in the "Letters Received Register." These entries are so seldom referred to that their omission will cause no inconvenience.

For all ordinary purposes filing in alphabetical order will I think prove the most generally useful and economical, provided always that all letters received during a period of three, six or twelve months (according to the volume of correspondence) are filed in strictly alphabetical order, so that all correspondence with any subscriber during such period may be fastened together, and in the same manner all correspondence with departments on one subject.

With the exception of a few larger districts, all letters for a period of twelve months may be filed in this manner.

It will be found of the utmost importance on calling for previous correspondence with a subscriber to find all such letters extending over a certain definite period attached to one another.

No difficulty will be found to arise by reason of the registers not being indexed, and much unnecessary labour will be saved.

July 17, 1907.

R. A. DALZELL, Provincial Superintendent.

THE CARE OF SECONDARY BATTERIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I beg to draw your attention to a mistake in my article published in the July JOURNAL, p. 74, viz., "The resultant pressure tending to force the current through the cells will be the difference between the back pressure and the applied pressure, which in this case is 2 volts." This should be 1 volt, as may readily be seen by the preceding figures. As some of the figures have been slightly altered it is quite likely that the error is due to an oversight, and I shall be glad if you will make the correction in the next issue if you think it necessary.

Northampton, July 8, 1907.

E. WIGLEY.

NEWCASTLE-ON-TYNE TELEPHONE OPERATORS' SAVINGS BANK.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

ON seeing an article on "Thrift Club Management" in last year's TELEPHONE JOURNAL, our operators expressed a desire that something similar should be carried out in this centre. After considering various methods very carefully, it was decided that a savings bank would best meet their requirements.

A small management committee was elected, with a secretary and treasurer; an auditor was also appointed.

The savings bank was opened last September, and although our next balance sheet will not appear until Nov. 20, 1907, agreeing with the date of the annual balance sheet of the Newcastle Savings Bank, in which our funds are invested, we feel that after eight months' experience we are in a position to speak as to the success of the venture.

Fifty-four operators have opened accounts and only seven accounts have been closed, chiefly by those who have left the Company's service.

The total amount deposited is	..	..	..	£85	14	3
And the withdrawals amount to	..	..	..	£20	19	9

Leaving a balance on May 3, 1907 £64 14 6

We only open for deposits on pay day, but depositors may draw on their accounts any day by giving one day's notice in writing. Generally withdrawals are made on the pay day, and this saves a journey to the bank, as the amounts withdrawn can usually be paid out of the receipts for the day.

The total amount deposited each week keeps a fairly steady average.

Each depositor's account is kept strictly private, and is open to inspection only by the secretary, treasurer and auditor.

As most people know, it requires an effort to approach the regular institutions when one's deposit is only small, and, moreover, their hours are not always convenient. Unlike the Telephone Company's Exchanges they are not always open.

Our operators are to be congratulated on having made the habit of thrift a simple matter, and really the labour of conducting the savings bank on the above lines is very light, and the only expense incurred is 1d. to each depositor for a deposit book.

J. G. GRAHAM, Treasurer.

Newcastle, May 18, 1907.

M. R. BEWICK, Secretary.

A GENERAL ADDRESS TO OPERATORS.

THE following extract (for which we are indebted to the *Telephone News*) from an address by the Chief Operator of the School of Instruction in Philadelphia will be found to contain useful hints to operating students on this side of the Atlantic also:—

It is very important that a subscriber should feel at all times that you are keeping in touch with him when he is waiting. Remember that, in case of a delay, the subscriber does not know the cause, and is, therefore, particularly irritated by it. The operator cannot stop to explain just what the delay is, and therefore the subscriber often thinks the operator is at fault when you are doing everything possible. This injustice toward you can be avoided by good work on your part. You can indicate to the subscriber by what you say and how it is said that you are doing your part. Report on calls promptly, answer a subscriber working his hook immediately and always in a cheerful tone.

Make a point of bringing to your supervisor's attention any little passing remark indicating dissatisfaction with the service. A few words from your supervisor to your subscriber at an early stage of affairs may often prevent entire dissatisfaction. A merely dissatisfied subscriber can easily be made an angry man, whom it will take much care and attention to bring back to a friendly feeling towards you and our Company. Do not forget, then, to notify your supervisor of all details, however trivial they may appear to you.

I want to bring to your attention three special qualities that should be the character of what I may term the ideal telephone operator. These three qualities are courtesy, accuracy and speed. An operator having these three qualities and using them can rise to any position, for it is of such stuff that supervisors and chief operators are made. An operator lacking these can never hope to achieve much success, and her advancement at best will be slow.

Be courteous.—Nothing will smooth out difficulties, and so readily make your work a pleasure instead of a burden, as courtesy properly applied. You can save more complaints and prevent more trouble by a kindly word or a considerate reply, spoken at the right time, than by any other means. Many people can be brought to reason in a minute by a little additional courtesy and consideration, when a gruff or careless speech will only add fuel to their anger. You are dealing directly with the public, and no individual or concern so dealing can afford to be anything but courteous. I cannot set this before you in too forcible a light, as it is the root and groundwork of all successful business. Try to bear it in mind every minute of your time, and think of it when things are apparently all going wrong and everyone seems to be cross and unreasonable. This applies, remember, not only to your dealings with your subscribers, but with other operators. You will be the first to appreciate the value of this advice when you have followed it for some time.

Be accurate.—because accuracy is absolutely necessary in telephone work. A cut-off, a wrong number, or a number incorrectly repeated, means loss of time and a certain amount of energy. Inaccuracy is an unpardonable fault, it destroys the effect of what would otherwise be excellent work. Nothing will do more towards securing your promotion and having confidence placed in you than to earn a reputation of being careful. Your supervisor will look upon you as one of her strongest aids.

Be quick.—because quickness is essential to good operating. Slow service is bad service. There is no room in the telephone business for people who are not quick and ready. Most people who use the telephone are in a hurry, and seconds seem like minutes.

NEWS OF THE STAFF.

Mr. J. E. DUNCAN, Contract Officer, Glasgow, has been promoted to be Contract Manager at Greenock.

Inspector A. GODDEN, Weymouth, has been appointed Inspector-in-Charge, Yeovil.

Inspector T. J. NASH, Brighton, has been promoted to the post of Chief Inspector at Windsor, and has been presented with a smoker's cabinet and pipe rack by the members of the Brighton staff. The district manager made the presentation.

Inspector F. E. FAITHFULL, Brighton, has been promoted to the post of Chief Inspector at Folkestone.

Mr. O. PRESTON, of the Fees Department, Bradford, has been transferred to Newcastle-on-Tyne as Chief Clerk in the local office.

Mr. FRED GASKINS, Engineer, Newcastle-on-Tyne, was elected an Associate Member of the Institution of Electrical Engineers on May 23.

Messrs. T. WALSH TURNER and H. G. PANTON, respectively Mechanic and Switchboard Fitter, Dublin, resigned their positions in order to proceed to Canada. They were presented with a silver timepiece, suitably inscribed, by the staff.

Mr. J. W. HOBSON, Sub-Engineer, Dublin, has been transferred to Edinburgh in a similar capacity.

Mr. A. H. REVITT has been appointed Storekeeper for Leicester district.

Miss B. A. COOMBS, Observation Clerk, Cardiff, has resigned.

Miss EVELINE COXON, Manchester, has been promoted from Senior Operator to Supervisor.

Mr. H. J. DAVIE has been appointed Cost Clerk at Reading. The duties of cash clerk and cost clerk at Reading, hitherto carried out by one clerk, have had to be separated owing to the growth of the work, and the new position of cost clerk created. Miss HORNE has been appointed Correspondence Clerk, vice Mr. Davie.

Miss W. F. DICKSON, Gorbals Exchange, Glasgow, has been appointed Operator-in-Charge of the new Pollokshields Exchange, and Miss A. BAILLIE, Senior Operator, Argyle Exchange, has been appointed Chief Senior Operator in the Gorbals Exchange.

Miss J. M. McMILLAN, one of the typists at Salisbury House, is to be congratulated upon gaining a certificate of proficiency in the commercial shorthand and typewriting contest recently held at the Business Exhibition at Olympia. This contest consisted of taking down ten business letters at the rate of 120 words a minute, the whole of the ten to be transcribed within fifteen minutes. Twenty-three candidates entered, and four prizes and three certificates were given. It may be of interest to add that two of those gaining prizes are Society of Arts gold medallists, and the one gaining the fourth prize was the champion typist of England, Mr. J. Wright.

Inspector H. J. HERINK (mentioned in the May issue) has so far improved in health as to be able to return to Norwich and take up his duties again.

Miss N. E. LEAHY has resigned her position as Personal Clerk to the London Contract Manager to return to her home in Australia. Prior to her leaving she was presented with a set of silver hairbrushes, mirror, etc. Miss Leahy carries with her many earnest wishes for her welfare, having been with the Contract Department since its commencement, and continued to hold her position with conspicuous ability.

London Traffic Department—Transfers.

Miss F. JENNINGS, Supervisor, Paddington, to be Supervisor, Gerrard.

Miss H. SOMERS, from the Contract Department, to be Supervisor, Paddington.

Miss M. COWARD, from the Contract Department, to be Operator, Brixton.

MARRIAGES.

Mr. E. S. PLUMMER, Test Clerk, Bournemouth, was married on June 19, the ceremony taking place at the Christchurch Priory. He was the recipient of a handsome marble timepiece, which was subscribed for by the members of the Bournemouth staff.

Miss PEARSON, Senior Operator, Accrington, left after nearly eight years' service to be married to Inspector ANDERSON, of Blackburn Exchange. Miss Pearson, who left with the good wishes of all, was presented by the Accrington staff with a dinner service. Her parents entertained the Accrington staff to supper after the presentation and a most enjoyable musical evening was spent.

Mr. S. F. TENNET, Resident Inspector, Bishop Auckland, was presented with a pair of bronzes by the Darlington and Bishop Auckland staffs on the occasion of his marriage, June 17.

Miss BELLA MOIR, Chief Operator, Hawick, was presented by the Border district staff with a silver tray on the occasion of her leaving the service to be married. The District Manager made the presentation.

Mr. H. J. MOBBS, of the Engineer-in-Chief's drawing office, was presented by his colleagues with a cruet and case of fish cutlery on the occasion of his marriage to Miss M. G. Wilkins.

Mr. S. J. CAIN, Chief Inspector, Luton, was presented with a cut-glass dinner cruet and silver breakfast cruet on the occasion of his marriage on July 1. The presentation was made in the district office by Mr. H. J. Raines.

Miss E. PENLINGTON, Operator, Colchester, on the occasion of her resigning to be married, was presented by the staff with a silver-mounted biscuit box.

Miss A. HOLMES, Operator, Southampton, who has been in the Company's service since Jan. 8, 1903, is leaving to be married.

Mr. C. A. CARPENTER, Rentals Clerk, Coventry, was presented by the district office staff with a copper kettle on the occasion of his marriage.

Mr. A. HARRIS, Order Clerk, Nottingham Factory, was recently presented by the factory and testroom staffs, on the occasion of his approaching marriage, with a handsome fire curb and brasses.

Miss CALDERWOOD has resigned her position as Senior Operator, Greenock Exchange, after twelve years' service, and is leaving to get married. The staff presented her with a silver salver.

Mr. P. J. RIDD, Divisional Electrician of the Southern (Metropolitan) district, was, on the occasion of his recent marriage, the recipient of a set of cutlery in case, from the various staffs in the Southern district, and table plate (spoons and forks) from the Maintenance Department, to which several of Mr. Ridd's friends in other departments contributed.

Miss L. M. ROBERTS, Operator-in-Charge, Neath, has resigned to be married. Miss Roberts had seen seventeen years' service with the Company. Prior to her departure she was the recipient of a handsome salad bowl from the Neath staff.

Miss ADELINE BOWDEN, Senior Operator, Manchester Central Exchange, has resigned her position in view of her approaching marriage. She was the recipient of a number of handsome and useful presents, including dinner and tea services, fruit stand, etc. Miss Bowden entertained a large number of her friends to a tea and whist drive.

Mr. J. A. THOMAS, Cashier, Cardiff District Office, was married on June 19.

Mr. C. D. ANSELL, Chief Inspector, Scarborough, was the recipient of various presents from the members of the staff on the occasion of his marriage.

Mr. J. A. GOMERSALL, Switchboard Fitter, Hull, was the recipient of an onyx marble clock from the members of the staff on the occasion of his marriage on July 16.

Miss F. DEAN, Clerk, Croydon Exchange, who recently left the Company's service to be married, was presented with a dressing case by the members of the operating staff.

Miss F. DEALL, Operator, Croydon Exchange, was presented by the operating staff with a trinket set and china biscuit box on the occasion of her approaching marriage.

London Traffic Department.—Resigning to be married.

Miss F. KETT, Supervisor-in-Charge, Ealing Exchange.

Miss F. MILLARD, Supervisor, Westminster Exchange.

Miss I. ATKINS, Operator, Gerrard Exchange.

Miss C. ISAAC, Operator, Gerrard Exchange.

Miss E. M. TAVEY, Operator, Gerrard Exchange.

Miss E. SOPER, Operator, Holborn Exchange.

Miss C. J. CONSITT, Operator, East Exchange.

Correction.—Miss M. Deakin, leaving to be married, should have been shown in the July number as Supervisor, not Operator.

OBITUARY.

We regret to announce the death of Mr. J. A. MORRIS, Rental Register Clerk, Bolton, on June 29, after a painful illness. Mr. Morris was well known throughout the district, having joined the service in February 1897. Much sympathy is felt for his widow and child. Wreaths betokening the sympathy of the staff were sent, the whole district being represented, and a deputation from the staff attended, acting as bearers at the last rites.

STAFF GATHERINGS AND SPORTS.

Nottingham.—An interesting gathering took place at the district office on June 8, Mr. Williamson, the late district manager, being presented with a gold cigarette case as a mark of esteem from the Nottingham district and Nottingham factory staffs, the latter having expressed a wish to have a share in the presentation. There were present at the gathering amongst others: Messrs. Sneath (chief clerk), Bonathan (local manager, Nottingham), Young (local manager, Derby), Smith (local manager, Lincoln), and Haimes (contract manager). Mr. Fenton (factory manager), in making the presentation, spoke of the high esteem in which Mr. Williamson was held by all members of both the district and Nottingham factory staffs, and while regretting the loss sustained by his transfer to Birmingham congratulated him on his promotion and wished him every success in his new work. Mr. Sneath, chief clerk, also spoke on behalf of the district office staff.

Dundee.—The members of the Dundee staff met in the general office on June 10 and presented Mr. Brown, the district manager, with a solid silver rose bowl, in celebration of his having completed 25 years' service with the Company. Mr. Kay (chief clerk) was in the chair, while there were also present on the platform Mr. Mackenzie (local manager, Dundee), Mr. Burnside (local manager, Perth), and the heads of the Engineering, Electrical and Operating Departments. Mr. Mackenzie made the presentation and referred to the happy relations which had always existed between Mr. Brown and the staff. Mr. Brown, in returning thanks, gave a *resumé* of his period of service. Joining the service in Dundee in 1882, when the subscribers numbered something like twenty and the staff five, he left in 1889 to be the district manager at Bathgate; then followed a period at Hamilton and Aberdeen; then his return to Dundee as district manager about ten years ago. Others of the staff also gave their early experiences and offered their congratulations to Mr. Brown, the meeting closing with the singing of "Auld Lang Syne" and "For He's a Jolly Good Fellow."

Norwich.—During June the male indoor staff had a very enjoyable outing by brakes to Wroxham, thence by steam launch to Horning, where sports were held and tea was taken. A trip round the famous Wroxham Broad formed an interesting item in the programme. The local Post Office engineer was a member of the party.

The operators employed at the Norwich Exchange also had a delightful excursion one evening during June. They journeyed by motor cars to Great Yarmouth where, after spending a happy hour or two, supper was taken.

Members of the Norwich staff and friends numbering 31 had an enjoyable picnic in Whittingham Grounds, which skirt the river Yare, through the kindness of Mr. Russell Colman. Special interest was manifested in a boating contest (inter-departmental) which was won by the district office.

Manchester. On June 5 the Manchester Central operators arranged a tea and whist drive in the newly enlarged dining-room. The occasion was made the opportunity of presenting a gold curb bangle to Miss Gertrude Richards, in commemoration of her promotion to the position of matron, and as a token of the esteem in which she is held by the operating staff. The presentation was made by Mr. Scott, the district manager, whose short congratulatory speech was much appreciated. Miss Richards responded in a few well-chosen words of thanks.

Birmingham.—*Reward for Bravery.*—An interesting ceremony took place on Saturday, June 8, at the Company's stores, Fleet Street, Birmingham, when Mr. E. Williamson, district manager, presented wireman Gilbert Brueton with a handsome solid gold medal, suitably inscribed, for rescuing a boy from drowning in the canal. Mr. Williamson, in the course of a very appropriate speech, remarked that telephone men were very prompt in dealing with emergencies, such as those caused by fire, storm, or other breakdowns, and he was glad to see the same energy displayed in the cause of saving human life. It was also pleasing to note the spirit of appreciation among the men in rewarding a fellow workman for a conspicuous act of bravery when the opportunity arose. Mr. Brueton replied by thanking all who had taken part in the presentation.

Dublin. The annual staff dance, at which there were some 200 couples, was lately held at the D.B.C., and was a great success. Credit is due to Mr. J. McShane and the committee for the manner in which the arrangements were carried out.

London.—*City Fitting Staff.*—The first outing of the fitting staff organised for the past three years was successfully carried out by Messrs. Carter, Bool, Kenway and Grant. The party proceeded to Woodford, where cricket and other sports were indulged in. The good feeling that prevailed ensured the success of the outing, and a very satisfactory collation was followed by a concert at which the fitters and their friends creditably provided their own vocal talent.

Luton District.—The first annual picnic of the employees of the district was held on Saturday, July 6. A company of about 80 journeyed by brake and train to Boxmoor, in Hertfordshire, where, under delightful weather conditions, a most enjoyable time was spent: cricket matches between Luton and Watford and Luton and Ware were played, whilst tennis and boating were amongst the many other attractions. The return journey was commenced at 8.30.

Sheffield.—A small representative gathering of the Sheffield staff and friends had their annual outing on June 29. The party took the train to Grindleford and from thence drove by char-a-banc to Bakewell, where a cold collation was provided. After a short stay in Bakewell the party returned to Sheffield, arriving there at 9.45 p.m.

Swansea.—On June 29 the Swansea indoor and technical staffs held their annual outing, the venue being Glyn Neath and Pont Neath, Vaughan. A party numbering 60 made the journey and a most enjoyable time was spent. After tea, sports were indulged in, amongst the principal items being tugs of war, Technical Department v. Other Departments for a challenge shield, and National Operators v. Corporation Operators for a challenge plate. The Technical Department proved themselves easy winners, and after an exciting struggle the National Operators were victorious in their event. Other items included flat race, egg and spoon race, long jump, team races, etc. The district manager acted as judge, and also distributed the prizes at the close of the sports, the "consolation" prizes causing much merriment. Swansea was reached on the return journey at 10.15 p.m. everyone expressing satisfaction at the day's outing.

Newcastle-on-Tyne.—*Crickets Club.*—On June 15 about twenty members of the Newcastle staff paid a visit to Middlesbro'. They were met at the station by some of the Middlesbro' officials and conducted over the exchange. Both districts are competing for the Chambers challenge cup, and during the afternoon their match in the first round was played. Middlesbro' won the toss and elected to play first. The weather, which had been fine up to noon, now seemed very uncertain, and rain commenced to fall. This affected the wicket greatly to the benefit of the bowlers, and the scores on both sides were small, the result being a win for Newcastle. Scores: Middlesbro' 24, Newcastle 43. In the evening Mesdames Hann, Nicholson, Mushens and other ladies entertained both teams to tea and a most enjoyable evening was spent.

The Newcastle Telephone Cricket Club is going ahead, seeing that this is only its second season. Out of ten matches played they have won seven and lost three. The new hon. secretary is Mr. B. Brewis.

Dublin. The staff in this district gathered together on June 19 to present Mr. C. H. Sibley, late district manager, with a beautifully illuminated address on the occasion of his leaving to take up the same post at Nottingham. During his term of office here his amiability and unflinching courtesy earned for him the respect of the whole staff, who regret his departure. Mr. F. Cowley, in presenting the address on behalf of the staff, expressed the hope that he would enjoy a long continuance of good health and prosperity. In replying Mr. Sibley said he regretted very much the departure from Dublin, and thanked the staff for the loyal support given to him. Mr. Currall, district manager, took the opportunity of addressing a few words to the staff, which were much appreciated.

Head Office. *Social Society.*—The annual summer outing of this society took place on July 6 and was favoured with exceptionally fine weather. Leaving the Thames Embankment at 1.15 p.m. in two four-horse brakes, upwards of 50 members drove *via* Hammersmith, Richmond and Twickenham to the Running Horse Hotel, Sunbury Common, where, after a brief delay for photographing, an excellent high tea was partaken of. The chair was occupied by Mr. T. Caparn, who, in a few words at the conclusion of the repast, congratulated the members on the success of the venture, and explained the regrettable circumstances which

had prevented Mr. V. Baldwin from accompanying them and occupying the vice-chair. An adjournment was then made to a quiet by-road near at hand where for want of a better track, the sports programme was brought off. The events, winners and prizes were: One hundred yards handicap: 1st prize (silver cruet stand, presented by Mr. P. Chester), S. Rogers; 2nd prize (umbrella, presented by Mr. V. Baldwin), R. G. Trebett; 3rd prize (cigarette cases and cigarettes, presented by Mr. J. G. Crowe), G. Albury. Egg and spoon race: 1st prize (dressing case, presented by Mr. E. E. Ironside), R. G. Trebett; 2nd prize (walking stick, presented by Mr. T. Caparn), E. Hazlewood; 3rd prize (silver matchbox, presented by Mr. A. Remington), J. Thirkettle. One mile walking handicap: 1st prize (marble clock, presented by Mr. J. R. Gall), E. Hazlewood; 2nd prize (silver-mounted pipe in case, presented by Mr. J. K. Waters), J. Verrall; 3rd prize (walking stick, presented by Mr. R. P. Jobbins), R. Burke. Returning to the hotel, time only permitted of the prizes being quickly distributed, and the return journey to London commenced about 8 p.m., the only regret being that time had not been available for a more extended programme.

LOCAL TELEPHONE SOCIETIES.

London.—The last and annual meeting was held at Salisbury House on May 27, there being about 70 members present. The president, Mr. C. B. Clay, who was in the chair, opened the meeting by inviting discussion on the balance sheet, each member present being supplied with a copy. There was no discussion and it was unanimously adopted. The next business was the election of officers for the new 1907-8 session. Mr. T. Fletcher was elected president; Messrs. H. Davis, L. Harvey Lowe and C. Elliott, vice-presidents. The result of the election for the new committee was as follows:—Messrs. J. L. Brown, J. F. Edmonds, H. Deane, H. Corner, G. F. Greenham, W. Blight, P. J. Ridd, W. F. Taylor, P. Cole, A. C. Greening, W. M. France, C. B. Clay, D. Stuart, J. Gall, R. Bryson. The present secretary and treasurer, Mr. W. K. Cherry, was again elected for the new session.

Mr. A. Ambrose, of the statistical office, read a paper on "Office Work." Mr. B. B. Johnson, of Brixton Exchange, read one on "Electrical Work," and Mr. P. Hay, of Croydon, one on "Engineering."

There was a short discussion on each of the papers, a few words of comment by Mr. F. Gill, and then the chairman presented the prizes: To Mr. A. Ambrose, a Gladstone bag; to Mr. B. B. Johnson, Miller's "American Telephone Practice"; and to Mr. P. Hay, four razors in a case. The Chairman also announced that four consolation prizes, valued at 10s. 6d. each, would be given, one to Mr. G. Jelfs, of the Northern district, for a paper on "Office Work"; one each to Mr. O. Crouch, of Eastern district, and Mr. A. Wilkin, of the construction staff, for papers on "Electrical Work"; and one to Mr. Harvey Smith, of Salisbury House, for a paper on "Engineering." Notice was given to the meeting of the alteration of Rule 4, and this will be put to the next meeting. This closed the 1906-7 session.

Western.—At a meeting of the members of the Western (Metropolitan) district held on June 20 it was unanimously decided to form a local telephone society. Mr. A. Wright, the divisional electrician, was elected chairman, and his proposal that Mr. G. F. Greenham should be asked to become president of the society was put into the form of a resolution and carried unanimously. Mr. A. Wright was then elected vice-president, and Mr. E. Layton hon. secretary and treasurer. The name of "Western District Telephone Society" was selected, and a committee of eleven members was agreed upon and elected. The arrangement of subscriptions and other details concluded the business of the evening. Mr. A. Wright then read a short paper giving an outline of the common battery system, and this proved most interesting, the diagrams being shown in simplified form and most clearly explained by the lecturer. Unfortunately, owing to the lateness of the hour, there was no time for any discussion on the paper.

Southern.—The last meeting of the session 1906-7 was held at the Hop Exchange offices on June 19 at 7 p.m. A very interesting and instructive paper on "Exchange Generators" was given by Mr. P. J. Ridd, president of the society, and was illustrated by lantern. There was a very good attendance.

Sheffield.—A Contract Department debating class was started on April 30, 1907, for the purpose of discussing matters appertaining to canvassing. The first meeting was attended by the whole of the staff and a paper was read by the Contract Manager, touching on various points in connection with the different rates. A discussion followed and much information was gained by the members. It was unanimously decided to continue the meetings monthly and a small subscription was agreed upon to meet the expenses of the class.

The second monthly meeting was held on June 11, and another paper was read by the Contract Manager on the changing of numbers when a subscriber transfers to a private branch exchange, and on various other points in connection with the different rates. A discussion followed. It was decided that each contract officer, according to seniority, should read a short paper monthly.

A meeting was held on July 9, and a short paper was read by contract officer T. W. Ward on "Experience in Canvassing on the Measured Service." The paper was very interesting and very much appreciated by the members present.

Luton.—At a meeting held at Luton on June 8 under the chairmanship of the District Manager (Mr. J. H. Wilson), Inspector B. Lester, of Watford, read a very interesting paper on "Instrument Faults and How to Clear Them." The meeting was well attended and a discussion of the points raised in the paper was engaged in by the members. It was decided at this meeting to hold a picnic on July 6.

Manchester.—A commencement has been made with regard to the syllabus of the Telephone Society for the forthcoming session, which has every promise of proving successful.

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No. 18.

TELEPHONE MEN.

XVI.—WILLIAM JAMES GRAY.

MR. GRAY was born in Middlesbro' in the year 1855 and was educated at Cooke's Collegiate School, Stockton-on-Tees. After leaving school he entered the office of Forster, Brotherton & Co., timber merchants, Stockton, with whom he remained for about ten years, and then joined the National Telephone Company. He had acquired some experience in the electrical field, as in 1880-81 he carried out fire alarm work and constructed over-house signal lines for the Stockton Corporation.

In 1881 Mr. GRAY was appointed Agent at Stockton for the National Telephone Company, and he built for the Company a number of private lines in that town. In 1883 he was transferred to Dewsbury and Wakefield as Local Manager, and during the time spent at these centres, he carried out the work of building the trunk lines from Wakefield to Barnsley and to Goole.

Early in 1884, owing to the rapid increase of subscribers on the Dewsbury Exchange, he devised and fitted to the Dewsbury switchboard a small system of multiple slipper jacks; this alteration greatly increased the speed of operating. This improvement was made quite independently of work being done elsewhere, and Mr. GRAY very narrowly escaped the honour of being the inventor of the multiple switchboard.

In 1887 Mr. GRAY was promoted to Bradford; at this time there were only about 600 subscribers connected to the system in that city, to-day the number is upwards of 8,000. During 1887-90 he had charge of the work of building the trunk lines from Bradford to Todmorden and from Bradford to North-allerton; these lines formed part of the general scheme for linking up the National system and those of the Lancashire & Cheshire Company and the Northern Telephone Company.

In 1885, when the first multiple switchboard was installed in Bradford, Mr. GRAY devised and fitted on the operators' receivers a spring key switch for connecting up the local battery, on the

same principle as the press key which is now fitted to all hand micro-telephones.

In 1891-2 he spent a considerable time in experimenting with duplex telephony, and in the latter year was successful in making three junction lines out of two, between Bradford and Shipley, on

the present superimposed system, using the centre points of the translators. After the Shipley experiment the whole of the junction lines in the Bradford area were converted to the superimposed system, thus giving about 50 per cent. of additional junctions to those already existing, without any material additional cost.

Under Mr. GRAY'S superintendence the Bradford system was made metallic circuit during the years 1897-9. This involved a complete new equipment of buildings, switchboard, underground work and the reconstruction of the whole of the line plant and subscribers' equipment. Towards the completion of the work, in fact a very few weeks before the transfer was arranged to take place, one of the most severe blizzards of the last decade thought fit to take a hand in the proceedings, and wiped out most of the overhead plant in the place, but unfortunately without discriminating as it should have done between the old and new plant. This involved some three months additional hard work to straighten out. In 1897 he designed an automatic system for recording the number and duration of calls on junction lines. This was patented in 1898.

In 1903 he was appointed Chief Electrician at the Company's works at Beeston, Nottingham, and was employed there until the works were sold to the British L. M. Ericsson Manufacturing Company,

Limited, at the end of 1903. During the time he was at Beeston he had charge of the Switchboard Department, and also of the department charged with the responsible and delicate work of tying and forming multiple switchboard cables, and soldering them to the jacks ready to put into large switchboards.



On the sale of the Beeston works Mr. GRAY was transferred to the Repairing Factory at Nottingham, and during 1904 the multiple cable work was under his charge there, also the fitting up of the Company's fire emergency switchboards. He also had charge of the work of converting superseded multiple switchboards and making the necessary alterations and additions to them to bring them into use for extensions to existing switchboards where required in different parts of the country.

In 1905 Mr. GRAY returned to his old position at Bradford and took in hand the work of preparing a complete transmission study for the whole of the Bradford area. This study was the earliest and remains one of the most complete up to the present date.

Mr. GRAY has contributed on many occasions to the series of papers given annually at the officers' meetings in London and has always some useful information in reserve on almost any telephonic subject on which he may be asked for an opinion. Unfortunately he suffers from a complaint which is not unusual among telephone men, viz., that of extreme modesty, and it is only with the utmost difficulty that he can be prevailed upon to express his views in public.

Mr. GRAY is most painstaking and careful, and his work always shows a high standard of ability, while he is always ready to help and encourage others; he is deservedly popular with all who have been fortunate enough to come in contact with him.

Mr. GRAY'S principal recreations are of a telephonic nature, but he also takes some interest in boating and cycling, and in addition is an enthusiastic amateur photographer. In the latter recreation he is actively aided and abetted by Mrs. GRAY, who it is only fair to say takes nearly as much interest in telephones as her husband.

MR. DUDELL ON WIRELESS TELEPHONY.

IN concluding his paper before the British Association on arc and spark methods in wireless telegraphy, Mr. W. DUDELL, F.R.S., said that an extremely interesting development, which was now progressing rapidly owing to the possibility of producing continuous oscillations by the arc method, was wireless telephony. Supposing that the intensity of the oscillations could be varied in a manner corresponding with the vibrations of the air which constituted sound and speech, then we should obtain at the receiving stations a train of Hertzian waves whose amplitude varied in a corresponding way; by allowing these waves to act on a telephonic receiver which was sensitive to the intensity of the waves we should obtain in the telephone a reproduction of the sounds. This had actually been carried into effect by employing an ordinary microphone to modify the current through the transmitting arc so as to vary the intensity of the oscillation current produced, and by employing what was known as a point-detector and a telephone at the receiving station. Another method which might be used consisted in causing the microphone to vary the frequency of the oscillations of the generator, and by arranging the receiver so that it was more or less strongly affected according to the frequency of the received waves. He was informed that such good results had already been obtained on the experimental stations for wireless telephony that it was proposed to equip stations at Oxford and Cambridge for the further perfecting of this application.

THE ERECTION OF LEAD-COVERED AERIAL CABLES.

By W. MANN.

THIS class of line construction is a comparatively new institution, and in consequence the average telephone man has had little experience and dreads the ordeal accordingly. Like most other difficult things, however, it turns out that the imaginary is worse than the real and that there is little, if anything, to dread, provided the work is prepared for and carried out in a proper manner.

What is the proper manner? It would be difficult to find a better answer than that contained in the article by Mr. E. A. PEARSON which appeared in the May JOURNAL. True, it does not cover all the ground, and it is open to criticism in places, notably in the matter of extra wood pulleys for getting round corners, etc., which

to some may seem superfluous and to others a waste of time, but take it for all in all its suggestions are excellent and one would not be far wrong in adopting them.

Here are a few points pertaining to a 15-pair cable, three miles in length, recently erected—well, it does not matter where.

Route.—The route is obviously the first point for consideration; and in selecting new routes care should be exercised to see that as far as possible they are accessible, possess good staying points, and lie along the line of least resistance from a wayleave point of view. In dealing with old ones the case is different; there they are, and good or bad, one has to make the best of them. This particular route was nearly all that could be wished as regards wayleaves and accessibility, but as to its spans and general suitability for cable construction, quite the reverse. Fifty-yard spans are the ideal; here they fell little short of double that figure, with the result that the cost of running the cable was at least one-third higher than it would have been had the spans been the normal length.

Wayleaves.—Cable work of any material length should never be put in hand until the wayleaves are obtained, otherwise in everything that counts there will be waste. This recommendation was followed in the case in question, so there was no waste, although wayleaves for 50 additional stays and for two poles had to be obtained, which, to the credit of the grantors and of the telephone as a civiliser, was done without difficulty. No, that is not quite correct. There was one little difficulty, and, as usual, there was a woman in it. She said she would never consent, and yet consented, to the erection of an important stay; but finally she would have none of it. Happily the trouble was surmounted in another way.

Stays.—Good staying is important for all overhead lines, but indispensable for cables; as may be inferred from the number fixed, although a considerable number already existed, the matter was not overlooked in this case, with the result that the perpendicularity of the poles was practically the same after the suspenders and cables were erected as before.

Suspenders.—Three were used and proved ample. Except where trees or other obstacles had to be cleared they were fixed immediately under the lower arm, the fourth of the existing open wire route. That the tension was good may be gathered from the fact that even in the longest spans the sag of the cable does not exceed 2 feet 6 inches. Before the suspenders were run a strip of sheet zinc 6 inches wide was fixed round each pole with the ends overlapping.

Slings.—These were just "so-so" in quality and differed in length, which does not improve the appearance of the line; it would be well if someone could devise a better article or a means of strengthening the present type at or below the slit, where they are apt to give way. A washer and rivet similar to those below the hook might meet the case. The 4½-inch is better than the longer ones. Why?

Running Out the Cable.—This was done for the most part in about quarter-mile lengths, in two cases in half-mile lengths, neither of which presented any great difficulty, especially when the men were experienced enough to give a long pull and a strong pull, and a pull all together. Men only were employed, no winch. Here arises the question—which is preferable for hauling purposes, men or the winch? Mr. PEARSON favours the latter and adduces strong arguments in support of his opinion, but he would probably not deny that a case could be made out for the men. Along the highway, the winch; across country, the men, especially for the lighter cables.

The Force.—Returning to the case in point, eleven men were engaged in running out the cable, of whom only the foreman and three or four of the rank and file had had any experience of the work; but a little coaching brought all pretty well up to the average, and on the whole they did their work very well.

Distribution of Men.—While the first half of each section of the cable was being run out there were

Two men at the drum, one unwinding the cable, the other marking it for the slings.

Two men on the pole next the drum, one putting the slings on the cable, the other hooking them on to the suspending wires.

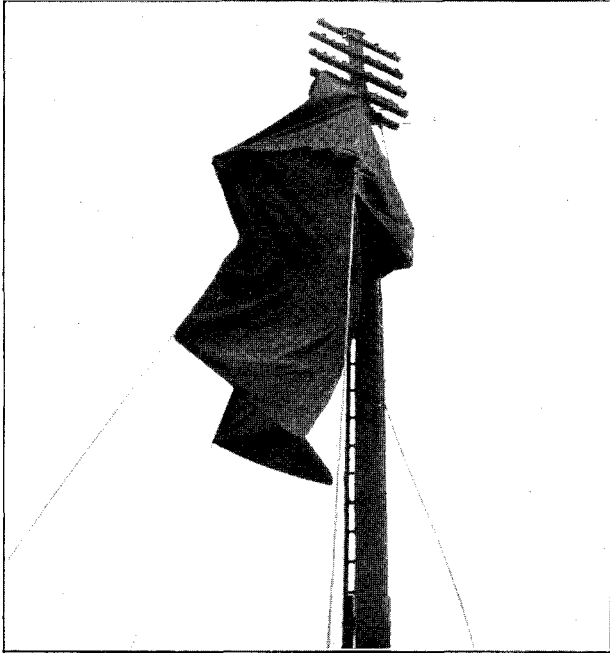
One man on each succeeding pole.

One man on the line at the distant end.

In the case of the second part of the section, one man sufficed for the drum and marking, the second going to the aid of the man on the line at the distant end, and all the others were as shown above.

Cost of Running.—The figure per yard for the cable is 1'3d., that for the three-wire suspender '6d., total 1'9d. Deducting one-third in respect of the abnormal spans, the average figure for suspender and cable would be '63d. per yard each.

Jointing.—A jointer and his mate can in fair weather do two to three joints a day, a large part of which goes in rigging up and taking down their platform and tent. The tent is an eyesore any-



where, but perched on the top of a pole its appearance is uncanny in the extreme. Just look at it! Horses do not like it. The sooner something more portable and presentable takes its place the better.

HOTELS AND PRIVATE BRANCH EXCHANGES.

BY C. H. BEANDRETH, *London.*

ONE cannot help being struck by the multiplicity of objections which are hurled at the suggestion of a private branch exchange by hotel managers in this country. Most scornfully is the suggestion received at hotels where for years the only facility has been an unlimited line placed in some remote corner of the building, for use by management, staff and visitors, and, in the case of the latter, where no charge has been made for the service. The proprietor or manager will stubbornly maintain that it would be against his interests to attempt to charge the visitors after they have been allowed to make calls without restriction for so many years, and further, that if the charge were enforced when objections were raised, the visitors would pay under protest, and transfer their custom to some other hotel. Another objection is that anything in the nature of an extra is most irritating to the average traveller, who expects everything at an inclusive charge; but in this respect the hotel people are chiefly to blame, as several years ago the attitude of the public is alleged to have become so irritated on the point of extras, that the leading hotel people held a conference, the outcome of which was to abolish extras entirely and to increase the price of the rooms in proportion. This was indeed a very short-sighted policy, as events have since proved. Competition has been terribly keen, rates have been cut, people have travelled more, and visitors to London hotels have become increasingly cosmopolitan.

Fully 20 per cent. of the visitors to London during the season

are Americans, who in their own country have hotels equipped with telephones from cellar to roof, and who naturally expect to find the same facilities in this country. These American facilities are not provided gratis; a visitor making a call from his room over the exchange is charged 10 cents, although the charge from the public call office, originally 10 cents, is now only 5 cents. Since the reduction in the public station charge took place, it has been argued that the hotel people should reduce their charge also to 5 cents, but this they have refused to do on the grounds that they have equipped their hotels with a thoroughly efficient and up-to-date system of telephone service, the traffic from which has not diminished to any appreciable degree since the telephone companies reduced their charges at the call offices—a fact which itself speaks volumes for the system and at the same time proves beyond doubt that the visitors are quite satisfied that the charge made is consistent with the facilities supplied. Therefore, it is only reasonable to assume that these people would be quite willing to pay over here for the same privileges. Diminishing dividends have in several cases brought wisdom to a few hotel managers, who have permitted the Company to supply these facilities, with the result that a large business has in several instances accrued.

In discussing the question of charges with a leading hotel director in London some little time ago, he revealed the fact that the hotel private branch exchange cost his company several hundreds per annum. I asked him why he indulged in such colossal generosity, to which he replied that it would be quite impossible to charge 3d. or even 2d. to his clients, who expected the facility to be included in the charge for the apartment just the same as electric light and attendance, etc. "Of course," I suggested, "you pay for your visitors' telegrams also?" To which he promptly replied in the negative, observing that the two services were entirely different. "You see," he argued, "in the case of a telephone message you simply ring the exchange, ask for your number, and the rest is done by the subscribers, whereas in the case of a telegram, the service of a special messenger is necessary for delivery!" I then explained that, as the messenger was an indispensable quantity in the case of the telegram, so in the same degree was the service of the exchange operator in the case of the telephone message, and after a careful explanation as to the relationship of the telegraph and the telephone, I was convinced that the matter had never been examined in a serious light and that the whole of the imaginary trouble was simply nothing more or less than prejudice.

The financial aspect of a contract for a private branch exchange frequently presents great difficulty. A large installation must necessarily involve a large annual rental, which is payable in advance; the smaller the subscriber's existing installation the greater is the difficulty of successfully demonstrating the value of a complete private branch exchange; last, but by no means least, is the difficulty of persuading clients to agree to the cancelling of the unlimited service by the new agreement. In dealing with prospective hotel subscribers there are several points which require careful observation before the subscriber is approached on the subject. They may be summarised as follows:—

- (1) The locality of the hotel.
- (2) The class of visitors.
- (3) Whether the proprietors are limited companies or private individuals.

Where hotels are situated in the main arteries of traffic there is usually a fair percentage of casual visitors who frequently use the service from the call offices in the hotel. Hence the percentage of calls per station is generally higher in the case of a purely commercial hotel in the City, where the visitors are business men with limited time, than in the case of a residential hotel patronised chiefly by rich idle people who are not so accustomed to using the telephone. In the former circumstances there is a better foundation to work upon, and the contract officer dealing with the matter should not neglect to have proper records taken of the present traffic, incoming as well as originating, making special note of ineffective incoming calls with the names and numbers of the callers unable to get connected. A very careful analysis of the record and due attention to the points previously referred to should

materially assist in negotiating a contract. Every allowance must be made for the ignorance of the working of the service usually prevalent amongst subscribers. It is better to abstain from using too technical language, and to direct all efforts towards getting the subscriber to appreciate that the system the Company have to recommend is greatly superior to their present arrangements, will eventually prove remunerative, and will certainly signalise the hotel as being up to date.

CENTRAL BATTERY PRIVATE BRANCH EXCHANGES ON THE CUNARD STEAMSHIPS LUSITANIA AND MAURETANIA.

THE Company has just completed the installation of a central battery private branch exchange on board the Cunard ss. *Lusitania*, and has in hand a similar installation on the sister ship *Mauretania*. In each case the equipment is designed to be connected with the Liverpool and New York Exchanges when the ships are in port. We believe this is the first instance of a complete private branch exchange, giving regular "exchange facilities, being fitted on an

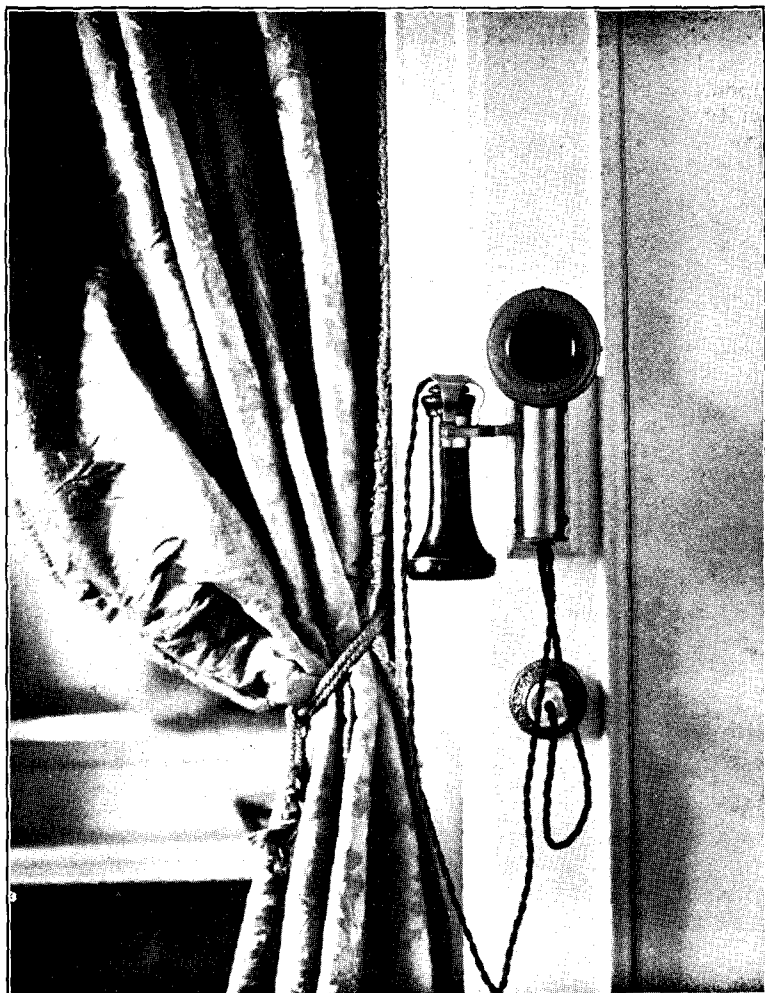


FIG. 1.—TELEPHONE INSTRUMENT SHOWING SPECIAL CLIP FOR RECEIVER.

ocean-going steamer, and it would appear that a new field of considerable importance has been opened up for the telephone exchange service. The installation on the *Lusitania* consists of 89 stations and ten exchange lines connected to a switchboard having capacity for 200 stations and twenty exchange lines. The telephone instruments are fitted only in the regal and first class state rooms, in the cabins of the ship's doctor, purser and chief steward, and in the bureau. The instruments are of special construction and of the design shown in Fig. 1; the body is of metal, gilded or silvered as

the case may be, to harmonise with the scheme of decoration of the cabin. The switchhook is designed to grip the receiver and prevent the latter falling down or knocking against the side of the instrument when the ship rolls. That part of the switchhook which holds the receiver is also pivotted horizontally, so that the receiver may swing with the ship and always tend to maintain the active length of the lever. If this provision were not made the latter would lift

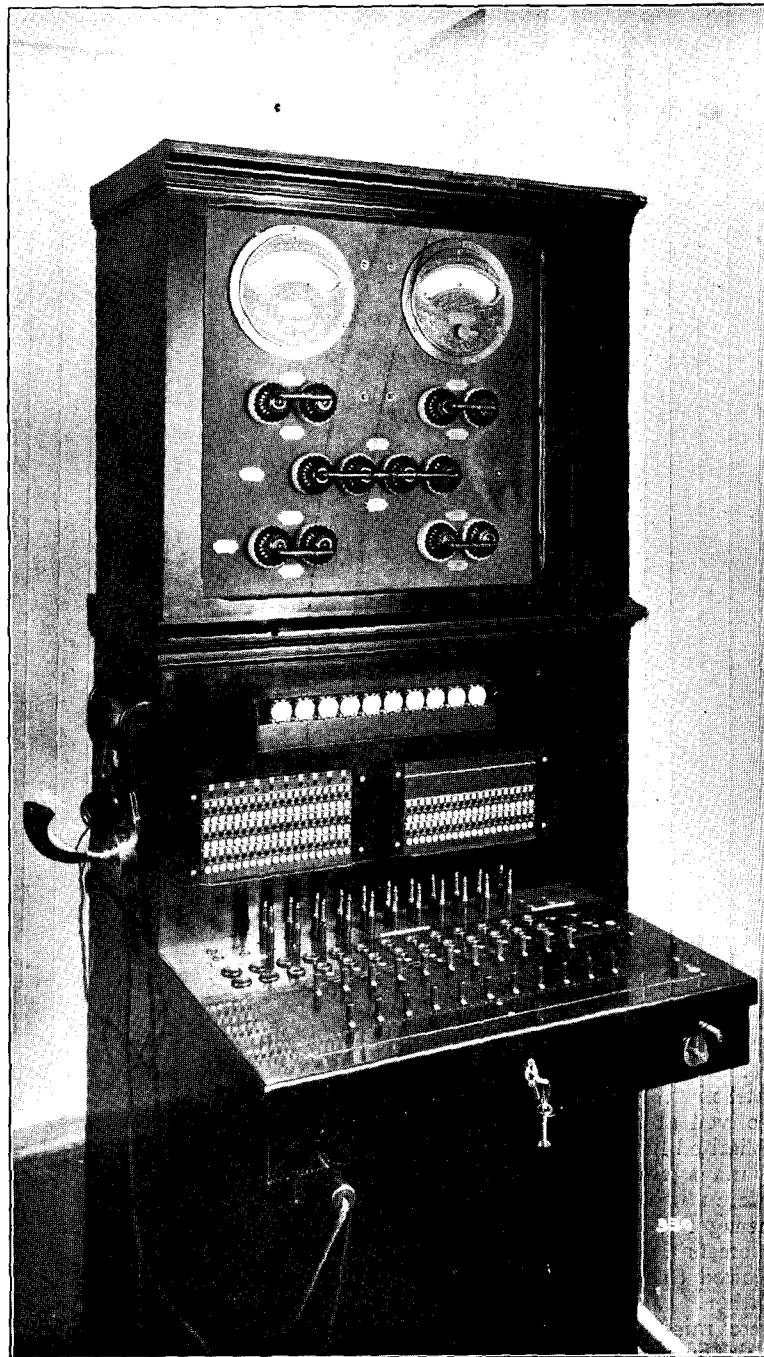


FIG. 2.—SWITCHBOARD.

with the rolling of the ship, owing to the shortening of the horizontal distance between the centre of gravity of the receiver and the fulcrum of the lever. The bell, induction coil and condenser are all fitted in a box having a metal cover enamelled white. In most cases the bell boxes are placed completely out of sight, and the wiring between them and the instruments is run behind the panelling of the cabins.

Fig. 3 is a view of one of the regal state rooms with telephone instrument.

A room amidships has been set apart for the switchboard and exchange apparatus. The switchboard is of special design, having the power board placed on the top, as shown in Fig. 2. The

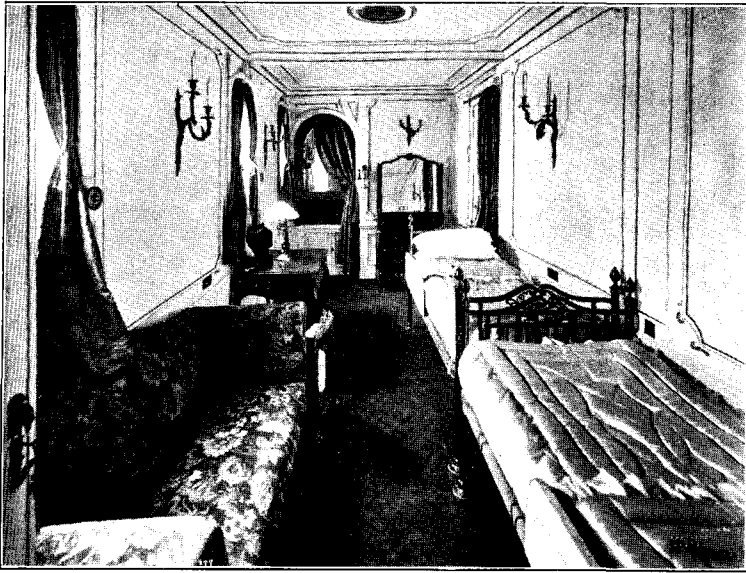


FIG. 3.—REGAL STATE ROOM SHOWING TELEPHONE INSTRUMENT.

distributing frame is of the vertical type, fitted with 120 pairs of fuses in the upper part, and 120 pairs of arresters and heat coils in the lower part. The whole is enclosed in a mahogany cabinet, and

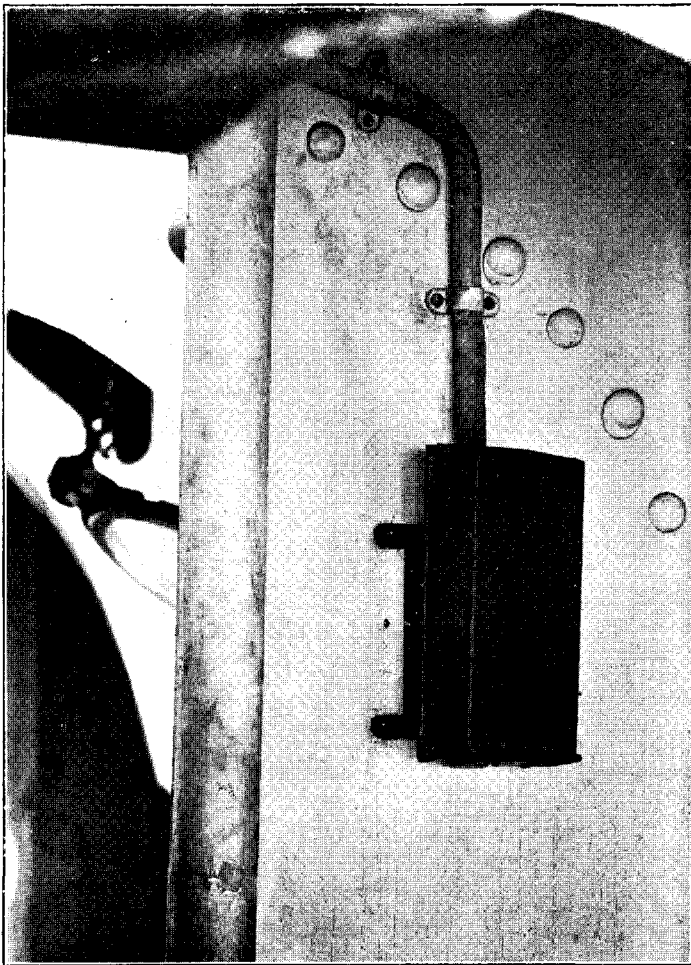


FIG. 7.—CABLE BOX IN POSITION ON THE SHIP.

the space between the fuses and arresters is used as a cross-connecting field. Two ringing machines have been provided and are run from the ship's supply; these are enclosed in a sound-proof case and are controlled by switches on the power board. Two batteries, each consisting of thirteen accumulator cells, are provided to supply current for the operation of the switchboard. These cells are conveniently situated in a special case close to the switchroom. They are charged direct from the ship's supply (110 volts) through a reducing resistance consisting of four 32-candle-power lamps. The charging and discharging of the batteries is controlled from the power board.

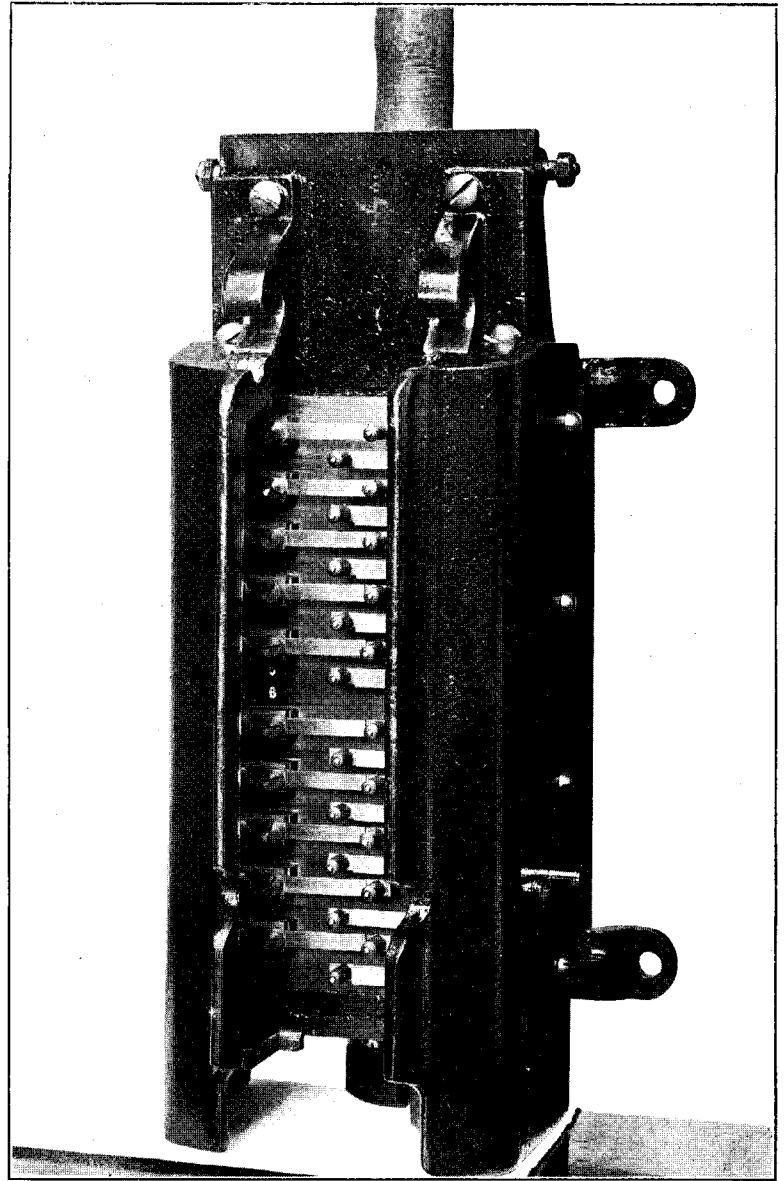


FIG. 8.—CABLE BOX WITH COVER REMOVED SHOWING THE PLATINUM-TIPPED SPRINGS

On reference to the extension line circuit (Fig. 4) it will be seen that calling is effected by means of lamps, but without relays. As the lines on the ship were uniformly of low resistance, it was found to be quite practicable to light the 24-volt calling lamp by means of the current from a 26-volt battery passing through the instrument when the receiver was removed.

The exchange junction lines terminate on self-restoring drops. Fig. 5 shows the circuit of a line from a central battery main exchange. In the case of an exchange junction line from a magneto exchange, a special circuit which will supply current for speaking must be provided.

The cord circuit (Fig. 6) is the ordinary central battery private branch exchange circuit.

Ten pairs of wires for exchange junction lines are carried in lead-covered cable from the distributing frame to each side of the ship where they are terminated in a box of special design.

This box is made of gunmetal and is fitted with ten pairs of

Fig. 8 the box with the cover entirely removed, showing the platinum-tipped springs.

On the landing stage or dock where the ships will be berthed, are fitted a series of similar boxes, each having the ten junction lines from the town exchange terminating on them. These boxes are so placed that in whatever position the ship is berthed one of them will be within easy reach of the box on the ship.

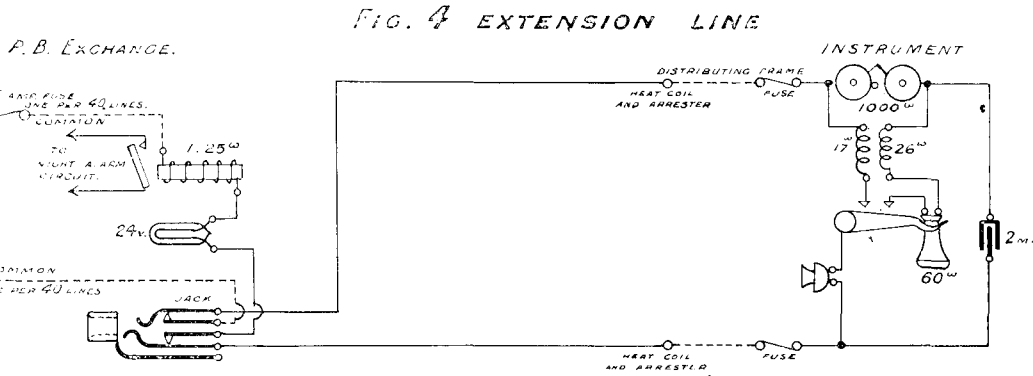


FIG. 4 EXTENSION LINE

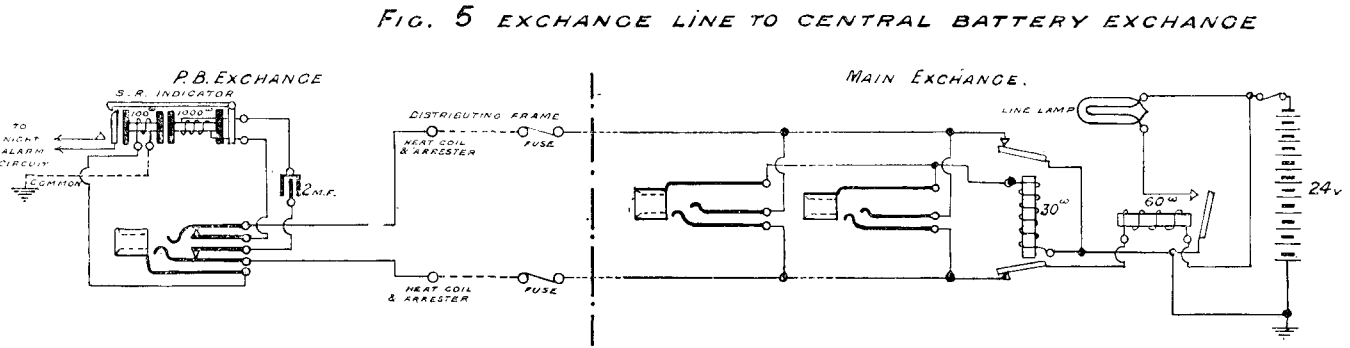


FIG. 5 EXCHANGE LINE TO CENTRAL BATTERY EXCHANGE

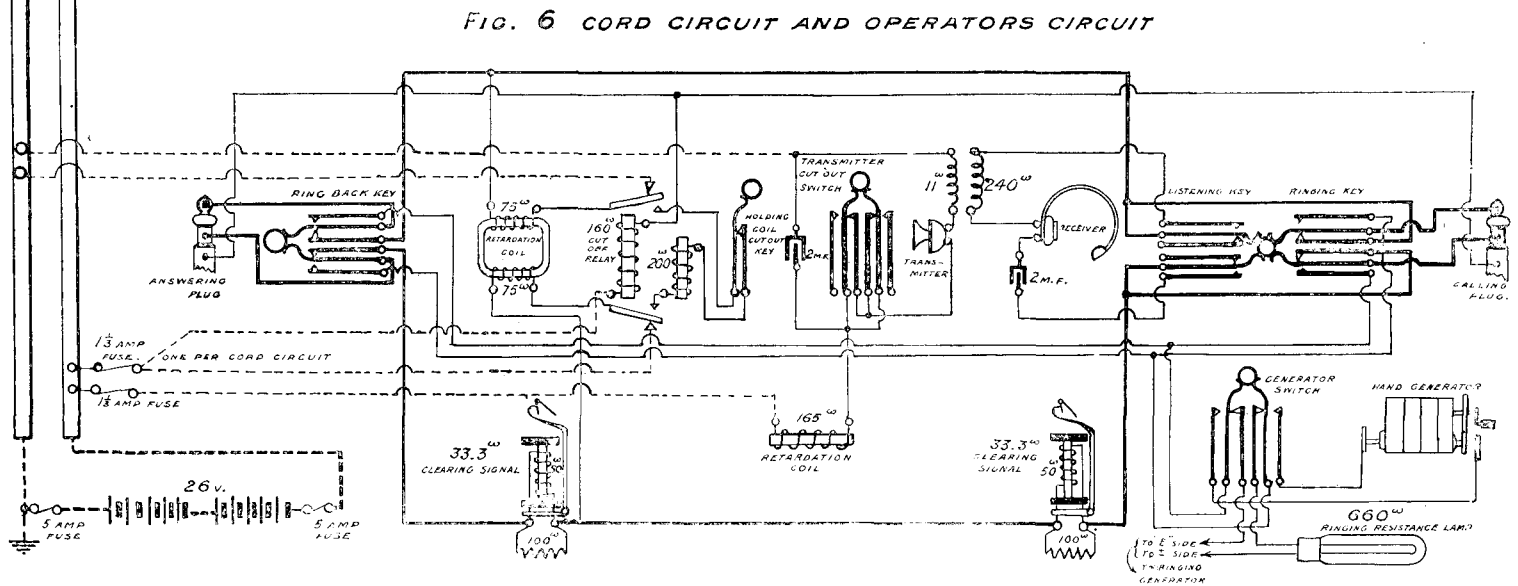


FIG. 6 CORD CIRCUIT AND OPERATORS CIRCUIT

Figs. 4, 5 & 6.—Circuit Diagrams, "Lusitania" and "Mauretania" Private Branch Exchanges.

platinum-tipped bronze springs carried on an ebonite slab. The 10 pair cable is taken through a nozzle in the end of the box, and the conductors are connected on to their respective terminals. A wiped joint is made between the cable sheath and the nozzle, the interior of the box is filled with hot compound, and the back cover screwed on.

Fig. 7 shows the complete box in position on the ship, and

A length of special flexible cable containing ten pairs of wires, and fitted at each end with a cable head, is provided for effecting connection between the ship's box and the shore box. Each cable head on this linking-up cable consists of a gunmetal casting, fitted with ten pairs of platinum-tipped studs carried on an ebonite slab. The cable is taken through a brass nozzle and the conductors connected to terminals (solid with the studs referred to) inside the

cable head, the remaining space is filled with hot compound and the metal cover screwed on. Fig. 9 is a view of one of the linking-up cable heads with the flexible cable connected.

When the cable head is placed in position on the fixed terminal box and pressed home, a spring catch is automatically brought into operation and holds the cable head firmly so that the studs of the movable cable head make good contact with the springs of the fixed terminal box, thus connecting the exchange junctions through to the ship switchboard.

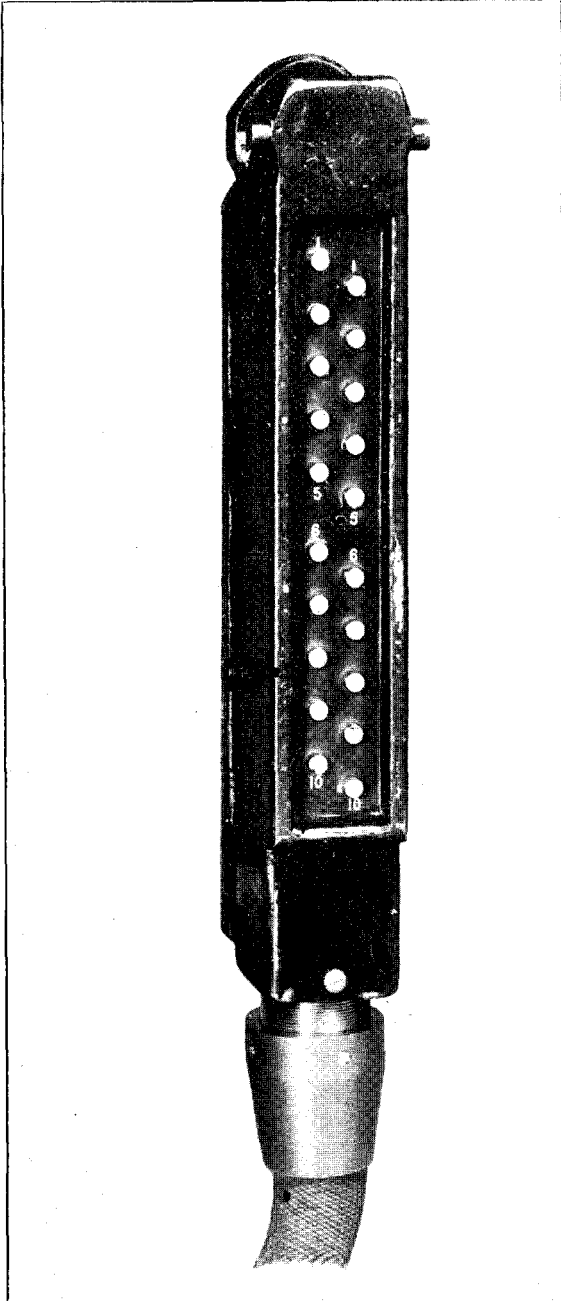


FIG. 9.—CABLE HEAD WITH FLEXIBLE CABLE ATTACHED.

To release the cable head from the terminal box, a thumb piece on the under side of the latter is depressed, allowing the cable head to fall into a position in which electrical connection is severed and from which it can be lifted clear of the box. Fig. 10 shows the ship's box with cable head in position.

At the Liverpool landing stage three shore boxes are provided.

Each box is fitted in a special pit, sunk near the edge of the stage, the ten pairs of exchange lines being run to each of the pits underneath the flooring of the landing stage.

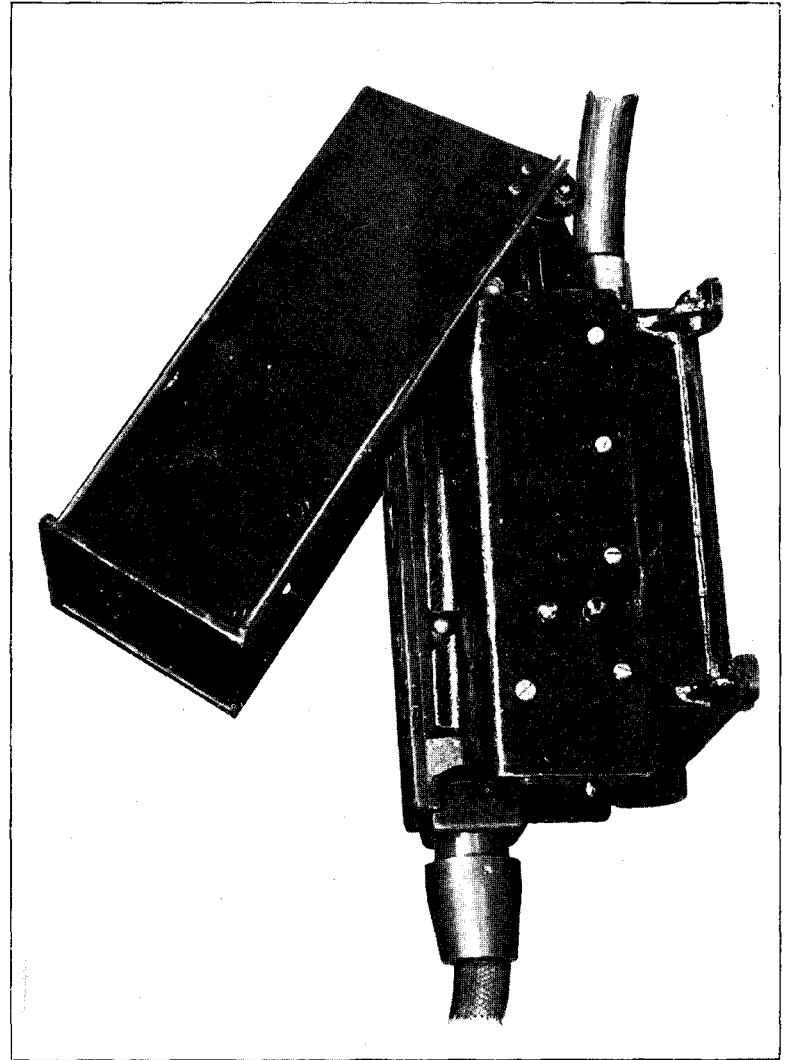


FIG. 10.—SHIP'S BOX WITH CABLE HEAD IN POSITION.

The *Lusitania* starts on her first regular voyage from Liverpool on Saturday, Sept. 7.

SELSEY-ON-SEA.—GOOD WORK BY THE SUSSEX CONTRACT DEPARTMENT.

SELSEY-ON-SEA has recently figured somewhat prominently before the public, owing to the formation of a company to develop this rising seaside resort, which is so favourably situated on the Sussex coast, standing on the well-known promontory of Selsey Bill. It was therefore thought that it would be an opportune time to canvass the district for the opening of an exchange, as the nearest telephone exchange is seven miles away. A beginning was made by well circularising the place with telephone literature, together with an intimation that the Company would be prepared to open an exchange, provided sufficient support could be secured, and on following this up fourteen measured rate orders were obtained together with an agreement for a private branch exchange at the Marine Hotel with 27 stations, which allows for a telephone in every bedroom. The hotel proprietor in this case has been keen enough to see the various advantages to be gained by the establishment of a private branch exchange in his hotel, one of the principal being the great saving of servants' labour. Under the old *regime* of electric bells, two journeys to the guest's room were necessary to ascertain and then fulfil his requirements. Now only one will be required. With the servant problem ever before us, this is a point no canvasser should fail to drive home when laying before hotel companies the advantages of the private branch exchange.

THE HUMAN SIDE OF THE ENGINEERING PROFESSION.*

By V. KARAPETOFF, *Cornell University.*

FUNDAMENTAL THOUGHT:

Professional usefulness and personal satisfaction depend on the right conception of life and on the degree in which this conception of life is manifested in daily activity.

PART I.—WORK AND CONDUCT.

THERE are three essential requisites for an efficient and successful engineer:

- (A) Sound professional knowledge;
- (B) Knowledge of business forms and of human relations;
- (C) Good and strong character.

(A) *Professional Knowledge.*—A man who knows only "how" to do certain things, but does not know "why" they are done so, usually remains in subordinate positions. Get into the habit of analysing; also, have your knowledge systematised.

In order not to get "rusty," you ought to do some study, or at least some reading outside of your daily routine work. This outside work may be classified, in an ascending scale of difficulty, as follows:—

1. Keep notes on your regular work, with sketches, samples of calculations, etc. On separate notes keep matters of doubt to straighten them out at a future opportunity.

2. Read regularly at least one periodical relating to your specialty, and keep some kind of a general index on at least one subject in which you are particularly interested.

3. Be sure about the fundamental laws, facts and assumptions on which your branch of engineering is based. If you are but recently from college you can go over your old books and notes; otherwise read a good modern text book.

4. Gradually get familiar with more advanced books treating of the various branches of your profession; go from time to time to the public library and see if there is anything new in your specialty.

5. Select some one branch of engineering, if possible somewhat different from that in which you are regularly engaged, and devote some time to it. Know more than the next fellow does; it will pay you.

6. Do not miss any chance to make an original investigation; this will develop your thinking, increase your self-confidence and raise your standing in the profession.

7. Inventing is the highest form of the engineering activity; there is no reason why you should not bring some improvement into the work in which you are engaged. Concentrate your mind on one thing, work patiently and persistently, and you will be sure to achieve something that will be new and useful.

(B) *Knowledge of Business Forms and of Men.*—You naturally expect some day to occupy a responsible position in your profession. This is impossible without a sound knowledge of established business forms and of human relations in general. Here again there are several stages of study and observation. Take up as many of these as your ambition, time and ability will allow.

1. Observe the characters of men you are working with; in particular, the influence of their previous experience and education, of their age and temperament, of their views on general life questions, etc.

2. Observe things that make them efficient and happy, or that are impediments in their work; things that they would like to have and the main things that they object to.

3. Observe critically your superiors and their ways of acting towards their chiefs and subordinates. Do this without malice, but rather with a sincere desire to find out the best way of conducting the work, when you shall be called to perform their duties. Make for yourself a clear mental

picture of an ideal man in a certain position, and try to follow this ideal in your own business life.

4. Observe and read about general business systems adopted in large modern commercial and industrial enterprises; in particular,

- (a) Subdivision of the duties of various officers, and their correlation;
- (b) Correspondence, accounting, orders, receipts, etc.;
- (c) Causes of loss, waste, inefficiency, etc., and possible remedies.

Merely knowing the facts is not sufficient; you must see clearly the necessity for a certain organisation. Only then will you find a right place in it for yourself and efficiently discharge your duties.

5. Do not get "rusty" on general life questions; read books on history, economics, philosophy, etc., with the view of finding the underlying facts and motives in human relations. Do not adhere too readily to a traditional school; work out your principles for yourself, and be willing to change them when new evidence is laid before you. A man in a responsible position must be a well educated man; he meets a great many men, and has to face new situations. Therefore he must be well informed on things in general, and ought to be able to judge about them.

(C) *Training of the Character.*—Engineering and business knowledge are the necessary conditions for usefulness ("success" and usefulness are not always the same), but the proper development of the character is the third necessary condition.

What is the use of having a profound knowledge of engineering, if you have not the necessary perseverance to achieve results; or to have a knowledge of business forms and relations, if your temper is such that nobody cares to be associated with you in business?

Practice daily the qualities of the character that you find essential for a good citizen and a good business man.

1. Work patiently on any problem until a result is achieved. If it should be impossible to get satisfactory results, at least make clear to yourself the nature of the hindrances.

2. Be honest in all things; do not be afraid to confess your mistakes or your ignorance. Train your character by doing your work ever cheerfully.

3. Keep down your selfish personality and ambition. Do not let them interfere with your business. *The highest goal of personality and ambition is to have your part of the work done in the most ideal way.*

4. Be generous, polite, and considerate to others; there are no circumstances where you would be justified in breaking this rule. Remain dignified even under unjust reproof.

5. Work with the understanding that your activity of to-day shapes your future. You need not trust to chance; *your opportunity will come when you are ready for it.*

PART II.—UNDERLYING MOTIVES—(A Theory of Life).

Some men are happy and efficient in their work without having any clearly defined conceptions of life and its purpose. In a great majority of cases, however, a lack of a workable theory of life brings with it a decrease in possible efficiency and in personal satisfaction. It is of importance, therefore, to know

(A) What are the principal limitations and wrong beliefs that are hampering engineers in their work.

(B) How these limitations can be removed by working out a theory of life that gives a general meaning to man's activity.

(C) How an engineer's work is shaped, when his underlying motives are illumined by such a theory of life.

(A) *Usual Limitations* that prevent an engineer from being fully efficient and happy in his work.

1. Belief that he is underpaid; abnormal striving after money.

2. Belief that his efforts are not appreciated by his employer; also that there is no chance for promotion.

3. Lack of knowledge, theoretical or practical lack of

* Abstract of an address delivered before the New York Electrical Society, Oct. 31, 1906.

general education; a deficient knowledge of business forms and human relations. This is often accompanied by a belief that he has no time for study; in cases where a man has not exercised his mind for a long time, he has also to contend with his own mental apathy.

4. Deficiencies in character, such as weakness, roughness, egotism, narrowness, pedantry, absent-mindedness, laziness, etc.

5. Lack of enthusiasm due to the absence of a guiding and unifying purpose in life. This is particularly noticeable in very young men who are just beginning to form their own conceptions of life, and in older men who already see the end of their usefulness and cherish no more illusions.

(B) *A Theory of Life*.—Each man must work out for himself a practical theory of life; this will make his acts and words, thoughts and feelings, harmonious and consistent. The experience of humanity past and present is the material to work on; his reason is called upon to interpret this, and his conscience is the court of final appeal.

The following is an example of such a theory of life:—*

1. The Universe, including man, is governed by an Infinite Intelligence, which is manifested in man as his conscious life. There is no meaning in a man's life if it be detached from other men's lives. In proportion as he becomes conscious of this one, infinite life, common to all men, his own life becomes reasonable and harmonious, and the fear of poverty, sickness, old age and death gradually disappears.

2. The highest purpose of life is to work for the realisation of the above ideal conditions of life on earth. We do this either by actually removing certain hindrances and fetters (practical work), or by making this great work clearer to others (literary, educational work, preaching, etc.).

3. Once this attitude is understood, the real compensation for the work consists, not in money and notoriety, but in the state of consciousness reached. This is manifested in particular:

- (a) In a clear and definite programme of life, and a ready answer for all difficulties (doing your best).
- (b) In a state of harmony and good fellowship with all men, through the understanding of that life which is common to all.
- (c) In a freedom from fear, anger, jealousy, apathy, and other limitations caused by the assumption that life is an accidental chain of phenomena and circumstances.

(C) *Work Illumined by Higher Ideals*.—Once he has obtained a workable life-theory, all of the limitations enumerated above, that prevent an engineer from being efficient and satisfied in his work, can be removed by actually applying this theory to his daily work.

1. The belief that he is underpaid or not appreciated enough loses its power; the man works no more for a company or a corporation. He works for his conscience's sake, and finds his true compensation in the results of his work.

2. He is full of desire to do as much as he can, and not as little as he is allowed to. For this reason he wants to know much and to have his knowledge in a practical form, ready for use. He is active and studious all the time, and the expression "mental lethargy" is incomprehensible to him.

3. He frees himself from possible shortcomings in his character by keeping the ideal of perfection continually before his mind's eye. He no longer finds difficulty in handling men and in treating his co-workers and chiefs aright; he has a sincere sympathy for them, tries to help them, and to make their work more pleasant and efficient.

* It may seem presumptuous on the part of the writer, who is not a philosopher by trade, to formulate a "theory of life"; this he gives, however, simply in order to illustrate what a practical doctrine of life (not a "canned" religion) may be. For the author personally this doctrine is the truth he believes in and according to which he tries to shape his life; for others it may serve merely as an example. He hopes that by criticising his metaphysics readers may make their own conceptions on the subject clearer to themselves, and in this way be indirectly benefitted even by a theory presumably wrong.

4. He is full of enthusiasm, for he is aware of the infinite importance of his life and work. His work is infinite as is life itself; and each problem solved brings with it a higher and more important problem, brings more truth and light into his consciousness.

CONCLUSION—(*Credo*).

1. Make yourself ready for a broader and higher field of activity; then your opportunity will surely come.

2. The true purpose and value of engineering activity lie in providing better and easier ways for satisfying ordinary human needs. This provides more leisure and opens new possibilities for a higher spiritual and intellectual development of humanity.

3. The engineer's personal satisfaction consists in knowing this high purpose of his vocation, and in giving his service at a maximum efficiency. The other compensation is a result and not the purpose.

MEASURED RATES ON THE CONTINENT.

BY W. H. GUNSTON.

FOLLOWING the practice adopted after the most comprehensive study of business conditions by the more enlightened telephone administrations, the Austrian Government, as from November last, have adopted a system of measured rate tariffs. This eminently fair arrangement provides that a man shall pay for what he uses, and, what is most important, that the small user shall not be overcharged in order that large firms who get the greatest value out of the service, and overload their lines with an inordinate number of calls, may get their service at a relatively low rate which is not remunerative to the administration.

The public of all countries, however, look upon adjustments of tariffs and rates with great suspicion, and even when it is abundantly proved that a railway company is losing money by carrying passengers at fares which do not pay, a howl of execration is raised in the popular press at any attempt to place fares on a paying basis. Where it is a question purely and simply of raising fares, as in the case of a railway company, the dislike of the public to pay more money for their travelling than they have been accustomed to pay is very natural, but the alteration of a telephone tariff from a flat to a measured basis is a very different matter. In the latter case the rates are actually reduced for the small user, while for the moderate user they remain practically *in statu quo ante*.

The system of measured rates has been extremely successful in America, where it has led to the rapid, almost phenomenal, development of a highly perfected service; it is on its trial in most of the large towns in this country, and its adoption, it is believed, is under consideration in France and Germany; but whereas upon the introduction of measured rates in Great Britain existing subscribers are not interfered with, the Austrian subscriber, whether he likes it or not, finds himself paying at the new rates as from July 1.

The wrath of the large telephone users accordingly flamed up; they formed themselves into protective unions to resist the new rates. "In a short time," says the *Zeitschrift für Schwachstromtechnik*, "2,000 subscribers in Vienna had formed themselves into such a union, and in Prague, Grätz, Lemberg and other towns similar unions are surprisingly strong. Mass meetings of telephone subscribers are planned, and the minds of all property holders are pregnant with intentions to withhold wayleaves for the leading in of wires. In the most conservative circles revolutionary moods hold sway." The same journal says that the telephone undertaking of the Austrian Government shows a deficit, and that the basic idea and leading motive of the raising of the rates is to make this good; that the public considers that the pleas of the injustice of a common rate for all subscribers and the necessity of differentiating rates in graduated scales are so many arabesques to give the scheme a good external appearance.

The *Zeitschrift*, perhaps, makes the mistake of confounding the voice of the large user with the voice of the public. The truth is that the small or moderate users—that is, in a country well developed telephonically, the majority of subscribers—suffer the irregularities of a tariff in comparative silence. Not so, however,

the large user, the influential man who is a power in chambers of commerce, a friend of deputies and members of Parliament, whose voice, magnified by these powerful channels as by a megaphone, sounds like the voice of the whole public; his grievances, real or imaginary, resound from press and platform and echo and re-echo up and down the country. To the general public the graduated measured rate is what it actually claims to be—a fair and reasonable method of charge which brings the telephone within the means of many who could not afford a comparatively high "flat" rate. The fact that the discontinuance of a flat rate (to the chagrin of the large user) enables an administration to prevent loss on its telephone service does not alter this truth.

To quench these flames of discontent the services at the pumps of high government officials, Generalpostdirektors and Hofrats were requisitioned. *Die Zeit* publishes a lengthy paper entitled "The New Austrian Telephone Tariff," by Dr. VON WAGNER JAUREGG. It deals largely, of course, with Austrian conditions, and disposes of some apparently favourable comparisons which appear to have been incorrectly made with the "good old days," when Vienna and other towns had a very small telephone development. It also points out that installation charges disappear and mileage rates are modified under the new tariff and proceeds to demonstrate that the latter shows favourably in comparison with those of Switzerland (towns of a like size being compared) and Germany. As Dr. JAUREGG says: "Comparisons of the new tariffs can only be made when like conditions prevail. The American tariffs can hardly be brought into comparison when a little-used telephone costs a trifle of £12 10s. or £15 annually, and a private house telephone £11 5s., nor on the other hand should we compare the abnormal Swedish rates, the result of a tariff war."

Elsewhere in the paper the same writer says: "The basis of tariffs for the use of a city telephone system must consist of two component parts. One component must cover the interest and sinking fund of the capital invested in the construction of the telephone system; the second must meet the working costs. The first component is naturally very different for different sized systems; it is higher in large systems than in small and this component rises more rapidly than the number of subscribers, a feature which as a rule is not sufficiently considered. Owing to the completeness of the exchange construction and the solidity of the line construction, this figure on the Vienna system cannot on an average be less than £5 12s. per annum for each connection. The second component consists of widely different single items, the cost of exchange operating playing the chief role in these. At an operator's position in our large exchanges 800 daily connections are manipulated. A subscriber who makes 40 calls daily absorbs therefore a twentieth part of the working strength; as, however, a whole day's service must be provided for, each operator's position requires a staff of four within 24 hours, having regard to the night service and to the making of the necessary provision for the relief of the staff. The subscriber has thus to pay for four-twentieths or one-fifth of the pay of an operator. As the average annual cost of an operator in Vienna, with extras, is £48, under this head alone, the subscriber has to bear an annual charge of £9 12s. This does not include the proportion of sundry expenses, the cost of old age pensions or the cost of reserve fund for sick operators. Much less does it include the proportion of the cost of management, or of the supervisory, electrical and fault-finding staff." These figures place the case for tariff revision before the large user in an indisputable manner. He cannot in reason expect to pay £8 or £10 for the right to enjoy a traffic which it costs from £10 to £15 to handle.

In conclusion, he says: "A word more about the counting of calls and those telephone diseases in connection therewith which have suddenly arisen in Vienna amongst private house subscribers, viz: (1) *Telephone-Fear*, which causes the subscriber, in order not to exceed his maximum number of calls, to pay a messenger of his own—rather like the owner of a carriage who, in order to spare his horses, always rides in a cab; and (2) *Telephone-Delusion*, under which each subscriber thinks the liberally placed limit of calls too small to satisfy the needs of his business, although his train of thought for the most part never develops in the direction that an increased use of the telephone must mean increased cost. In practice the case is not so bad, and the annual number of calls allotted is, according to experience, adequate for private houses. It

will certainly tend to soothe them when he hears that in the great foreign telephone systems the average daily rate of calling (large and small user, business and residence together) is only ten to twelve. The Vienna system has indeed a higher average of about sixteen calls, partly due to the abnormal proportion of business to residence connections (18,000 to 3,000), and partly to the practice in vogue in Vienna of transmitting by telephone the features of the newest fashions for ladies or the success of the latest operetta; added to which is the liberality with which telephone subscribers place their telephones at the disposal of their employees and others for communicating on their private affairs—important or the reverse. Probably, therefore, the exceeding of the limit of calls in Vienna residences will seldom happen."

The measured rate was applied to new subscribers as from December last. Since that date to April 30 there was an excess of new orders over orders to cease of 2,960, and 983 requests for transfer to the party-line service. "It seems, therefore," says the writer above quoted, "as if in future the Administration will have more trouble to find wires for their subscribers than subscribers for their wires."

EVOLUTION.

I BELIEVE in occasionally reviving the past, and in these notes I have hoped to bring home, more especially to contract managers and agents, how great an invention it is with which we have to trade. I hope that some of the extracts may be of use in pushing business. POPE wrote:

"Bid Harbours open, Public ways extend,
Bid Temples worthier of God ascend,
Bid the Broad Arch the dang'rous flood contain,
The mole projected break the roaring main,
Back to his bounds their subject sea command,
And roll obedient Rivers through the land,
These honours Peace to happy Britain brings,
These are Imperial works and worthy kings."

Roads have in all times been among the most influential agencies of society; and the makers of them, by enabling men readily to *communicate* with each other, have properly been regarded as among the most effective pioneers of civilization.

Roads are literally the pathways not only of industry, but of social and national intercourse. Wherever a line of *communication* between men is formed it renders *commerce* practicable; and, wherever *commerce* penetrates, it creates a civilization and leaves a history.

Roads place the city and the town in connection with the village and the farm, open up markets for field produce, and provide outlets for manufactures. They enable the natural resources of a country to be developed, facilitate travelling and intercourse, break down local jealousies, and in all ways tend to bind together society and bring out fully that healthy spirit of industry which is the life and soul of every nation.

The road is so necessary an instrument of social well-being that in every new colony it is one of the first things thought of. First roads, then commerce, institutions, schools, churches, and newspapers. The new country, as well as the old, can only be effectually "opened up," as the common phrase is, by roads; and until these are made it is virtually closed.

Freedom itself cannot exist without free communication—every limitation of movement on the part of the members of society amounting to a positive abridgment of their personal liberty. Hence roads, canals, and railways, by providing the greatest possible facilities for locomotion and information, are essential for the freedom of all classes, of the poorest as well as the richest.

By bringing the ends of a kingdom together, they reduce the inequalities of fortune and station, and, by equalising the price of commodities, to that extent they render them accessible to all. Without their assistance the concentrated populations of our large towns could neither be clothed nor fed; but by their instrumentality an immense range of country is brought as it were to their very doors, and the sustenance and employment of large masses of people become comparatively easy.

Let anyone imagine what would be the effect of closing the roads, railways and canals of England. The country would be brought to a deadlock, employment would be restricted in all directions, and a considerable proportion of the inhabitants concentrated in the large towns must at certain seasons inevitably perish of cold and hunger.

The Romans, with many other arts, first brought into England the art of road-making. They thoroughly understood the value of good roads, regarding them as the essential means for the maintenance of their empire in the first instance, and of social prosperity in the next. It was their roads, as well as their legions, that made them masters of the world.

But whatever the roads were in these days, they were allowed to degenerate into such a condition that WHITTAKER tells us that when the noble family of CLIFFORD required to travel between their houses at Skipton and Westmoreland they had sad work of it,

though they chose the best seasons. How they were entertained on the way, where they slept, and how they fared, are matters of exceeding wonderment. They must have carried their own bed and provisions.

The roads were little better than tracks worn out of the surface of the virgin land, and when they became impassable, another track was formed. In Scotland, for instance, the channel of the River Gala, when not flooded, was chosen as the most level and easiest to travel on. When travelling by coach and six, great men had a lusty footman running on each side to help keep the carriage up in rough places; it was no uncommon occurrence for a traveller to make his testament before setting out on a journey.

One road was judiciously named Scarthneck, *i.e.*, Scare Nick, or frighten the devil. Near Cardiff the roads were mere rocky lanes full of stones as big as one's horse, but there was bias against improvement, an example of which is provided by the driver of the Marlborough Coach, who, when the new Bath road was opened refused to travel by it, and stuck to the old wagon track. He was an old man; he said his grandfather and father before him had driven the aforesaid way, and he would continue in the old track till death.

I illustrate the means of locomotion plying between Bath and Bristol, without remark.

Living in these times one need not wish for HANS ANDERSEN'S "Goloshes of Fortune," nor to repeat RODERICK RANDOM'S experiences.



Means of communication were provided by the posts, but they were at long intervals, and of slow transmission, and the postage excessive.

But a man was not wanting.

Blind METCALFE, whose birthhouse is close to our Knaresbrough Exchange, began to improve the roads and made it possible for JOHN PALMER to institute an efficient system of mail coaches. Now see the reward to his employers; the revenue by this means of communication was increased from £250,000 to over a million pounds.

Passing over a considerable period we come to the introduction of steam; written communications were first carried by railroad on Nov. 11, 1830, but only between Liverpool and Manchester.

Then on Dec. 5, 1839, the adoption of a universal 4d. rate of postage was possible, and on Jan. 10, 1840, the universal 1d. rate was introduced.

In 1846 private telegraph companies were established, to be taken over in 1869-70 by the Post Office.

Then without doubt the greatest invention of modern times, the telephone, arrived.

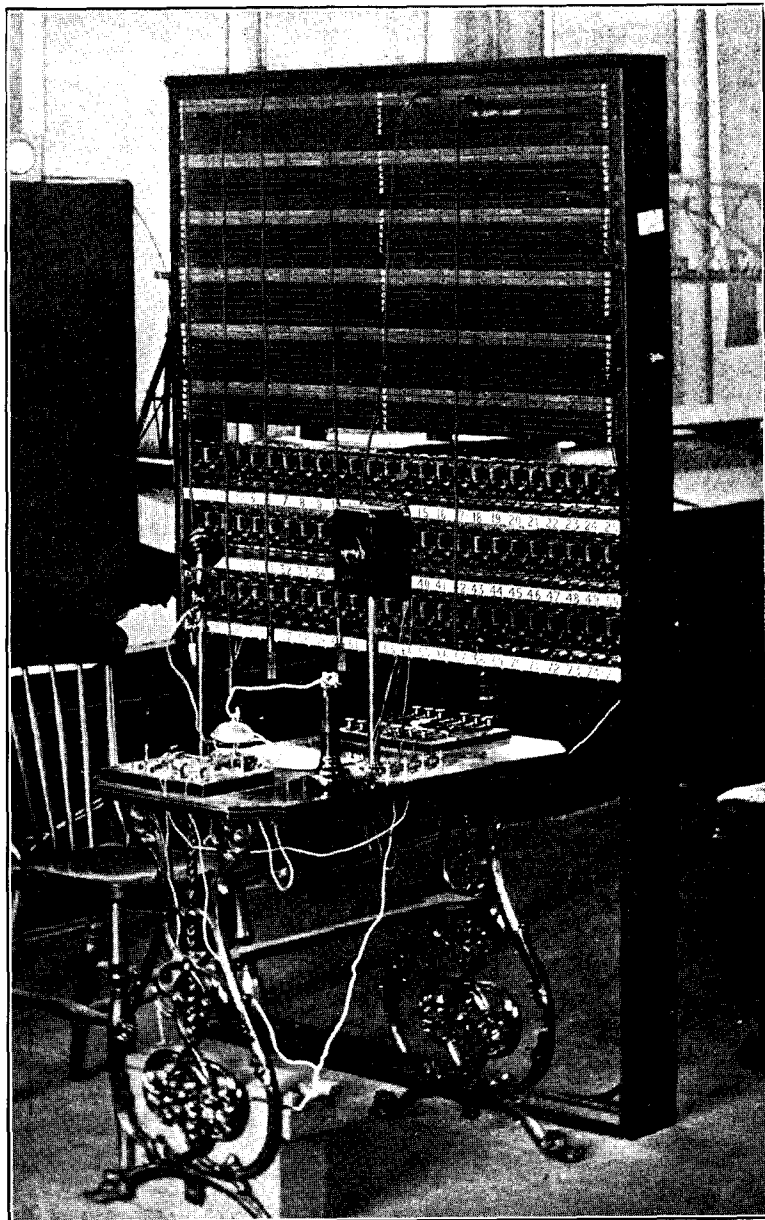
To bring home the progress made, I will remember the late J. B. MORGAN starting me at 10s. per week and handing me over to Mr. FLETCHER, who committed me to the tender mercies of Mr. PHILLIPS, who gave me my first job, that of putting gutta percha leads on to a terminal board on the roof of old Cornhill Exchange. I remember the old slipper switchboard illustrated, and suggest a comparison with the present day common battery boards.

And the Company's reward? The Postmaster-General's recent acknowledgment that the telephone was diminishing the revenue from the telegraphs and from THE PENNY POST.

"The history of the Post Office is a history of national benefactors." What then of the telephone?

"The Post Office giveth wings to the extension of commerce," but the Company's wings are swifter.

"Those inventions which abridge distance have done most for the civilization of our species." What would MACAULAY say now? "To cover distance use the telephone, and have the whole country at your fingers' ends"?



THE "SLIPPER" SWITCHBOARD OF 1880.

In the provinces I find quotations from great men often serve a good purpose, when I meet such an one who resembles the pupil of the eye, the more light you pour into it the more it contracts, such men who venerate their old beam engines as the Deacon did his

"Wonderful one-horse shay
That was built in such a logical way,
It ran a hundred years to a day."

But I advise canvassers not to quote these until their relations are on a friendly basis.

The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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VOL. II.]

SEPTEMBER, 1907.

[No. 18.]

" TELEPHONE - DELUSION " AND " TELEPHONE - FEAR."

THIS being the season when, with most parts of the world at peace with themselves and with each other, it is rather hard for newspaper editors to find a sufficient supply of exciting topics with which to fill the acres of printed page they feel called on to produce daily to meet the demand for light reading, the "telephone question" has had more than its share of autumnal attention. In the article in which Mr. GUNSTON reproduces some Austrian views of the "telephone question"—which by the way is ubiquitous, universal, for according to the daily Press of all tongues no people on earth is satisfied with its telephone service or rates—some useful and appropriate phrases are quoted from a Vienna authority. The telephone-using public of Vienna, it seems, have been suffering from "telephone-delusion," which makes them think that when called on to pay for telephone service in proportion to their use of it they will be face to face with utter and irretrievable ruin; and from "telephone-fear," which causes them to regard a measured-rate telephone somewhat as they would a box of inordinately expensive cigars, only to be drawn upon on the rarest and most important occasions.

There has been a good deal of "telephone-delusion" and "telephone-fear" rampant in our own daily Press of late, with the result that some exceedingly comical views of the "telephone question" have found their way into print. That one touch of telephone makes the whole world kin, to paraphrase a well-worn aphorism, is quite evident; and it is one of the curious features of our business that in almost every country one goes to the general opinion seems to be, if the newspapers are to be believed, that the one thing dear and bad, dearer and worse than in any other country, is the telephone service. People of all nationalities—French, German, Belgian, Austrian, Dutch, Danish, Swedish, Norwegian and

Swiss—will tell you that most of their institutions are the best in the world; they have magnificent railways, they have trams, omnibuses and cabs which are quicker, more comfortable and cheaper than yours, they have an enterprising and instructive Press, theatres which are a joy to the soul, tailors who fit well and charge little, cigars of a fragrance and cheapness incomparable, restaurants which meet at once the exactions of LUCULLUS and the purse of LAZARUS—but the one thing which is incredibly bad, and dear beyond belief, is the telephone service!

This attitude is so universal that there must naturally be some fundamental cause for it. There are several. One may put aside the ignorance of the general public and of newspaper writers on technical matters, and their unwillingness to discuss or attempt to understand technical matters, as being also universal. This is a familiar handicap under which all those who operate technical services have to labour. With engineers and managers of great mechanical and electrical systems it is a commonplace that the many technical features of their work are generally ignored by the public and by the informants of the public, and, what is worse, are frequently misunderstood and misrepresented. That sort of thing we are all accustomed to and we take it as a matter of course. To a large extent it is accountable for the readiness to find fault with the telephone service, but it by no means explains everything. We think there are two main causes of "telephone-delusion" and "telephone-fear." They are, first, the continuous nature of the telephone service, and secondly, the habit of regarding the telephone instrument as an entity and ignoring all else that goes to make up the system and the service.

With most other services the use is only occasional, and seldom brings the customer in close presence with the working. Actual contact with the telegraph service, for example, is comparatively rare and is generally confined to writing out a message and handing it across the counter. Although most of us use trains, trams, omnibuses and cabs fairly frequently, we by no means use them continuously or enjoy the continual presence of a train, an omnibus or a cab in the office or in the home. With the telephone it is different. If it is there at all—and of course it ought to be there—it is there continuously, all day and every day. Familiarity breeds not exactly contempt, but antagonism. The tendency is for a man to adopt the attitude that too many men, after the first short period of the contract has run out, adopt toward their wives; to put it colloquially, to "nag." In how many households is much sweet and willing service never gratefully or graciously recognised; but the slightest mistake, the smallest hitch, the least lapse from the usual standards or practices is greeted with ferocious complaint and remembered resentfully perhaps for months. "Oh, yes. That was a good enough dinner last night, but I sha'n't forget that burned pudding on Aunt Jemima's last birthday in a hurry!" It is much the same with the telephone. It is always with us, and, like any other sensitive organisation, it is not always in the same mood nor invariably equal to the same performance. So occasionally we find cause to grumble, and it is so much easier for human nature to grumble and to keep on grumbling than to praise even at rare intervals. We remember much more distinctly that last week we were "five minutes" (thirty seconds by the clock) trying to get the operator, or that a month ago we were "cut off" before the end

of a talk, than that this morning we made a dozen calls to different corners of the town without a hitch and did a big day's work in ten minutes. This permanent presence of the telephone among us—which, meaning instant availability of the service at all hours, is one of its greatest recommendations—is at the same time one of the psychological features of the telephone business that helps to explain the apparent general readiness of the public to grumble at the telephone.

The second point—the habit of the public of regarding the telephone instrument on the wall or desk as the whole thing, as if it were a hat-peg or an inkstand—is a matter with which we are all familiar and for which we telephone people are partly responsible. Even to-day there is a class of people actually concerned with telephone business who habitually refer to telephone service as “telephones”; our municipal friends, for example, always talk of “corporation telephones” and “cheap telephones” as if they were talking of “cheap clocks” or “cheap book-cases.” If we could put the telephone user into a camera obscura, and let him see the long stretches of line and cable, the huge and complicated switchboards, the big telephone buildings filled with electrical machinery and active people, the varied apparatus and the numerous workers, all brought into play to complete his message, he would realise that the telephone instrument is only a small item in a great organisation, and that each use of it, each call, brings into play many appliances besides the telephone and means definite work for a whole train of workers. For not educating the telephone user in all this, for not showing him that as telephone exchanges increase and spread over wider areas the plant and the organisation become more and more complicated and costly, we ourselves are partly to blame. We have gone on for years talking about “telephones” and “renting a telephone,” when we meant “telephone service” and “taking telephone service,” and we have accustomed the public to look on the telephone instrument as being the whole thing, and of the same value and cost whether used much or little. In time we shall educate the public away from this point of view, and when a reasonable proportion of intelligent people thoroughly grasp the fact that the telephone business is a message business, and that the cost depends on the number of messages and on the distance over which they are sent, when these fundamentals are more generally recognised, then there will be a great abatement of “telephone-delusion” and “telephone-fear.”

WIRELESS TELEPHONY.

WE publish this month an article of great interest to the scientifically inclined members of the Staff, in which Mr. POOLE summarises the progress in wireless telephony—recently the subject of an interesting series of articles by Professor REGINALD FESSENDEN in the *Electrical Review*. A good many sparks have flown since Professor ALEXANDER GRAHAM BELL first spoke along a ray of light, and the transmission of speech waves without the aid of a conducting wire has been the subject of countless interesting experiments during the past twenty years. During the past decade the rapid development of wireless telegraphy has naturally quickened the interest in the wireless telephony problem and has directed telephone experiments into different and more promising

channels. The “radiophone” experiments of BELL, HAYES, TAINTER and RUHMER, however beautiful from a scientific aspect, contained little promise of commercial results. The methods described by Professor FESSENDEN, and referred to by Mr. DUDDELL in his recent British Association paper, are of a much more robust character, and the success already achieved indicates that practical and commercial wireless telephony will not be long delayed. Whether the nature of the apparatus and methods required for wireless telephone transmission will lend themselves to the extensive use of wireless telephony for overland communication under ordinary commercial telephone conditions is at least doubtful, though it is not safe to prophesy too positively, as new methods, when placed in practical hands, have a way of developing with great rapidity. But in communication between ship and shore and ship and ship there is a great field for the wireless telephone. No shipping man will want to retain the slow and cumbersome telegraph, with its trained operators, if he can secure the same range of communication with the simple, quick and capacious telephone. The equipment of ships with wireless telephony opens up wonderful possibilities. We may live to see floating branch exchanges kept in touch with the shore telephone systems throughout an Atlantic voyage. “Trunks” may one day get a call like this: “I want Mr. So-and-So, on the *Lusitania*, off the Great Banks” Of course, sometimes Mr. So-and-So would be unable to take the call for reasons which do not apply on dry land.

GROCCERS AND TELEPHONES.

“TELEPHONES have become a necessity to the grocery trade.” This statement we have on the excellent authority of Mr. ATKINSON, secretary of the Retail Grocers' Association of Hull. That telephone service is indispensable to the grocery trade as well as to every other retail trade is what the Contract Departments in all parts of the country have been trying to teach the traders, who, however, are not yet unanimously of the same view as Mr. ATKINSON. Now that such an authoritative statement has been made on behalf of a representative body of grocers, it deserves to be widely known and extensively circulated, so that all waverers who are still without conviction as to the indispensability of the telephone service in retail trade may have their last doubts removed. For ourselves we unhesitatingly and whole-heartedly support Mr. ATKINSON'S *dictum*, and we trust that before long all grocers throughout the kingdom, and all other retail traders will be of the same opinion and will show it in a practical manner.

There is another point, however, which troubles the mind of Mr. ATKINSON and vexes the councils of the Retail Grocers' Association of Hull, on which, with all respect, we have to point out that a wrong attitude has been taken up. Mr. ATKINSON, on behalf of his Association, protests against the measured rate tariff. He has had a long correspondence with the Secretary to the Post Office, in the course of which Mr. BABINGTON SMITH makes a closely reasoned and most forceful case for the measured rate principle. But Mr. ATKINSON will have none of it, and contends on the contrary that the flat rate principle is essential to the telephonic convenience and comfort of the grocery trade.

In this we think Mr. ATKINSON and those who think with him are wrong, and wrong not merely in theory, but from a purely

selfish business point of view. No very deep examination of the subject is needed to demonstrate that the measured rate tariff is of great advantage to all retail traders. The principal use of the telephone service in retail shops is for the purpose of receiving orders from customers. Therefore the more customers or possible customers there are connected to the service the greater the value of the service to the shopkeeper. The measured rate tariff gives low rates for private residences and is certain to develop largely the use of the telephone service at private residences. There are not yet connected to the telephone systems of our cities and towns one-tenth of the possible private residence subscribers. Every additional private residence subscriber is a possible customer for the shop equipped with telephone service; the use of the telephone increases, quickens and simplifies trade, and it is much to the interest of retail traders that the development of the telephone service among private residences should be encouraged.

It is quite true, of course, that every shopkeeper requires to send a certain number of outward calls, for communicating with wholesalers and with branch establishments and for soliciting orders, and naturally he would like to get those calls as cheaply as possible. But the main purpose of his telephone is to serve as a receiving station for orders from customers, and as a purely business proposition it would pay him to pay a much higher rate for his telephone service than he does pay, if by doing so he could materially increase the number of telephone connections among his customers. In fact it would often pay the retail trader to supply some of his customers with telephone service at his own expense; indeed, this has actually been done.

Opposition to the measured rate telephone tariff by retail traders, based solely upon their own supposed large use of the service (which is often overestimated), is extremely short-sighted. The main feature of the measured rate tariff is the low rate for small users and private residences, and this must surely increase the development of the service among the very classes which the retail traders most desire to see "on the telephone." Such objections as have been made against the measured rate principle have been raised by those large users of the service who imagine that they may be called on to pay a higher rate for their telephone service without corresponding benefits. The Retail Grocers' Association seem to have hastily adopted the same somewhat superficial opinion. If the retail traders study the telephone question in a more far-sighted manner they will see that the measured rates will work greatly to their advantage. In reality the most enthusiastic supporters of the measured rate principle should be the retail traders of all kinds.

THE FORTIETH ORDINARY GENERAL MEETING OF SHAREHOLDERS.

At the meeting of the shareholders of the National Telephone Company, held on July 23, Mr. Franklin, the President, said he could not address himself to the consideration of the accounts, nor refer to the work of the Board without discharging a duty which they all owed to the memory of one whose services and personality as chief officer of this Company had left their impress upon its history and administration. (Hear, hear.) He referred, of course, to the death of the General Manager, Mr. Gaine. After a week's illness, their friend, in the prime of his life, had been taken from them, and they to-day are left to mourn over an event which had deprived the Company of invaluable service, and the staff generally of a sincere friend.

With reference to the arrangements for the future which are indicated in the same paragraph of the report, the wishes of the Board were a personal call to

him, which in the circumstances of the Company he had not felt at liberty to refuse. At the same time he was sensible that such wishes so flatteringly expressed indicate a wealth of confidence on their part for which he was altogether unprepared, and to which he felt he must respond by placing such abilities and such energies as he might have, freely and fully at the service of the Company.

Paragraph 9 of the report would convey to them the welcome intelligence that their former colleague, Lord Balfour of Burleigh, had consented to rejoin the Board, and he hoped they would be glad to welcome him to-day. They were well satisfied in having once more his great abilities, as well as his experience in telephone matters at the service of the Company. (Hear, hear.) It is very gratifying to the directors, in the circumstances in which the Company is placed, and particularly having regard to its limited tenure, to have at the disposal of the Company the services of a gentleman like Lord Balfour of Burleigh.

Concluding, he said he thought he could safely congratulate the shareholders upon the comparatively smooth water in which they found themselves to-day. It is true they were face to face with great responsibilities, that they had before them times of anxiety, but he could not help thinking that if they continued their policy there was no reason for any undue alarm or unrest among the shareholders. They might rest assured that the Board of Directors were fully alive to the responsibilities which are upon them, and that they would see to it that the very best is made of the opportunities which were presented to them from time to time. No body of shareholders could ask for more than that. (Hear, hear.)

The staff which the Company now had of some 17,500, and a shareholding body of 16,600 persons, indicated the area and the extent of their business obligations; and, he thought at the same time, it would show to the shareholders the responsibility upon them, to do what they could to support the directors in the difficult task which lay before them.

Mr. Thomas W. Stephens (a shareholder) said he would like to say a word as to the services of the staff. He was a user of the telephone, and he only hoped that after 1911 the service would be as good as it was now. (Hear, hear.) Whenever they had a complaint to make they were received in a businesslike way—(hear, hear)—and not in the way of a Government Department. (Hear, hear.) He thought there was a great deal in that. They were not free from complaints, very far from it, but he spoke of the way in which they were attended to. The other day he had occasion to use the telephone at a call office, and he found one of the staff there seeing that things were going right, and that was as it should be. He thought they were much indebted to their staff.

Mr. J. Lea-Smith said, referring to what the Chairman said with regard to the late Mr. Gaine, he felt sure that not only the directors but every shareholder who had been accustomed to attend these meetings missed his cheery face to-day, and he thought it showed the very great value that the directors placed on his services in appointing the President to the position of Managing Director. He was also very pleased indeed, speaking as a shareholder, that Lord Balfour of Burleigh had come back to this Company. They remembered him very well in the past, and valued his great experience and the very great interest he took in the troublesome times which the Company has passed through.

He would like to say that the accounts were really brought before the shareholders in a very clear way indeed, and he thought it reflected very great credit on the auditors. There was one point showing the progress of the Company. He noticed in the first half of the year 1894 they paid the Government in royalties £32,000; this last half-year they paid them £125,000. That spoke for itself.

Mr. Lea-Smith also said that they ought not to separate without passing a cordial vote of thanks to the Chairman and the directors and the staff of the Company. He thought it a great thing for any company to have a strong board. Without the Board of Directors he did not know where they would have been in the past, and he felt sure the shareholders would most cordially thank the President, the directors and the staff.

A cordial vote of thanks ought also to be given to the staff, because although they might have very good directors, in a Company like this, with a staff of 17,500, unless they did their work well, where would this Company be? They would have complaints everywhere. As a large user of the telephone he felt very grateful for the way in which the telephone is worked. There was a very interesting TELEPHONE JOURNAL issued, he did not know if by the Company or the staff, and it only cost 2s. 6d. a year. He subscribed to it himself, and he suggested that other shareholders should follow his example and do likewise. He had much pleasure in proposing a vote of thanks to the directors and the staff.

NEWSPAPER TRIBUTE TO THE TELEPHONE.

In an article entitled "The Telephone Habit" the *Tribune* (London), of July 29 last, speaks as follows of the development of the telephone in London:—

There are in all 150,000 telephones in use within the Metropolitan area, and the number is increasing at the rate of from six to eight hundred a week. Such increases have never been known as are at present taking place, and in order, if possible, to discover the reasons for this a representative of the *Tribune* made inquiries in responsible quarters.

The chief reason assigned for the increase in the number of subscribers is the introduction of the measured rate. As this service becomes better known so the business of the National Telephone Company and the Post Office Telephone Department increases.

Telephones in private houses are increasing very rapidly. Many households have an instrument installed as an assurance against emergencies, so that they may call the doctor, the fire brigade and the police. The fact, first

published in the *Tribune*, that the police stations have at last been put on the telephone has proved a big inducement to private householders, especially nervous ladies, to become subscribers to the telephone.

There has also been a big increase in the use of the telephone in the warehouses of the City and the large "stores" of the West End. Both the Company and the Post Office are meeting with some success in persuading proprietors to have a "proper system," which means a system by which it would be possible for a lady at home to get absolutely in touch with her favourite salesman or saleswoman in a large store, just as if she were in the shop. The National Telephone Company have just installed such a system in one well-known London establishment. The store has its own exchange, and there are instruments on the counter with any one of which an outside subscriber may be linked up. Where this system is installed it is quite common for ladies shopping at the counter to ring up their own address to consult some other member of the family as to the advisability of making certain purchases. Curiously enough, it is found that the store system of telephones makes people want them at home.

Another telephone development which is, to quote the officials of the Company, "going strong" in London just now, is the installation of private branch exchanges in hotels. Some London hotels have already some five or six hundred instruments. The *Tribune* representative learnt that it had been a hard struggle in this country to induce hotel proprietors to adopt the system, but those who cater for American visitors have been bound to instal it because every hotel in America of any standing has long had the system at work. A telephone in every bedroom is what first-class hotels are now providing, and many Americans refuse to go to hotels where they cannot have this luxury.

The *Daily Express* of Aug. 3 last sums up the present position of the telephone in business and social affairs as follows:—

The telephone has become an absolute essential not merely of commercial but even of social life. It is difficult for us to understand how business was carried on without the telephone, although it is a boon of comparatively recent date, and it should be borne in upon the minds of our pastors and masters that it is extremely bad for the community not to have the best possible telephone.

WIRELESS TELEPHONY.

By J. POOLE, Wh. Sc., A.M.I.E.E.

WIRELESS telephony is now exciting much interest, and has lately made a great stride forward owing to the fact that means have been discovered for satisfactory transmission in a manner similar to that adopted in wireless telegraphy, viz., by the aid of electric waves projected to a distance through the air.

Previous to this wireless telephony had been carried on to a very limited extent by two methods, which employed respectively (a) reflected light or heat rays and (b) leakage rays or currents. In the first (a) light or heat rays are projected from one reflector and received by another, such as in the case of BELL'S photophone, TAINTER'S radiophone and RUHMER'S wireless telephone. In RUHMER'S arrangement the light rays of an arc lamp are caused to vary in intensity by forming part of a microphone circuit, and are then reflected by means of a parabolic reflector on to a similar reflector at a distance, in the focus of which is a prepared selenium cell, this being included in the circuit of an ordinary telephone receiver.

In the second system (b) of carrying out wireless telephony leakage of current or of lines of force is utilised between two telephone circuits, each formed by a telephone instrument connected by a long or short line to two separate earth connections set as wide apart as possible. The leakage may take place through the earth, or the lines of force from the aerial lines may spread through the air to parallel circuits some distance away, such as across a river, but unless the lines are long compared to the distance separating them but little practical result can be obtained. Examples of the (b) system are the ORLING-ARMSTRONG and the PREECE and GAVEY wireless telephony arrangements.

Telephoning by means of the (a) methods is restricted by the conditions that the two stations must be visible one from the other, and that to obtain practical results over lines of a few miles in length it is necessary to employ powerful and expensive apparatus at the stations. With the (b) method the force which can be utilised diminishes as the fourth power of the distance separating the two circuits, so that it is evident that little use can be made of it for long distances. As a consequence of these difficulties neither of these methods can be said to point towards commercial results.

Telephonic transmission of a kind has also been accomplished by the aid of electro-magnetic waves sent through the air produced by sparking discharges, as used in the earlier and present systems of

electro-magnetic wave telegraphy. These discharges were obtained usually from condensers, and consisted of groups of very rapid alternations of currents having a frequency of hundreds of thousands per second, separated by comparatively long intervals of some $\frac{1}{2000}$ th or $\frac{1}{3000}$ th part of a second. The discharges in any one group rapidly diminish in intensity, and hence give rise to what are called "damped waves."

Such sparking systems of wireless telephony suffered from the defect that the interruptions between successive groups of sparks were made at such rapidities that they caused sounds to be produced in the receiving instrument well within the audible range of the human ear. (According to HELMHOLTZ the limit of this audibility may be taken at about 33,000 vibrations per second.) The rate of such sparking was also not uniform, so that the sounds when transmitted were accompanied by other harsh sounds at the receiving end, which interfered greatly with the transmission results.

What was required in order to eradicate these interferences, which prevented the practical success of such a system as the above, was some method of producing a practically continuous and uniform generation of electro-magnetic waves, the single waves following each other at such a rapidity that if a sound were generated it would be well beyond the range of audibility, or above 33,000 alternations per second.

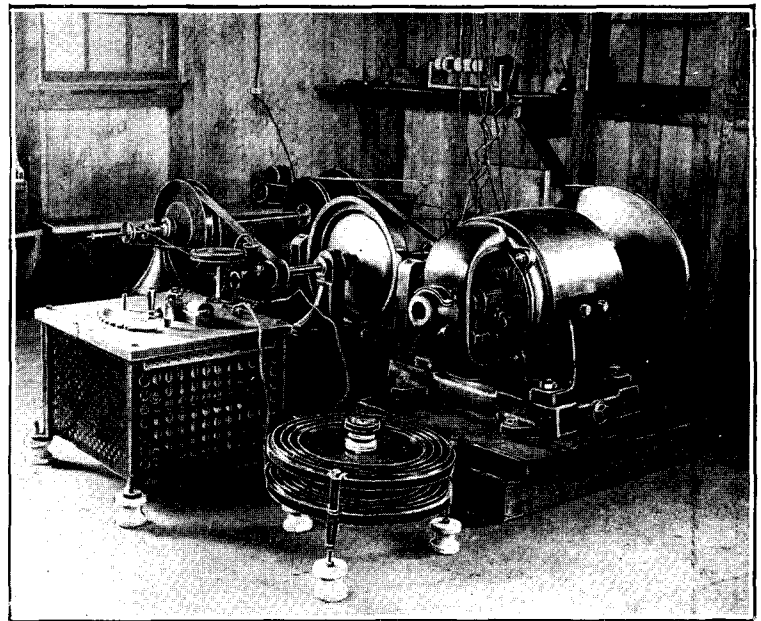


FIG. 1.—FESSENDEN ALTERNATOR FOR WIRELESS TELEPHONY.

Methods for the generation of such continuous high frequency waves were first discovered by Professor ELIHU THOMSON, in America, as far back as 1892, but such waves were not utilised for telephonic purposes until 1901, when Professor R. A. FESSENDEN, of Washington, made improvements in the method of production and attained some success. He, however, obtained much more success with a dynamo which he devised, capable of normally giving 60,000 alternations per second, and which might be run as high as 80,000 cycles per second if required.

By the aid of this high speed alternator, Professor FESSENDEN has worked out wireless telephony to a practical success; it is now in reliable operation over a distance of ten miles, and stations are being constructed to operate between two American cities 30 miles apart.

Professor FESSENDEN has given a history and details of his work in connection with wireless telephony in articles which appeared in the *Electrical Review* (London), of Feb. 15 and 22 and March 1 of this year, to which description I am indebted for most of the particulars given in this article.

The alternator, which embodies many ingenious mechanical arrangements, is illustrated in Fig. 1 (for which and for other figures I am indebted to the proprietors of the *Electrical Review*).

The armature (having a resistance of about 6 ohms) is driven by belt gearing up to a speed of 10,000 revolutions per minute, and the voltage at this speed of 60,000 cycles per second is 60 volts. The operation of the machine is said to be extremely satisfactory, even though running at this high speed for six or seven hours per day. A steam turbine has since been built to drive the alternator, and 80,000 cycles per second are now easily obtained.

In operation the alternator is generally connected to the "aerial" high vertical conductor (which, in some cases, is over 400 feet high) through a transformer, as shown in Fig. 2, which

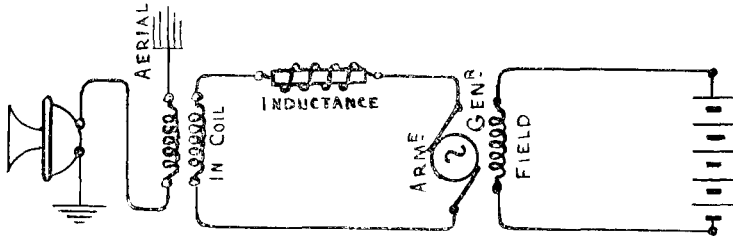


FIG. 2.—TRANSMITTING STATION, WIRELESS TELEPHONY.

shows the connections adopted in one of the latest forms of transmitting arrangement. In the generator circuit is inserted an inductance and the primary of an adjustable variable transformer, which latter has inductive cores. For telephoning over a line of ten miles, in one instance the primary turns of the transformer were ten, and current through them $2\frac{1}{2}$ amperes, voltage 45; secondary coil, number of turns 700, voltage about 3,000, frequency 50,000. The number of turns of the transformer are altered to suit various conditions. The aerial is connected to the secondary of the transformer and the other end of the latter to a carbon transmitter and thence to earth.

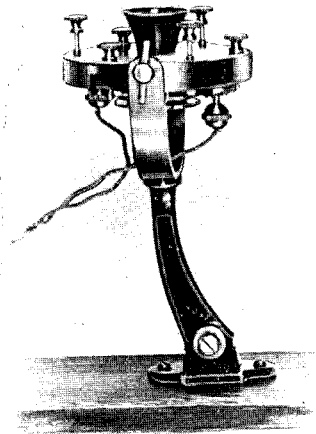


FIG. 3.—WIRELESS TELEPHONY TRANSMITTER.

The transmitter, shown in Fig. 3, is a granular solid-back type of about 8 ohms resistance, so constructed that it can carry a very heavy current, the heat generated by such current being dissipated by making the metal carbon chamber with two deep grooves, as shown at the back of the figure. In operation the aerial is tuned so as to be resonant to the period of the alternator, and acts with regard to the etheric waves in a somewhat analogous manner to that in which a bar of steel fixed at one end and struck at the other gives rise to sound waves in the air, or is even more analogous to the air vibrations in a closed organ pipe. If the vibrations are sufficiently rapid in such a pipe, musical sound waves are sent through the air, the effect being much enhanced if a resonant box or tube is used in connection with the vibrating body; so in the

case of the aerial conductor, if the electrical vibrations or alternations are sufficiently rapid, electro-magnetic waves are sent through space from the aerial at the speed of light, or 186,000 miles per second.

By speaking into the transmitter while the alternator is in operation, the resistance is caused to vary, the voltage of the surging impulses in the aerial is by this varied in accordance with the sound waves and the etheric waves thrown off are correspondingly influenced.

The transmitter may be connected in the exciter circuit of

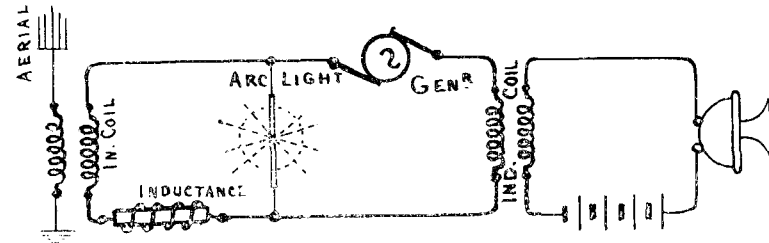


FIG. 4.—SINGING ARC METHOD.

the alternator, so that it will vary the strength of the exciting magnets and so give rise to variations of potential in the generated alternations, and to similar variations in the aerial surging.

In another arrangement the transmitter is connected directly in series between the aerial and the generator, the other pole of the latter being earthed, all the parts being thus in one series circuit.

A type of transmitter which has given excellent results is the "condenser" transmitter, which is the old form of DOLBEAR'S telephone, in which the approach and recession of a conducting diaphragm to and from a fixed conducting plate varies the capacity, and so affects the potential difference of a conductor in connection with one of the plates and a source of electro-motive force, and thus may be made to affect the resonance of the aerial. It is stated that in one experiment with this transmitter, having a diaphragm two centimetres in diameter (? 2 inches), an inward movement of the diaphragm of only $\frac{1}{100}$ th of an inch reduced the current from 3.1 to 2.5 amperes.

The discovery of the singing electric arc by DUDDELL (which was on similar lines to a discovery of Professor E. THOMSON already referred to, and was utilised by RUMER for his wireless telephony), followed by the great improvement made by POULSEN, by causing the arc to be formed in hydrocarbon gases under high pressure, and with the temperature of one of the poles kept low by circulating water, has opened up a promising field for electro-magnetic wave transmission for telephonic purposes. By such means, steady alternations in a shunt circuit about the two poles of an arc (such shunt containing capacity and inductance between certain calculated limits) can be obtained of very high frequency, even a million per second, and the electro-magnetic waves arising from such alternations would appear to offer a very satisfactory line or conductor, as it were, on which the speech wave undulations may be superposed.

Experiments have already been made on this principle by Professor RUMER between Berlin and Nauen, a distance of some sixteen miles. At the transmitting station some twelve arcs in series were used, each having a carbon and copper pole. The arcs were operated by current of 4 amperes at a voltage of 440. The frequency of the oscillations was 400,000 per second.

Fig 4 shows the connections at the sending end, one arc only being shown. The comparatively small variations in the carbon microphone cause very great fluctuations in the arcs and in the shunt circuit, which, through the medium of the translator, correspondingly influences the surging in the aerial and the transmitted electro-magnetic waves. Experiments with wireless telephony on the POULSEN system are now being carried on between Oxford and Cambridge.

The Receiver.—In order to utilise the transmitted etheric waves for telephonic purposes, they are gathered up or intercepted by another "aerial" at the distant station, and various types of receivers are used in connection with this aerial for converting such

received ethereal waves into conducted electrical waves or currents, and then into corresponding sound waves.

The receiver which has been most generally used by Professor FESSENDEN is known as the "liquid barretter." This instrument is a small cylinder containing a conducting liquid, such as acidulated water, immersed in which is a metal diaphragm having a very small hole in the centre, opposite which hole is fixed a very finely pointed platinum wire connected to the collecting aerial. The received waves act upon the layer of liquid lying between the fine point and the rim of the small hole in the diaphragm, causing the resistance to vary in proportion to the intensity of the waves. The barretter is shunted by a circuit containing a battery and an ordinary telephone receiver as shown in Fig. 5. The variations in resistance produced by the varying strengths of the electro-magnetic waves cause a reproduction of the original sound waves in the telephone.

FESSENDEN's thermal barretter has also been used as a receiver with good results. This is made up like a small carbon filament electric lamp, but in place of carbon a very short length of platinum wire, drawn down to a diameter of only .05 of a mil is used. The electric oscillations from the receiving aerial are sent through several of these barretters, which are connected in parallel with a telephone receiver and a source of small electro-motive force. Variations of resistance caused by the heating of the fine wire by the received oscillations cause the reproduction of the sounds in the telephone.

Such receivers of electric waves as those just described are "current operated" receivers and act continuously, as contrasted

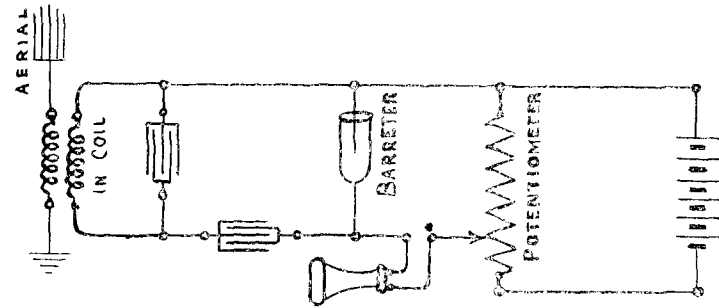


FIG. 5.—BARRETTTER RECEIVING CIRCUIT.

with "voltage operated" receivers, such as the carbon or metal filing "coherers" used in wireless telegraphy, which act intermittently by the circuit being first rendered conducting by the impinging of electric waves and then being rendered non-conducting by some mechanical or electrical process. Receivers of the latter class are unsuitable for wireless telephony and only those of the first class can be used for the purpose.

All forms of the voltage operated receivers and nearly all of the current operated receivers are very inefficient. Even the liquid barretter, which is considered by Professor FESSENDEN to be as sensitive as any in common use, has an efficiency of only about 0.1 per cent. for weak signals. Such a barretter will give an audible indication with a current energy of between .01 and .001 of an erg, while an ordinary telephone receiver will respond to less than .000001 of an erg (an erg is one ten-millionth of the work done in a second by a current of 1 ampere passing through a resistance of 1 ohm). It is evident, therefore, that if any method could be devised for using a telephone receiver to be acted on directly by the received waves, the efficiency would be increased about 1,000 times. This has been done by Professor FESSENDEN by means of his "heterodyne" receiver, which he describes as follows:—

"A telephone is constructed having a fixed magnetic core formed of iron wires $\frac{1}{1000}$ th of an inch thick and excited from a source of high frequency, such as a high frequency or condenser dynamo. A small coil, with or without a core, is cemented to a thin mica diaphragm, and this coil is arranged to be excited by the oscillations produced by the received magnetic waves." Two

heterodyne receivers of a modified form are shown in Fig. 6 connected to a translator and to a double high frequency generator.

An advantage of the heterodyne receiver is that it is unaffected by atmospheric disturbances or disturbances from near-by wireless stations and that it lends itself to multiplex working. There is no difficulty in receiving a message on the same aerial which is being used to transmit a message to another station, and practically any number of messages can be simultaneously transmitted and received on the same aerial without interference.

The following notes of general interest are, by the courtesy of the proprietors of the *Electrical Review*, abstracted from Professor FESSENDEN's articles in that journal already referred to above:—

The clearness of the speech received varies with the type of wireless telephone apparatus used. Where a spark is used at the transmitting end there is always more or less of a hissing or crackling noise in the receiver, which, though extremely disagreeable, is not enough to interfere with the transmission so long as the spark is properly adjusted. Where no spark is used for transmitting, and a carbon transmitter is used for modifying the strength of the waves, the speech is as distinct as over a short telephone line, and much more distinct than over lines containing cables, and there is a total absence of extraneous noise. When a condenser transmitter is used at the sending end the speech is much more distinct than over any wire telephone line, and, where a double telephone is used as receiver, produces a peculiar illusion, as if the speaker were talking in the same room as the hearer, and the room were covered with sound absorbing hangings, cutting off all reverberation or echo.

The Future Prospects of Wireless Telephony.—Telephony by wireless methods has a great advantage over the present methods, in

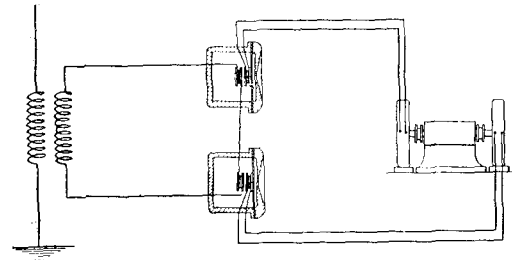


FIG. 6.—HETERODYNE RECEIVER.

that there appears to be no distortion of the transmission with increase of distance. This might, indeed, have been anticipated. It has, however, been experimentally demonstrated, by comparison of the relative intensities of notes of different frequencies at different distances.

There would appear, therefore, to be no reason why wireless telephony should not be operative over much longer distances than is possible in the case of wire lines. It is true that telephone relays are now in commercial use on a number of long lines; for instance, in talking from Boston to Cleveland it is customary to relay at New York or Troy, but these telephones relays do not improve the articulation, and merely increase the loudness of the speech, leaving the distortion unchanged, and, in fact, making it slightly worse than it is without the relay.

The difficult problem in wireless telephony is, of course, the modulation of the large amount of energy used for transmission. Where a carbon transmitter is used for this purpose an ordinary transmitter will not successfully modulate more than half an ampere of current, and even with special transmitter buttons $2\frac{1}{2}$ amperes seems to be about the limit. With multiple buttons the limit is reached at about 10 amperes.

For currents larger than 10 amperes a number of telephone relays placed in series and operated by a single transmitter can be used. The limit to this arrangement is not yet known.

Where the telephone transmitter is used to affect the strength of the field of a high frequency dynamo, the amount of power which can be handled is less than 10 kilowatts, on account of the fact that the self-induction of the armature increases very rapidly with the output. Where the transmitter is used to divert the magnetic

flux, no limit has as yet been reached. The same statement applies to the case where a condenser telephone is used for affecting the resonance.

Up to the present, therefore, it is not possible to state what the limiting distance of transmission by wireless telephony is. It appears fairly certain, however, that there will be no difficulty in communicating between ships at least 200 miles apart, provided that they have masts at least 130 feet high, and are equipped with aerials of suitable capacity.

One advantage which the wireless telephone has over the wireless telegraph is that it does not require a skilled telegraph operator to operate it, and, moreover, it is not put out of work by atmospheric or other disturbances, since the speech is readily understood over the noise. The extent to which this is the case is shown by the fact that, as a rule, individuals who have listened to the wireless telephone for the first time, and are asked after they have removed the receiver from their ears if there was any atmospheric disturbances or interference, have almost invariably to replace the receiver to their ears before being able to answer the question.

This is, of course, only another instance of the well-known selective power of the human ear, which enables it to interpret speech over a wire telephone through disturbances many times the intensity of the transmitted speech.

It is doubtful whether wireless telephony will ever supplant the present wire local exchanges. The difficulty is not entirely one of selectivity, as though this is a sufficiently serious one it is not impossible, improbable as it may seem, to overcome it. The difficulty goes down to the basic fact that the most successful local system will be the one which is the simplest and least liable to get out of order. Now nothing, so far as the subscriber is concerned, can be more simple than the present central energy system, and it is not likely, therefore, that there will be any immediate future for wireless telephony in this field.

As regards long-distance telephony, however, the matter is a different one. Speech has already been actually transmitted to a wireless sending station, automatically relayed from the wireless sending station to a wireless receiving station, and automatically relayed again from the wireless receiving station out over a wire telephone line and heard with perfect distinctness.

In addition, messages of more than one frequency have been simultaneously transmitted, and a test will shortly be made, the success of which is not doubtful, on sending out speech from a wireless antenna, while at the same time receiving speech from another station on the same antenna.

The cost of a long-distance wire telephone line is considerable. The line must be of high conductivity and of the very highest class of construction. It is understood that some of the long-distance telephone lines in America have cost not less than £150 per mile. For a distance of 1,000 miles this means an expenditure of £150,000.

While at the present time long-distance wireless telephony may seem rather premature, those who are acquainted with the actual operation of the apparatus know that there is no difficulty in the way, provided sufficient power and capacity be used to overcome the effects of atmospheric absorption. In addition, the fact that multiplex telephony can be obtained between two wireless stations should be a great commercial advantage.

It is, therefore, not at all improbable that, in addition to its use on shipboard, wireless telephony will have a real commercial field in long-distance telephony.

Another disadvantage which wire telephone lines labour under is the effect of capacity. Relays cannot overcome this difficulty, and the use of the Heaviside-Pupin method has not, as yet, shown itself practicable for the transmission of speech by cable across the sea. Moreover, even if this were possible, the cost of a deep sea cable is even higher than that of the best-constructed landline, approximating £200 per mile. As the wireless telephone is not subject to these capacity effects, it is, in the writer's opinion, only a matter of time when wireless telephony will come into use for long-distance telephony across water.

"I CAN'T AFFORD IT."

EVERY contract officer knows what a popular answer this is with the prospective telephone subscriber. The Philadelphia *Telephone News* is publishing a series of rejoinders, compiled by contract men. We cull two, the first applying to business service, the second to residence.

I.—BUSINESS.

Do you ever advertise? What does it cost you a year for the cheapest advertising? How many circulars do you put out? Have you ever taken into consideration that the Bell telephone advertises your business for you by listing your name in the directory, and that the cost of doing so is only \$4 a month? Does your advertising cost you less than this? What do you spend for tram fares? How much time do you lose from your business? Now, taking your time, tram fare and all worry into consideration, don't you think it would be advisable to put a telephone in? You would save all this and be brought before people who have never heard of you by placing your listing in the directory. Your trade connections would also call you up, when otherwise they would go to a near neighbour to purchase. I know you would see the benefit in a very short time; it would place you in the world of prosperous people, and at this time and age this is everything.

II.—RESIDENCE.

You can't afford to be without one; let us demonstrate. If we cannot prove that, then you do not need the service and we have no excuse for asking you to take it.

We stand prepared to prove that while the nominal cost of the telephone for a residence is about 7 cents (3½d.) per day, the actual cost is nothing. If you use the telephone enough it will not only cost you nothing, but will make a profit for you. Strange statement, is it not? Rather surprising that a man who has nothing to sell can make a profit on a telephone, yet this is what we mean. Now for the illustration:

One family in this city demonstrated by actual figures that their residence telephone showed a profit from 10 to 50 cents per week because it enabled them to buy where they could get goods the cheapest and opened the entire city to that house, instead of confining the family to some shop near by. Suppose guests come in unexpectedly and you have no telephone. You send someone out to buy the supply you need on account of the arrival of the guests. Ten cents car fare and considerable worry is the cost. Suppose you had a telephone and called Mr. Grocer. There is neither car fare nor worry. The cost of the telephone for the day is overpaid by that one transaction through the saving of car fare.

Suppose some member of the family is ill. You want the doctor to know his condition. Without a telephone you send for the doctor and are charged \$1, although you merely wanted him to know how the patient was. If you have a telephone, you call the doctor, tell him the patient's condition. It is not necessary for the doctor to come. You save \$1, and the telephone pays for itself for two weeks.

You send to the grocer's for goods half a dozen times a day; you lose the time of your servant (if you have one), or your own time and patience if you have not. You have a telephone, you call the grocer and let him send you what you want. The telephone is paying for itself by saving shoe leather worn out in making trips to the grocer's, money in the shape of the time of your servant or avoiding doctor's visits in the future, occasioned by the worry of making so many trips.

There are many other illustrations which could be given. The best demonstration of all, however, is to put in a telephone. Try the experiment and see how much you save. If you cannot save the rental of the instrument you had better take it out. The purpose of telephones is to save time and money. They do it, too, and the best way to live comfortably is to have a residence telephone.

Perhaps some National contract officers would like to try their hands at compiling rejoinders to "I can't afford it," for publication in the JOURNAL.

CORRESPONDENCE.

COMPLETION QUERIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. W. F. TAYLOR'S contribution in response to my letter on the subject of non-completion of orders is much appreciated and I trust will have the effect of drawing the opinions of others, not only of the contract managers, but of the engineers, who are particularly concerned with this important subject, and so lead to the adoption of some measure of uniformity throughout the country. As to whether uniformity is essential, that is a debatable point, but the absence of it considerably discounts the value of the comparative tables which we receive from month to month. I think we may take it that the system described as being in vogue in London until recently is, generally speaking, the system obtaining throughout the country, with one or two exceptions where the works order clerk deals with the non-completions. It is good to note the saving in number of staff which has been effected by the adoption of the new system, and Mr. Taylor is to be congratulated upon it, but perhaps we shall hear from some of the engineers on this point.

Every contract man and every other business man having the interests of his business at heart must of necessity do his best to keep expenses down, but we must look at this matter with a broader view than the purely departmental point of view. If the work which the Contract Department is doing in one district is performed by a different department in another district, away goes the

value of comparison of expenses; and further, if the drafting into the Contract Department of work which is not now performed by it means economy on the whole for the service, then the sooner such work is drafted into the department the better.

As regards the definition of the Contract Department's mission this cannot be gainsaid, but if that mission may be better served by extending the scope of the Contract Department's work, so much the better. I gather from the *Telephone News* of Philadelphia that the Contract Departments there go so far as to take on the work of collection; and it will, I think, be agreed that we have much to learn from the American Contract Departments.

The "nursing" of subscribers is surely the business of the Contract Department. The Sales Department in every business must "nurse" its customers. The best contract officers in this district make a practice of nursing their subscribers, so long as they are allowed to remain on the same ground, with very satisfactory results indeed.

From a purely departmental point of view I expect Mr. Taylor's contention to meet with some sympathy, but I still hold that it is to the best interests of the Contract Department in so far as its interests are served by keeping in the closest possible touch with its subscribers and with the outside public, and also to the best interests of the Company that subscribers should be encouraged in the belief that they should look to those with whom they placed their orders for the carrying out of those orders.

Manchester, August, 1907.

HENRY ELLIOTT.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

REGARDING Mr. W. F. Taylor's treatise on the above subject in the August JOURNAL, by which he has shown conclusively that the responsibility of inquiries re incomplete works orders should rest with the Engineer's Department, perhaps a system in vogue at Portsmouth might prove of some interest. Briefly it is as follows:—

On receipt of works orders at the engineer's office a card is made out for each and filed in alphabetical order. These cards are gone through each week by the engineer's clerk, and brief reports relating to delays, etc., are endorsed thereon from information obtained from the assistant engineers concerned; if then a query is raised by another department as to the probable date of completion the cards can be referred to and a definite reply given forthwith.

In Portsmouth we make application for a good number of War Department and Admiralty wayleaves which always spell delay, but apart from these and in spite of the fact that the municipal bias is strongly felt here, our new lines are completed with remarkable rapidity, in fact, it is a common occurrence for a subscriber to be connected within two days of signing his contract.

The utility of the cards does not, however, stop here; a weekly report is made from them, showing exactly the number outstanding at the end of each week, classified under the different rates. Further, a reason for the delay is given for each order more than three weeks' old. In addition to these uses, a permanent record is made of man-hours spent on each works order by endorsing on the back of the card all time spent, this being obtained from the gang sheets and posted up each day. When the subscriber is connected the card is removed from its place and, with the date of completion entered on it, is transferred to the completed set. I may add that a similar set of cards is kept for engineering works orders. The system has been found extremely useful and requires quite a small amount of labour to keep it up to date. The cards used are the ordinary 5-in. by 3-in., Schedule No. 1415, and these are suitably ruled and otherwise altered by a Mimeograph stencil.

Portsmouth, August, 1907.

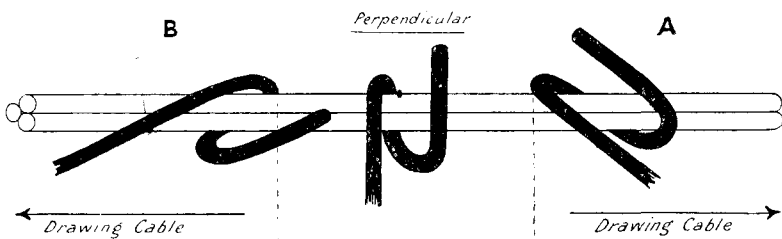
W. S. COULSELL.

AERIAL CABLE SLINGS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THERE is a point in the article on overhead cables by Mr. E. A. Pearson, in the May JOURNAL, on which I should like to pass a criticism. Speaking of the running out of cables, he says the sling should be turned in the direction shown by the arrow in his sketch No. 2.

First, the suspenders are not sufficiently large even if five strands are used to fill the whole of the circle while the sling is upright. (A No. 10 steel is only 125 mils in diameter, so that five would take up, approximately, five-sixteenths of the diameter of a ring of five-eighths diameter.)



CABLE SLINGS ON SUSPENDERS

Putting the sling on as shown by Mr. Pearson, the pull of the cable tends to set the sling as at "A" in accompanying sketch, while by putting the sling on the other way, shown at "B," it is obvious that the angle of the sling on the suspender can be considerably increased before it binds. Practice confirms this, and tests with a three-suspender and an ordinary sling show that the angle possible under the "A" position is 30 degrees only, while the "B" position gives 70 degrees out of the perpendicular.

Cambridge, June 20, 1907.

E. J. WOODS, Local Manager.

[NOTE.—This letter was unfortunately accidentally mislaid.—Ed.]

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

Will you allow me space to point out that in my paper on "The Erection of Aerial Cables" in your May issue the width of the wood pulley (Fig. 1) should be 3½ inches and not 2 inches as shown.

I might also add that Table IV includes the whole of the work, carting out cable, fixing winch and ropes, etc., to the return of the empty drum to the stores.

July 22.

ERNEST A. PEARSON.

CONVALESCENT HOMES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I THINK the time has arrived when it is worth considering whether the weekly collection for the Hospital Saturday Fund, amounting to £400 a year, could be dealt with in a way that would be more beneficial to all concerned.

At present the amount is sent to the fund, and for our contribution we receive letters for various hospitals and convalescent homes, but the unsatisfactory feature is that an applicant may be kept waiting for two or three weeks before admission can be obtained to a home. This proves a great drawback, and might be remedied by a direct contribution to a convalescent home or homes, for which a bed or beds, according to the amount of the contribution, would always be available.

The object I have in view could be secured if the subscribers would agree that half the contributions should go to the hospitals and the other half be devoted to convalescent homes. Thus, for a certain payment down, or a fixed sum of, say, £40 a year, we could have the guarantee of a bed always at our disposal, so that there would be no waiting for admission. There are several convalescent homes which would give us this advantage, viz.:

Alfred Bevan, Sandgate	£40 per annum.
Rustington, Littlehampton	£30 "
Morley, near Dover	£40 "
Homeopathic, Eastbourne	£40 "

Many of the staff I am sure would gladly avail themselves of such an opportunity of obtaining restoration to health. A small sum weekly, say 5s., would be charged, and for those who could not afford this payment, arrangements might be made to enable them to go free, through the Benevolent Society.

I suggest that first of all a meeting of the collectors should be called to ascertain their views on the subject, and if the plan should meet with approval, a hospital fund committee might be appointed to deal with the allocation of the money collected.

I shall be glad to receive any suggestions either through the medium of the JOURNAL or addressed to me at London Wall.

Salisbury House, E.C., Aug. 1.

A. T. WALLER.

AWARDS FOR INVENTIONS AND SUGGESTIONS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

ONE of the most interesting items in the last issue of the JOURNAL is that under the above heading. No doubt some of the suggestions will ultimately find their way into general practice through Service Instructions, Tool Books, etc., but I suggest, as a matter of general interest, a short description (with photographic illustrations or diagrams) from the inventors or designers. Most of the suggestions are of general interest, and the diffusion of information through the columns of the JOURNAL from the original thinkers among the members of the staff will be of general benefit to the JOURNAL and to the staff. If portraits of the writers of the articles are given, they will add to the personal interest.

Glasgow, August, 1907.

W. A. VALENTINE, District Manager.

THE NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

At the monthly committee meeting the secretary announced that the following donations had been received:—

City Maintenance Staff, Holborn	5	d.
" " London Wall	7	5
" " Bank	5	2
" " "	3	11

Applications for assistance from members of the undermentioned departments were received and dealt with:

- (1) Engineers'.—A grant of 54s. was made.
- (2) Metropolitan Office.—A grant of £5 was made.
- (3) Maintenance.—To be brought up again at next meeting.

Salisbury House, E.C.,

ARTHUR T. WALLER, Secretary.

August, 1907.

CORRESPONDENCE CLASSES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

Now that the results of the Correspondence Classes have been published will you kindly allow me a little space to offer a few remarks.

I note that, while a large number of no doubt enthusiastic members join these classes, a great number drop out as the courses go on. To what is this due? I have canvassed this centre with the query, "Why did you drop the classes?" In most cases the reply was, "I cannot understand them. They do not explain themselves sufficiently in detail." No doubt the papers are spread over too wide a field in too short a time.

I welcomed the fact when I saw that "M" Course had been divided into "M" and "N." It was surely too much to start in September with vulgar fractions and to finish in May with trigonometry. Apart from this, I shall be pleased to see another mathematics course dealing from the binomial to the calculus; this would be of great use for transmission problems. It is all very well to say, for example, $2x = x^2$, but if the student does not understand the

calculus he has to accept this fact as he accepts Euclid's axioms. Another suggestion I should like to make is that the district manager or local manager should hold a class for these once a month and work the papers through, explaining everything. Books are very well, but it sometimes is dreary work studying in this manner, and sometimes a word or two from one who knows would be greatly appreciated.

Norwich, July, 1907.

HENRY J. HERINK.

HIC ET UBIQUE.

ONE of those American advertisers who aim at putting what in their copious and recondite terminology they call "ginger" into their advertisements starts off as follows:—

"Weddings and strikes are the bane of a telephone manager's life," said one of the afflicted the other day in our office. "It's hard enough to get operators, anyway, and just when they begin to be worth their salt they start something doing. One day this spring I learned that two of my best operators were going to get married soon and that a bunch of the worst ones were framing up a labour union."

TRULY the Archer is always abroad and is responsible for much, but nevertheless the remedy of the advertising gentleman, namely, the automatic exchange ("I'm here for business" he says cheerfully), might be worse than the disease. Imagine a subscriber of the testy order, such, for example, as complain the loudest, having to jig a little apparatus four different ways when he wanted a four-figure number. Imagine, further, him jiggling himself with infinite pains on to a wrong connection; and then imagine—but imagination will not stand the strain. Yet one of the apologists of the automatic system suggests that an impatient man would rather be manipulating his connection himself than waiting with receiver at ear whilst an operator went through the process. It would be something to distract his thoughts. But does he realise—if a wrong connection is made—the injurious effect on the testy man of having to direct comminatory language inwards to himself instead of outwards to the offending operator?

A SHORT time ago a young merchant in South Wales, who shall be nameless, had the telephone installed at his residence. It was his custom to ring up often—very often, in fact—during the busiest part of the day, and on the most trifling excuses. He might as well use the telephone and get his money's worth, he argued. One day, however, he failed to get an answer from his house. He rang again, again and again without effect. Bubbling over with wrath, he called the telephone everything, made vague threats about having it removed, and vowed he would have the rival system's instrument put in without delay. Three minutes later he was still at it, when he discovered that there was nobody at the other end. This incensed him all the more. Arriving home, his wife heard him very patiently, and then said, "Well, the only thing to do is to turn the dog out of the telephone box and keep him in his kennel again."

It is possible to err even in advertising the Company's business. Recently a final notice that his rental was overdue was sent to a member of a firm of 220 years' standing, with a leaflet attached worded "Forget anything? Telephone." When remitting, the subscriber wrote across the leaflet, "I did, but you don't seem to like it."

WHAT THE COMPANY IS DOING.

SINCE the August JOURNAL went to press, the Company has opened exchanges at Cheadle (Manchester), Brinscall (Blackburn), Crewkerne (Hants and Dorset), Kilbarchan (Greenock), Gullane (Edinburgh), Eastergate (Sussex), Douglas (Mid Lanark), Radcliffe (Nottingham), Saltford (Bristol), Tramore (Cork), Willenhall (North Midland), bringing the total up to 1,363. The new stations added during July were 2,533, making a total of 431,236.

WOLVERHAMPTON.—Estimates have been passed for opening

exchanges at Hagley, Codsall and Upton-on-Severn, and the work in connection therewith is actively in hand.

Premises have also been taken for new exchanges at Hagley and Codsall.

EDINBURGH.—The report of the Royal Infirmary of Edinburgh for the year ended Oct. 1, 1906, has the following paragraph of interest in it:—

"The new and improved telephone service referred to in last year's report was completed on Feb. 16, and has since been in operation with most satisfactory results."

The new installation at the Royal Infirmary comprises a switchboard equipped for ten junction and 80 internal lines, and has at present working on it six junction lines, 50 exchange extension lines and 25 private lines. An operating staff with three reliefs is supplied by the Company, the whole service being available day and night.

NEWCASTLE-ON-TYNE.—Private branch exchanges: Bainbridge & Company, Limited, Retail Stores, four junctions, 41 stations, 18,000 calls. Wallsend Slipway & Engineering Company, six junctions, 24 stations, 31,000 calls.

EXMOUTH.—An additional 50-line switchboard is being installed here.

TORQUAY.—The underground routes in this town are being extended, involving 5½ miles of new duct and 8½ miles of cable. The contractors (Messrs. Bennie & Thompson, of Warrington) will commence the work shortly. An estimate for the extension of the switchboard has been approved, and the work will be put in hand forthwith.

BRISTOL.—The extension of the Bristol switchboard by the Western Electric Company is now in full swing. The contract is for adding equipment for 1,540 ordinary subscribers' lines, a two-position monitor's desk, a number of registers, two new junction positions, and the reconstruction of three existing junction positions.

WESTBURY-ON-TRYM EXCHANGE.—This exchange has been moved to another part of the building, and an additional 60-line in 100-line frame switchboard has been added. A 100-line board was obtained to assist in the transfer, and the work was successfully carried out in about five hours without interrupting the service. Power ringing is also being installed at this exchange.

LEEDS.—An agreement has been completed with Mr. Fred. W. Wood for a new private branch exchange system, centralising the service to three hotels and two large music halls. The speciality about this installation will be that, in addition to calls being given to each point from the exchange direct, the stage manager and the hotel managers at their private rooms will be able to listen to the full entertainment going on at each music hall, electrophone transmitters having been fitted on the stage of the two music halls in question. The total installation will comprise 33 stations.

READING.—One and a quarter mile of lead-covered aerial cable have been erected on poles between Bourne End and Cookham.

Quarter mile of pipe has been laid by contractors in Queen Street, Maidenhead.

One and a half mile of pipe and cable have been laid from Ascot to Sunningdale Station.

One and a quarter mile of pipe and cable have been laid in Shinfield Road, Reading.

It has been decided to erect a dry-core aerial cable on the junction route between Slough and Maidenhead; instead of using heavy conductors to give the proper transmission results for the Post Office junctions, 20-lb. conductors will be used, and loading coils will be inserted at intervals.

The capacity for measured rate lines is being added to on the Reading switchboard, and new 100-line sections and multiples are being put in at Windsor and Ascot exchanges.

A private branch exchange agreement has been secured from Balliol College, Oxford.

It is anticipated that an exchange at Burghfield Common will be authorised shortly, and it is expected to get support for

new exchanges at Boar's Hill, near Oxford, and Farnham Common.

SOUTHAMPTON.—New exchanges are under construction at Netley, Upwey, Hook, Odiham, Hartley Wintney and Alton.

Winchester underground scheme is approaching completion, and a new 300-line section is being fitted at the Company's new premises.

Southampton Exchange.—A party of 60 scholars from the Western schools were shown over the above exchange on July 25, for educational purposes.

BRIGHTON.—The Western Electric Company have just completed an extension of the Hove (Sussex) switchboard by the addition of four subscribers' sections and one junction section, increasing the capacity of the exchange to 1,400 subscribers.

The contractors have completed the laying of underground ducts at Bexhill, and a commencement has been made on drawing in the cable.

Underground schemes have been sanctioned for Chichester and Bognor.

The accommodation on the Eastbourne switchboard has been increased by lamp calling equipment on the multiple for 360 subscribers.

An agreement has been secured for private branch exchange service to be installed at the Sackville Hotel, Bexhill, consisting of two exchange lines and three extensions, with 8,000 calls.

An agreement has been signed for private branch exchange service at the Beach Hotel, Littlehampton, consisting of one exchange line and three extensions, with 1,500 calls.

SWANSEA.—The Swansea Corporation system was taken over by the Company on Aug. 10. Free and unrestricted inter-communication was at once given to all Corporation subscribers, and this traffic has increased by leaps and bounds. The week following the transfer was a very busy one, but all demands have been met and everything passed off satisfactorily, and without complaint.

STAFF GATHERINGS AND SPORTS.

Head Office.—A swimming match between teams representing the Telephone House Swimming Club and the Macmillan Swimming Club (Macmillan & Co., Limited, publishers) took place on Aug. 20 at the Westminster Baths, Great Smith Street, and, after a very exciting race, resulted in a win for the telephone men by two seconds. The Telephone House team consisted of Messrs. Chadwick, Caparn, Humphreys and Fraser.

Durham.—The cricket team, accompanied by several other members of the staff, visited Newcastle on Aug. 17. The match between the two district teams was played at Gosforth Park in fine weather, and after an interesting game the Durham district team gained an easy victory, the result of the Chambers Challenge Cup tie played in June being completely reversed. The team and other members of the staff were afterwards kindly entertained to tea by the Newcastle operators, to whom a cordial vote of thanks was tendered, and Mr. Gwyther in reply complimented the Durham team on their success and good fielding during the game. The visitors were subsequently shown round the switchroom and premises.

Nottingham.—*Nottingham Factory Football Club.*—The factory have joined one of the local leagues for 1907-8, and with the assistance of all last year's players hope to have a successful season. There will be a second team for the younger employees. Mr. H. Wilcockson has again undertaken the duties of secretary.

Ipswich.—The staffs of Ipswich and Colchester held their first annual outing on Aug. 10. The parties journeyed by brakes and met at Dedham. Cordial greetings were exchanged and, after a brief delay for photographing, an excellent high tea was provided at the Sun Hotel. At its conclusion sports were indulged in, the principal items being cricket, boating and tugs of war. On returning to the hotel in the evening a very enjoyable smoking concert was held, the principal contributors to the programme being Messrs. R. J. Downing, B. Willmott, F. Cannell, T. Brierley and H. H. Bell. A special feature of the concert was the bone solos by Mr. A. Rose. The weather was all that could be desired. The outing was thoroughly enjoyed by all, and reflected great credit upon those responsible for the arrangements.

Manchester.—Several members of the Manchester district staff visited Handforth on Saturday, Aug. 17, and took part in a game of bowls at the Greyhound Hotel, in which the sides were captained by the district engineer (Mr. Magnall) and the contract manager (Mr. Elliott) respectively. The result was in favour of Mr. Elliott's side by nine points in the singles and eight in the doubles. The green was distinctly of a "sporting" nature, and as the winning side consisted of members of the Contract Department it was suggested that their success in obtaining the right bowling length might have some subtle connection with the "measured" rate. Following a doubtful and threatening morning a delightfully fine afternoon and evening resulted, and those present thoroughly enjoyed the outing, which included tea at the same hostelry.

Wolverhampton.—The district staff held their second annual picnic at Arley-on-Severn on Aug. 17, journeying there by special saloon. After tea the return journey was varied by a very delightful pleasure-barge trip to Bewdley, where the train was re-joined. There were present Mr. A. W. Smith (District Manager) and Mrs. Smith, Mr. and Mrs. Redhead, Messrs. Grosvenor and Lucas, and representatives from each department of the local centres. The outing was most enjoyable, and the picnic was pronounced a complete success by all.

Hull.—*Second Round, Chambers Challenge Cup.*—A match took place on July 27 between the Hull and Leeds staffs on the ground of the former team, which resulted in a handsome win for the Leeds team, whose total was 135; Hull's reply being all out 31. Mr. A. Keighley was very successful with the ball for the Leeds team, performing the hat-trick; Mr. C. W. Blackburn making the highest score of 41. After the match the visitors were entertained to dinner at the London Hotel, and altogether a very pleasant time was spent.

Bath.—On Saturday, July 13, the Bath local office staff had an excursion by train to Bournemouth, leaving Bath just before two o'clock. Tea had been arranged for immediately on arrival, and the limited time available after tea was very enjoyably spent on the seashore and pier, the inevitable raid on the picture postcard shops in the town of course being made. The return journey was commenced at 9.20 p.m., and all agreed that the day had been exceedingly well spent.

Birmingham.—The annual staff picnic took place on Aug. 10, when about 80 members went to Bidford-on-Avon. Amongst those present were Messrs. E. Williamson (District Manager), H. Julius Maclure (Contract Manager), A. Morris, C. W. Piggott, F. Baldwin. The arrangements were made by Mr. R. U. Tucker (Chief Clerk) and a thoroughly enjoyable day was spent.

Bristol.—The Gloucester district staff journeyed to Bristol to play the return cricket match, which took place at Abbot's Leigh, one of the prettiest spots near Bristol. The match resulted in a draw. The Gloucester party drove in brakes through the city to the ground. At the close of the game tea was partaken of at the George Hotel; a musical evening followed and dancing on the lawn was indulged in. The party returned to Bristol at 10 p.m.

NEWS OF THE STAFF.

The Company's Correspondence Classes, 1906-7.—Referring to the information published in the August issue regarding the above, the following additions and alteration to the schedule of first five places obtained by members in the different courses, should be noted:—

Additions.

"C" Course—1st place: Mr. T. Pettigrew, Glasgow . . 98.4 per cent. of total

"M" Course—1st place: Mr. G. B. Bowman, Notts F^tory 99.6 possible marks.

Alteration.

"N" Course—Mr. W. Goulden, Brighton, who was shown in the 5th place with 98.3 per cent. of the total marks, should be 1st place with 100 per cent. marks.

City and Guilds of London Institute.—At a meeting of the Council on July 22 the diploma of Associate of the Institute was awarded to (amongst others) the following third year students of the Central Technical College who had passed through a full course of instruction in electrical engineering as prescribed by the Council: Messrs. Mr. J. W. Wheeler (Siemen's medal and premium), C. H. Toms, C. G. Barker and H. E. Parry.

These students since leaving the college have received appointments on the staff of the Engineer-in-Chief.

Examinations.—Mr. F. Cresswell, Hanley, 1st-class honours in Telegraphy.

Mr. Jas. Frost, Hanley, 1st-class ordinary, Telegraphy and Telephony.

Mr. H. Watkin, Hanley, 2nd-class honours, Telephony.

Mr. W. Langley, Harrogate, 2nd-class ordinary, Telegraphy and Telephony.

Mr. R. J. Skelton, Harrogate, 1st-class honours, Telephony.

Mr. W. Roberts, Sheffield, 1st-class ordinary, Telegraphy and Telephony.

Mr. A. H. Grindrod, Sheffield, 2nd-class ordinary, "

The Board of Education Examination in Machine Drawing and Construction has been passed by Mr. A. H. Grindrod, Sheffield, 1st-class elementary.

Mr. GEO. HEY, Contract Manager, Swansea, has been promoted to Contract Manager for the South-East Lancashire district, at Oldham. He has had charge of the Contract Department at Swansea from its formation in July, 1903, to the transfer of the Swansea Corporation system to the Company on Aug. 10, 1907, which included the whole period of competition. Mr. Hey has been in the Company's service over twenty years.

Miss G. HEY, Fees Clerk, Swansea, has resigned.

Miss M. H. PATTERSON, Senior Operator, Central Exchange, has been promoted to be Supervisor at Leith Exchange.

Mr. WM. KNOX, Inspector, Edinburgh, who was married in June, was presented by members of the staff with a piano stool.

Mr. J. E. DUNCAN, Contract Officer, Glasgow, has been appointed Contract Manager, Greenock.

Mr. HUGH McARTHUR, Contract Officer, Glasgow, has been appointed Contract Manager, Swansea.

Miss BROWN, Contract Officer, Glasgow, has been transferred to the Contract Department, Greenock.

On behalf of the staff of the Contract Department in Glasgow, Mr. Brown, the Contract Manager, presented Messrs. Duncan and McArthur and Miss Brown with tokens of the regard in which they are held.

Miss A. M. SIMS has been appointed the Clerk-in-Charge of the Hastings Exchange.

Mr. G. TATE, Inspector, South Shields, has been transferred to Newcastle-on-Tyne, vice Mr. C. RATCLIFFE, transferred to the new Jesmond Exchange.

Mr. G. CAMPBELL, Contract Officer, York, has been transferred to Hull as Chief Contract Officer. He was presented by the York staff with a mahogany coal cabinet.

Mr. R. G. REYNOLDS, Correspondence Clerk, Hull, has been appointed Contract Officer at Hull.

Mr. J. LAMMING, Instrument Fitter, York, has been promoted to Inspector at York.

Mr. E. MOORE, Foreman, Hull, has been transferred to the position of Pole Inspector on the Engineer-in-Chief's staff.

Inspector J. GILBERT, Bridgend, has been transferred to Barry.

Mr. A. J. WILLIAMS, Fitter, Pontypridd, has been promoted to Inspector.

Mr. W. PHILLIPS, Battery Boy, Pontypridd, has been promoted to Fitter.

Mr. H. GILBERT, Foreman, Bridgend, has been transferred to Newport.

Mr. W. H. NEADS, Wireman, Cardiff, has been promoted to Foreman.

Miss GRANT, Senior Typist, Birmingham, was presented with a silver purse upon leaving the Company's service to take up a position in Spain.

Mr. G. HOOPER, District Manager, Plymouth, was presented by the members of the Birmingham staff with a silver rose bowl, etc., accompanied by their best wishes.

Mr. A. W. BRIDLE, Canterbury, has been promoted from the position of Wayleave Officer to that of Assistant Engineer.

Mr. O. C. GOODWIN, Chief Inspector, Folkestone, has left the Company's service to take up an appointment with the Bell Telephone Company, Montreal, Canada. Mr. Goodwin carries with him the sincere good wishes of his many friends amongst the staff in East Kent district.

Mr. H. E. WATERHOUSE received the congratulations of the Birmingham District Office staff on the occasion of his transfer to Portsmouth, and was also presented with a travelling bag as a token of their goodwill.

Mr. T. BEECROFT, Contract Office, Birmingham, was presented by his colleagues with an umbrella upon leaving the Company's service.

The operators' staff in the Wakefield area presented Mr. A. E. JONES with a handsome oak and silver smoking cabinet, on the occasion of his transfer from Wakefield to Grimsby.

Mr. C. W. BUCKLEY, of the Bristol Local Office staff, has been transferred to Weston-super-Mare as Local Manager's Clerk. Advantage was taken of the occasion to present him with a dressing case and a silver cigarette case. Mr. Buckley had been on the Bristol local office staff for five years.

Mr. A. G. BRISTOW, who was temporarily stationed at Bristol, has been transferred to Penzance to take up the position of Inspector-in-Charge.

Mr. S. WAINSCOT, aged seventeen, of the electrician's staff at Portsmouth, has been successful in the following examinations, and has obtained certificates:—

(1) Electric light and power, ordinary, 2nd class in the City and Guilds Examination; (2) electric wiring and fitting, 1st class in the City and Guilds Examination; (3) electricity and magnetism, stage 2, 1st class, South Kensington Examination. It is very satisfactory to see so young a member of the staff successful to this extent in a public examination.

London Traffic Department—Promotions and Transfers:

Miss J. ANDREWS, Supervisor, London Wall, to be Supervisor, Holborn.

Miss V. BARTLETT, Operator, Deptford, to be Supervisor, Gerrard.

Miss A. MCCOMBE, Operator, Streatham, to be Senior Supervisor-in-Charge, Streatham.

Miss A. H. ROBINSON, Supervisor, Gerrard, to be Senior Supervisor-in-Charge, Ealing.

Miss E. WILLIAMS, Operator, Brixton, to be Supervisor, Westminster.

Mr. H. BROWN engaged as Switchroom Clerk vice Mr. H. RICHMOND (Central Exchange) resigned.

On account of the resignation of Mr. COLE, the Metropolitan Construction Electrician, on his appointment to the position of Engineer-in-Chief of the Shanghai Municipal Telephone Company, certain staff alterations have been necessitated. The Construction and Maintenance Departments have been combined, with Mr. GREENHAM as Chief Electrician and Mr. P. T. WOOD as his Assistant. The positions of Maintenance Electrician and Construction Electrician will be filled by Mr. A. WRIGHT and Mr. P. J. RIDD respectively. Mr. F. M. HALL has been promoted from the position of Technical Assistant to the Maintenance Electrician to the post of Divisional Maintenance Electrician of the Western District. Mr. W. BLIGHT has been promoted to fill the position of Maintenance Electrician vacated by Mr. Ridd, and Mr. G. F. GADSBY has been promoted from Exchange Electrician, London Wall, to fill a similar position vacated by Mr. Blight. Mr. HUMPHREY has been transferred from Western District to the position of Exchange Electrician, London Wall, and Mr. T. O. STEED has been promoted from the position of Construction Foreman to that of Exchange Electrician, Gerrard.

MARRIAGES.

Mr. HARRY LEWIS, District Office, Birmingham, was presented with a barometer by the office staff, on the occasion of his recent marriage. The presentation was made by Mr. R. U. TUCKER, chief clerk, in a felicitous speech, which was suitably acknowledged by Mr. Lewis.

Miss WEBSTER, Supervisor, Birmingham Central, was presented by the operators with a dinner service upon leaving the Company's service to be married.

Miss HALL, Supervisor, Birmingham Central, received presents of a marble clock and silver cake basket from her colleagues upon leaving to be married, after fifteen years' service.

Mr. J. A. THOMAS, Cashier, Cardiff, who was recently married has been presented by the staff with a china cabinet, the presentation being made by Mr. Waite, District Manager.

Mr. J. THIRSK, Collector, Hull, was the recipient of a marble timepiece from the members of the staff on the occasion of his marriage on Aug. 7.

Mr. B. HARDY, Inspector, Grimsby, was the recipient of a china tea service from the members of the staff on the occasion of his wedding on Aug. 4.

Miss ZILLAH JONES, Operator at Southwick Exchange, Sussex, has resigned to be married.

Mr. C. NICHOLSON, Instrument Fitter, Notts Factory, was presented by Mr. Garner, Foreman, on behalf of the Wall Set Department, with a cruet, butter dish and teapot on the occasion of his marriage.

Miss MARGARET DODDS, Supervisor, Leith, resigned in July in view of her marriage on Aug. 3. She was presented by her friends in Leith and Edinburgh Central with a silver cake basket. Miss Dodds has been with the Company for twelve years.

Miss E. DAVIES, Operator-in-Charge, Mumbles Exchange, Swansea, has resigned to be married.

Miss J. SAVAGE, Senior Operator, Swansea, has resigned to be married.

Miss A. BOWLES, Senior Fees Clerk, Swansea, has resigned to be married.

Miss LOUISA DAVEY, Senior Operator, Manchester Central Exchange, resigned her position on July 23 to be married. She was the recipient of several handsome and useful presents, including dinner and tea services, trinket set, etc. Miss Davey entertained a large number of friends to tea and later the proceedings included a humorous sketch given by members of the operating staff.

Miss BEATRICE KEARSLEY, Supervisor, Manchester Central Exchange, resigned her position on Aug. 8 in view of her approaching marriage. Prior to her leaving she was presented with several handsome and useful presents, including dinner and tea services, tapestry cloth, etc. Miss Kearsley entertained a large number of the operating staff to tea. During the evening a very laughable sketch was given, the parts being sustained by members of the operating staff.

Mr. T. F. REEVES, Test Clerk, Southampton, was presented on Aug. 10 with an occasional table and flower stand, upon the occasion of his approaching marriage to Miss A. HOLMES, Operator, Southampton.

Mr. JOHN G. DEAN, Cost Clerk, Aberdeen, on the occasion of his marriage was presented with a handsome silver kettle and spirit lamp from the District Office staff and others. The presentation was made by Mr. E. E. STOCKENS, District Manager.

Mr. W. H. GUNSTON, of the General Superintendent's Office, was married on Aug. 12 to Miss E. K. WORLEY, late of the Correspondence Department. His colleagues signalled the occasion with a present of plate, cutlery, and a coffee service.

Miss A. L. OLIVER, of the Typewriting Department, Head Office, was presented by her colleagues with a pair of hand-painted Worcester vases on the occasion of her resignation to be married.

Mr. S. H. FITZGERALD, of the Metropolitan Rentals Department, was presented on July 22 by his colleagues with a marble clock to commemorate his marriage, which took place on July 6.

Mr. W. D. SCUTT, Chief Inspector, Leeds, was married on July 27, the ceremony taking place at St. George's Church, Leeds. He was the recipient of a handsome Sheraton clock, case of cutlery and two bronze ornaments. Subscriptions to the testimonial were received from all members of the staff in the Leeds district, and as showing the popularity of the ceremony a number of the staff attended the church. The bride and bridegroom afterwards went to Scarborough on the honeymoon, and had a good send-off from the Leeds station.

Miss ISABELLA RUDD was married on June 13, and was presented with a silver cake basket and knife by the switchroom staff, consisting of operators and inspectors. Miss Rudd has been in the service since October, 1903.

Miss F. E. KETT, Clerk-in-Charge, Ealing, resigned on July 18 to be married. Before leaving she was presented with a handsome hand-coloured engraving and a watercross dish as a mark of esteem from the members of the past and present Ealing staff.

Mr. T. W. BARNES, Stores Clerk, Manchester, has been presented with a handsome clock, suitably inscribed, as a token of esteem from the members of the Manchester district staff on the occasion of his recent marriage.

Miss C. HALL, Monitor, Central Exchange, Birmingham, has resigned after fifteen years' service to be married. She was presented by the members of the operating staff with a marble clock and silver-plated cake basket.

Miss NELLIE CHADDERTON, Clerk-in-Charge, Preston, has left the service, and was married on July 29. She was presented with a set of silver spoons and a biscuit jar by the staff as a token of their appreciation. She has been in the Company's service eleven years.

Miss E. NUGENT, Senior Night Operator, recently of Douglas Exchange, Glasgow, was on Aug. 19, presented by the operating and electrical staff in that exchange with a handsome dinner service and vase, on the occasion of her marriage. The presentation was made by the Clerk-in-Charge. Miss Nugent carries with her the good wishes of her late co-workers.

London Traffic Department.—Resigning to be married:

Miss E. E. JEWELL, Clerk-in-Charge, Battersea.

Miss B. COOPER, Senior Supervisor-in-Charge, Streatham.

Miss A. BLACKLEDGE, Operator, Bartholomew House.

Miss L. BURTON, Operator, North.

Miss E. COCKS, Operator, Gerrard.

Miss B. MACKRORY, Operator, Paddington.

Miss M. SPINDLER, Operator, London Wall.

Miss M. TRENAMEY, Operator, Barking.

Miss E. A. VARNEY, Operator, Westminster.

Miss A. WATTS, Operator, London Wall.

Miss D. M. WATTS, Operator, East.

Miss COOPER, who has been in the service since 1894, was presented on leaving with a very handsome *entree* dish and egg stand by many of her friends among the staff.

OBITUARY.

HERBERT SKELLY, Instrument Inspector, Manchester district, died on July 20, after a painful operation, having only been away from duty about ten days. His colleagues forwarded wreaths in token of their sympathy.

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TELEPHONE MEN.

XVII.—JOSEPH CHARLES CHAMBERS.

JOSEPH CHARLES CHAMBERS was born at Stockton-on-Tees in January, 1857, and was educated at a private school. He is the eldest son of the late JOHN CHARLES CHAMBERS, Superintending Engineer of the North-Eastern division (General Post Office), and himself entered the Engineer's Department of the Post Office in December, 1870, where he spent some time measuring up road routes for the construction of a large number of circuits which required new routes.

In June, 1880, he entered the service of the United Telephone Company at Leeds, which, a month after, transferred its interests in the district to the Provincial Telephone Company, which again transferred a little later to the Yorkshire Telephone Company. Even this company was short-lived, as it was taken over by the National Telephone Company. Mr. CHAMBERS was in Leeds at the very beginning of telephony, and many incidents which happened about that time are interesting. It was no uncommon thing for the men to leave work on Saturday without wages, there being no money to pay them with, and things generally were in a very unsettled condition. The business went through many vicissitudes, but emerged safely, and when the National Telephone Company took it over, all financial and other troubles ended. Messrs. BLAKEY and EMMOTT, of Halifax, really had the first telephone exchange in Yorkshire; it was situated in Leeds, and included about 30 subscribers. The switchroom was a small waiting room in the Royal Exchange, the switchboard being placed on the mantelpiece. It was not, however, working for long, being bought out by the Provincial Company. The subscribers to this exchange formed the nucleus of the present system, and most of the original subscribers still remain, retaining their original numbers. The Provincial Company was run chiefly by Americans, the Hon. GARDNER HUBBARD being Chairman, and CHARLES J. BELL, brother to GRAHAM BELL, General Manager. For some time there was a steady flow of Americans into the district, and as there was not nearly sufficient work to employ them all, no small amount of

confusion resulted. In 1881 Mr. C. J. BELL was stricken down with illness and was abroad for about four months, during which time the business was making progress, but without any organised method of procedure. On his return the surplus American staff was sent away, and in a very short time, Mr. BELL, who was a keen and energetic manager, organised the whole working of the company and very soon had things on a methodic basis.



Mr. CHAMBERS filled in rapid succession the posts of Inspector and Local Manager, Leeds; District Manager, Hull; and District Manager for Yorkshire. When the National Company took charge of affairs Mr. BELL was appointed General Manager for England, but in the early part of 1882 his health was such that he was compelled to relinquish his appointment and return to the United States, and on his recommendation Mr. CHAMBERS was appointed to succeed him. The telephone was now making very rapid progress, its development in different parts of the country necessitating Mr. CHAMBERS' frequent absence in the Nottingham, Birmingham and Potteries districts, and early in 1885, to relieve him of part of the work, Mr. A. COLEMAN, District Manager at Bradford, was appointed General Manager for the Midland Counties. When in 1889 the National and the Lancashire & Cheshire Companies were amalgamated, Mr. CHAMBERS visited Manchester and Liverpool in connection with the National Company's system of weekly and monthly returns. Just previous to this some difficulty had arisen with the staff in Dundee, and Mr. CHAMBERS was ordered to that place to put matters straight, and whilst there he received instructions to proceed to Aberdeen on a similar errand. He

returned after a few weeks and had the satisfaction of leaving everything and everybody working smoothly. In 1890 he was sent on a special mission to Manchester which was expected to occupy about twelve months; he remained there, however, until 1893, when, under the new organisation, he was appointed Provincial Superintendent for the Northern province with headquarters at Leeds.

Mr. CHAMBERS has many reminiscences of the amusing incidents of the early days of telephony. One, though it loses in print, is worth telling. In the early eighties, the United Telephone Company, who owned the British patent rights, were very strenuous in their efforts to prevent these rights being infringed, and the officers of all subsidiary companies were required to watch for any infringing instruments and to report them to the United Company. A certain gentleman (whom we will call Jones) had bought a number of telephones from the United Company, and was licensed by the latter to use them as he thought fit, either to sell or rent them. Jones was suspected of having more telephones than he ought to have, and it was arranged for a clerk from the Company's solicitors, accompanied by Mr. CHAMBERS, to visit Jones' premises and examine everything in the shape of telephones. Now the solicitor had an unfortunate twitching of the muscles of one eye, which caused him to appear to be constantly winking. Jones was known to be a very irascible gentleman, and when the examination of instruments (which, by the way, was ridiculously close) was over, he asked the two searchers into his office, and then the following dialogue occurred:—

Jones (glaring at the solicitor): "Now then, I hope you've seen everything. You've taken long enough over it, and I hope now that you will go back and tell your people how frank and open I have been with you, and how I have laid everything bare for your inspection. I trust that in future they will give me fair play, and not treat me like a thief as they have done in the past."

Solicitor: Oh yes (*wink*), I will certainly tell them that we have seen everything (*wink*), and when I give them your message (*wink*) and make my report to them (*wink*) I have no doubt they will appreciate your wishes for a better feeling (*wink*), and—" but at this moment Mr. CHAMBERS saw that something serious was likely to happen, and hastened to explain to Jones that the gentleman was not really winking at him, but was suffering from a muscular twitching of the eyelid, which he couldn't avoid. It was only with very considerable difficulty, however, that Jones was appeased, and when the search party left his premises full of telephone numbers and marks, he was far from satisfied—and looked it.

In his younger days Mr. CHAMBERS was an oarsman, and between 1871 and 1875 took a prominent part in most of the regattas in the north of England. His chief hobby, however, has been volunteering. He has served 34 years, was acting adjutant of his battalion, the 3rd V.B. West Yorkshire Regiment, during the South African War, and has just retired from the service with the rank of major. He has recently become a convert to golf.

He is quick in grasping a point, prompt in his decisions and sound in his judgment. Although he bears the character of being a strict disciplinarian, Mr. CHAMBERS is a kind chief, turns his face strongly against any favouritism, is just and sympathetic with those under him, and, as a consequence, has his staff most willingly at his back to further the best interests of the Company. His well-known "early to work" habit has the most beneficial effect upon those under him.

Mr. CHAMBERS became an Associate Member of the Institution of Electrical Engineers in 1884, and a Member in 1886.

IN FAVOUR OF THE MEASURED RATE.

THAT the writers in the technical press take a sounder economic view of the measured rate question than some of their daily contemporaries is evidenced by the following paragraphs from the *Electrical Times*:—

Chambers of Commerce throughout the country are protesting against the new telephone tariff. Both the National Telephone Company and the General Post Office are applying the measured rate system to new subscribers, and the flat rate for unlimited service is no longer optional to the newcomer. In time the flat rate will be withdrawn entirely, and all users, new and old, compelled to pay according to the service rendered. Most of the people represented by Chambers of Commerce use their telephone a lot, making on an average thousands rather than hundreds of calls yearly. The old method of charging suited them well, since it gave big telephone users a telephone service below cost price. As commercial men they ought to realise that in these circumstances a telephone concern can make ends meet only by charging the small user an exorbitant rate. Whether they admit that the big user gets his service under cost or not it must be clear to them that charges should bear some proportion to the amount of service rendered. They clamour for the retention of the unlimited service rate, but it is not the principle they are fighting for. What they demand is the retention of the present inadequate price for unlimited

service. Every week they find the service of more use to them, as new subscribers come on: but they want to get this increment of value for nothing. So far as their arguments are not founded on ignorance they are purely selfish.

There is no doubt that the flat rate must go. It is utterly at variance with the conditions of modern telephone service. In the whole sphere of commerce there is no counterpart to the telephone flat rate. The Chambers of Commerce know that, for they have not been able to cite instances in support of their arguments, nor have they produced any arguments worthy of the name. A flat rate for unlimited service is not only wrong financially, it is a direct cause of inefficient service. It encourages the man who ought to have two or three instruments to restrict himself to one, and to overwork it so that half the time he is inaccessible to calls from outside. Thus, he not only spoils his own service, but he helps to spoil that of the people who want to call him up, and this is an evil that tends to increase. According to Mr. Ogilvie, of the General Post Office, in London no less than 23 per cent. of the calls made are ineffective. This figure would be larger were it not that in London the flat rate is not the only method of charge, measured service is also largely used. As soon as the latter system becomes universal the proportion of abortive calls will be far less than one to four. The advocates of the old tariff might ponder on this ratio and ask themselves whether they are not defeating their own ends by supporting a system that would in the course of a few years make not one but two out of every four calls a sheer waste of time to the caller and to the exchange staff.

THE DEVELOPMENT OF THE TELEPHONE IN THE ENGLISH COUNTIES SINCE 1892 GEOGRAPHICALLY CONSIDERED.

BY W. H. GUNSTON.

I—THE SOUTH MIDLAND COUNTIES.

IN the year 1892, which saw the acquisition of the last remaining large telephone companies by the National, whose operations since then have covered the whole surface of the British Isles, the telephone was not much in evidence outside the large cities and their suburbs, the manufacturing centres and some of the more important health resorts. Country towns and even cathedral cities (such as Salisbury, Hereford and Ely) knew not the telephone system, the gradual extension of which over the agricultural counties and to the remoter northern, western and eastern parts of the country is an interesting feature of the development of the service, and at the same time demonstrates that the rural community has not been so much neglected as some of our critics would have the public believe.

It is proposed to show how in the course of fifteen years the telephone network has reached every county (not excepting the sleepest, such as Rutland and Huntingdon), and in these papers I shall adhere to the limits of the ancient or geographical counties, such administrative entities as the Soke of Peterborough, the Parts of Kesteven, the counties of East and West Suffolk, the County of London and so forth not being taken into account.

Middlesex.—The telephone exchanges in Middlesex in 1892 were entirely confined to central and western London. They were Queen Victoria Street (now Bank), Coleman Street and Smithfield (since closed, and the subscribers distributed to other exchanges), East India Avenue (transferred to Lime Street but still known as Avenue), King's Cross (transferred to North), Eastern, Heddon Street (transferred to Gerrard), Chancery Lane (transferred to Holborn), Westminster, Kensington, Edgware Road and Kilburn (these latter two now being comprised in Paddington). Hammersmith and Ealing were opened in 1895, the latter being the first exchange in Middlesex outside London. Staines, Harlesden, Tottenham and Dalston followed in 1896, London Wall (at first only as a service exchange) in 1897, Finchley and Uxbridge in 1898, Enfield in 1899, Hampstead in 1900, Harrow-on-the-Hill in 1901, Stanmore in 1902, Southall in 1903, Sunbury in 1904, Edgware in 1905, Feltham and Ashford in 1906, and Potter's Bar in 1907.

In the meantime the Post Office had opened their Central, Western and Victoria exchanges in London in 1902, Mayfair and Chiswick in 1903, and Hampstead (Post Office) in 1904. Their activities in Western Middlesex began with an exchange at Uxbridge opened in 1903, which was succeeded by exchanges at Hatch End, Pinner, Northwood, Yiewsley, Hayes, Hillingdon, Wealdstone, Ealing and Harrow.

There are thus 44 exchanges now working in the county; in addition to these the northern borders are served by Barnet, Elstree and Bushey Heath, and on the south-west Twickenham, Teddington and Hampton are served by Richmond, Kingston and Molesey.

Hertfordshire.—Watford was the only exchange the Company had opened in this county in 1892. St. Albans and Rickmansworth followed in 1895; Barnet, Boxmoor and Berkhamsted in 1897; Ware, Hertford and Waltham Cross in 1898; Hitchin and Bishop Stortford in 1899; Bushey Heath in 1900; Hoddesdon in 1901; Harpenden in 1902; Hatfield in 1904; Elstree and Sawbridgeworth in 1906; and Radlett in 1907.

The Post Office opened at Tring in 1901, at Hitchin in 1902 and at Rickmansworth in 1903. These were followed by exchanges at Royston (1903), Baldock, Knebworth, Letchworth, Stevenage, Welwyn and Chorley Wood (1904-5). The Post Office also have exchanges with two or three subscribers each at Ware, St. Albans, Bishop Stortford, Buntingford and Watford. There are now 33 exchanges altogether working in Herts.

Bedfordshire.—No exchange existed in 1892. Luton and Bedford were opened by the Company in 1896 and Dunstable in 1897; Leighton Buzzard was opened by the Post Office in 1904-5, followed by Sandy, Pottton and Biggleswade. There are now seven exchanges in Bedfordshire.

Huntingdon.—Huntingdon was the first exchange opened in the county (1899); St. Ives followed in 1904 and St. Neots in 1905. Including the exchange opened by the Post Office at Ramsey this year there are four now working. The county has a population of only 57,000.

Buckinghamshire.—This county, which possessed no exchanges in 1892, now has twenty. Marlow and Slough were opened by the Company in 1894 and Bourne End in 1896, High Wycombe and Chesham in 1897, Beaconsfield in 1900 and Burnham in 1906. The Post Office opened in Aylesbury in 1900, Chesham and Wendover in 1901, Great Missenden and Amersham in 1902, and at Fenny Stratford, Stony Stratford, Newport Pagnell, Olney, Woburn Sands, Wolverton, Buckingham and Winslow during the last eighteen months.

Oxfordshire.—Oxford was the only exchange existing in 1892. The Company opened at Henley in 1895, Witney in 1897, Banbury in 1898, Goring in 1899, Woodstock in 1905. The Post Office opened exchanges at Banbury and Chipping Norton in 1905. This makes eight exchanges in all in the county.

Northamptonshire.—The Company had exchanges at the manufacturing towns of Northampton, Kettering, Wellingborough and Rushden, and also at Peterborough in 1892. Rothwell was opened in 1897, Finedon in 1829, Irthlingborough in 1903, Raunds in 1904, Desborough in 1905, and Earls Barton in 1906. The Post Office opened at Daventry in 1903, Long Buckby in 1904, Towcester and Brackley in 1905, and at Oundle in 1906. The county is thus very well developed, and there are now sixteen exchanges working.

Cambridgeshire.—Cambridge was the only exchange of the Company in the county in 1892. Newmarket and Wisbech followed in 1898, Shelford in 1901, Cherry Hinton in 1904, Fordham in 1905, Soham and Whittlesea in 1906. The Post Office opened at Newmarket in 1902, and at Ely in 1904. The total number of exchanges in Cambridgeshire is now ten.

II. EASTERN COUNTIES.

Essex.—The first exchanges opened by the Company in Essex were at Tilbury and Colchester in 1894, followed by Stratford, Barking and Chelmsford in 1896; Walthamstow, Albert Dock (since closed), Romford, Southend and Manningtree in 1897; Clacton in 1898; Rainham, Braintree, Brentwood and Saffron Walden in 1899; Wanstead in 1900; Harwich in 1901; Ilford and Hornchurch in 1902; Woodford in 1904; Leigh-on-Sea in 1905; Rochford, Loughton and Ingatestone in 1906; and East Ham, Harlow and Shoeburyness in 1907. It will be seen that these exchanges are spread all over this extensive county, town and country being equally favoured, and with the exchanges established by the Post Office at Brentwood, Halstead, Earls Colne, Sible Hedingham, Frinton-on-Sea and Walton-on-the-Naze about 1903-4, Maldon and Witham in 1905, Wickham Bishops and Dunmow in 1906, there are few villages of any importance in Essex without the telephone service. Altogether 35 exchanges are now working.

Suffolk.—Ipswich was the only exchange working in 1892. A small one with four lines at Haverhill opened in 1893 was the next; Lowestoft followed in 1894; Beccles in 1896; Felixstowe and Gorleston in 1897; Bury St. Edmunds and Fritton in 1899;

Oulton in 1901; Woodbridge in 1902; Stowmarket and Needham Market in 1904, and Mildenhall in 1906. The Post Office opened at Bury St. Edmunds in 1903, and the exchanges which they have established within the last few years at Sudbury, Haverhill, Leiston, Saxmundham, Aldeburgh, Halesworth, Southwold, Eye and Bungay cover most of the remaining towns in the county. Suffolk now has 23 exchanges.

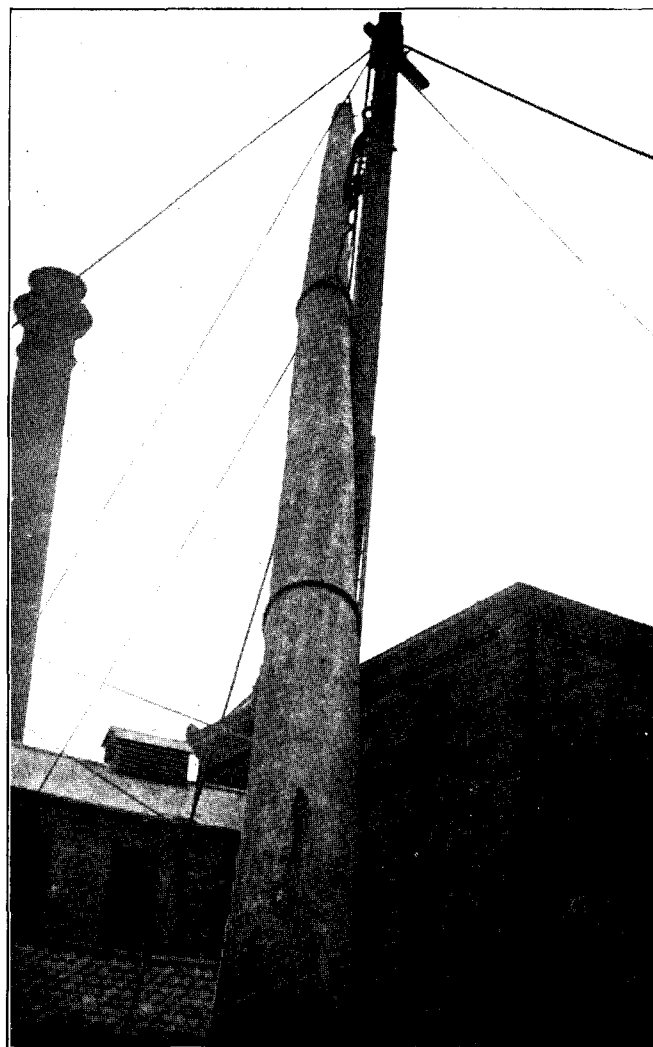
Norfolk.—The Company possessed exchanges at Norwich, Yarmouth and King's Lynn in 1892. The next exchanges opened were at Thorpe in 1897; Cromer and Wroxham in 1898; Sheringham and Brundall in 1899; Coltishall in 1900; Eaton in 1906; and North Walsham in 1907. Within the last two years the Post Office have opened at Loddon, Brooke, Thetford, Hunstanton, Wymondham, Aylsham, Harleston and Diss, making the total number of exchanges for the county nineteen.

(To be continued.)

POLE ERECTING IN TOWNS.

By J. E. GREENWOOD, *Inspector-in-Charge, Beverley.*

MANY difficulties occur in this particular branch of work but not often of such a nature as those recently encountered at Beverley, East Yorkshire. A 70-ft. pole for the purpose of carrying aerial cables had to be erected in the yard immediately behind the exchange. The only means of access to the yard from the street



was through an arched passage, to bring the pole through which was out of the question on account of the buildings opposite, the narrowness of the street, and the lowness of the passage. The pole had therefore to be taken to a street a considerable distance behind the exchange, from which derricks had to be used to get the pole

through two different yards, owing to their narrowness and awkward turnings, before placing it in position to be lifted over a building 30 feet high. Two derricks were required for the purpose, one on either side of the building. The attached photograph shows pole balanced on the last derrick after coming over the building, ready for dropping into the hole. The pole dimensions and weight were: Length, 70 feet; circumference, top, 42 inches; circumference, base, 66 inches; weight, 1 ton 6 cwts. 3 qrs. 3 lbs.

TEAM WORK: PRECEPT AND PRACTICE.

By A. E. COOMBS, *Exchange Manager, Swansea.*

It is now, I believe, an accepted axiom with all who may be actively connected with telephone traffic that team work has come to stay.

This being so, it may be as well, perhaps, at the outset of this short essay to briefly describe what is meant by "team work" when applied directly to the service.

We are told—and believe—that one of the most important requisites in securing efficient service is proper team work. To secure this it is necessary that all operators shall assist one another both in answering line signals (i.e., subscribers' calls) and in disconnecting, and in no case shall be allowed to confine themselves to the answering of calls terminating directly before them. In other words, all operators should feel under obligation to answer the first signal operated in their vicinity. In order to obtain proper team work among the operators, they should never be allowed to plug out a line signal until they are able to answer the call as soon as the plug is inserted. With proper supervision and a careful observance of this requirement excessive delays in answering subscribers can be greatly reduced in number.

A supervisor should have charge of, say, nine to eleven operators; groups of nine form a satisfactory arrangement.

The foregoing represents the "precept" or "theory" of exchange "team work." There are many other details, but this gives the gist of the matter. It reads very well on paper and tells us plainly that our operators should not be allowed to do this, but must do the other; then, assuming this was not done and the other was, with careful supervision excessive delays can be greatly reduced, and so on.

It is an old truism that a carriage and pair can be driven through the loopholes of some of the most carefully thought out codes of law. This very same reasoning will apply to "rules and regulations." For one method of compliance many of non-compliance can be invented; every one of the latter will perhaps conform to the letter but quite mutilate the spirit.

The advantages to be secured from team work, properly applied, have always been apparent to me, and, acting upon this conviction when first taking charge of Swansea Exchange (June, 1906) it has been strengthened; but at the same time a few illuminating facts were brought to light as to the quality of success attendant upon precept being carried into practice.

One outstanding feature has been the knowledge gained that the theory above outlined is practically useless unless the operating staff is thoroughly imbued with team work enthusiasm. Every operator should not only feel under "obligation" to do or not to do, but should feel under "moral obligation" also to carry out the principle involved in this great question. But of this more anon; this is a slight digression from the main thread of the paper.

Upon taking charge of the Swansea Exchange, as before mentioned, the first step taken towards reorganisation was the introduction of team work on approved principles. The staff had a very hazy idea of the matter. Individual operators would stick to their sections, the consequence being that whilst there was a fair percentage of calls answered in three, four, or five seconds, there was also a goodly number varying from twenty to 60 seconds. This of course required remedying, so during the months of July and August a gradual redistribution of operating strength was effected, juniors were intermixed proportionately with seniors; each operator was informed that the calls originating at her neighbours' positions were as much her's as those at her own. The supervisors were allotted certain sections of the board covering (as per "theory"

paragraph) nine to eleven operators, and everything was done to carry the team work principle into effect.

It will be seen from this that the precept of team work was being followed out, yet at the end of September, whilst there had certainly been a slight improvement, the results attained had not come up to anticipation. To put the matter in a nutshell the application of team work had been a comparative failure!

But had it? There still appeared great possibilities in this direction, yet a two months' trial had left an impression on the mind that something was lacking and that the principle involved had not had a fair trial. I was still convinced that, properly managed and applied, team work would prove an undoubted advantage, so the question of moral responsibility came to the front and active education of the staff in the principles of this matter was commenced.

In the first place it had become apparent that one supervisor could not overlook nine operators at one and the same time with any degree of certainty unless she was ably seconded by the operators themselves, that is to say, unless the operators individually and collectively had within themselves the idea and intention of giving as good and efficient a service when the supervisor was standing immediately behind them as when she was at the far end of the section, the supervisor would be practically ineffective for supervision over more than, say, three or four operators at one and the same time.

The "moral" factor is therefore at once obtained. Another "theory" on improved service had been developed. So far, so good. To be proved it must perforce be acted upon.

Before proceeding further it may be advantageous to enumerate the staff. These were:

- 1 Exchange Manager.
- 2 Supervisors.
- 6 Seniors.
- 16 Juniors (senior juniors, junior juniors and learners).

The old division of authority had been:

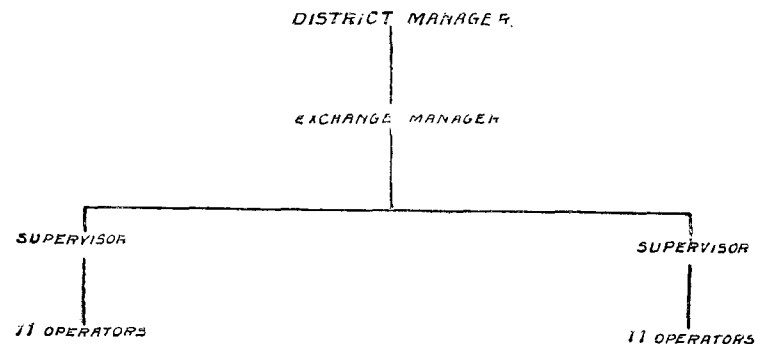


FIG. 1

This was now changed to:

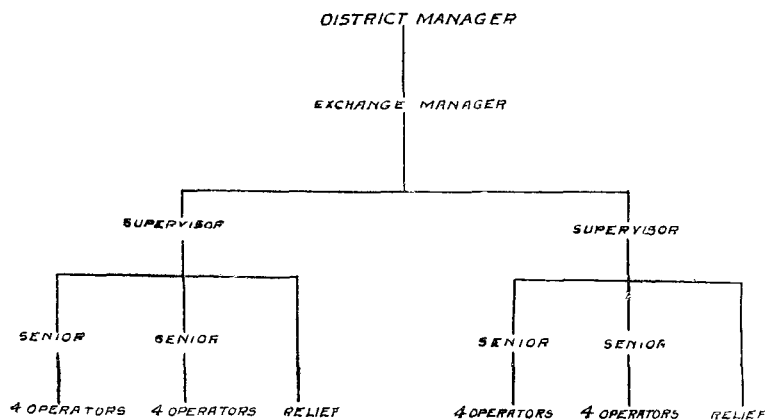


FIG. 2

As per Fig. 1 each supervisor had eleven operators directly under her control, which as before mentioned did not work as well in practice as in theory. The new arrangement placed two seniors directly under and responsible to each supervisor, and four juniors

directly under and responsible to each senior. The work was distributed to this extent, that the senior operators were held directly responsible to the management for the service rendered at their particular sections. They were not to supervise in the strict interpretation of supervision, but were to overlook the juniors and assist the learners.

Four teams of five operators each had thus been formed, with two relief operators for emergencies. These teams were made up of:

- 1 Senior.
- 2 Senior juniors.
- 1 Medium.
- 1 Junior junior or learner.

The switchboard was divided into four sections and each team was allotted a certain section per month. Each week during the month the different units of the team would interchange positions (still keeping the same section), and at the end of the month the teams would be moved *en bloc* to a new section. A twofold end was attained by this: (1) A fair comparison of the class of service given at each section by different teams would be secured; (2) in four months each team would have occupied all sections of the board and each individual operator would have occupied (as far as possible compatible with ability, etc.—for the placing of learners on junction positions, except as a means for training, must be considered and avoided) each position in every section. So that by the end of the fourth month every operator should have made a circuit of the exchange and sufficient results obtained *via* the Observation Department to indicate: (1) Weaknesses in the operating division; (2) overloaded positions.

The senior of each group—as before mentioned—was made responsible for the service given by that group. The service on each section was taken monthly and the various figures compared and results made known to all the operating staff. The senior usually occupied the central position with two of her team on either side. (There is, of course, an occasional change made, and the senior will occupy second or fourth position, so that other members of team may have an opportunity of taking the central position.) Being an active operator herself and at the switchboard, this senior would of course be in a position to exercise a personal watch on the work carried on on either side and would be able to easily detect and eliminate inaccuracies. All irregular calls for her section were referred to her, and the chances of tracing them were 95 per cent. Incidentally, this does away with one of the objections to team work, which is that if more than one operator is held responsible for calls at any section, the irregularities, long calls, etc., cannot be satisfactorily traced. There is certainly something to be said in favour of this statement, but on the other hand there is much more to be said for the theory that proper team work should eliminate irregularities, etc., so that no tracing should be required. However, this by the way. The method outlined above should meet both aspects of the question, for there was still the unit, with this difference, that the "team" formed the unit and not the operator. Team work could still be carried out and if necessary lost and irregular calls could be traced.

The over or under loaded condition of any portion of the switchboard would be automatically revealed and by a far more sure, if a little slower, process than that of recording traffic.

It is obvious that in a grouping of four teams absolute uniformity of strength and results, will not be obtained. Therefore, by a natural process of deduction, if it was discovered that on one particular section of the board and irrespective of the group or team of operators a uniformly high service, in comparison with other sections of the exchange, was given, it would be apparent that that particular section, or at any rate some portions forming it, were overloaded and as a consequence required distributing. The necessary steps could at once be taken. In the first place, who would be more qualified at once to locate busy numbers than the seniors who had worked the section? A list of, say, 50 of the busiest numbers could be obtained from each of the seniors. A week's record—some personal observance—and you have as effective a means for discovering busy numbers and distributing them as possible.

It has been shown how busy subscribers and sections may be located. It is quite as easy a matter to discover the best operators

—and otherwise. The service reports will at once furnish a mass of information. Personal supervision and experience will supply much more.

This may perhaps sound somewhat dogmatic and theoretical, but not being a believer in precept without practice the following experience may be interesting.

Practice.—December, 1905, was really the first practical test at Swansea of this new subdivision and arrangement of the operating strength. The switchboard had just previously been completed after undergoing extensive additions and alterations. The different services had been grouped and everything so far as the exchange was concerned was in order. It is only right, however, to mention that the staff had been undergoing a training in the new scheme during the months previous, so that at Dec. 1 each member understood the "plan of campaign," so to speak.

The distribution of switchboard as in Fig. 3 will serve to illustrate the position of affairs as at Dec. 1 last:

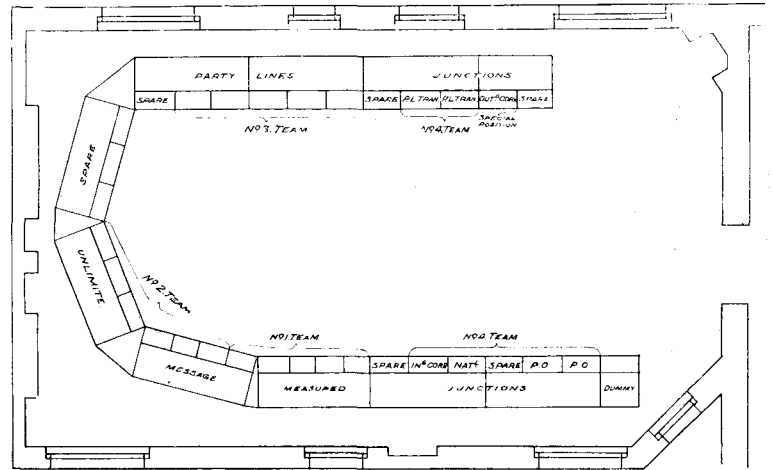


FIG. 3.

During the first week of this month all long answers, with one exception, occurred at the unlimited and message rate section marked No. 2 on drawing. One team was of course responsible for this, and inasmuch as this was the first real test of a new scheme it became at once apparent that one of two factors, viz.: (1) Inefficient operating, or (2) overloaded positions, was responsible. It might, on the other hand, have been a combination of both, that of course was to be proved.

To determine which was the case it was decided at the end of this first week to transfer No. 2 section team *en bloc* to No. 1 section, and No. 1 section team was placed at No. 2 section. This change was adhered to for a week. It will be as well perhaps to keep in mind what information was required: (1) Quality of operating, (2) quantity of traffic.

Below is a tabulation of the service rendered during these two weeks:

	Average answer	Average clear.	Total.	Percentage answered in						
				2 secs.	3 secs.	4 secs.	5 secs.	10 secs.	15 secs.	20 secs.
1st week : Original team	5'3	4'1	9'4	10	41	65	76	91	94	100
2nd week : Changed team	3'7	4'2	7'9	10	54	83	95	100	100	100

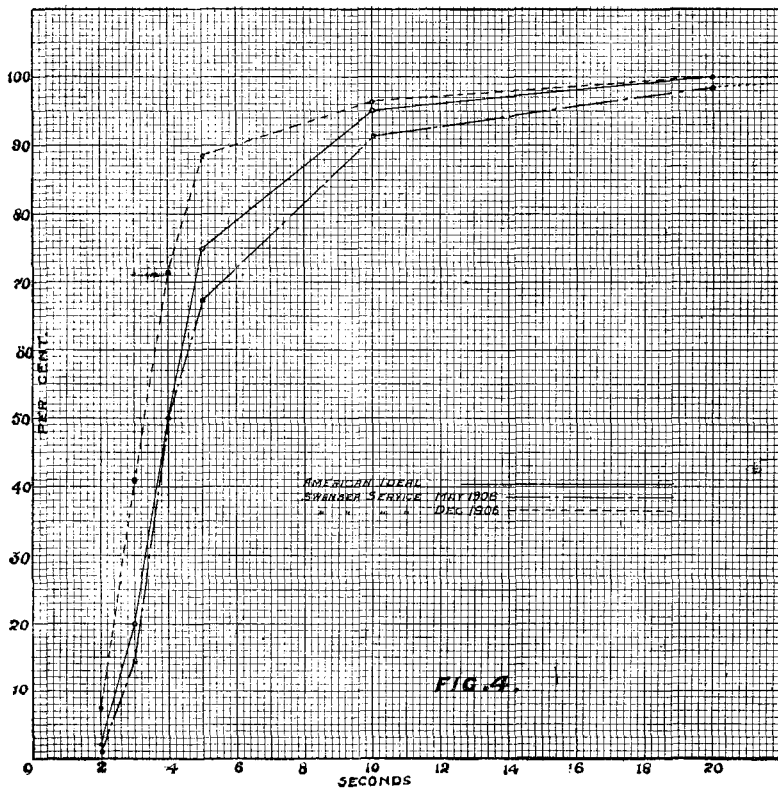
There was no question here of overloaded positions being considered, for it must be borne in mind that each team was of equal status. If a service of 3'7 seconds could be attained during the second week why not the first also? This was pointed out to the senior in

charge of original team, and for the third week the teams were restored to their original positions and opportunity given to No. 1 team of proving what could be done. Evidently something had taken place in the interim, for compare the following:—

	Average answer.	Average clear.	Total.	Percentage answered in						
				2 secs.	3 secs.	4 secs.	5 secs.	10 secs.	15 secs.	20 secs.
1st week : Before change	5'3	4'1	9'4	10	41	65	76	91	94	100
3rd week : After change	3'9	4'0	7'9	10	39	71	97	100	100	100

Do not these figures speak for themselves? The same body of operators, working at the same positions, under similar circumstances, can in the short space of two weeks improve the service rendered by one and a half seconds per call. It seems even more remarkable when the fact is borne in mind that the third week was immediately preceding Christmas, when the traffic at all positions had a tendency to be abnormal.

It might be pointed out in passing that the service attained by this team during the third week before mentioned was not temporary, as the high standard then attained has since been kept up.



	Percentage of calls answered in					
	2 secs. or less.	3 secs. or less.	4 secs. or less.	5 secs. or less.	10 secs. or less.	20 secs. or less.
American ideal is ..	3'0	20'0	50'0	75'0	95'0	100'0
Swansea figures for May, 1906, were ..	0'2	14'7	50'0	67'2	91'1	98'3
Swansea figures for December, 1906, were ..	7'5	41'0	71'5	88'2	96'2	100'0

What then accounted for this? The reason is not far to seek. In the first instance this team did not properly realise the benefits arising from mutual help; there seemed to be lingering mistrust of answering one another's calls; if at all avoidable, it was avoided. Team work was being carried out perhaps, but only in the letter. Legal responsibility was acknowledged and acted upon, but the moral responsibility factor was lacking. The tenets of mutual help

had evidently not been quite digested, and whilst each member of the team was anxious and desirous of attaining good results they had not adapted themselves to the team work spirit of "each for all and all for each." By the third week of the month all this had been taken to heart, and the resultant improvement in the service carries its own comment.

This then is one result of team work thoroughly carried out and serves to give one a firmer belief in it than ever. Team work between teams is of course acted upon if necessary, but it is very seldom that occasion for this arises, as it has been found that each team will easily absorb its own traffic; in fact the traffic must be abnormal if the supervisors have at any time to call out numbers requiring attention owing to inability of home team to cope with calls. Every member of the exchange staff is thoroughly imbued with the "spirit" of team work, and all teams work to their seniors and the seniors to their supervisors.

The operating curve attached gives record of service before and after adoption of team work.

We have at Swansea formed an Operators' Telephone Society (there is a General Society in addition), which all the members of the exchange staff have joined. Meetings are held monthly and matters pertaining to the operating, traffic and exchange work in general are discussed. Up to the present the average attendance (of a membership of 30) has been 95 per cent.; the meetings are looked forward to with interest, and some very enjoyable and instructive evenings have been spent.

To sum up! The main objective of this paper has been to show that precept and practice sometimes do not agree, but the former should be given a good trial in letter and spirit before it is condemned as unworkable. Let every member of the staff, from the learner to the supervisor, feel an active interest and enthusiasm in the work to be done and the way to do it. Introduce the "moral" factor and use it actively.

Swansea, perhaps, furnishes but a small portion of the huge daily telephone traffic, but the principles of team work apply to all exchanges alike, and the foregoing remarks on what has been done here may possibly be of assistance somewhere in the fuller adaptation of team work, by which means only can we hope to achieve the results aimed at.

QUARTERLY BALANCING IN RECORD TIME.

By T. A. CROWTHER, Chief Clerk, Leeds.

THE making of records has become a prominent feature of the day. It extends not only to recreations and sports, but also to business and commerce. That our own staff is imbued with the prevailing spirit is evidenced by the accounts appearing in the JOURNAL from time to time of expeditious pulling out and running in of underground cable, of making good damage by fire, verbatim typewriting, etc. A sense of emulation existing amongst the staff cannot be otherwise than advantageous to the Company. In this connection it occurs to me that the Mid Yorkshire district have lately achieved a place amongst record makers, and I adduce the following as being of interest to the clerical staff generally.

In the ordinary course of business the stores clerk on the evening of Sept. 12 reported, that he (and of course his assistant) had arrived at *and agreed* his balance of stores and tools for the whole of the district for the quarter ending Aug. 29, 1907, and in addition obtained fresh average prices. Now when it is considered that in this period two Sundays and two Saturday afternoons intervened, and, in addition to ordinary daily routine, August recovery slips and issue sheets had to be totalled, priced out, and posted to works order costs slips; the outward and inward books compiled; ledger cards posted; and factory consignments seen to; before the ledger cards could be added and balances of accounts got out and totalled, I think the successful attainment of an agreed balance in such a short space of time a meritorious performance, and shall be glad to know if any chief clerk can point to a better. It should be stated that ordinary office hours only were worked, and that no attempt at setting up a "record" was made, although one (for this district at least) was achieved. The figures for the quarter are: Inward, £8,136 3s. 6d.; outward, £8,330 11s. 2d.; balance on hand, £6,220 6s. 2d.

TELEPHONE WOMEN.

III.—BARBARA MARGARET PETERS.

GLASGOW, in the course of her telephone history, has produced many enthusiastic telephone men and not a few enthusiastic telephone women. Among those of the latter who stand out pre-eminently is the subject of our sketch, Mrs. B. M. PETERS, the Matron at Glasgow, who joined the Company's service in 1902.

Mrs. PETERS is a Glasgow woman, having been born in that city and educated at the Ladies' College there. During her term of service with the Company many changes have taken place to improve the *personnel* and the conditions of the operating staff, in all of which Mrs. PETERS' wisdom and forethought have been invaluable. The growth of the system during her period of office may be gathered from the fact that there are now fully three times as many telephones working in Glasgow as were working five years ago. The exchanges then numbered 23—there are now 37—and the operating staff all told numbered 232—now there are close on 600. The increased importance of the Glasgow Matron's duties



will also be inferred from the fact that during her first year she engaged 45 operators, and in 1906 she engaged 183.

In Glasgow, as in all other large centres, the selection of suitable girls to be trained as operators lies with the Matron, and it has always been her aim to raise the tone of that most important part of the Company's staff. An excellent reader of character, and as quick at noting the good points as the defects of candidates, Mrs. PETERS makes few mistakes in her selections. She, in conjunction with the clerks-in-charge who conduct the training schools, are justly proud of the efficiency as well as of the general superiority of the girls under their charge, and this is due in no small degree to the wise selection of the proper material.

Mrs. PETERS carries out her varied duties with amiability and firmness. In selecting girls, besides taking note of the various qualifications which are apparent even at a first interview, Mrs. PETERS puts the candidates through an educational test the thoroughness of which and the soundness of her judgment may be gathered from the fact that not more than 5 per cent. of those passed into the school fail at the examination. Her daily routine includes arranging operators' duties, which is done with absolute

impartiality, and visiting operators off duty through sickness, when her sympathetic, kindly disposition make the matron's visits welcome.

In 1903 an operators' dining room was established in Argyle Exchange, the organisation and equipment of which showed the practical bent of the matron's mind. An interesting description of it from her pen appeared some time since in the JOURNAL.

She has served under three traffic superintendents, all of whom she has loyally supported, and her period of service has not been altogether devoid of excitement as she has witnessed big fires in two Glasgow exchanges.

Mrs. PETERS is a telephone enthusiast and refers with pride to the growth and progress of the Company, in whose service she cares neither pains nor devotion. She is well read, has a retentive memory, and keeps herself abreast of the times.

IV.—HELEN SCOTT.

MISS SCOTT, the Clerk-in-Charge of the Aberdeen Exchange, entered the Company's service in the summer of 1882, and has therefore just completed 25 years telephone work. When she joined the Company there were only 52 subscribers in Aberdeen,



and no trunk lines north or south of that city. It will, therefore, be perceived that Miss SCOTT has seen some surprising developments and some comprehensive changes of system during her period of service. She has seen the indicator system give way to the call-wire system, and is now looking forward with pleasurable anticipation to the impending transfer to an up-to-date common battery system in the new exchange, which is confidently expected to obviate the worries incident to an overgrown call-wire system. She has witnessed the introduction of the lamp-calling signals and many other improvements, and the inauguration of the party line and measured rate services.

Miss SCOTT was appointed chief operator two years after entering the service. During her period of office numerous sub-exchanges have been opened and she has had to supervise an ever-increasing junction wire traffic. She is always on the alert for improvements which may facilitate the distribution of traffic, and her opinion on this as on other cognate operating subjects is much valued.

Although a strict disciplinarian, Miss SCOTT is very popular with her staff. She is also very popular with the subscribers, by whom owing to her long service she is well known.

SOME MEASURED RATE POINTS.

By W. F. TAYLOR, *Contract Manager, London.*

I HAVE anxiously scanned the pages of the JOURNAL from month to month since the measured rates came into force in the provinces in order to get all the information possible on this interesting subject. The articles published have been of absorbing interest, but one is struck by the small number of them.

A revolution in the method of charging for telephone service has taken place in this country, and yet the experiences of those members of the staff who come into touch with the public and whose opinions and criticisms would be most useful and instructive to their fellow missionaries are practically absent. Unfortunately, we in London have not yet got a complete measured rate tariff, our only measured rate being that for private branch exchange service. We nevertheless look upon the education and conversion of the public which is taking place throughout the country with the keenest interest, as it is certain that sooner or later we shall have to educate the London public also on similar lines. I do not think there can be a doubt in the mind of any telephone man that a measured rate tariff is the only fair and equitable one, both to the subscriber and to the Company. If any argument is required to prove that the measured rates are on correct lines it is only necessary to turn to America, where we find they have been practically universally adopted, and in the cities where they were introduced years ago the telephone system has gone up by leaps and bounds. It has been said with truth that the splendid development of the telephone in America has been in a great part due to the charge for the service being on the measured rate basis.

It is extremely interesting in America to note the almost complete disappearance of the old flat rate. In New York the company has worked at the subscribers on that service and gradually convinced them that they were wrong in remaining on it, and has been so successful in this that now only a few hundred flat rate subscribers remain, and these are being slowly but surely converted. When it is pointed out that this is being done wholly by persuasion, and not by simply cancelling the old contracts, the results are all the more interesting. It is obvious that persuasion is the better of the two means of getting a subscriber to give up the flat rate and come on the measured rate. Convince a man that he is changing on to the right rate, and he will be contented; but force him, and he is certain to be dissatisfied—even though he pays less on the new system and receives a better service, he will feel sure the Company has some base design in making him give up his cherished unlimited connection.

Whilst it should not be a difficult matter to convince a small user of the many advantages of the measured rate, it is another story altogether in the case of the large user. A small user sees that the measured rate is going to meet all his requirements at a reasonable cost, and even if his telephone traffic increases considerably, as it is bound to do, he still remains on the safe side of the old flat rate, the comparatively high figure of which has deterred so many people from joining the service.

The payment which is made by small users on the flat rate goes without doubt in some measure to bolster up the large user, who gets his service at cost price, or even at less than cost price. From this it would seem that there are no objections to the moderate user being on the flat rate, whereas there is a very great objection to the large user being on this rate. The large user, then, is the one to tackle. If the matter is laid before him in a business-like way he will see, as a business man, that he should pay for his service a reasonable price, which is going to leave the Company a margin of profit in order to allow it to pay a fair interest on its capital.

While the business man cannot but see in his own mind the reasonableness of the measured rate principle, the difficulty is to get him to admit it in his own case. Our friend, the large user, has been getting a good bargain, indeed too good a bargain, in the past, and he will argue that he cannot see why he should pay more money for what he terms the "same thing." Is it the same thing? I think not. He is getting a new class of service. He is paying for each call and in view of this he will take extremely good care that no useless or "frivolous" calls are allowed to pass over his line. This will in the first place improve his service to a surprising

extent, eliminating straight away 5 per cent., 10 per cent., 15 per cent., or it may be 20 per cent. of the calls which formerly were made from his station. Further, with only one unlimited line he gets as much out of it as it is capable of carrying, usually more, with the result that the service is poor, through no fault of the Company. The reason given by the large user in the past for not adding to his installation was the high cost of the additional connection; but with the measured service this reason vanishes. While the subscriber may refuse the second connection costing £8 10s. he is open to conviction that a line costing £4 is going to give him a vastly improved service, out of all proportion to the small amount expended, and he will realise this if the question of auxiliary line working with consecutive numbers is fully explained to him.

Another interesting point is that if he clears away his unnecessary outward calls he leaves more room for his incoming traffic, which it will pay him to cultivate; looking at this from the Company's point of view, it immediately reduces the ineffective calls to that subscriber, and means so much saving in cost of operating. What this means is difficult to realise, but by the judicious use of "engaged" records and through them convincing the subscriber that he requires more lines and probably more stations, in fact, that in order to deal adequately with his traffic he requires a full-fledged private branch exchange, the ineffective calls can be reduced to a most extraordinary degree. This has been done most systematically and successfully in America, and in one case I know of, ineffective calls now stand at some 7 per cent. or 8 per cent. of the total traffic. Compare this with our 20 per cent. to 25 per cent., more likely the latter figure. What monetary saving such a reduction of ineffective calls would mean on the billion or so of calls passing through our system in a year, I leave to someone with more time and capability for abstruse calculations than I have.

The question of the subscriber being in the hands of the Company in the matter of counting calls seem to me to be one which might in many cases be raised by him, especially if the number of calls contracted for runs out in a short time and he is asked to enter into a new contract. What is wanted in a case of this kind is to inspire confidence in our system of counting the calls, as well as in our fair methods of dealing with subscribers. It is also desirable to point out to the subscriber that everything possible is done to ensure accuracy, and that if any mistake does occur it is more likely to be against the Company and in the subscriber's favour than otherwise.

A very interesting study, and one which should be made by every member of the staff likely to deal with this question, is that of the average rate per call under the various classes of measured service, small user, large user, residence and so on. At the higher rates of calling the average cost of each call is extremely low, and when one considers the cost of providing the plant and keeping it in good order, of operating and management and general expense, it is extraordinary that it should pay. It is perfectly obvious, of course, that if we take an isolated subscriber his service would not pay, but as we deal with hundreds of thousands of subscribers, and with millions of calls, the Company is manufacturing calls on a wholesale scale and can supply the wholesale user at wholesale rates and still make a living profit.

When arguing with a subscriber on the question of cost per call, which to the small user sometimes appears high, the value of the incoming traffic and of permanent service, always available, must not be lost sight of. I would like to have gone into the question of cost per call more fully, showing how our rates in this country compare with those in America, but I am afraid the Editor will have something to say if I occupy any more space.

Let us hope that we may have many converts to our new rates and that our progress from now on may be as wonderful as that on the other side of the Atlantic.

THE NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY.

At the monthly meeting of the above society the undermentioned grants were made:—

(1) Engineers Department (a)	..	..	..	£3	0	0
				2	10	0
(2) Metropolitan Stores Department	..	..	..	3	4	0
(3) Traffic Department	..	..	..	4	0	0
(4) Maintenance Department	..	..	..	2	10	0

TRACTION TELEPHONES IN SOUTH LONDON.

BY A. C. GREENING, *Salisbury House.*

To facilitate the handling of its traffic, the Tramways Department of the London County Council has recently had telephones installed by the Company at some ten important points within its South London section, and it is anticipated the service will be considerably extended. The circuits all terminate upon a private branch exchange at the Central Car Depot, Camberwell.

A cast-iron box, mounted in general upon one of the Council's

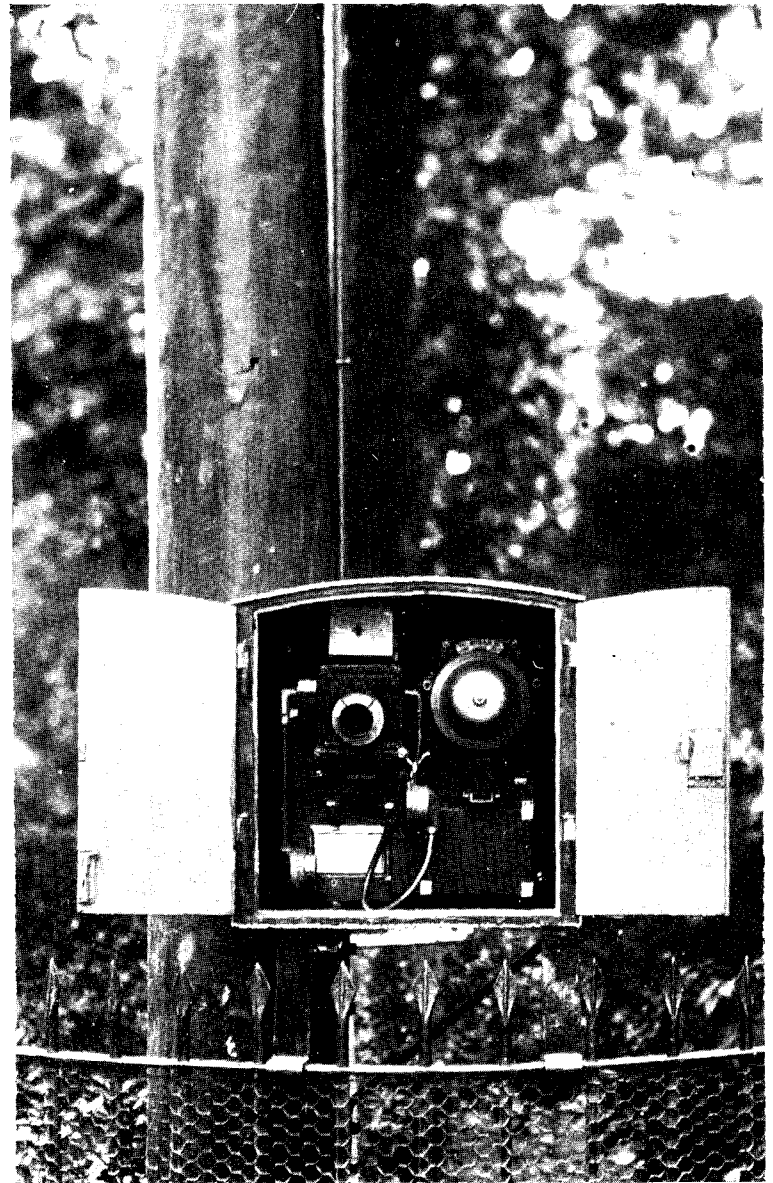


feeder pillars, contains the street telephone equipment, which comprises a B 365 set, as illustrated in the Company's catalogue, and a weatherproof drop indicator ringing a watertight diaphragm bell.

The box shown is furnished with the sound outlets in either side, with protecting screen, the function of the bell being to attract attention from the service man upon duty at the point in the event of the depot making a call.

The feeder pillar illustrated stands immediately to the front of the Elephant & Castle tavern (more generally known to Londoners and others as "the Elephant"), the busiest car point within the British Isles, controlling as it does no less than twelve tracks, many of which intersect, and over which continuous streams of cars glide and interthread at all hours of the day and night.

The other point illustrated is that at "the Plough," Clapham, and here a stout iron bracket, secured to ground pole and railings, supports the box and its apparatus. The remaining points



equipped are situated at Camberwell Green, Tooting, Blackwall Lane, New Cross Gate, Kennington Gate; and upon the Surrey side ends of Blackfriars, Waterloo and Westminster bridges.

MEASURED RATES ON THE CONTINENT.

THE *Zeitschrift für Schwachstromtechnik*, commenting on the article under the above heading which appeared in the September issue of the JOURNAL, draws attention to the fact that in an editorial note (in another column, however) it had explicitly stated that the strictures on the new Vienna rates were republished from the daily press, and "appeared not uninteresting as embodying the feeling of a newspaper reporter." We therefore desire to make it clear that the views credited to the *Zeitschrift* were merely quoted by that paper and not their own expression of opinion. It should be added that the article in defence of the new rates by DR. VON WAGNER JAUREGG was reprinted in full in the next issue of the *Zeitschrift* as a sort of antidote to the irresponsible criticism of the daily papers, and in an editorial note they drew attention to the unsatisfactory and erroneous ideas awakened in the public mind by the discussion of great technico-administrative questions in the lay press up and down the country.

OPERATORS IN TRAINING.*

BY MISS A. DUGGAN, *Chief Operator, Dublin.*

OTHERS having shown in former papers the method adopted for the laying of the wires and their subsequent introduction into the test-room and on the switchboard where the subscribers' lines are joined up, it now remains for me to deal with one of the most important parts of the Company's work—the question of operating—on the successful discharge of which the popularity, or otherwise, of the Company must necessarily depend.

To ensure such success, a careful selection should be made among candidates desirous of becoming operators, and only intelligent, observant girls, quick of action, with good hearing and sight, distinct articulation, even temper, and sufficient tact to enable them to see their way out of difficulties, should be selected for training as operators.

Having found this learner, I proceed to train her. Having supplied her with a book of instructions, and impressed upon her the necessity of being punctual, I place her in the switchroom, where she is allowed to look on and "observe" for a day or so, after which she is supplied with a head receiver which is attached to the instrument of a working operator, so that the learner can listen and get accustomed to numbers. It is necessary that the learner's head receiver should be attached only to the instrument of an operator who keeps strictly to the rules, as *first impressions* are very lasting, and any careless habits acquired are hard to get rid of. Later on she is supplied with a complete operator's set, that is, a head receiver and breast plate transmitter (on which is stamped a number by which each operator knows her own), and is taught to adjust it for use, and to fold it up and replace it on number peg when not in use.

She is next placed at the switchboard, preferably at the least busy position and at the hour when fewest calls are likely to occur, although this is a rather difficult matter in Dublin, as all the positions are fully loaded with 100 subscribers each, and are continually going between the hours of nine and six. Even the quietest positions would require a fairly experienced operator if satisfaction is to be given, so that the learner can only get to the board for short periods, and only when there is someone at liberty to supervise her. However, since operators must be trained, even under difficulties such as these, and since we in Dublin are not as fortunate as London in having a school for the training of operators, I would suggest that a dummy board, or a board with 20 or 30 of the less important wires, be fitted so that the learner could have some little practice before attempting to operate at the busier positions, as subscribers, while making every allowance for learners, object to their being trained at their expense.

The switchboard in Dublin being a multiple, worked mostly on the magneto system, is composed of a number of sections alike, placed one after the other, each one being a repetition of the first. The lines coming into the exchange are divided into hundreds, and placed 100 at each position, for the purpose of equalising the work, and enabling the operator to get at the answering jack the more readily. Each subscriber has a multiple jack on each section, but only one "answering" jack, which latter is on the position on which he calls.

Each section of the board has three positions marked "A," "B," "C," the "B" position being the senior, and the "A" and "C" medium and junior, or both junior. The multiple jacks of all subscribers (except the party lines) are placed in panels of 100, starting from one to 100, 101 to 200, etc., from left to right of each section, so that the number which is furthest from the "A" position on the right is close to "A" position on the left, owing to each section being a repetition of the first; the answering jacks are immediately opposite the operator and are numbered with subscriber's full number.

Each position has fourteen pairs of cords, with plugs at both ends, each cord having a weight attached which draws it into

position on keyboard when not in use, fourteen clearing signals, or one for each pair of cords; this is a disadvantage, as some subscribers put the telephone on the rest while getting information, thereby giving a clearing signal, and as there is only one clearing signal for both subscribers the operator disconnects, whereupon both subscribers call for one another again and are probably told "engaged," the fact being that each subscriber is calling on his own position and is "engaged" only with the operator.

Each position has also fourteen combined ringing and listening keys, or one for each pair of cords, a master key, a pilot calling-lamp, and a pilot clearing-lamp, the lamps being placed immediately over the cords so as to attract the operator's attention when a subscriber calls or clears.

The learner, whose operating set is connected with the switchboard by means of a plug (which can be removed when the operator moves to another section or goes off duty) having been placed at the least busy position, is instructed to take up one of the back cords of the fourteen and holding it by the plug, to draw forward the listening key corresponding to the cord selected, so that she may be in readiness when a call comes. Number one rings; the operator inserts back plug of cord selected into answering jack of the number calling, and in doing so restores the indicator or extinguishes the lamp.

The listening key being forward the operator is in communication with the calling subscriber, and starts by saying "number please"? which subscriber gives, and operator should then repeat distinctly each figure, as mistakes are likely to occur, different numbers sounding much alike by telephone. Having repeated the number, the operator takes up the front plug of the same cord, and taps with the tip of the plug the brass rim of the multiple jack of the number required, to ascertain if the subscriber is engaged on any other section; if she hears a click in the receiver she knows number is engaged and says "number engaged." It is most important that the learner be taught to take the greatest care when testing for "engaged," as it is much worse to connect a subscriber on a line already engaged, than not to give the connection at all. If no click is heard the operator pushes plug into the multiple jack and presses listening key from her till it sticks; the key acts this time as an automatic ringing key and remains over until subscriber answers, when it comes back to normal position. If the ringing key does not come back after a reasonable time, the operator should withdraw the plug and replace it again in the jack without pressing over the ringing key; this will allow the listening key to be drawn towards her so that she can find out what the trouble is. Sometimes the subscriber called does not answer, or line is earthing, or ringing key is faulty, and subscriber cannot speak until it is released, and then a clearing signal will show while the subscriber is speaking, so that it is necessary for operator to come in on line now and again to ascertain whether the subscriber has finished. When the subscriber places his receiver on the rest, a clearing signal corresponding to the cord in use is shown and the operator, seeing it, disconnects both ends of the cord. A tendency to flick the cords out at a distance from the plug should be checked, as it not only *wears* the cord, but runs the risk of flicking another or two with it, and so cause trouble. When no clearing signal is given after a reasonable time, the operator should go in on line and listen before challenging it by saying "have you finished?" If no reply is given she may disconnect.

If a subscriber asks for a number in an outside exchange, say, "24 Dalkey," operator selects a junction to that exchange, and, having found one disengaged, rings the distant exchange, who answers by giving name of exchange called, the first operator passes the number, and the distant exchange connects and rings, the first operator seeing call through. If the junction is engaged operator repeats "junction engaged"; if number is engaged operator repeats "number engaged"; if number cannot be got subscriber is told "no reply." If a trunk call is required, the operator, having looked at indicator or lamp, knows by a red tab on indicator, or band on lamp, that the subscriber cannot order trunk calls; if there is no mark, operator at once connects subscriber with the Post Office on record wire. The subscriber gives his call direct to the Post Office operator, giving his own number and the number required. When the call matures he is again rung up by the Post Office operator.

* A Paper read before the Dublin Telephone Society.

If the calling subscriber requires a party line number, operator tests a transfer and engages it but does not ring, as the putting of a plug into a transfer jack lights a calling lamp on the transfer position; she passes the call to the transfer operator, who tests number and rings X or Y as required; a clearing signal shows on the calling position, and a lamp glows on the transfer position, till the party-line subscriber answers, when both lamps go off; when the subscribers have finished, a clearing signal is given on both calling and transfer positions, two lamps glowing on the latter position, one for the transfer junction and one for the party line.

Each transfer position has 25 transfers, or incoming junctions with double clearing or supervisory lamps, two sets of X and Y ringing keys (one automatic and the other not) for each transfer, the X key being black, and the Y red. When transfer operator receives a call a lamp glows and she presses over the top of the "listening key" corresponding to the transfer and answers by saying "number"; operator at calling position passes number, which transfer operator repeats and tests party-line jack for "engaged," as although party lines are not multiplied on any other section the number might be engaged at answering jack, and if the operator receives a click, number is "engaged," and she so tells the subscriber. If number is free, operator plugs in and pressing down her ringing key, rings X or Y subscriber through.

The transfer supervisory lamp goes out; and party-line supervisory lamps remain alight till subscriber answers, when both lamps go out. When subscriber finishes, both lamps glow on transfer section, and a clearing signal is also given on the originating position, and operators at both positions clear, and so leave transfer free for other calls.

Party-line subscribers are known as X and Y. They must take turn about to use the wire, X being engaged (so far as a call for him is concerned) when Y is using the wire, and *vice versa*. Some party-line subscribers who come in on wire when their partner is finishing a conversation think that by remaining on the line they are sure to get attended to sooner, but the reverse is the case, as by remaining on the line they prevent the other subscriber from clearing and so delay themselves.

The party-line subscriber's call is automatic; when the subscriber takes the telephone off the rest, a lamp glows at the switchboard. Each party-line position is fitted with fourteen pairs of cords for party-line working only, with double clearing signals or supervisory lamps, and fourteen selective ringing keys. To answer a party-line call the operator takes up one of the back cords and plugs, which extinguishes the lamp, and, having listening key corresponding to cord in use pressed from her, she is in communication with the calling subscriber. To connect, the operator uses the front cord and, after testing for "engaged" she draws the combined listening and ringing key towards her to ring. If the subscriber requires another party-line subscriber, the operator passes the call to the transfer operator, except when the subscriber requires his own partner; in this case the operator, still keeping back plug in calling jack, must ask the caller to replace his telephone on the rest for a few seconds, and then ring X or Y as required, leaving the back plug in until the clearing signal is given. Each party-line signal is marked according to the service required, two down strokes denoting full service, two down strokes with a stroke across denoting Post Office facilities barred, a green band meaning that junction fees are chargeable and that a ticket must be made out. A green lamp means that the operator must record on the form supplied, having first to ask the subscriber whether he is X or Y; the reply is not always reliable, as sometimes a caller does not know which he is, and an unscrupulous subscriber could easily charge his calls to his partner, and give him the pleasure (or pain) of paying for them!

Message rate record subscribers pay so much a call, and all effective calls are recorded (calls being considered effective if the subscriber makes no complaint as to not getting number).

Measured rate and private branch exchange subscribers are those who have contracted for a number of calls at a certain rate, and their calls are recorded on tickets. In my opinion the measured rate and private branch exchange will be the system of the future as it will do away with the irresponsible use of the service.

Auto box subscribers are subscribers or public call offices where caller must put *rd.* in box, a green dot on indicator, or a red lamp being the sign by which the operator knows she is to ask for

a penny. I remember a caller who complained that he could not get any reply from the number he had called. He was shown into the call office at the exchange, and the number required was put through. Then no word could be got from the complaining caller, so someone went into the cabinet to find out what was wrong, and discovered the caller (not a lady) leaning against the instrument with his hat slightly tilted and the receiver hanging gracefully down his back!

The trunk and junction sections serve the outside exchanges and the Post Office. Each junction ends in a single cord and is used for incoming and outgoing calls. Unfortunately the junctions are not all auto-clearing, and ring-off signals are not always reliable, as some subscribers simply put up the telephone and go away, and in many cases the first notice of the subscriber being finished is when the outside exchange rings for another number, the calling and ring-off indicator being one and the same.

To answer a junction, operator presses down listening-key, which restores indicator, and having got the number, proceeds as in handling a flat rate call. The ringing not being automatic at this position, the operator has to hold down a button while ringing.

All incoming trunk calls from the Post Office are handled at this section, the Post Office selecting the junction. The National operator tests and rings the number required. If the subscriber is engaged on a local call, the operator breaks in on conversation and asks the subscriber if he will take a trunk call; if subscriber refuses, Post Office operator is told so and the call is lost; if he agrees to take the call, he is asked to tell his correspondent and ring off; the junction operator withdraws plug for a few seconds and then retakes the line required, the subscriber having been meanwhile disconnected from the local caller.

The following are the principal switchboard plug signals:—A *red* plug in a multiple jack denotes "temporarily disconnected"; a *yellow* one "ceased"; a *black* one "not yet on service"; and a *white* one "number changed."

The operator is taught to record calls with wooden pegs and is also shown how to test cords, ringing keys, indicators, etc., and to report all faults observed to the monitor, who enters them on forms which are sent on to the test clerk, or to the switchroom inspector, according to the nature of the fault.

Having explained the different methods of working to the learner, who has long since finished her month's probation of four hours per day, and has been appointed half-time operator, I start her operating at a working position, putting her in charge of a senior operator (for which I am afraid the senior is not always grateful), so that the senior may help her along for a while, and personally I watch her as much as possible, and explain things to her as she goes along. After six months the new operator has a *fair idea* of the *general* working, but to leave an operator of two or three months' experience to manage a position of 100 subscribers *during the whole day* would be expecting too much. During this time she has to be constantly helped by the operator at either side, who frequently have to take the lion's share of the work. To leave her to herself altogether would be fair neither to her nor to the service.

Thus it will be seen that not only is it of the most vital importance to have operators trained and in readiness when there is a prospect of the switchboard extending, but that it is also necessary to have operators trained and in waiting when positions already working, but which are only supplied with operators *during what is considered the busy portion of the day*, show increasing traffic, or when the positions already filled require the constant calling out of excess calls by the supervisor; it is simply disastrous to a good service to defer training new operators until the traffic shows an actual necessity for more experienced operators. An operator of two or three months' experience, taking a position of 100 lines for many hours of the day, and a larger number during the luncheon hour and relief hours, although doing her utmost, cannot give a good service. This the observation tests will show, and although these tests may appear bad from the "observation" side they are no proof of negligence on the "operating" side, as the operator may be doing very good work although she is not giving the subscribers the service they require. And now I think my operator is six months in the Company's service, and as she is entitled to holidays after six months, she gets ten days—I won't say anything about the hard labour: she will get that when she comes back.

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"BY THE STAFF FOR THE STAFF."

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[No. 19.]

ON SAYING THE SAME THING TWICE.

EVERY business man knows the value of insistence; with him repetitions are not vain—"such as the heathen use." What is advertisement but a constant insistence on and repetition of truths or otherwise concerning the wares it is his object to sell? If he is not believed the first time he may be the second time; or, failing that, the seventy and second time. But a new idea reaching a receptive mind is like seed thrown on good soil; it becomes productive in due season, and to elaborate it with repetitions is as wasteful as treating a fertile tract with expensive manures. A flash of wit penetrates such a mind at once, while to the slower intellect, as to a mariner "all at sea," it requires flashing many times, like the light from the revolving lantern of a lighthouse. To be a popular comedian—beloved of minds whose grades vary in the extreme—you cannot repeat a joke too often; in fact its magnitude increases in direct proportion to the number of its repetitions. Laughs lie in wait for it—those boisterous laughs of easily excited mirth which the Psalmist likens to the crackling of thorns beneath a pot. Conversely, the second telling of a good story, or the exposition of a new idea after it has become a commonplace, is an infinite boredom to a fine intellect. Unhappily this order is in a minority; those others, with whom wit requires concentrated "seeing," and in whom new ideas only awaken suspicion, are the great majority. But if, as is alleged of the Scotch, they "joke wi' deeficulty," still they do joke; if they only apprehend new ideas when these have become ancient history to the advanced guard, still they do apprehend them; and that must be the excuse of those whose interest it is to further the new idea for saying the same thing twice and many times twice.

We have been tempted into this disquisition by the knowledge (continuously strengthened by reports in the Press and elsewhere) that such advantages of a private house installation as shopping by telephone, ringing up absent members of the family in cases of emergency, or calling a doctor in the minimum space of time are,

despite a rapid and gratifying development of this branch of the service, still widely regarded as "new ideas." To most of our readers, and to a daily increasing section of the public, these incalculable benefits are a commonplace. When they see them painted in glowing colours they may feel disposed to complain impatiently that they have read all that before. But the fact remains that countless people, as contract officers can testify, imagine they cannot afford the telephone. If their imagination only went a little further it would be given to them to see clearly that they cannot afford to do without it.

There is an innate conservatism within us all which disposes us to place a certain limit to the conveniences and luxuries provided for us by science and to say: Thus far and no further. For instance, if we can get to Manchester in a comfortable express in three hours and a half we are apt to look with indifference on the proposal to build a new electric railway which will accomplish the journey in two hours. It is something like gilding refined gold, and scandalises our sense of economy. No doubt people argue that with the penny post and the telegraph at hand the telephone is a superfluity in the home. But it is a truism that the luxury of yesterday is the necessity of to day. There are also those to whose misguided æsthetic sense the railway, for example, is an eyesore. They see no poetry in its pillar of cloud by day and pillar of fire by night, and ask fretfully: Even if we do get in eight hours as far as our forefathers got in eight days, are we any better off? Such are almost beyond argument, though no man is quite hopeless. It is, however, to the milder form of conservatism, which feels a wavering diffidence as to the tangible benefits of the telephone that we address ourselves and repeat our incontrovertible facts. To them we point out that in every home where a reasonable standard of comfort prevails the telephone is an essential, compared with which a lawn mower is a luxury and an elaborate garden hose an economic crime. To have friend and relative, client, tradesman or doctor, however distant geographically, within talking range of the home is a benefit not difficult to appreciate, and to those who fail to grasp this truth it is our mission to say the same thing twice, as attractively as our wit can devise, even at the risk of boring those more open minds which are readily susceptible to new ideas.

THE HUMORIST AND THE OPERATORS.

TELEPHONE humour is much like railway humour; there is a parity in the thoughtlessness and staleness of both. Each consists in reiterating the same charges against the same Company or the same service an indefinite number of times with such feeble touches of wit or satire as the humorist may have at command. According to him the operator is always discussing new hats with her neighbour at the switchboard, or what *he* said last night, and can scarcely tear herself away to attend to the exasperated caller. It cannot be denied that the subscriber who is kept waiting for a reply to his call sometimes suspects that gossip is the cause of his difficulties; and, if he is given to exaggeration, complaints of unholy revelry in the exchange are poured into the Company's ears. The Company, realising that most of its clients are very naturally ignorant of the conditions of exchange working, finds the best remedy for their delusion in inviting them to inspect a large exchange, where the sight of the rows of busy girls, unceasingly

watching and answering the constantly lighting signal lamps, and of the apparatus of supervision and exchange management employed to ensure efficiency, usually dispels their suspicions. They realise that however generously the switchboard is staffed there arise occasions when several signals are given simultaneously and cannot all be answered at once.

The critic is not an unwelcome friend; his judgments often beget reforms. The true humorist sweetens the criticism of reproof with a not unkindly laugh. The parrot-humorist, however, serves no useful purpose. He has learned nothing; he has nothing to impart. As an example of his lucubrations we recently read in the editorial notes of a provincial daily paper of "the apparently constitutional inability of the average lady operator in the average exchange to tear herself away in the midst of business from the delights of a gossip. Their leisurely methods largely tend to rob the telephone of the advantages it is supposed to confer, and habitual users of the instrument will hail with delight the advent of the really efficient and assiduous human link in the system—when she comes. She has not arrived yet."

We make no assumption of perfection on behalf of telephone operators; but we are disposed to maintain that no one who has carefully assimilated the various papers by operators and upon operators and operating which have appeared in past issues of the JOURNAL will deny that the majority of them are "efficient and assiduous human links in the system." We think that those who read of the percentage of ladies in the Swansea Exchange, for example, who give up their time to improve their knowledge of telephony at evening classes; of the enthusiastic rivalry of teams to stand high in the speed-of-answer records; of the interest displayed in their work evidenced by various articles by the operators themselves; and further, of the lines on which a modern exchange is conducted and the *morale* of its principal members; will form a juster opinion of their efficiency and assiduity than those who draw upon their imagination for pictures of gossiping and chattering girls, evolving them as the fabled German philosopher evolved a camel "from his inner consciousness." It is our earnest endeavour in this JOURNAL to give the operators every assistance and to awaken their interest in the important part they play in the telephone service. That we have not laboured in vain is abundantly testified, and we are glad of the opportunity of saying that, whilst perfection is difficult of attainment and there is always room for improvement, we deny that the "efficient and assiduous human link" has not yet arrived.

GLASGOW'S TELEPHONE DEFICIT.

The following is reprinted from a Glasgow paper, the *County and Municipal Record* :—

While a telephone department has been struck off the list of Glasgow's municipal enterprises, there still remain very material traces of the Corporation's struggle with the National Telephone Company, which traces they would obliterate with the quickest despatch. One of the results of the Corporation's telephone undertaking, it may be remembered, was a loss of £17,000. That sum still remains debited against the city exchequer, and how to get rid of the item is a question that is concerning the council. It has been suggested that the loss might be met out of the Common Good, but those who have the matter in hand are dubious about the expediency or legality of that course. Glasgow Common Good is a vexing and mysterious concern, and until a decision is given in the action pending in the Court of Session regarding the expenditure of about £2,000 in connection with the Taxation of Land Values Bill, there is much doubt as to what assistance may be looked for from that quarter. We understand, however, that if the money is not forthcoming from the Common Good, the deficiency may be met by a levy on the rates, which is provided for by the Corporation Telephone Act.

SHOPPING UP TO DATE.

MESSRS. PATRICK THOMSON, LIMITED, a cash drapery stores in Edinburgh, who have an installation of four junction lines and 25 stations, have issued a novel pamphlet to their clients, entitled "The New Idea. Telephone Shopping—Smart, Simple, Sure, Satisfactory. 4181 Central is Patrick Thomson, Limited. Talk Direct to the Department you Want."

WHEN YOU'RE AT HOME

Perhaps—It's wet.
Perhaps—You're busy.
Perhaps—The wanted item isn't worth the journey.
Perhaps—You don't feel like going shopping.

WHEN YOU'RE HERE

Perhaps—You've forgotten something.
Perhaps—You're not sure of the quantity required.
Perhaps—You wish to make an appointment with a friend.
Perhaps—You want to call a cab.

USE THE 'PHONE

Remember—We've telephones in every section of the store.
Remember—You can talk direct to the assistant at the counter.
Remember—You can state your requirements to the smallest detail.
Remember—It's as satisfactory as calling—only much quicker.

USE OUR 'PHONE

Remember—That every telephone in the place is at your service.
Remember—That we have a special private box—if the message is private.
Remember—It is Telephone Company's tariff charges—one penny per call.
Remember—You can use any instrument, any time. That's what they're there for.

WE HAVE FOUR MAIN LINES

AND . . .
TWENTY-FIVE SUB-STATIONS.
RING UP 4181 CENTRAL.

Then ask for the Department you require—Tea Room, Smoke Room, Delivery Office, Counting House, Costumes, Millinery, Laces, Gloves, or any other section. Our Telephone Operator will connect you direct and—at once.

WE HAVE FOUR MAIN LINES

AND . . .
TWENTY-FIVE SUB-STATIONS.
RING UP FROM 4181 CENTRAL.

We want to help you in every possible way. We want you to have every convenience, every facility. We want you to make this popular shopping centre even more popular.

RATHER A GOOD IDEA, ISN'T IT?

THAT'S THE MODERN STYLE OF SERVICE.

Use Your 'Phone, or Use Our 'Phone—there's Satisfaction Both Ways.

UNDERGROUND WORK.—SUBSTITUTION OF CABLES.

By C. W. APPLEBY, *Divisional Engineer, South-East London.*

A LARGE quantity of ducts and cables of varying capacities from 600-pair downwards have been laid in the south-east district during the past few years, and in certain areas where we have been unable to provide underground routes the Post Office have supplied them. Where the Company's ducts have all been in use it has been found economical to substitute the existing 20-lb. conductor cables by 10-lb., or to substitute 20-lb. conductor cables containing a larger number of wires, thereby increasing the capacity by about 160 per cent. and saving the cost of laying additional ducts. By these substitutions a large number of distributing points have been opened up.

Of course there are instances where it is more economical to lay new ducts than to change, say, a 204-pair 20-lb. conductor cable for a 357-pair 20-lb. conductor cable, as the increased capacity in such a case would not warrant the outlay, especially having regard to the interruption to the service entailed, and to local conditions such as the regulations of the local authorities and the obstruction to street traffic and to business generally.

In a recent case in this district 2,761 yards of 204-pair cable was substituted by 600-pair cable, and the cost of the work was found to be £47 per yard. As a comparison, if one additional pipe had been laid and a 400-pair cable of 20-lb. conductors drawn in, it is estimated the cost would have been £109 per yard, and again, if two pipes and one 400-pair cable had been laid the cost would have been £139 per yard.

As there is a considerable amount of detail to arrange in this class of work perhaps a few remarks may be of some interest, as doubtless the work varies according to circumstances in different localities.

The estimate having been sanctioned and the cable requisitioned

and received, the vital part of the whole proceedings is to plan out and arrange the details for carrying out the work. A careful investigation of the service to be interrupted is made and the necessary advices despatched. The next proceeding is to test and label the existing cables at the points where it is desired to draw out. The tools required are a very large item, the collection of which generally occupies a great deal of time, and this difficulty is considerably increased, to my mind, by London's being one centre so far as stores are concerned, which does not tend to guarantee the tools being supplied in good condition. In a recent instance the following tools were used:—Twenty-two winches, sixteen jacks, 24 cable grips, 41 sets of digging tools, 280 road lamps, 3,000 yards of rope.

The next point to be considered is the engagement of the temporary labour, which is divided into sections over the whole route of cable being dealt with, each section being placed under the control of an engineer. The tools and materials are distributed over the various sections, and the opening of the ground at the split pipes, the rigging up of the sheaves in the manholes and placing the winches, jacks and drums in position, drawing out and drumming the cable is proceeded with. In certain cases (according to local circumstances and where convenient) the whole length of cable can be drawn straight along the footway or roadway and subsequently redrummed. Before drawing out the cable special care should be taken in the attachment of the draw wire to the cable, otherwise should an accident occur to the draw wire considerable delay may be occasioned.

As the individual lengths of cable are drawn in a pressure test is applied, and upon satisfactory results being obtained the lengths so tested are handed over to the jointers. As the jointing is carried out the completed circuits are tested through from end to end, and connected through to the ends of the interrupted circuits.

As soon as the replacement of the whole of the cable has been completed, the tools, redrummed cable, etc., are returned to the stores and the surplus labour paid off. On the completion of the jointing, and before plumbing operations begin, the whole of the circuits which have been interrupted are tested at the test-rooms concerned, and the spare circuits in the cable are tested for continuity, earth, short circuit and induction. If the results are satisfactory the plumbing is proceeded with, after which each joint is subjected to careful pressure and insulation tests.

The trench disturbed is then reinstated temporarily, and the usual advices forwarded at once to the borough surveyors concerned for the permanent reinstatement of the road or footway.

THE TRAINING OF OUTSIDE STAFF: GANG BOY TO FOREMAN.

By J. W. PRICE, *Local Manager, Pontypridd.*

This subject should be of great interest to all the younger portion of the outside staff, as no doubt it is the ambition, or should be, of each boy to become one day a linesman or foreman in charge of a gang. For instance, let us assume that a gang boy intends taking an interest in his work; he will not when opportunity occurs occupy his time in throwing stones after sundry stray cats and dogs to the amusement of himself and other small boys in the vicinity, and leave the soldering irons in the fire to take care of themselves.

On starting with a gang one of his many duties will be to attend to the fire pot and soldering irons. The latter he will learn to face and keep in good condition, which means that they must not be allowed to remain in the fire until they become red hot as this is detrimental to their long life, and if a little care be exercised the irons will not require constant facing.

Another important duty which a gang boy has to perform (though to him apparently trifling) is the care of the tools. He should see that they are not left lying about, and in this way frequently mislaid. As time permits he will do well to see that they are cleaned and oiled, so that they may be kept free from rust. He should not wait for his foreman to tell him of this, but make up his mind that the tools belonging to his gang shall be the best kept of all the squads in the centre.

He must always be ready and willing to obey his foreman's instructions, and when told off to some work should attend smartly and try in every possible way to give satisfaction. This will be greatly to his advantage, for on the foreman's report his future prospects depend.

While attending to his duties, he will have opportunities of learning the names of the many different kinds of bolts, insulators, etc., in use with the Company. He will also in time know the lengths of wire required for binding in on insulators, and for making joints on copper wire. These he will then be able to cut as required.

When old enough and strong enough the gang boy becomes a labourer. While in this capacity he will be instructed in the digging of holes for poles and stay blocks, which is one of the chief duties of a labourer when new routes are being erected.

Another duty will be the paying out of wire by means of a drum provided for the purpose. I should like to give just a few words of advice to the labourer attending to this work. He should keep a sharp look-out on the traffic and not allow his wire to get slack, which greatly endangers the public. Another result of paying out wire slackly is the sagging of wire in the spans between the poles, and this may cause trouble (especially if the route runs in a curve) as it may arouse the curiosity of the passer-by who, seeing it within reach, gratifies his curiosity and examines it. While doing so the wire might be pulled up sharply, thereby probably causing him some slight injury. The result is a long letter to the Company complaining of the carelessness of their workmen and demanding compensation.

There are many things outside his sphere that an intelligent labourer can perform. When such opportunities come his way he should always grasp them and carry them out to the best of his ability, and not leave them severely alone because they do not form part of his duties. By so doing he gains additional experience and paves the way for his advancement.

While serving his time as labourer he should persevere and make himself proficient in the required duties, and thereby enable himself to pass the examination for which a knowledge of the following is necessary:—

- Fixing combiners on long arms and standards.
- Fixing and making off stays.
- Arming standards and ground poles.
- Preparing soldering irons for use.
- Making and soldering twisted and Britannia joints.
- Binding in and making off line wires on insulators.
- Fixing pole steps.
- Running off overhead wires in twist.
- The class of wire used for earth wires on poles.
- The difference between single and metallic circuit.
- The way which a hole should be dug to receive poles.

If he has taken an interest in his work there should be no difficulty in passing this examination, which means a move in the right direction, namely, a step forward and an increased rate of pay.

The gang boy having now reached the position of ordinary wireman will have further opportunities of learning the more important duties appertaining to this stage of his work. He will now have to exercise great care in his duties, as the good working of a line depends upon his workmanship.

Occasionally complaints are received that a line which has just been run and completed is not working satisfactorily. The fault-finder on examining the line finds a slack joint or the wires badly regulated, with the result that contacts, etc., ensue.

The new wireman should endeavour to prevent troubles of this kind and thus save the Company many complaints which would otherwise be received. Faults of this kind on new lines are, in my opinion, only brought about by carelessness and indifference on the part of the workmen.

However, let us hope that the individual who started as a gang boy, and who is now matured into a wireman, has fully conquered the tendency to commit little acts of carelessness which, though trifling, mean so much, and that he has gained all the experience possible while in this capacity.

He should now be anxious to become a first-class wireman. To achieve this it is imperative that he should pass a further

examination, and to do so he must be thoroughly acquainted with the following:—

- Erecting, strutting and staying ground poles.
- Making off steel suspenders.
- Running out cables.
- Distributing the ends of cable over the arms to their respective positions.
- Testing lines with battery and galvanometer.
- The fitting of eavs, brackets and spikes, etc., at subscribers' premises under different circumstances.
- Selecting the most convenient position for good earths at subscribers' premises. Running and fixing same.
- Keeping diagrams of position of lines on poles.
- The selecting of positions for poles; knowing what to avoid and what to take advantage of.
- Varying the height of poles required according to circumstances and the number of wires on the route.
- The minimum height of wires crossing streets in the town and on country roads.
- Running revolving or rotated wires.
- Testing for an intermittent fault.
- Sizes of stay rods to use under various conditions.
- The circumstances under which guard wires should be used.

I would especially point out to wiremen that in many cases sufficient care is not taken in soldering the connections for the earth wires at the subscriber's end. It is very necessary if the earth wire is being connected to the water tap to see that the latter has been properly tinned before the actual soldering takes place. After it has been done it should again be thoroughly examined, so that there may be no doubt that the connection is electrically good and will answer the purpose for which it is intended.

The wireman who has been successful in the last examination now assumes greater responsibilities in the position of first-class wireman. While in this position I would recommend him to study faults and their causes whenever opportunity occurs. By so doing his value to the Company will be greatly enhanced.

Very few of the outside staff take the delight they should in this branch of the Company's work, and a man who is capable and takes a keen interest in faults is sure of meeting with success.

It occasionally happens that a foreman is unavoidably absent from his gang; then the senior wireman is called upon to take charge. Again, during the holiday season it is probable that he will have to relieve foremen of other gangs who are away on their annual leave. He will have opportunities of showing his worth and capabilities while holding this temporary position of trust, remembering that his next step will be a foremanship.

Should a vacancy for a foreman occur, or a new gang be formed, this wireman stands a good chance of being appointed to the much-coveted position with its many advantages. The duties and the responsibilities of a foreman are numerous and often require tact and thoughtfulness.

A foreman should always keep the following in mind:—

First and foremost, it is most essential that he should set a good example to his men.

When interviewing subscribers and owners of properties he should, under all circumstances, be courteous.

All work done by his men should receive his careful supervision, especially when new lines are being run, or when alterations to existing routes are being carried out, so that faults may be kept down to a minimum.

When spare wires are being used again as part of a new line he should see that they are in good working condition. A great deal of trouble is often avoided if this is done. A foreman may blame his men for bad work, but he should remember that he is the responsible person and that the Company's officials look to him for the carrying out of the work in accordance with the Service Instructions.

When erecting heavy poles he should carefully examine the tackle and see that the temporary stays for the derrick are securely fastened. If this be neglected serious accidents may result.

When dealing with stores too much care cannot be exercised, as much trouble is caused by bad figures and careless booking. I should like to instil this into the minds of foremen as I am afraid at times much indifference is displayed. The foreman should not

think it too much trouble to check his stores again and again as the best of men are apt to make mistakes.

His gang sheets should receive special attention. A clear report of the day's work must be given, and he should be careful that time is allocated correctly to the various works orders on which he has been working.

I would strongly impress upon all grades of men, from gang boy to foreman, that by taking pride in their personal appearance, although in working clothes, they create a good impression of their standing in the eye of the world.

In conclusion I would mention that there are two other openings for the outside members of the Company, namely, in the positions of faultsman and jointer. The work of the former is well known, but for the information of those who may take up the latter I may say that it is necessary to pass an examination in the following:—

- Drawing-in cable.
- Jointing, branching and testing dry-core lead-covered underground and aerial cables.
- Making potheads for terminating.
- Jointing of vulcanised indiarubber cables.
- Applying dry air to cables and the method of pressure testing.
- Connecting for Engineer-in-Chief's test.
- Submitting a sample joint.

Now that cables are being extensively used there will be openings for a large number in this direction.

I CAN'T AFFORD IT.

LAST month we invited contract officers to try their hands at compiling rejoinders to the above oft-met-with objection to taking telephone service. The two following are worth printing:—

J. S. CHRISTIE (Glasgow):

"Can't afford it!" Have you weighed the matter carefully? Now, what do you think of a man who spoke only English—yet he opened a shop in bi-lingual Montreal. More, he refused to learn French and to hire French-speaking assistants—said he couldn't afford to. He cut off half his business, of course. Wasn't he short-sighted? Why the profits on the French business would soon have repaid his outlay in equipping himself to deal with French orders. Do you see my point? Here in this city two tongues are in use. The short-distance one which you set store by and for which you opened your shop—and quite right, too. But there's the other tongue which takes no heed of distance—the telephone tongue. Why do you disregard it? Think of the numbers who are prevented by circumstances from coming to your shop. Their orders are given by means of the telephone tongue. If you ignore it, others won't be so foolish; and to the man who can hear the telephone tongue will speak. Think of the tide of such business passing your door and then ask yourself—not "Can I afford telephone service?" but "Can I afford to be without it?"

J. H. CORLETT (Leeds):

"Not if it paid you?"

"No. If the Telephone Company would accept quarterly payments tendered by the subscribers at the Company's office each quarter day I might be able to avail myself of the facility, but I can use £6 or £10 to certain profit by turning it over every month in my business, and it would cripple me to lay so much out for an advantage during twelve months."

"Then if I were able to offer you £12 worth of gas or coal for use in your business during twelve months for £6 cash, would you grasp the offer?"

"I might, as the profit on the transaction is about exactly what my capital has to make during twelve months, *i.e.*, £500 capital has to make £500 yearly to pay expenses and enable me to live."

"That means you make £42 a month as a necessity. If telephone service will increase that to £50 a month without extra capital, other than the £6 or £10 rental, would you afford it? Telephone service opens thousands of doors into your premises, and at the same time saves you and your staff so much time that subscribers are enabled to cope with the amount of increased business it brings without increasing their staff."

"At present I turn my capital over twenty times each year at 5 per cent. profit. Do you suggest the telephone would enable me to turn it over 24 times?"

"Certainly! And, furthermore, you are overlooking the fact that telephone service not only helps you to turn over your capital oftener, but, by putting you in close touch with shippers and manufacturers, you can regularly buy to better advantage and occasionally get offers of goods which have to be dumped on the market immediately, and do not admit of the slower process of offering by post, even if the seller cares to put the offer into black and white for you to show to his competitors. These little islands of ours are the dumping ground of the world, and it is our privilege to buy for 20s. many articles which have cost the manufacturers 20s. 6d. to produce, whether in Germany or any other country; not to speak of the thousands of instances where perishable produce has to be realised at less than cost. These are among the advantages you can secure only by being in touch with the quickest means of communication."

THE ENGAGING OF CLERICAL STAFF.

By P. H. C. PRENTICE, *Engineer-in-Chief's Office.*

WHEN a new man is wanted in the Company's service the head of the department concerned is naturally most anxious to secure the very best possible man available for the work, but I am inclined to think he very often does not show his anxiety as practically as he should. How often, when a vacancy occurs, someone is recommended by a third party interested in getting him employment; the man is sent for, talked to more or less casually for a few minutes, and then, unless there appears to be something radically wrong with him or his credentials, he passes into the service. A little

sent about his business, all the trouble of dealing with a fresh man and training him having to be faced anew. Not unfrequently however and this is worse still—the head of the delinquent's department, through misplaced kindness and without due regard to the Company's interests, lacking the moral courage to dismiss the man from the service, attempts instead to transfer him to another department which in turn has to wrestle with him to everyone's detriment. Although the impropriety of such course as this latter is almost self-evident, the writer has known of numerous cases of this description and has himself suffered many things because of them. In consequence of this it was determined in the Engineer-in-Chief's office to stop all such waste, and to find the cure in a little definite examination. If this be of an entirely mathematical nature it will generally answer all purposes, the idea being, of course, just to

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Chairman of Committee.

MISS A. ELLERY,
Executive.

MISS R. SMALE,
Executive.

SWANSEA OPERATORS' TELEPHONE SOCIETY.

later on it is found that he seems unable to think for himself, and that his figuring capacity is very limited, possibly some serious mistake having been made in an estimate or quotation through his fault. This, of course is very tiresome; but, annoying as the discovery has been there is generally a tendency when a man has once been put on the permanent establishment not to discharge him unless that course is quite unavoidable. The culprit is admonished, and perhaps another clerk is told to coach him up where he is deficient; any calculations he makes, however simple, have to be checked, and this may go on for some months or indefinitely, the department the man is in making shift, so to speak, with him, and the best of a bad job.

Perhaps, at last, things become too bad, something serious happens, or someone wakes up to the fact that the man requires too much teaching and leading to be longer endured, and he may be

see if the man can think. Without this examination a clerk, junior or otherwise, is not admitted into the Engineer-in-Chief's Department.

It must be quite understood that the examination is an elementary one. As it may be of interest, I give an example of an actual question paper which has been used:

Name _____
Age _____

Find the cost of 240 articles at 17s. 6d. each, less 1¼ per cent. Calculate 5½ per cent. on £200.

What percentage is 17 of 24 (to two places of decimals)?

Calculate $17\frac{4}{10} \times \frac{25}{100}$.

A room is 12 feet long, 9 feet wide, 10 feet high. Find (a) its cubic contents, (b) the superficial area of its walls.

The diameter of a wheel is 14 inches. Find its circumference.

Two marks are awarded for each question. Marks are also awarded for appearance and address, and for any other qualification that may be requisite, thus :

Bad, 0; indifferent, 1; fair, 2; good, 3; very good, 4.

This system, simple as it may be, is of considerable assistance in enabling one to arrive at a proper judgment of the merits of several men, each of whom may be fairly suited to the requirements of the case.

It will be seen that no subtle or difficult calculations are set in the papers, but, nevertheless, very few men applying in the ordinary way for a junior clerkship can tackle them. Indeed, some time back, and prior to advertising the fact that the examination was an indispensable condition, out of curiosity I made an analysis which showed that of a considerable number of clerks, junior and otherwise, seeking employment, fully 90 per cent. of the applicants were unable to cope with a few simple figures, about 8 per cent. were only able to make a very poor show, whilst 2 per cent. did well.

In the ordinary way now, when advertising a vacancy, it is stated that the test has to be passed. The effect of this can be realised when I mention that to an advertisement for a junior clerk, without any reference to an examination, as many as 100 replies have been received; to the same advertisement, but with the statement as to the test in elementary mathematics, ten or fifteen replies would be the most that would be received, and these figures are average ones. It is, judging from my experience, quite impossible to go by the statements in an applicant's letter that he has a "fair knowledge" of this subject or that. Often this means little or nothing from a practical point of view. I remember the case a year or so ago of a clerk who had matriculated, and who, according to his statement, was *au fait* with the calculus; yet he could not work out a simple percentage that could almost be done mentally.

That which goes hand in hand with the inability to make a few simple calculations is the poor writing and poorer composition of the majority of clerks. As to handwriting in the case of a new junior clerk, this is a point which should not be too lightly overlooked. Bad writing is but too common, and unfortunately is, I think, becoming more so. The following case, which actually occurred recently in London, illustrates what I say:—

An advertisement was inserted in one issue of a daily paper for a junior clerk at 20s. per week; 187 replies were received, and the handwriting of the applicants was specially analysed as follows:—

33 per cent., writing which would disgrace any firm.

58 per cent., writing which would be tolerated in an office if no better were available.

9 per cent., good commercial running hand.

In conclusion, the points to be remembered when engaging a clerk are these:

- (1) Have a definite examination in elementary mathematics, besides any special subject of which a knowledge may be required.
- (2) Don't be regardless of the handwriting of the applicant.
- (3) Choose the better class of man socially. Other things being equal this type of man is far preferable to his brother of lower grade.

Several responsible officers in the service have ridiculed the idea of an examination such as I have mentioned. "We tell a man," they say, "there's your work, and if you can't do it you must go." Now the old haphazard way is all very well, but in the Engineer-in-Chief's Department the standard is, of necessity, a high one, even for an office boy or junior clerk, and instead of the common type of lad who can scarcely multiply two by four, and to whom the term "5 per cent." conveys no meaning whatever (and I have known more than one such), we have juniors who can intelligently handle the slide rule and a table of logarithms, and are not afraid of algebra and trigonometry. It may be said, as it was recently to me, when I was advocating our system for getting boys of the right type: "Oh, but we only want boys for running about; we don't want all you ask for." We, too, want our juniors for running about, but we prefer to appoint in the first instance only such youths as have the making of men in them—lads who can use their brains. We have no place for any others.

Five years ago there were in London and the provinces a clerical staff of, roughly, 900. Now the figure is about 1,500,

showing a geometric increase of nearly 10 per cent. per annum. Seeing this, and the fact that last year about 150 new clerks were appointed to the service, it is I think quite evident that the question of endeavouring to secure at the outset the right sort of men is not an unimportant one.

MEASURING *v.* GUESSING.

SOME carpenters, when they figure on a small job, will hold a rule half-way between their eyes and the hole they are going to fill with a piece of board, squint, try to look wise, mutter a few numbers and walk away. The next day they come back with a board half an inch too short. Of course this makes no difference. They can splice on a piece to fill the gap.

It is true that this kind of work saves a little effort on the first trip. It is easier for a carpenter to hold up a rule and squint than to lay it along the space he wishes to measure and observe its exact length. But in the long run the carpenter makes his time figure out something like ten hours with saw and plane and five minutes measuring, as against six hours with the saw and plane, which would have been the result of an additional five minutes in measuring. On the whole, time is wasted, the job is spoiled, and the customer gets angry.

Telephone men will see quickly enough where the carpenter we mention was in the wrong, but how about a few of the things that go on in a telephone exchange? Quite a few wire chiefs, when there is a rush of work, have been known to send men out on a trouble after making the roughest kind of a test. That is one way to substitute a conjecture for a measurement. The wire chief takes the chances and the troubleman wastes the company's time. The wire chief pays for his carelessness in the same way that the carpenter does, too. The man is going to call in, perhaps, from four or five locations and call for repeated tests and instructions. Finally, when he does locate the trouble, he is more than likely to be so discouraged that he will fix it up in some slipshod fashion and let it go. He can rely on the wire chief to make a perfunctory test and not detect his poor work. Of course he is to blame for doing a thing like this, but the responsibility really rests rather heavily on the wire chief who started him wrong.

Of course this goes through all departments when it is present at all. It is also a weakness that every organisation has to guard against. The thing is for each individual to recognise it in himself. Quite a number of managers who read this will probably say we have hit off their wire chiefs rather sharply; but we would like to see a few wire chiefs write in and tell us what to say about the manager, the next time we take a shot at this particular mark.—*American Telephone Journal.*

THE TELEPHONE AN AID TO MOTORISTS.

THE following reprint from the *Gravesend and Northfleet Tavern* shows the usefulness of the all-night telephone service to the motorist in distress:—

A MIDNIGHT VISITOR.

Shortly before twelve o'clock on Sunday night Mr. W. Busbridge, manager of the Ingress tavern, was aroused by a knocking at the door, and on descending to ascertain the cause, found a gentleman accompanied by a policeman. He requested the use of the telephone, which Mr. Busbridge readily granted, although he presumed there would be some difficulty in getting through to London at that hour. The visitor explained that he was motoring when one front tyre burst just outside Gravesend, while the other went wrong when the machine was opposite the "Leather Bottel." Eventually he established communication with a London garage, ordered a new pair of tyres, and requested that they might be sent down at once by motor. It appeared that he was a Mr. Goldstein and was to fetch Mr. Herbert Gladstone, the Home Secretary, early the next morning for an important appointment in London, hence his anxiety to have the repairs made good immediately. Having chatted with Mr. Busbridge for some fifteen minutes the visitor returned to his damaged car, after warmly thanking him for his assistance, and remarking that he would not be unmindful of the service rendered him. An hour later the "relief" car passed the Ingress tavern with the new tyres.

RESCUED BY TELEPHONE.

THE following occurrence recently took place near Burton-on-Trent:—A tramp went up to a residence in the suburbs and on the pretence of collecting old bottles, etc., attempted to force his way into the house. The maid, with commendable presence of mind, slammed and bolted the door and telephoned at once to the police, who quickly arrived at the spot and arrested the man as he was leaving the premises. He was brought before the magistrates and sentenced to fourteen days' imprisonment.

HIC ET UBIQUE.

THE International Bureau of Telegraph Administrations has issued its annual statistics of telephone communication throughout Europe. They show the state of development as at Dec. 31, 1905, and form an interesting study. We give the number of telephone stations in each country:

Germany	584,105
Great Britain and Ireland	406,173
France	137,725
Sweden	130,895
Russia	66,940
Switzerland	55,039
Austria	53,051
Denmark	52,154
Norway	39,715
Holland	32,093
Italy	30,459
Hungary	28,122
Belgium	27,023
Spain	16,297
Roumania	4,410
Luxemburg	2,499
Servia	1,181
Bulgaria	870
Greece	840

The figures for Portugal are not given. Telephone development on the other side of the Balkans is very poor. Turkey at present has no telephones, but we understand that the establishment of exchanges in Constantinople and Salonica has recently been sanctioned by the Ministry of Trade. Germany and Great Britain are about equal in the proportion of telephones to population and are far ahead of the other great European States.

VIRTUOUS indignation at the new measured rates still lifts its voice at meetings of the Chambers of Commerce. That of Leeds distinguishes itself by "urging the continuance of the present flat rate with an alternative message rate for small user." As pointed out by the *Electrical Times*, no argument whatever is adduced why the large user should obtain a service under cost price; but what we like is the disinterested and kindly consideration for the small user—at the Company's expense.

Telephony publishes every month a delightful page of "Items from the Rural Line Districts," being telephone intelligence selected from small local newspapers. A report in the *San Jose Mercury* tells how eight girls in the local telephony company "quit work" because the manager told them that their conduct at a picnic on the previous Sunday was unladylike. It seems that the chief diversion had been tree-climbing, and that one of the principal stockholders had observed and reported them. In the mind's eye one pictures the eight maidens on the bough, each "like eny swa!we chiteryng on a berne," as CHAUCER has it; the entry on the scene of the scandalised stockholder; and the subsequent indignation of the girls at being styled unladylike. It does not appear whether the stockholder was moved to wrath by the actual desecration of the sabbath, or by the simian calisthenics of the ladies in the trees. Perhaps he objected to the "overcrowding of the trunks."

ONE of the Company's district offices has received the following request:—

Dear Sir,—Please remove whires and Poost from my Premises and decut from my desopit my trunk fees and return balance—yours Respectfully.

We are afraid the district manager will find no guidance in the service instructions as to carrying out these extraordinary requests.

WESTERN ELECTRIC COMPANY.

ON Sept. 30 the above well-known firm of manufacturers of telephone apparatus removed their London office from 171 Queen Victoria Street to Norfolk House, Victoria Embankment, W.C. Their Post Office telephone number remains the same, but their National telephone number is 5349 Gerrard.

THE CHILI TELEPHONE COMPANY, LIMITED.

IN submitting the accounts for the past twelve months to the shareholders at the general meeting

The Chairman said that it had been a very exceptional year and one of great difficulty for the company's business. The terrible earthquake disaster which took place on the evening of Aug. 16 last caused great loss of life and property in the central portion of Chili, especially near the coast. Valparaiso, Chili's principle port, and other smaller towns were laid in ruins and the company's offices and plant were completely wrecked. The whole of the subscribers in Valparaiso and district were disconnected. Santiago, the capital, also suffered very severely and most of the public buildings were seriously damaged and rendered unsafe, but, fortunately, the plant there escaped with comparatively small injury.

Mr. Johnston, the general superintendent and manager, lost no time in taking steps to meet the unprecedented position. All communication with Valparaiso being interrupted, he proceeded there on horseback. On the way he made arrangements for the restoration of the trunk line communication. On his arrival at Valparaiso he found everything in confusion and that seven of the company's employees had been killed in trying to escape from the central building, while others were missing. He immediately took steps to relieve the distress and to re-establish communication. A wooden shed to serve as a temporary exchange was put up by permission of the authorities in the street in front of the wrecked building, and a department opened to provide food for the employees. Amongst the generous assistance otherwise given to them he mentioned with much satisfaction the spontaneous contribution made by the staff and employees of the United River Plate Telephone Company in the Argentine.

Within a fortnight of the disaster telephone communication was again established with Santiago, to the great convenience and satisfaction of the Government and authorities, and a commencement was made to join up those subscribers who had been able to establish themselves in temporary premises. After some months the central building was repaired and the exchange re-established in it. The other smaller offices which had been wrecked were also restored, and, before the close of the financial year on March 31, a large portion of the subscribers who had been cut off by the disaster were reconnected and the business resumed its normal condition of working.

Business generally throughout the country had been active and prosperous. The diminished number of subscribers at Valparaiso had in a measure been covered by the increase at the other centres, which has reduced the aggregate loss for the year to 155 subscribers. The company's property at these centres had also been extended to meet the growing requirements for telephone communication and the cost, amounting to £4,011, had been carried to the capital account.

The increase shown in the currency revenue had been due partly to increase of business at the centres unaffected by the disaster and partly to the higher rates charged in order to cover the heavy fall in the value of the currency and the great rise in wages and cost of materials of every description. This, as well as the exceptional reconstruction work at Valparaiso, had largely increased the year's expenditure and the net profit in Chili came out at £30,414, showing a decrease for the year, entirely due to the disaster, of £7,021.

The total income, including interest on investments and transfer fees, amounted to £31,252, and after meeting the London expenses and charges and adding the amount brought forward from last year's account there remained a credit balance for the year of £29,892. An interim dividend of £6,600 was paid in January and £9,564 had been put to the reserve. The directors now proposed a final dividend of £11,000, making a total distribution for the year of 8 per cent. on the shares, free of income tax, the same as for the previous year, and leaving a balance of £2,727 to be carried forward to next year's account.

CORRESPONDENCE.

AERIAL CABLE SLINGS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

Will you permit me to reply briefly to Mr. Wood's criticism in the September JOURNAL.

On referring to Fig. "B" in his sketch, it will be noticed that the free end of the hook is practically level with the suspending wires. When pulling over cables with the sling in this position, there is a tendency for this free end to become entangled in the suspending wires, and also for the sling to slip off altogether. By banging the sling on the wires as shown in Fig. "A" of the same sketch this is prevented.

With regard to the reference to wood pulleys in Mr. Mann's article, I can assure him that they are not at all superfluous. When running heavy cable the weight may be from 10 cwt. to a ton or more, and some such expedient to reduce friction is a necessity.

Any attempt to run a heavy cable round a sharp angle without passing it round a pulley would probably result in the breakage of the rawhide slings one by one as they reach the bend and get the pull of the cable upon them.

Crewe, Sept. 11, 1907.

ERNEST A. PEARSON.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I WOULD like to supplement the letter from Mr. Woods in the current month's JOURNAL by pointing out what is the real point at issue; it is of some little importance, and is not made known in the letter to which I refer.

Our aim is to construct economically, and although the question of economy may not appear to enter into the simple point as to whether a cable hanger is best put on the suspending wires a particular way, in actual practice such is very often found to be the case.

The suspending wires on being run out should be painted with preservative

paint to increase their life, and if a man puts the wire rings on the suspending wires the wrong way the increased friction, due to binding, cleans the paint off a portion of the suspenders and thus destroys in a measure the value of the paint. The result is the suspending wires will require to be replaced earlier than would be the case had the slings been handled correctly. Here we have an example of what one might term "small economies in the construction of plant."

Glasgow, September, 1907.

A. B. GILBERT.

COMPLETION QUERIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. HENRY ELLIOTT, in the September issue of the JOURNAL, challenges the opinions of engineers on this subject, and as an engineer closely concerned in the system described by Mr. Taylor in August, I may perhaps be allowed to briefly state my views as derived from the working experience of it.

First, I agree with Mr. Elliott that the question of uniformity, particularly in this instance, is a debatable point. My opinion is that it is not essential that exactly the same method should be adopted in dealing with completion inquiries in all districts. There must be so many varying circumstances of staff and organisation that what would be suitable in one district may not be suitable in another. But it appears to me that each district should be able to decide which is the most economical and satisfactory system to be adopted by it, the last condition applying equally to the prospective subscriber and the Company.

I need not attempt to give any further description of the method adopted in London. It will be agreed, I think, that Mr. Taylor has made this very clear. But I may say that the system was adopted before Mr. Taylor's advent in London, and his advocacy of it, to my mind, in the light of his experience in other large and busy districts, really proves the value of it so far as London is concerned.

The experience so far is that a decided economy in labour has resulted, although it should be said that this was not the first object aimed at in making the change, but the chief gain has undoubtedly been the smoother working and prompter and greater satisfaction of the subscriber.

I agree that the question should not be looked at with any departmental bias. We should, therefore, eliminate any question of departmental sympathy, as suggested by Mr. Elliott; but we can look for and do get departmental concurrence in the satisfactory results obtained.

Our business is not quite on equal lines with an ordinary sales business; certainly we do repeat supplies to a large proportion of our customers, but I think the bulk of our work consists of single supplies to individuals or firms, and it does not seem to me that it is absolutely necessary for the man who takes such orders to keep in touch with them for all time.

It is far more important in my mind that the officer who has to execute the order should, as soon as possible, be brought into close relationship with the man requiring the line. The advantages are proved to be mutual from a wayleave and technical point of view.

A further very considerable advantage is the short cut between the source and destination of the required information.

On the whole I can assure Mr. Elliott that the opinions of the various engineers who have tried both systems are distinctly in favour of the one now in use.

London Wall, Sept. 9, 1907.

C. ELLIOTT, Metropolitan Engineer.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to Mr. Elliott's letter on this subject in last month's issue, he has given me credit for making the alteration in the method of dealing with such queries, which was explained in my article in the previous number. I think it is only fair to state that the alteration was made by my predecessor some time before I took up duty here, and that all the credit is therefore due to him.

London Wall, Sept. 13.

WM. F. TAYLOR, Contract Manager.

THE HUMAN SIDE OF THE ENGINEERING PROFESSION.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. V. KARAPETOFF, in the address which is reprinted in the September JOURNAL, says: "Read regularly at least one periodical relating to your industry." Now, most telephone men would like to carry out this suggestion, but we are faced with the fact that with the exception of the JOURNAL, which is necessarily only in part an engineering periodical, there is no English telephone magazine published. The electrical engineering magazines are expensive and very rarely contain an article of telephonic interest, while the American telephone magazines are also expensive and about three-quarters of the matter contained therein usually relates to financial, etc., affairs, which are not of much moment to National Telephone employees. To sum up, to obtain 12s. worth of telephonic matter per annum it is necessary to subscribe to, say, 60s. worth of periodicals, and this is a larger sum than most of us can afford to expend. It is true that the JOURNAL can and does reprint occasional engineering articles from other magazines, etc., but technical matter obviously can only claim a portion of its pages.

Could not the staff of this Company (possibly in conjunction with the electrical staff of the department) by promise of support induce one of the English publishers to produce a good telephone and telegraph magazine. It could be made up largely of reprints from the various magazines of all countries, and if published monthly at about 1s. would almost certainly have a wide circulation. Perhaps in the educational interests of the staff our Engineer-in-Chief would himself take the matter up if sufficient interest was manifested by the staff.

Personally I do not find public reading rooms of much aid as telephone magazines are not usually taken, besides which the possession of the articles is advisable for reference.

Carnarvon, Sept. 9, 1907.

J. B. SALMON.

[Perhaps you interpret the expression "relating to your industry" in too narrow a sense. The reading of a good electrical weekly would, generally speaking, keep you informed of the latest electrical developments. The publication of a magazine such as you suggest would, it is feared, be costlier than you imagine.—Ed., "N. T. J."]

POT-HEADS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. STUART BEST, in the March issue, asks if we never have any wet weather in this district. For the last twelve weeks the question would have been more apt if it had been put the other way about. But I don't see that if it rained for a whole twelve months, without stopping, it would alter the fact that pot-heads could be made better at the factory (but I do not remember mentioning factory in my note in the November issue, although I support Mr. Moody's idea in the January issue, of having the pot-heads made in that way) than by probably two or three different men who could shift the responsibility if anything was subsequently proved to be wrong with the pot-head, and I do not think that Mr. Best can argue that the latter method would be more economical.

And again, is it not possible that there might be some dissension as to who should work in wet weather, for each man might claim at least a chance of being taught. Again, in the Potteries district there are towns where the gangs might be working which are 8, 9 and 10 miles away from the centre with a very indifferent train service. Should a stock of 20-10 be kept at these places to employ the men in wet weather, or should time be spent in bringing them in?

Then why should a centre be taken at a disadvantage for want of pot-heads? Is it not as easy to stock pot-heads as 20-10 vulcanised india rubber, and this would be quicker than waiting for pot-heads to be made, that is, assuming the "needful wet spell" had not been provided in which to make a few pot-heads for stock. Then the booking of the stores would be better if pot-heads were sent from the factory than if they were made locally and kept in stock by the district, as the time would probably be spent before the works order was issued, and therefore would have to be charged to some other works order (of course of the same allocation) whereas the price of the complete pot-head could be charged by the factory.

I must congratulate Mr. Best on having such a self-contained centre.

Hanley, July 20, 1907.

JAMES FROST.

DICTATING AND TYPING.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

SINCE the article under the above head in the May JOURNAL was written, the system described has been under trial in the Glasgow office.

The results are thoroughly satisfactory, and, if Glasgow may be taken as a type of the general office, there can be only one answer to Mr. Crowther's question (in the August issue) as to whether typing direct from dictation is a workable system.

An article which appeared in the June issue of the *World's Work* confirms this, and seems to show at the same time that the idea is not altogether novel. Under the title of "The Business Woman" Constance Smedley writes: "Typing from dictation is necessary, as more and more people are giving their letters straight on to the machine instead of having them first taken down in shorthand."

I agree with Mr. Crowther that the dictation of letters cannot conveniently be limited to specific hours, and, as mentioned in the original article, the restrictions formerly laid down in Glasgow were removed; they were found unnecessary under the new system, as the typists are practically always up to date.

There is not much time lost through letters having to be re-typed because of alterations made by the dictator. During the past week about 600 letters have been typed, and only one has had to be re-typed for this reason. This is about the usual proportion, and it cannot be considered large.

I do not know of any special circumstances which should be taken into account when making comparison with the speed of the Glasgow typists, nor can I think of any further useful particulars which might be supplied. Nothing will commend the system better than some practical experience of its advantages.

I am afraid the step recommended by "Interested" would result in a retrograde movement. We have had some experience of some types of reproducing machines in Glasgow, but to meet the requirements of a large office staff there can be no doubt that from every point of view the system now in operation is preferable.

Any further information may be obtained through the usual official channels; it will be of interest if other districts who try the experiment will communicate the results through the columns of the JOURNAL.

Glasgow, August, 1907.

J. R. THYNE.

[Several letters are unavoidably held over.—ED.]

THE TELEPHONE SOCIETY OF LONDON.

THE first meeting of the 1907-8 Session will be held at Salisbury House on Wednesday, Oct. 30. Lady members of the Staff will now be admitted to the Society, and at half-rate, viz.: *old* entrance fee and 1s. subscription for the session. W. K. Cherry, Hon. Sec.

Visitors.—MESSRS. F. JOHANSON, General Manager, and M. MÜLLER, Traffic Engineer, of the Copenhagen Telephone Company, visited Telephone House on Sept. 18, 19, 20.

STAFF PENSION FUND.

MR. F. GILL, Engineer-in-Chief, has been appointed one of the trustees for the staff in the place of the late Mr. GAINES.

WHAT THE COMPANY IS DOING.

FIFTEEN new exchanges have been opened by the Company since the last issue of the JOURNAL, bringing the total up to 1,378. They were Twyford, Netley and Upwey (Hants and Dorset district), Lockerbie (Dumfries), Bearsted (West Kent), Wigton (Cumberland), Wolston (Coventry), Bettws-y-Coed (Chester and North Wales), Boroughbridge (Leeds), St. Columb (Plymouth), Buckhaven (Kirkcaldy), Crosby (Liverpool), Box (Bristol), Attercliffe (Sheffield), and Burghill (Gloucester); 3,540 new stations were added during the month, making a total of 434,719. This includes 1,344 subscribers transferred from the late Swansea Corporation system.

MANCHESTER.—A contract has been signed for a private branch exchange installation in the new Royal Infirmary buildings, Manchester, covering three junctions, 71 stations, and 10,000 calls. Negotiations have also been brought to a successful issue for a big private branch exchange installation of 30 junctions, 145 stations, and 276,000 calls. This brings the total number of private branch exchange stations in the Manchester district to 1,150.

LONDON.—The management of the Vandyke Hotel, Cromwell Road, has adopted the private branch exchange system with an installation of six stations and two junction lines.

NOTTINGHAM.—Considerable progress has been made with the various underground schemes on hand at Nottingham centre, and the following lengths have been drawn into the pipes during the current month:— $1\frac{1}{2}$ miles of 600-pair dry-core cable; $\frac{3}{4}$ mile of 400-pair dry-core cable; $\frac{1}{4}$ mile of 50-pair dry-core cable; $\frac{1}{2}$ mile of 200-pair dry-core cable; $\frac{1}{4}$ mile of 300-pair dry-core cable; $\frac{1}{2}$ mile of 100-pair dry-core cable; 600 yards of 200-pair dry-core cable. A commencement has also been made on the underground scheme at Newark. The extension of the Company's building at George Street, Nottingham, is now beginning to show much progress. The old property has been demolished, and the builders have made a very good start with the foundations of the new premises.

ABERDEEN.—During the month of August seven orders were obtained for private branch exchanges. These represent an aggregate capacity of 45 stations and 32,000 calls. The subscribers include the two leading newspaper offices, and the head office of the North of Scotland Bank.

WEST YORKSHIRE DISTRICT.—*Huddersfield*—The underground scheme in the hands of the Post Office is making progress, and the work of drawing in cable will shortly be commenced. There will be 83 distributing points, 30 of which have already been erected by the Company's staff.

Ilkley Underground Scheme.—This scheme has been passed, and the stores required are now on order.

Bradford Alterations.—The alterations and extensions of the Bradford premises are now almost completed.

LIVERPOOL.—In connection with the shore connections for the Cunard steamships 65 yards of pipe were laid and 390 yards of 10-pair cable drawn in. 777 yards of 600-pair and 896 yards of 800-pair cable have been drawn in in connection with the work of transferring about 360 Central Exchange subscribers to the Royal Exchange. A private branch exchange is being fitted at the London and North-Western Hotel, consisting of two 50-line switchboards, four junctions and 66 extensions. In connection with this work two miles of twin lead-covered cable were used.

SUSSEX.—*Private Branch Exchange Development.*—The Contract Department have just completed an agreement for a private branch exchange at the King's Hotel, King's Road, Brighton, which comprises three exchange lines and 36 extensions. The King's, which is now closed and undergoing extensive alterations, is known to the *habitué* as one of the oldest hotels on the Brighton front. Arrangements have been made for a telephone to be fitted in every visitor's bedroom and every public room in the hotel.

A private branch exchange agreement has been signed by the Royal Victoria Hotel, St. Leonards, comprising two exchange lines, and eleven extensions, and 4,000 calls have been contracted for.

Preparations are now being made for carrying out an extensive underground scheme at Lewes.

The underground work at Keymer, Sussex, has been continued, and slightly over a mile of duct has been laid.

The alterations to the premises at Kemp Town Exchange, Brighton, are rapidly proceeding, and as soon as they are complete a central battery board will be installed. While excavating in the basement in connection with this work for the purpose of burying an earth plate, a workman narrowly escaped a fall of 42 feet into an old disused well, a relic of old Brighton. Fortunately he was out of the hole before the subsidence took place. It is now necessary to dig at the bottom of the well a further 10 feet for the purpose of discovering a stream which is supposed to exist.

Additional premises have been taken at Preston, Sussex, in order to extend the exchange at that place. As soon as the alterations are completed a 200-line switchboard will be installed. A considerable number of additional junction lines between Preston and Brighton have also been authorised.

SOUTHAMPTON.—The extension of Shirley underground work, involving the laying of two and a half miles of 3-inch pipe and 500-pair cable is nearly completed; all the cable has been drawn in and is now being jointed.

A private branch exchange has been opened at the Royal Mail Steam Packet offices, with four junctions, 30 stations, 17,000 calls and dictation sets for the typewriting department, the operator being supplied by the Company. The installation is giving great satisfaction.

BORNE MOUTH.—The important underground extensions authorised are approaching completion. One mile 1,062 yards of pipe have been laid on the Parkstone section, and all cable drawn in and jointed; 1,522 yards of pipe have been laid on the Holdenhurst Road section, and a 200-pair cable drawn in and jointed; one mile 951 yards of pipe have been laid on the Wimborne Road section, and a 500-pair cable is now being drawn in; 1,241 yards of 500-pair cable, and 751 yards of 600-pair cable, out of an authorised total of one mile 1,348 yards, have been drawn in on the Boscombe section.

LEICESTER.—A 100-line switchboard with accommodation for twenty junction circuits is being fitted at the British United Shoe Machinery Company's private branch exchange.

BURTON-ON-TRENT.—A 50-line switchboard with accommodation for ten junctions is on order for Messrs. Allsopp's Burton-on-Trent Brewery.

LOUGHBOROUGH.—A 50-line switchboard with accommodation for ten junctions is on order for the Brush Electrical Engineering Company, Loughborough.

BOLTON.—Negotiations have just been completed with Messrs. Tillotson & Son, Limited, Bolton, the well-known newspaper proprietors, for an installation comprising four junction lines with fifteen extension stations, and with Messrs. Haller & Riley, Limited, cash chemists, Bolton, for an installation comprising two junction lines and seven extension stations, four to be placed on the sale counters for the use of customers.

GUILDFORD.—The junction circuits in the area are being considerably increased; 296 miles are now in course of erection.

NEWS OF THE STAFF.

Mr. W. COWBURN, Local Manager, Grimsby, has been transferred to Leeds as Assistant Engineer. He was presented with a gold fountain pen by Miss L. Riggall, Chief Operator, on behalf of the staff.

Mr. E. STANLEY BERRY has been promoted to be Contract Manager, Chester.

Mr. GEORGE SUTHERLAND has been obliged, owing unfortunately to ill-health, to resign his position as Chief Collector, Glasgow. It is his intention to proceed later on to South Africa, and he carries the best wishes of his colleagues with him. It is sincerely hoped that his health will soon be perfect again, and that he will succeed in his new surroundings. He is being succeeded by Mr. JOHN GRIERSON, who has held the position of Stores Slip Clerk for some four years.

Mr. GEORGE DEWAR has been promoted to the charge of Correspondence Department, Glasgow. He has been in the service over five years, and has been rapidly promoted through various grades. A scheme is on hand to concentrate all the girl clerks into a new office for their exclusive use. There are, to begin with, sixteen members of this branch of the staff, and owing to the rapid increase of measured rate subscribers it is anticipated that this will be a quickly increasing figure. To the important position of Superintendent of this section Miss MARION JAMIESON has been appointed.

Miss EDITH WRIGHT, Junior Operator, in Hillhead Exchange, Glasgow, left

the Company's service on Aug. 29 to go abroad. Prior to her departure she was the recipient of a gold signet ring, subscribed for by the staff.

Miss MAY TUCKER, Operator, Bristol, has been appointed Supervisor.

Miss F. WALLACE, Senior Operator, Edinburgh, who had been with the Company for eight years, resigned in August. She was presented with a dressing case by friends in the Edinburgh and Leith Exchanges.

Mr. R. A. DAVID, Exchange Inspector, Central Exchange, Liverpool, has been promoted to be Exchange Manager, Royal Exchange.

Mr. D. C. DUNNETT, Foreman Fitter of the Liverpool district, was transferred to Barrow-in-Furness as Chief Inspector, on Aug. 19. On leaving to take up his new position he was presented by his colleagues with a dressing case and umbrella.

Mr. P. CREAGH, Exchange Inspector, Liverpool, left the Company's service on Sept. 12 to take up telephone work in Seattle, Washington, U.S.A. He was presented by Mr. E. S. Francis, Chief Electrician, on behalf of his colleagues, with a travelling bag and briar pipe in case. Mr. Creagh, before leaving, entertained his numerous friends to a smoker held in the "Bradford" Hotel, where a most enjoyable time was spent. He sailed on the *Tunisian* on Sept. 19.

Mr. STANLEY COULSELL has been promoted from Wayleave Officer, Portsmouth, to Chief Contract Officer.

Mr. R. A. WATSON, Cost Clerk, Bolton, has resigned from the Company's service.

Mr. GEO. HEY, late Contract Manager, Swansea, who has been transferred to Oldham, was before leaving presented with a handsome gold watch, suitably inscribed. The District Manager made the presentation on behalf of the staff.

Mr. H. S. SAUNDERS, Engineer-in-Chief's Department, resigned his position on Aug. 22, having been appointed an Assistant Examiner in the Patent Office.

Mr. FRANK HOLLINGHURST, Manchester, resigned from the Company's service on Sept. 5 to take up an appointment with the Bombay Telephone Company, India. Mr. Hollinghurst was presented by his colleagues of the Manchester staff, with a portable leather writing case, suitably inscribed, who wish him every success in his new sphere.

Mr. LEWELLYN MORRIS, Inspector-in-Charge at Redditch, Birmingham, has now been made Inspector-in-Charge at Rhyl, North Wales.

Miss SPEERS, Monitor, Belfast, has been promoted to the position of Chief Operator.

Miss MCILROY, Belfast, has been promoted from Supervisor to Monitor; Miss McCARTNEY, from Assistant Supervisor to Supervisor; and Miss DONNELLY, from Senior Operator to Assistant Supervisor.

Mr. R. A. BROADHURST, late Chief Inspector, Windsor, who was transferred to Tonbridge as Inspector-in-Charge in July, was presented with a handsome tantalus by the members of the Windsor and Maidenhead staffs.

Mr. F. SLOUGH, Fitter, Windsor, has been promoted to be Inspector, Windsor.

Mr. J. PAGE, Contract Officer, Reading, has been transferred to Hastings in a similar capacity.

Mr. P. H. COLE, the Metropolitan Construction Electrician, resigned on Aug. 9, 1907, after fourteen years' service, having obtained an appointment at Shanghai, China. On Sept. 20 he was presented by Mr. Harvey Lowe on behalf of all branches of the service in the Metropolitan area and a few friends at Head Office with a solid silver tea and coffee service, together with a tray suitably inscribed. In making the presentation Mr. Harvey Lowe referred to the fact that Mr. Cole was the pioneer of the Company's Correspondence Classes, and had in other ways done yeoman service for the technical education of the staff. He also mentioned that the present was subscribed for by approximately 600 members of the staff, whose best wishes would follow Mr. Cole where he was going. Mr. Cole feelingly thanked the staff.

Miss G. HEY, Fees Clerk, district office, transferred to Oldham (and not resigned as stated in September issue), was presented before leaving Swansea with a writing desk subscribed for by the staff.

Miss W. BUTLER, Correspondence Clerk, Nottingham, was, on the occasion of her leaving the Company's service owing to ill-health, presented with silver dressing-table ornaments. Mr. SIBLEY, in making the presentation, spoke of the esteem in which Miss Butler was held by the district staff, and also thanked her for the various little kindnesses she had shown to members of the staff in different ways, and hoped that she would soon be restored to good health.

Miss N. BRADSHAW, Senior Operator, Nottingham, has been promoted to be Supervisor; Miss M. MACHIN and Miss N. BENTLEY promoted from Junior to Senior Operators.

Mr. G. A. G. EVANS has been appointed Cost Clerk, Plymouth—a new position.

Mr. H. FITZGERALD, Clerk, Stores Department, has been made Storekeeper at East Ham.

Mr. W. C. KNAPMAN, Clerk, Metropolitan Engineer's Office, has been made Local Engineer at Brixton.

London Traffic Department.—Promotions and Transfers:

Miss B. ASHMEAD, Clerk-in-Charge, North, has been transferred as Clerk-in-Charge to Battersea Exchange, and Miss M. BUTLER, Clerk-in-Charge, Bank, transferred as Clerk-in-Charge to North Exchange. Miss ASHMEAD was presented with a silver-mounted umbrella, and Miss BUTLER with a travelling bag as tokens of respect and goodwill by the respective operating staffs at North and Bank.

MARRIAGES.

Mr. S. J. GODDARD, the General Superintendent of the Company, after about a month's absence from Telephone House through illness, was married very quietly at Starmore Church, on Aug. 28, to Miss Sechiari.

Mr. H. BARNETT, Secretary's Office, was married on Sept. 7 to Miss A. L. OLIVER, late of the Correspondence Department. He was the recipient of an oak sideboard from his colleagues and friends at Head Office.

Mr. ERNEST B. PARKIN, Senior Clerk, Dewsbury, was married on Aug. 31, on which occasion he was presented with a marble clock and pair of bronzes by his colleagues.

Mr. H. F. J. TARRANT, Accountant's Department, was married on Sept. 21. His colleagues presented him with a walnut sideboard.

Mr. H. L. GARFATH, Senior Clerk, Guildford District Office, was presented with a marble timepiece by the district staff on the occasion of his marriage.

Miss FANNY COLLIER, Operator, Cardiff, has resigned to be married.

Miss AUGUSTA BOWLES, Clerk, Swansea District Office, has resigned to be married.

Miss ISABELLA SAVAGE, Operator, Swansea, has resigned to be married.

Mr. C. HOOPER, Inspector, Brighton, was married on Sept. 14 to Miss A. TRIGENZA, who was until recently on the Brighton operating staff, the happy pair being presented with a dinner and tea service by the Brighton staff.

Mr. T. C. HONEYWILL, Storekeeper, Newport, Mon, was presented by the staff with a writing bureau on the occasion of his marriage on Sept. 4.

Mr. C. H. ANDERSON, Local Manager's Clerk, Bootle, was presented by the staff with a marble clock, suitably inscribed, on the occasion of his marriage.

Miss DOWER, Senior Operator, Central Exchange, Liverpool, has resigned from the service to be married, and was presented with a dinner service on her resignation.

Miss S. BLOWER, Senior Operator, Royal Exchange, Liverpool, resigned to be married on June 27, and was the recipient of a handsome present from the operators at the Royal Exchange.

Miss E. JACKSON, Senior Operator, Royal Exchange, Liverpool, resigned on Sept. 4 to be married, and was presented by her colleagues with a dinner service.

Miss G. PARIS, Senior Operator, Central, Liverpool, who resigned to be married on Aug. 15 was also presented with a dinner service by her fellow operators, and several other useful presents from her personal friends and colleagues.

Miss A. BOWLES, Fees Clerk, District Office, Swansea, who has resigned to be married, was presented by the staff with a handsome cake stand as a mark of esteem.

Miss E. DAVIES and Miss I. SAVAGE, of the Traffic Department Swansea, who had in each case resigned to be married, were at a general meeting of the operating staff presented with a handsome cruet and clock respectively, as a mark of esteem.

Mr. S. AMY, Cashier, Jersey, in anticipation of his approaching marriage, was presented by the staff with a silver tea kettle and spirit stand.

Mr. STANLEY J. HAMILTON of the Manchester district office was presented on Sept. 10 with a handsome clock in token of the kindly regard and good wishes of his colleagues in connection with his recent marriage.

Miss GERTRUDE MOFFITT, Senior Operator, Manchester, resigned on Aug. 27 on account of her approaching marriage, which took place on Sept. 4. A large number of friends from the operating staff partook of Miss Moffitt's hospitality at a tea and whist drive. Amongst the many beautiful and useful presents which Miss Moffitt received from members of the staff were dinner and tea services, and a tapestry table cover.

Mr. R. B. LESTER, Chief Inspector, Watford, was married on Aug. 7, the ceremony taking place at the Parish Church. He was presented with a dining-room clock by the various members of the Watford staff.

Miss ERVINE, Chief Operator, Belfast, who joined the service in 1890, resigned on July 25 last to get married. Before leaving she was presented with a case of cutlery by the staff.

Mr. T. C. RHODES, Local Manager, Maidenhead, was on Sept. 20 presented by the staff in the Thames Valley district on the occasion of his wedding with a brass curb fender and fire irons, spirit lamp and kettle and silver cigarette case.

Miss FANNY COLLIER, Senior Operator, Cardiff, left the Company's service on Aug. 29 in view of her approaching marriage. The operating staff at Cardiff have presented her with a pair of silver-mounted salt cellars and solid silver sugar tongs and teaspoons, as a mark of esteem and with best wishes for her future health and happiness.

Mr. A. BOOTH, Chief Clerk, Coventry, was presented with an octagonal-shaped tea service by the staff on the occasion of his marriage with Miss Johnson, sister to the operator at Kenilworth Exchange.

Miss A. TAYLOR, Operator, Nottingham, was presented by her colleagues with a gold chain on the occasion of her marriage.

Miss M. SANSON, Supervisor, Nottingham, was presented by the operating staff with a china tea service on the occasion of her marriage.

London Traffic Department.—Resigning to be married:

Miss EUGENIE JEWELL, late Clerk-in-Charge at Battersea, was married on Sept. 11 at All Saints, Clapham, to Mr. T. MONTAGU INMAN, Exchange Electrician at Hop. On resigning her position on Sept. 5 Miss Jewell was presented by the Battersea staff and other friends in the service with a handsome plated tea service and tray, and she would like to take this opportunity of expressing her sincere thanks to all those who contributed. The Hop Electrical staff also presented Mr. Inman with a splendid case of cutlery and double set of carvers.

Miss M. SPINDLER, of London Wall Exchange, who recently resigned to be married, was presented with a set of fish carvers.

Miss A. WATTS, who was extremely popular with her fellow operators, on leaving on Sept. 5 to be married was the recipient of the following presents from the staff:—Tea service, set of art pots, fruit dish, butter dish, sugar sifter, fancy handkerchief, pincushion, sugar basin, milk jug and jam dish.

Miss A. BLACKLEDGE, on resigning from Bartholomew House Exchange on Sept. 5, was presented with dinner service.

Miss L. BURTON, on resigning from North Exchange, was given a pair of Doultton vases.

Miss A. DUNN, Supervisor at Gerrard, who resigned on Sept. 12, was presented with a tea service and pair of specimen vases from the staff, and a sugar sifter from her team.

OBITUARY.

Miss BARNETT, senior operator, Belfast, died on Aug. 18 after a long illness. Mr. M. O'DONNELL died on Sept. 23 in the Warrington Infirmary, following upon an operation performed in that institution. He has held the position of Stores Ledger Clerk in the Warrington district office for the past ten years, and

his death after an illness of only a fortnight is much regretted by the whole of the staff, as he was greatly esteemed. With regard to Stores Ledger work his knowledge was all that could be desired, and a more faithful worker it would be hard, if not impossible to find.

STAFF GATHERINGS AND SPORTS.

Edinburgh. A cricket match was played on Aug. 17 on Daniel Stewart's College ground between eleven drawn from Glasgow district and Edinburgh and other districts. The composite eleven won the match by 86 to 33. Tea was provided by some of the ladies of the Edinburgh office.

A number of the Edinburgh staff on Aug. 17 proceeded by train to Balerno, thereafter going on foot over the Pentland Hills to Loganlea Reservoir, where tea was served, and the journey was continued by way of Bonaly Hill to Edinburgh—in all a distance of about twelve miles.

Dublin. The second annual picnic of the employees of the district was held on July 27. A company of 100 journeyed by brake to The Scalp, co. Wicklow, where, under delightful weather conditions, a most enjoyable afternoon was spent. Sports and dancing were amongst the many attractions. The district manager, Mr. Currall, acted as judge and also distributed the prizes to the successful competitors at the close of the sports. He expressed the hope that the staff would have more of these picnics. Dublin was reached on the return journey at 11 p.m.

West Kent. The staff of the district held their first outing on Aug. 31, various parties driving to Yalding. On arrival there the male portion of the staff indulged in football and cricket matches, while tugs-of-war and races (in which the ladies also joined) afforded plenty of amusement to the onlookers. Then followed the presentation of prizes, and, after a substantial tea, the whole company were photographed, a group of about 80 facing the camera. At dusk an adjournment was made to the grounds of the Anchor Hotel, where an enjoyable concert was held, various members of the staff contributing to the programme.

Reading. A staff football club has been formed here, and a good card of fixtures arranged for the winter. Home and away matches have been fixed up with the Guildford staff, and it is hoped it may be possible to arrange a game with the Metropolitan staff.

London. The operating staff of the Bank Exchange held a most successful garden fête at the Castle Hotel, Woodford, on Aug. 24. Sports and games formed the chief items of amusement during the afternoon, and in the evening a concert and dance were indulged in. The fête reflected great credit on those responsible for the arrangements, and all thanks are due to the ladies and gentlemen who kindly contributed towards the concert programme.

National Telephone Staff Benevolent Society. An entertainments' committee has been formed for the purpose of arranging concerts, dances, whist drives, etc., during the winter, with the double object of promoting social good feeling amongst the members of the staff, and adding to the funds of this very deserving institution. The expenses of these entertainments have been guaranteed by a few of the members of the Benevolent Society committee, so that, in the unfortunate contingency of a financial loss, none of it will fall upon the funds of the society. The committee formed is very representative, and the idea has been taken up with great enthusiasm. The four events already arranged are a Cinderella dance on Tuesday, Oct. 29, a whist drive on Wednesday, Nov. 20, a concert on Wednesday, Dec. 18, and a Cinderella dance on Wednesday, Jan. 29. The dances and concert will be held at the Holborn Town Hall. It is not intended that these gatherings should be confined to the Company's staff, and it is hoped that all members will do the utmost in their power to ensure the social and financial success of the venture, not only by being present themselves, but by promoting the sale of tickets among their friends. The secretary of the committee is Mr. Guy Buckeridge, Salisbury House, London Wall.

Northern Section. On Aug. 17 about 40 members of the staff from this section, together with representatives from Gerrard, the Western and City staffs, under the conductorship of Messrs. Roden and Stephens, left Broad Street by the 2.47 train for an outing to Bricket Wood, where various games and pastimes were indulged in. The cricket match, Ladies *versus* Gentlemen, was much enjoyed. The latter, needless to say, using the left hand only, met with sad defeat, Miss Higham carrying out her bat with eleven runs to her credit. Quoits, in which Mr. Stephens distinguished himself, found several supporters. Donkey riding and swings, too, appeared to be greatly appreciated, except that the "roundabouts" went round about too much for one or two of the gentlemen. After tea the whole party were photographed on the lawn. The day concluded with dancing and a concert.

Sheffield. National Telephone Cricket Club.—Mr. R. C. Bennett, president of the above club, has presented Mr. J. Keeton with a bat to commemorate the occasion of his securing the best batting average for the season 1907. The president has decided to present another bat next season.

National Telephone Holiday Club. The holiday fund started by the Sheffield staff has turned out a huge success. During the twelve months ended Aug. 31 last the sum of £146 17s. 11d. was collected from the members in sums of 6d. and upwards. The amount paid out to members in the same period being £126 15s. 6d., leaving a substantial balance in the bank to carry forward to the coming year's account. Judging from the collections up to date the next year's figures will greatly exceed those given above.

Warrington. Annual Picnic.—About 59 members of the staff attended the annual picnic of the South-West Lancashire district, journeying by train from the various centres to Chester, and continuing all together by boat to Eccleston Ferry. At the latter place tea was taken, and a series of sports were held which were highly appreciated and caused some amusement, although the showery weather was not altogether favourable.

Guildford. A meeting held on Sept. 6 and presided over by Mr. J. R. Black, for the purpose of forming an athletic club was largely attended. A ground has been secured and it is hoped to be able to run a football team regularly every week, and as far as possible to arrange inter-staff matches with other centres and

districts within easy reach. The Guildford Athletic Club will be pleased to hear from any neighbouring District clubs who would care to arrange matches with them.

Manchester. On Sept. 7 a picnic was held at Rudyard. Some 70 members of the staff and their friends spent an enjoyable afternoon and evening in the beautiful environment of the lake. A substantial tea was provided at the Rudyard Hotel, after which music and dancing were indulged in until train time. Although the weather was not ideal the picnic was thoroughly enjoyed by all, the arrangements having been admirably carried out.

East Kent. A meeting of the district office, Dover, and Folkestone staffs, was held at Dover on Sept. 7, when it was decided to form a football club, the District Manager (Mr. C. F. Ashby) being appointed president. It is hoped to arrange a good fixture list for the coming season.

Beeston. The British L.M. Ericsson Manufacturing Company, Limited, of Beeston, Notts, held their second annual sports on Aug. 24 at Beeston, in the presence of a large and enthusiastic gathering. At the conclusion of a most successful programme the visitors were further entertained until dusk with an open-air concert, rendered by Messrs. Humbers' prize band and a company of vocal artists.

Nottingham. The Notts Factory staff, to the number of 30, on Aug. 31, made an excursion by brake and cycles to Normanton-on-Soar, Leicestershire, and, although unfortunately the weather was rather unkind, an enjoyable time was spent, cricket and rowing being indulged in.

LOCAL TELEPHONE SOCIETIES.

Blackburn. The following is the syllabus for 1907-8:—Oct. 18, "Design of Circuits," by G. H. Frost, criticised by G. N. Fuller; Nov. 22, "Traffic," by C. Etherington, criticised by T. Hargreaves; Dec. 20, "Transmission," by R. Chambers, criticised by W. J. Storey; Jan. 23, "Works Orders," by J. C. Macdonald, criticised by J. Airey; Feb. 20, "General Construction," by H. J. Callis, criticised by W. Curran; Mar. 20, "Contract Work and Development," by H. M. Curtis, criticised by G. Stevenson; April 6, Open night.

Western (Metropolitan). The opening meeting of the 1907-8 Session was held on Aug. 29, the chair being taken by the president (Mr. G. F. Greenham). After the preliminary business dealing with the programme for the coming session had been dealt with, Mr. Greenham read a most interesting and instructive address relating to telephone work generally. Many offers to read papers during the session were made and accepted, and with the variety of subjects which the authors have chosen there is every prospect of an interesting and useful session. Mr. F. M. Hall was elected a vice-president of the society.

Birmingham. The annual meeting will take place at the district office on Sept. 20, at 6.15 p.m., for the purpose of electing officers for the forthcoming session, and also to consider the following alterations in the rules:—

Rule 4 to read, "The meetings shall take place monthly, on the first Tuesday in each month, at 7 p.m."

Rule 5 to read, "The subscription shall be 2s. per annum, 1s. payable at the beginning of the session, and the balance or any part at such times as may be determined by the committee. The committee to have power to waive the balance altogether in the event of the finances of the society warranting such a course."

Additional Rule 9, "No alteration to be made to the rules except by special resolution at any general meeting of the members of the society."

The retiring committee wish to suggest to the members and to the new committee to be elected, the advisability of offering prizes to junior members of the staff reading papers, and suggest three prizes of 10s. 6d. each for the three best papers read during the session. They also suggest that two prizes of, say, 5s. each be given to those members most regular in their attendance at the meetings and exhibiting the greatest amount of interest and intelligence in the discussion.

Leicester. A general meeting was held on Friday, Sept. 13, at the Oriental Café, for the object of electing officers for the ensuing session, and for the reading of the balance sheet. The president (Mr. John Ashton) was in the chair—and in his speech made reference to the very successful first session which the Society had experienced. The opportunity was taken of awarding the certificates from Head Office to those students who had successfully passed in the Telephone Correspondence Classes, and two prizes given by the president were presented for the best papers read during the session.

1st prize.—E. Rendell, "Party lines."

2nd ,, J. Bagley, "Underground work."

After the distribution of prizes refreshments were served, and the proceedings terminated with a musical programme.

Glasgow. A meeting of the Traffic Department staff was held on Aug. 17, at 8 p.m. The meeting was well attended, and it was unanimously agreed to inaugurate an operators' telephone society and club. It was decided to hold the meetings one night in the month from October to March. A provisional committee was appointed, which will make all the necessary arrangements for the carrying through of the scheme.

Swansea. At a general meeting of the staff held on Aug. 30, the District Manager presiding, it was unanimously resolved to form a telephone society for session 1907-8. Mr. Gauntlett was re-elected president, Messrs. R. Williamson and H. G. McArthur vice-presidents, Mr. W. H. Crook (Chief Clerk) secretary, and Mr. R. A. Skinner treasurer. Meetings will be held the third Monday in each month, and it was also decided to open the session with a smoking concert on Sept. 20. A successful session is anticipated.

At a general meeting of the operating staff on Sept. 4 it was unanimously decided to form an operators' telephone society for session 1907-8. The District Manager (who presided) was re-elected president, and Messrs. R. Williamson, H. G. McArthur, W. H. Crook and A. G. Mackie vice-presidents. Miss Campbell was re-elected secretary. Meetings will be held on the first Wednesday in each month, and the District Manager has consented to open the session in October. There were 42 present at a very enthusiastic meeting, and future gatherings are being looked forward to with much interest.

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No. 20.

TELEPHONE MEN.

XVIII.—THOMAS FLETCHER.

THOMAS FLETCHER was born in London in 1849, and was educated at Victoria College, Jersey. His business life commenced in the office of a London architect, but in 1868 he entered the engineer's office of the United Kingdom Telegraph Company at Gresham House. In 1870, when the various telegraph companies of the United Kingdom were taken over by the Post Office, Mr. FLETCHER joined the service of the late Mr. W. T. HENLEY, the well-known telegraph contractor, of North Woolwich. In 1873 he accepted an offer made by Sir WM. THOMSON (now Lord KELVIN) and the late Professor FLEEMING JENKIN to carry out a series of experiments in developing the Siphon recorder, Sir WILLIAM'S newly invented instrument for telegraphing on long submarine cables. These experiments were conducted in the Physical Laboratory at Glasgow University. Mr. FLETCHER was also engaged for some time in the testing of the Brazilian submarine cables which were then being made by Hoopers' Telegraph Works Company at Millwall and Mitcham, and for which Sir WM. THOMSON and Professor JENKIN were the consulting engineers. In 1874 he returned to the service of Mr. HENLEY and so remained till that gentleman ceased business, when the staff was disbanded. During his period of service with Mr. HENLEY, between five and six years in all, the greater part of the time was spent on submarine cable-laying expeditions. He next accepted temporary employment in the office of Mr. (now Sir) W. H. PREECE at the Post Office. On the formation of the Telephone Company in 1878, he, on the introduction of that gentleman, entered the telephone service, and he has remained in that service ever since.

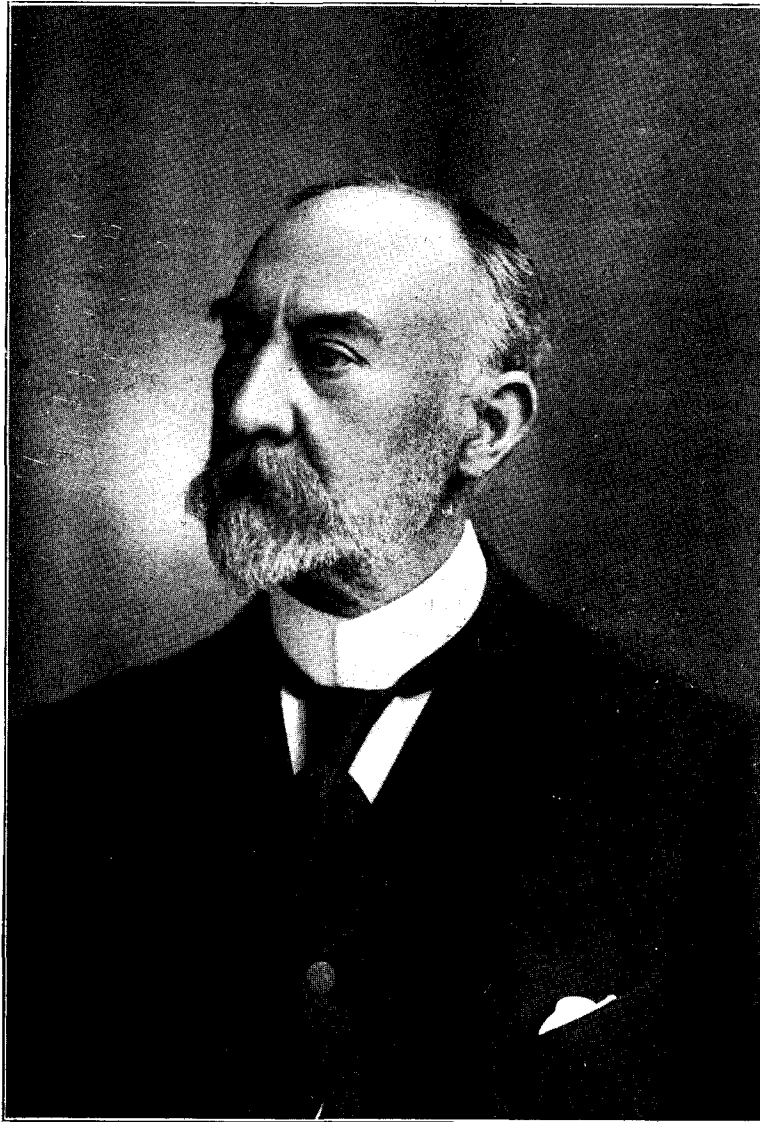
In the early days of the telephone the staff could have been numbered on the fingers, and Mr. FLETCHER had frequently to journey to various parts of the kingdom to construct and equip

private telephone lines, to which the use of the telephone was at that time confined. This had to be done with the aid of scratch crews of men picked up locally. Several of these lines were laid underground, and were consequently the earliest examples of underground telephone work in this country. The conductor was insulated with gutta percha, this being enclosed in a leaden tube. In some later examples the cable was laid in a small wooden troughing.

It is, perhaps, worthy of note that in the matter of line construction the telephone has followed the example of the telegraph. For in both cases, whilst underground work was adopted in the construction of some of the earliest circuits, the practice was abandoned in favour of overhead work, only to be reverted to and largely extended in modern times.

The landmarks in the history of the progress of telephony in the United Kingdom, since Lord KELVIN described BELL'S invention in Glasgow in 1876, are important legal decisions, and not scientific discoveries and inventions. Sir WILLIAM PREECE brought a pair of practical Bell telephones over from America in 1877, and exhibited them at the Plymouth meeting of the British Association that year, and soon afterwards "The Telephone Company (Bell's Patents)" was formed. It was Mr. JAMES BRAND who conceived the idea of forming this company, and he became the first chairman. Bell receivers, similar to those already described, were used both as transmitters and receivers, each set consisting of a pair of these, a battery bell, ringing key and a switch-hook.

The company at the first sold some of these instruments at £70 per pair of sets, and QUEEN VICTORIA was one of the first customers; but their chief business consisted of renting them out, and subsequently the company discontinued offering instruments for sale. The instruments were, to begin with, all imported from



America, and it was not until later that English-made instruments were adopted to any great extent.

The adoption of the exchange system in connection with the telephone towards the close of 1878 caused the business and the staff of the Telephone Company to increase by leaps and bounds, a process which has continued to the present day.

At the end of 1878 an exchange was started in London at 36 Coleman Street, at first with only seven or eight subscribers. The number of subscribers rapidly increased, and by the end of 1879 exchanges had been opened in Mincing Lane and Leadenhall Street.

In 1879 the Edison Telephone Company was started and opened an exchange at 11 Queen Victoria Street. By the end of the year the increased number of subscribers made it necessary for this Company to open two more exchanges, one in Eastcheap and the other in Chancery Lane. The subscribers' instruments were a combination of the Edison carbon transmitter and the Edison "Electromotograph" as receiver.

The Bell Company's next step was the introduction of the Blake transmitter. The adoption of this transmitter led to an action for infringement being brought by the Edison Company against the Bell Company. Before the legal proceedings could come to a conclusion the amalgamation of the two companies caused a withdrawal of the action. The new company, which was founded on May 1, 1880, was called the United Telephone Company, and carried on the businesses of the two parent companies.

The telephone's legal troubles were by no means ended by the amalgamation of the Bell and Edison Companies. The Government had been considering the position of the companies with respect to their encroachment on the Government monopoly of telegraphic communication, and had entered an action against the Edison Company just previous to the amalgamation. Service was accepted by the United Company, and the case came on for hearing on Nov. 29, 1880.

The result was practically a declaration that the Government held a monopoly for the transmission of messages or other communications by means of electric signals, so that a telephone was a telegraph within the meaning of the Telegraphs Act. The royalty, for which the Government allowed the United Company to continue its operations, was fixed at 10 per cent. of the gross receipts.

In 1889 the United Company started amalgamating with its offspring. Chief among the amalgamating companies were the United, National, Lancashire and Cheshire, Northern District, South of England, and the Western Counties and South Wales Telephone Companies and the Telephone Company of Ireland. The name of the National Telephone Company was retained, this being rendered necessary by the terms of the articles of association of the original companies.

Through all the changes chronicled above, as well as subsequent reorganisations, Mr. FLETCHER, like the brook, has "gone on for ever," and he is now, in point of service, the senior member of the staff.

During his long and distinguished connection with the telephone service Mr. FLETCHER has filled the posts of Engineer to the old Bell Company ("The Telephone Company") and to the United Company (on the amalgamation of the Bell and Edison interests), of Engineer for London (after the consolidation of the various telephone companies as the National), and, on the division of London into districts, of Manager of the No. 1 district. On the formation of the Engineer-in-Chief's Department, Mr. FLETCHER took up the position which he still retains and where his large experience and abilities are of great value to the Company.

Only those who were in the thick of the fight in the early days can realise the difficulties which had to be overcome in order to keep pace with the rapidly increasing requirements of the enterprise. As the business was a new one, new questions were constantly arising to be dealt with. Staffs had to be found and trained, and although full advantage was taken of the few electrical schools then existing the supply of suitable material was very short. Mr. FLETCHER had his hands full and there is no doubt that the exceedingly rapid development of the business was in great measure due to the skill and ability which he displayed in dealing with the situation, whilst the kindness and consideration he always showed towards his staff is attested by the affection with which he is regarded, especially by those longest associated with him.

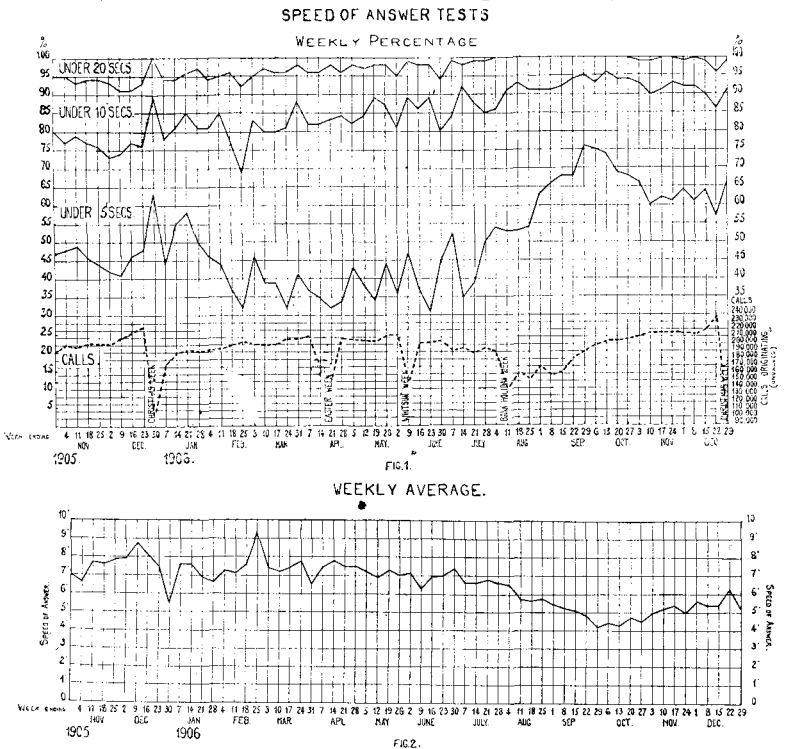
A TRAFFIC RETROSPECT.

BY A. H. DYER, Exchange Manager, Holborn, London.

THE review of a past year's work is always instructive; and it is thought that some of the results obtained from a large and busy exchange will be of interest to readers of the JOURNAL, especially to those working in the traffic branch of the business.

The curves exhibited speak for themselves, but a few supplementary remarks are necessary. They are plotted from: (1) Tests made from the monitor's table in the exchange; (2) Tests made from the central observation office. These I am able to give by kind permission of the traffic manager.

Figs. 1 and 2 are based on 800 tests per week (200 per team)



made at the monitors' table with the speed-of-answer equipment. The tests are spread over the day between 9 a.m. and 6 p.m., and the number of tests per half-hour is directly proportional to the load. Care is taken that the tests are equally distributed to the "A" positions, about three per position per day being made. A docket is issued by the monitor for tests over twenty seconds, and these are reported on by the team supervisor. The curves include November and December in the two years 1905 and 1906, as it is thought, being the busiest months of the year, they are very suitable for comparison. Generally the teams keep very close to one another in order of merit, which points to healthy competition; and in this connection, it is obvious if all the teams fall together in their results, there is probably something outside their control to account for this, and it is equally obvious that it is no disgrace to a team to be bottom in the order of merit if it is only a small fraction of a second removed from the top team in the average. It is also of interest to observe that the originating calls per week generally show an increase of about 9 per cent. over the corresponding week of the previous year, and it may be mentioned that the number of calls dealt with (236,000) the week before Christmas, 1906, was abnormal even for that week.

I have dwelt thus far on the speed of answer. It would be unwise, however, to stake everything on this, and the traffic manager's observation tests (Figs. 3 and 4) are invaluable to exchange managers as a check on their speed-of-answer tests, being an indication of the time taken to connect, the time taken to clear, and of irregularities.

Written Complaints Relative to Operating.—For the year 1906 there is a decrease of 14 per cent. in the complaints per station as compared with 1905. The figures are of a very erratic nature.

There is no uniformity, and a curve conveys little. During and following the busiest week of the year (week ending Dec. 22), when one would expect the complaints to rise, the number was remarkably low; but perhaps this is accounted for by the "peace and goodwill" associated with that period, annoyed callers being perhaps restrained thereby from complaining. It is helpful with these written complaints to take periods of, say, three or six months and ascertain the percentage of complaints per subscriber or station, and to use these figures to check the efforts being made to reduce this class of complaint.

year. The following points, however, in connection with the heading are noteworthy:—

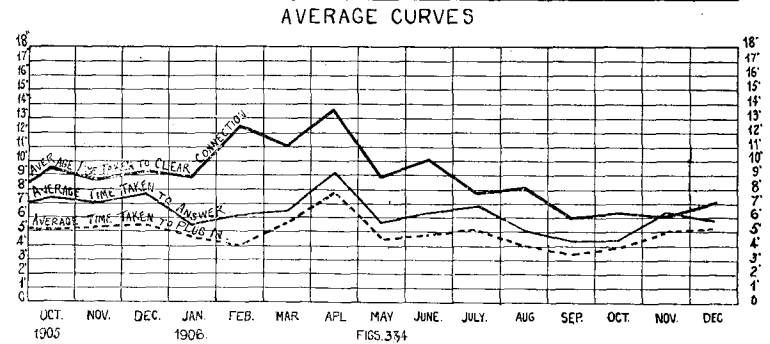
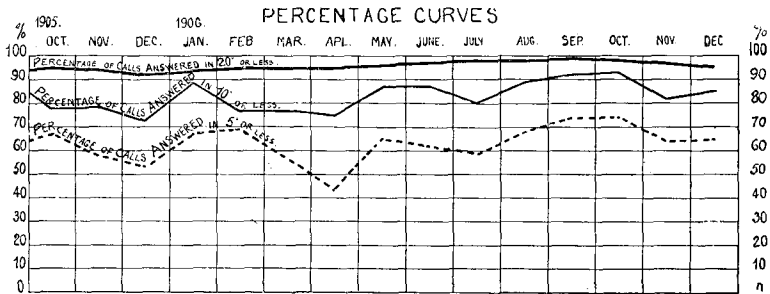
Subscribers (number of).—This is the net increase. It averages 10 per cent. regularly. The ratio of the stations to the exchange lines is 2:3. I mention this because it has an important bearing on the time of clearing.

Calls Originating (unvalued).—Every week shows an increase over the same week of the previous year.

TABLE I.

Valued Calls per Operator per Half-hour. Working "A" Positions 48.

Time.	Valued calls.		
	March, 1906.	June, 1906.	October, 1906.
9-9.30	57	83	71
9.30-10	81	101	87
10-10.30	103	117	109
10.30-11	104	124	116
11-11.30	112	105	108
11.30-12	97	119	101
12-12.30	110	110	105
12.30-1	105	110	110
1-1.30	107	97	106
1.30-2	96	87	102
2-2.30	104	94	108
2.30-3	97	86	99
3-3.30	94	98	98
3.30-4	101	93	96
4-4.30	92	93	96
4.30-5	85	80	102
5-5.30	100	95	107
5.30-6	109	98	95
6-6.30	89	69	68



These curves would not be complete without some information relative to the conditions—load per operator per half-hour and per busiest half-hour, etc.—under which the results are obtained, and the progress, as regards the reduction of the number of complaint dockets per subscriber. The following tables are therefore given:—

Table 1.—Average Calls (valued) per operator per half-hour.—These figures are taken from the March, June and October load lines. It will be seen that the duties are arranged so that the load per operator is well sustained throughout the day.

Table 2.—Comparison of corresponding weeks 1905 and 1906.—This is a very fair way of judging progress, because generally, taking corresponding weeks, the conditions in regard to the amount of traffic being dealt with are much the same if due allowance is made for any increase in the number of subscribers which may occur. It would be most unfair, for instance, to compare July—a comparatively slack month—of one year with December—a very busy month—of the next year. The table requires little comment. The weeks given are typical of the conditions at the time of the

Operators.—During the first six months of the year there was a decrease of 13 per cent. in the number of "A" operators. At the end of 1906 there was still a decrease of 12 per cent. compared with the conditions prevailing for the first six months of 1905. This means a good deal when the increase in traffic dealt with is taken into consideration. The surplus operators were drafted to other exchanges to fill vacancies.

Calls per Operator.—Every week, again, shows an increase over the same week of the previous year.

Dockets per Subscriber.—Generally a decrease in spite of increased load.

Speed of Answering.—As a rule better than the same week in 1905. The steady improvement is clearly shown by the curves Figs. 1 and 2.

TABLE 2.

Comparison of Corresponding Weeks in 1905 and 1906.

	Week ending Mar. 18, 1905.	Week ending Mar. 17, 1906.	Increase or decrease.	Week ending July 29, 1905.	Week ending July 28, 1906.	Increase or decrease.	Week ending Sept. 16, 1905.	Week ending Sept. 15, 1906.	Increase or decrease.	Week ending Dec. 16, 1905.	Week ending Dec. 15, 1906.	Increase or decrease.
Subscribers (number of) ...	2,809	3,083	9% inc.	2,917	3,182	9% inc.	2,954	3,210	9% inc.	3,001	3,305	10% inc.
Calls (originating unvalued) ...	160,330	192,200	19% inc.	163,979	184,400	12% inc.	149,998	153,922	3% inc.	204,208	210,304	3% inc.
Operators, "A" ...	55	48	13% dec.	48	48	...	48	48	...	48	49	2% inc.
Calls (unvalued) per operator ...	2,915	4,004	37% inc.	3,416	3,842	12% inc.	3,125	3,207	3% inc.	4,254	4,292	9% inc.
Dockets ...	1,583	1,902	20% inc.	1,656	1,783	7% inc.	1,519	1,578	4% inc.	1,828	1,590	15% dec.
Dockets per subscriber ...	.56	.61	9% inc.	.57	.56	2% dec.	.51	.49	4% dec.	.61	.48	21% dec.
Speed of answering {												
under 5 secs.	42%	37%	12% dec.	48%	50%	4% inc.	50%	68%	3% inc.	46%	70%	52% inc.
under 10 secs.	79%	78%	1% dec.	77%	85%	10% inc.	82%	92%	12% inc.	76%	93%	22% inc.
under 20 secs.	96%	96%	Same	94%	99%	5% inc.	94%	100%	6% inc.	91%	100%	9% inc.

Table 3.—Order of merit of teams for each week, 1906.—It is significant that the team which has been top the greatest number of times has the smallest number of written complaints.

TABLE 3.
Order of Merit of Teams. Weekly, 1906.

Teams.	Number of times.				Written complaints.
	1st.	2nd.	3rd.	4th.	
A ...	26	16	6	4	93
B ...	7	9	20	16	149
C ...	6	16	16	14	144
D ...	15	10	10	17	125

In conclusion, a word of high appreciation is due to the operating staff, from the clerk-in-charge downwards, for their constant efforts, resulting in increased efficiency with increased load.

THE DEVELOPMENT OF THE TELEPHONE IN THE ENGLISH COUNTIES SINCE 1892 GEOGRAPHICALLY CONSIDERED.

BY W. H. GUNSTON.

(Continued from page 135.)

III.—SOUTH-EASTERN COUNTIES.

Surrey.—In 1892 the Company had exchanges working at the Hop Exchange (Borough), Battersea, Clapham (since closed), Wimbledon, Balham (since closed), Richmond, Croydon, Redhill and Streatham; Kingston and Epsom were opened in 1893; Guildford in 1894; Godalming in 1895; Peckham (since closed), Sutton and Farnham in 1896; Camberley, Woking and Leatherhead in 1897; Weybridge, Dorking and Chertsey in 1898; Egham, Esher and Walton in 1899; Molesey in 1900; Brixton and Bagshot in 1904; Ashted and Bookham in 1905; Byfleet in 1906; and Ripley in 1907. In 1902 the Post Office opened exchanges at Putney, Wimbledon, Kingston and Richmond, having prior to this a few subscribers at Leatherhead. Cranleigh and Horley were opened in 1903, and since then the Post Office have opened at Cobham, Oxshott, Caterham, Epsom, Esher, Sutton, Croydon, Woldingham, Haslemere, Hindhead and Grayshott, Forty-seven exchanges in all are now working in Surrey.

Kent.—The Company had exchanges in Kent in 1892 at Deptford, Sydenham, Woolwich and Bromley in the London area, and at Tunbridge Wells, Tonbridge, Southborough, Dover, Folkestone, Hythe, Sandgate, Sandwich, Deal, Canterbury, Whitstable, Faversham, Ashford, Ramsgate, Margate, Westgate, Minster, Chatham and Maidstone. Broadstairs, Chartham, and Boughton were opened in 1893; Strood (since closed) in 1894; Dartford, Gravesend and Sevenoaks in 1895; Herne Bay, Sittingbourne and New Brompton (afterwards called Gillingham) in 1896; St. Margaret's Bay, Snodland and Queenborough in 1897; Birchington in 1899; Northfleet, Pembury and Lee (near Lewisham) in 1901; and Sidcup, Erith, Hadlow, Paddock Wood, Lamberhurst, Goudhurst and Hildenborough in 1902. At the end of the same year the Company acquired the Tunbridge Wells Corporation system, which had only been working since July, 1901. It included the following Kentish exchanges:—Tunbridge Wells, Tonbridge, Southborough, Pembury, Hadlow (all these were subsequently closed and the subscribers connected to the National exchanges), Penshurst, East Peckham, Fordcombe and Langton. Brenchley and St. Mary Cray Exchanges were opened in 1903; Cheriton, West Malling and Aylesford in 1904; Sturry, Kearsney, Riverhead, Sheerness (Queenborough being closed and its subscribers transferred thereto), and Kennington (near Ashford) in 1905; Greenhithe, Wye, Easry and Willesborough in 1906; Minster-on-Sea, Rainham, Horsmonden, Borough Green, Bexley Heath, Charing, Bearsted and Bridge in 1907. From this extensive list, which covers the county from London to the coast, it would

not seem that much room was left for the operations of the Post Office. However, within the last few years they have opened exchanges at Dartford, Crocken Hill, Swanley, Farningham, Hextable, Brasted, Westerham, Edenbridge, Cranbrook, Hawkhurst, Nonington (near Dover) and Tenterden, bringing the grand total for the county up to 84.

Sussex.—In 1892 the Company possessed exchanges at Brighton, West Brighton (afterwards called Hove), Kemp Town, Preston (since closed), Rottingdean, Hurstpierpoint, Shoreham, Steyning, Lewes, Worthing, Newhaven, Hastings, St. Leonards (since closed and the subscribers transferred to Hastings) and Eastbourne. Meads Exchange was opened in 1894, but has since been merged in Eastbourne, and Bexhill was opened in 1898.

Up till now the development of the county had been almost entirely confined to the coast, but in 1899 Horsham and Arundel Exchanges were opened, as well as Littlehampton and Seaford. Chichester followed in 1900, and Frant in 1901. Crowborough, Rotherfield, Wadhurst, Groombridge, Frant (since closed), Mayfield and Ticehurst were acquired from the Tunbridge Wells Corporation in 1902. In the same year Bognor was opened, and Burgess Hill in 1903, when a new exchange was also established at Preston.

The year 1904 saw the opening of Southwick and Portslade, 1905 of Keymer and Henfield, 1906 of Battle, and 1907 of Plumpton, Eastergate (Chichester) and Hailsham. Last year the Post Office acquired the exchanges established by the Brighton Corporation at Brighton, Shoreham, Steyning, Burgess Hill, Hurstpierpoint and Portslade, in addition to which they already possessed exchanges at Horsham, Crawley, East Grinstead, Haywards Heath, Turners Hill, Cuckfield, Uckfield, Nutley, Rye and Bognor. Lately they have opened at Lindfield, so that there are now 53 exchanges working in Sussex.

Hampshire.—The only exchanges working in 1892 were those which the Company possessed at Bournemouth, Boscombe (since closed), Christchurch, Southampton, Portsmouth, Southsea (since closed), Gosport and Winchester.

Fareham was opened in 1894; Woolston (since closed) in 1895; Westbourne (since merged in Bournemouth), Cosham, Aldershot and North Camp in 1896; Shirley (now included in Southampton), Mundeford (since closed), Eastleigh, Totton, and Basingstoke in 1898; Ryde, Newport, Cowes, Shanklin, Ventnor, Sandown, Wootton and Freshwater (all in the Isle of Wight) in 1898; Lymington and Andover in 1899; Havant and Niton in 1900; Bonchurch in 1901; Emsworth and Bassett in 1902; Portchester, Waterlooville and Brockhurst in 1903; Stubbington, Titchfield, Lee, Wickham, Alverstoke and Hayling in 1904; West End (Southampton), Romsey, Hook, Fleet, Rowlands Castle, Locks Heath, Hambleton, Seaview (Isle of Wight) and Bembridge in 1905, and Chandlers Ford, Twyford, Netley and Brading in 1907. The Corporation of Portsmouth opened an exchange in that town in 1902 and are now operating at Cosham, Fareham, Gosport, Waterlooville, Havant, Emsworth and Rowlands Castle.

The Post Office have exchanges at Highclere, Tidworth (near Andover) and New Milton, and three or four subscribers at Basingstoke. There are therefore now 61 exchanges working in Hampshire.

Berkshire.—Reading was the only exchange open in 1902, but the principal riverside places and country towns quickly followed. Maidenhead was opened in 1893, Windsor in 1894, Sonning in 1895, Wokingham and Abingdon in 1896, Pangbourne in 1897, Ascot and Bracknell in 1898, Newbury in 1899, Hurley in 1902, Wallingford in 1904, Wargrave and Wantage in 1906, and Theale in 1907.

The Post Office have exchanges at Newbury and Hungerford, and there are now altogether seventeen exchanges working in the county.

IV.—SOUTH-WESTERN COUNTIES.

Wiltshire.—No exchanges existed in this county at 1892, but 1893 saw the opening of Swindon. In 1898 Bradford-on-Avon, Trowbridge, Devizes and Melksham were added, and Salisbury, Wilton, Warminster, Chippenham and Marlborough in 1899, Calne and Corsham in 1905, Westbury, Hilperton, Wootton Bassett and Ludgershall in 1906, Highworth, Bratton, Beckington, Lavington and Box in 1907. This year the Post Office opened an exchange at Malmesbury making 22 exchanges now working in Wiltshire.

Dorsetshire.—Poole and Weymouth Exchanges existed in 1892, and Parkestone and Dorchester were opened in 1896. The next exchange to be established was Bridport, in 1899, followed by Portland in 1900, Sherborne in 1903, Wimborne and Swanage in 1905, Broadstone, Wareham and Preston (near Weymouth) in 1906, and Upwey in 1907; a total of thirteen in all.

Devonshire.—This county, in area the third largest in England, possessed several exchanges in 1892 along the southern coast. They were Plymouth, Devonport, Mutley (since closed), Torquay, Paignton, Brixham, Dartmouth, Totnes, Newton Abbott, Ashburton (since closed), Dawlish, Teignmouth, Buckfastleigh (since closed) and Exeter. Ivybridge, Cawsand (since closed), Plympton and Millbrook were opened in the following year, and Crown Hill and Exmouth in 1894; Sidmouth, Tavistock, Horrabridge and Yelverton followed in 1896, in which year the development of North Devon commenced with the establishment of an exchange at Ilfracombe. Barnstaple and Budleigh Salterton were opened in 1897, Kingsbridge (since closed), Bideford, Northam, Torrington, Westward Ho and Tiverton in 1899, Lynton in 1906, and Topsham in 1907. Beyond two subscribers and a call office at Exeter and one subscriber at South Brent, the Post Office have nothing in Devonshire, which now has 30 exchanges.

Cornwall.—No exchange existed in Cornwall in 1892, nor, indeed, until Falmouth, Newlyn (since closed) and Penzance were opened by the Company in 1896. They were followed by exchanges at Truro, St. Austell, Fowey and Par in 1897; Newquay, Redruth, Hayle and Camborne in 1899; St. Ives in 1902; Bodmin, Saltash, and Stenalees in 1906, and Penryn, Helston and St. Columb in 1907. With the Post Office exchanges at Liskeard and Mevagissy there are now nineteen exchanges working in Cornwall.

Somersetshire.—The Company had exchanges at Bath and Weston-super-Mare in 1892, and opened others at Clevedon and Portishead in 1894. Bridgwater and Taunton were opened in 1895, Frome and Batheaston in 1898, Yeovil in 1899, Wellington in 1901, Lansdown in 1902, Radstock in 1903, Highbridge, Burnham and Midsomer Norton in 1904; Combe Down and Weston (near Bath) in 1905, Brislington and Keynsham in 1906, and Crewkerne and Saltford in 1907. Since 1903 the Post Office have established exchanges at Minehead, Dunster, Watchet, Williton, Wells, Dinder, Glastonbury, Shepton Mallet and Street. Altogether Somerset is well covered by the telephone system and has 30 exchanges working.

(To be continued.)

SELECTIVE PARTY LINES.*

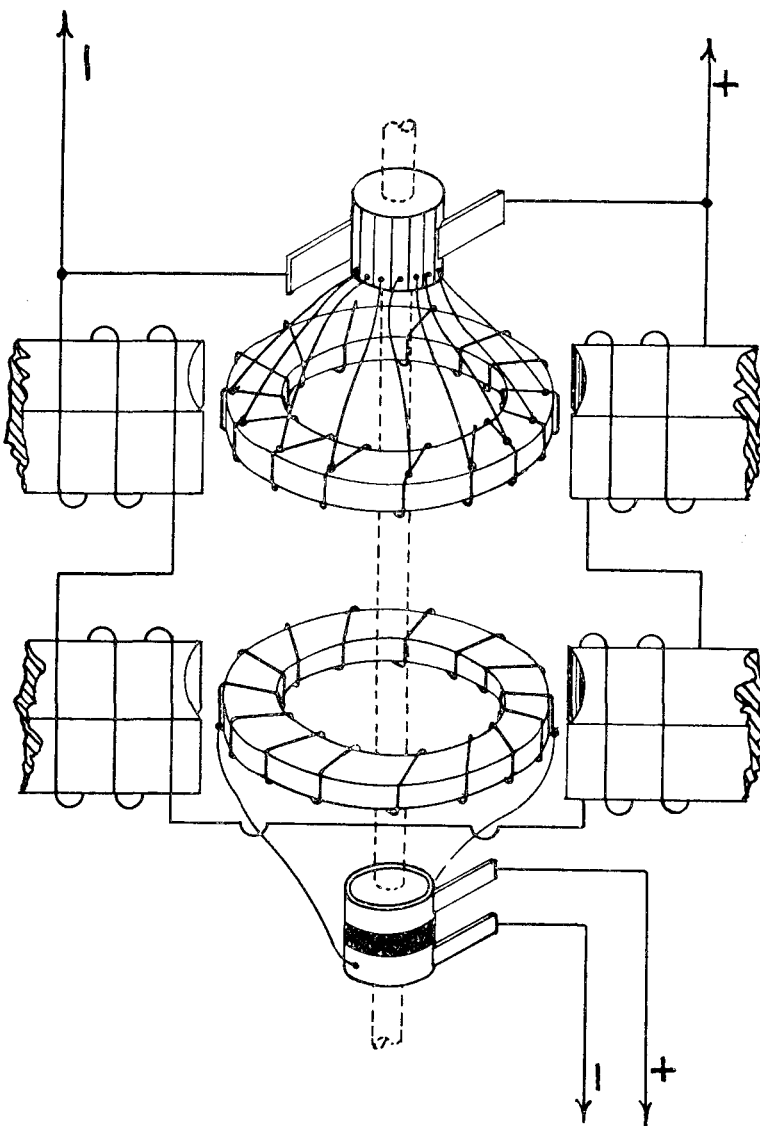
By ERNEST RENDELL.

THE principle of code ringing is bad and, so far, selective systems are not perfect. However, the Company are adopting a selective ringing four-party line system which has a good reputation in the States, and which I will describe briefly. The ringing connections only are here shown, these being the distinctive feature of the system. It will be seen from the diagram that there are two subscribers on each side of the loop, and for calling each subscriber each bell is biased so that it responds only to a negative or positive pulsating current. A pulsating current is a current varying in strength, but flowing in one direction only. I will briefly describe the method of obtaining a pulsating current.

Ringling machines are designed with a commutator rigidly attached to the main shaft for giving out pulsating positive or negative currents. The drawing shows the design of a motor generator. The commutator consists of a brass ring divided into two parts insulated from each other. One part of the commutator is so connected to the armature as to deliver positive and negative waves which alternate at a certain frequency, generally between 900 and 1,200 per minute. By the interception of the waves in this manner the ringling becomes a succession of pulsations all in the same direction, each being followed by a half-cycle of no current, applied in conjunction with the interrupter by the positive or negative key. The bell coils are wound to respond to these positive or negative currents as required, and this is done by winding the ringer coils in opposite directions. For a full description of the laws governing the winding of coils, I must refer

* Extract of Paper read before the Leicester Telephone Society.

you to the Company's "A" and "B" Correspondence Courses, as time will not permit me to go into further details. The method of obtaining a bias is by means of a spring attached to the armature of the ringer, thereby holding it to one side. This spring allows the armature to respond only to one position of an alternating current.



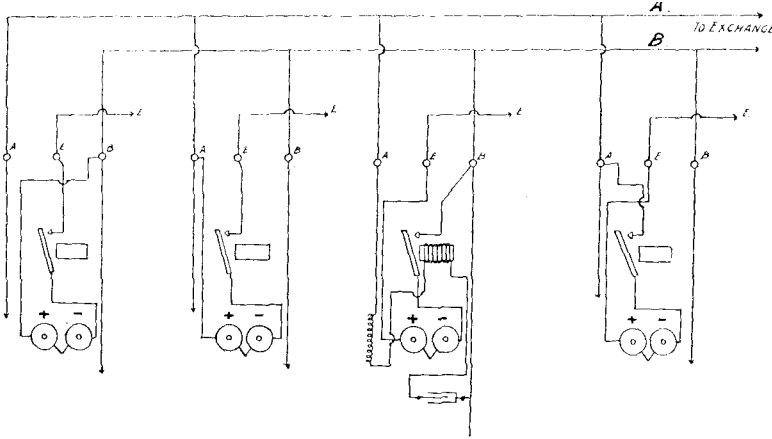
When the pulsating current is sent out on the line, it arrests the action of the biased bell spring and attracts the armature more strongly, and no movement of the hammer is noticed if the adjustment is correct. If a loose adjustment is permitted the bell may tap slightly. If the direction of the pulsating current be reversed, each wave pulsation will pull against the spring, attract the armature and pull over the hammer, causing it to strike the opposite gong, and between the pulsations the tension of the spring will pull the armature back to the normal, and so the gongs are each alternately struck as in alternate current ringing. It will be obvious that for the proper working of this system, it is essential to preserve an equal distribution of the positive and negative waves from the ringling machine. This will depend on the proper adjustment of the brushes on the motor side of the ringling machine. This, if not obtained, means there is a danger of the impulses collected by each brush overlapping, one brush receiving a large portion of the positive and, in addition, a small portion of the negative impulses. This interference will obviously reduce the effective voltage of the pulsatory current and seriously affect the operation of the system.

The operation of calling is as follows:—

1. The operator presses a negative key, sending a negative pulsatory answer over the "A" line through all condensers and relays, and back *via* the "B" line to the earthed side of ringer. The negative current rings the bell

of No. 1 station, but the bell of No. 3 station remains inoperative, as it is biased to respond only to positive currents.

2. The operator presses a negative key, sending a negative pulsatory current over the "B" line through all condensers and relays to earthed side of ringer via the "A" line; the negative current rings the bell at No. 2 station, but No. 4 does not respond as it is operated by only positive pulsatory currents.



The same principle is applied to ringing parties three and four with conditions reversed, positive pulsations being sent alternately on the "A" and "B" lines by different keys. There are four combined listening and ringing keys fitted to each cord circuit and one extra key per position used for all ordinary alternate ringing. The keys are arranged with a locking device which enables the operator to tell immediately which station was called. The relay used is especially designed to work with either an alternating or direct current, and has a slow movement—this being necessary as the pulsating current becomes alternating on passing through the condensers to the bells.

It will be observed the relay cuts out the bell during conversation, thus restoring the balance of the line, this being a decided advantage over the two-party line system. In the States, where the relays are not inserted, I understand it is necessary to wind the ringers to a considerable resistance (in some cases as much as 5,000 ohms), owing to the leakage, which would be considerable if this were not done.

With reference to the omnibus lines which the Company, I understand, have working in Glasgow, and which our contract agent is anxious to introduce into Leicester, it is not possible to make these lines selective without introducing either a step-by-step action or many combinations such as I have already described, involving a great deal of work for the operator. However, an adaptation of biased bells, operated by positive and negative pulsating currents such as are used for the four-party line system which I have explained, together with the following simple code, might reduce the work at the exchange and also the annoyance to the subscribers, and improve the working conditions of the line. The code is as follows:—Each subscriber on the line has a number consisting of three figures, the first two numbers indicating the number of his line (thus, 72 party line), and the last number indicating the number of his signal (thus, 72/5). In addition, the line has four letters A B C D, the significance of the letters being: A, positive current, x leg of loop; B, negative current, x leg of loop; C, positive current, y leg of loop, and D, negative current, y leg of loop. The basis of the code which the operator would have to memorise is this: (1) means one long ring, (2) means two short rings, (3) means one short and one long ring, (4) means one long and one short ring, (5) means two long rings.

The four keys could be marked A B C D so that on receiving a call for 72/A 5 the operator would plug into 72 line, and with the code in her mind would ring the A key two long rings. This would only ring five of the ten stations on the x side of line, and on no occasion would it be necessary to give more than two rings, which, considering the fact of there being twenty subscribers on a line, considerably simplifies the operation of calling and reduces the possibility of error.

FOREIGN INTELLIGENCE.

Sweden.—The "Swedish Official Statistics" give the following information concerning the State telephone system in that country:—Total number of stations (end of 1906) 90,811, of which 15,639 were in Stockholm, 9,609 in Gothenburg, 4,605 in Malmö, 3,015 in Gefle, 3,012 in Norrköping, 2,235 in Örebro, 2,056 in Sundsvall and 1,928 in Upsala. The number of conversations exchanged was nearly 270,000,000. The exchanges increased from 1,380 in 1905 to 1,497 in 1906, the stations from 81,994 to 90,811, and the length of lines from 166,397 kilometres to 183,261 kilometres.

Denmark.—From figures given in the *Journal Télégraphique* it appears that the number of subscribers to the State system for the year 1905-6 was 632, and to the various companies systems 47,718, making a total of 48,350 subscribers with 52,154 stations. The length of wires was 9,000 kilometres (State) and 193,000 kilometres (companies), or 202,000 kilometres in all. The total number of trunk line conversations exchanged was 810,000 and of local conversations 101,769,200.

Germany.—To improve the communication between Cologne and Hamburg, Mannheim and Rotterdam new trunk wires are being run this year between Cologne and Ludwigshafen, Cologne and Hamburg, Düsseldorf and Mannheim and Crefeld and Rotterdam. Further wires will be erected next year. The Cologne-Mannheim wire will cost £750 and the Cologne-Hamburg line £1,750.

Austria.—For the years 1908 to 1910, we learn from the *Zeitschrift für Schwachstromtechnik*, it is proposed to spend 12,000,000 kronen (£480,000) annually, or 36,000,000 kronen in all on new telephone work. This will be partly applied to the construction of new trunk lines and partly to the completion of those in course of erection.

The erection of two additional exchanges in Vienna is contemplated, and the extension of the local systems and improvement of existing exchanges are also provided for. As regards Vienna the present exchanges have only accommodation for 26,400 subscribers, of whom there are at present 23,000. New multiple boards are now being erected in the two principal exchanges for 3,000 connections altogether, chiefly party lines, and will therefore provide for from 6,000 to 12,000 subscribers. Exchanges are being planned to accommodate 100,000 subscribers. Two new exchanges of 15,000 lines each and seven sub-exchanges of 10,000 lines are to be erected to serve ten of the old inner districts of the city, and four exchanges of 8,000 lines in all for the outer districts. Two exchanges for 10,000 lines in districts VII and II, which are expected to be working by the end of 1909, are on the automatic principle, which is also being introduced into the exchanges at Graz, Innsbruck, Cracow and Reichenberg. The connection of the new subscribers in Vienna, however, with the subscribers on the existing manual exchanges will of course necessitate the intervention of operators.

TELEPHONE WOMEN.

V.—BEATRICE A. F. NEWMAN.

BEING the second senior lady member of the Metropolitan exchange staff and having held, during a total length of service in London of 25 years, the position of Clerk-in-Charge of the Hop Exchange for eleven years, Miss NEWMAN can certainly be said to have gained distinction in the telephone world.

After leaving a large public school she entered the service of the United Telephone Company on May 8, 1882, being made an Operator at Cornhill Exchange; she was subsequently transferred to what was familiarly known as "Queen Vic." the original of the "Bank" Exchange, situated in Queen Victoria Street.

Her first promotion was to the position of Supervisor, or as the position was then called "Second-in-Charge," at Cornhill, and after the closing of that exchange she held similar positions at Avenue and Coleman Street.

In 1894 Miss NEWMAN was appointed "Clerk-in-Charge" of the original "Hop" Exchange, which derived its name from being situated over the actual Hop Exchange or market in the Borough. For a while she was subsequently "Clerk-in-Charge" of Central, Stratford and East, and in 1899 again returned to Hop.

During her service Miss NEWMAN has assisted in three "change-overs"—the first at Cornhill from an upper to a lower floor, the second the removal from the original Hop Exchange building to 6 and 8 Marshalsea Road, and the third the change not only to the other side of the street but from the magneto to the central battery system in March, 1906.

In looking back Miss NEWMAN says she cannot but be impressed with the confidence with which the last change-over was anticipated and with the smoothness with which it was effected, compared with the dread with which such events were viewed in past times. The immense progress made by the Company in dealing with such matters as breakdowns in the present day is also an impressive sign of the great improvement in organisation. In

a bad snowstorm in 1886 she remembers that when the operators returned after the Christmas holidays (the exchanges were closed during holidays in those days) they found the poles and wires had been so heavily damaged that so far as their work was concerned there was scarcely any to do, for which she is afraid they were not properly sorry, and for quite an interval telephone users must have been compelled to resort to the old methods of sending messages by hand or letter.

Like all the senior operating staff Miss NEWMAN has, in



MISS BEATRICE A. F. NEWMAN.

comparison with what they had to experience in the early days of their service, much to say in appreciation of the present arrangements for their comfort, and remembers, as a case in point, one exchange where the lunch-room was formed by dividing off a portion of the switchroom by a huge piece of baize provided with a sort of tent flap for entry and exit.

Miss NEWMAN is a strict disciplinarian, but one has only to know her thoroughly to appreciate the conscientiousness which governs every detail of her work, and the desire to be perfectly just which actuates her dealings with the staff under her charge. Without doubt her organising ability and imperturbable coolness went far to bring about the ease with which the operators took up the working of the new switchboard after the change-over from magneto to central battery system at the Hop Exchange.

Miss NEWMAN will confess to no hobbies, but is a great Sunday School worker, having held a class since 1885.

VI.—LAURA DURANDU.

Miss DURANDU entered the service of the Lancashire and Cheshire Telephone Company in 1886.

During her long connection with the Company Miss DURANDU has seen some wonderful developments of the business. At the time she joined the service there were only 28 operators in the district and the system contained 700 subscribers and twelve junction lines; at the present time there are 184 operators on the staff of the exchange at which she is Clerk-in-Charge, which serves no less than 1,000 junctions and 5,500 subscribers' lines, the totals for the district being 350 operators, 2,339 junctions and 13,539 subscribers' lines.

She has served under three District Managers (Messrs. CLAXTON, MARTIN and HIDDEN, five Chief Electricians (Messrs. HOPE-JONES, GILL, FRANCE, WILLIAMS and FRANCIS) and five Clerks-in-Charge (Misses LINGHAM, AHIER, EDWARDS, JOHNSON and WILLIAMS). She is the only representative in the district of the original staff and her loyalty to the Company has always been sincere, for when the Company handed over the trunk lines to the Post Office in 1896 she refused to go over to the Department, preferring to remain in the Company's service.



MISS LAURA DURANDU.

In 1903 when the Liverpool "Royal" Exchange was opened, Miss DURANDU was transferred there to give the benefit of her experience in dealing with difficult subscribers, of whom those transferred to the "Royal" appeared to contain a large proportion. After fulfilling her mission she was transferred back again to the Central Exchange where, as mentioned above, she is Clerk-in-Charge at the present time.

Having had such a long experience in this important branch of the Company's business she has seen many changes in the staff and methods of working, and has a very clear recollection of the introduction of the headgear receiver and breastplate transmitter, being the first operator in the district to use one. The operators at this time were under the impression that these appliances would be dangerous to their hair and eventually result in its "total loss," an idea which naturally caused some alarm in operating circles. The example set by Miss DURANDU, however, had the desired effect and the headgear receiver soon became standard equipment.

Altogether about 600 operators have passed through the Central Exchange while Miss DURANDU has been Clerk-in-Charge. She is noted by the staff as being exceedingly keen, a strong disciplinarian, thorough in all her work and untiring in her energy, and by her kindness and consideration she has become as general a favourite with the staff as with the public.

A strong believer in *esprit de corps*, she has always been one of the first to support any entertainments or picnics that have been organised by the staff, and when appeals have been made to the operators to support any charitable object the fact of Miss DURANDU taking the matter in hand has assured its success.

Miss DURANDU has three sisters in the Company, all holding very good positions. One—Miss LOTTIE DURANDU—is Travelling Supervisor for the sub-exchanges and also visits operators who

are away from duty through sickness. Miss MARY DURANDU is Chief Operator at the Wavertree Exchange, and Miss FLORENCE DURANDU is Monitor at the "Royal" Exchange, so that Liverpool has reason to be proud of the name of DURANDU.

WANTED—A TELEPHONE. HOW I GOT IT.

BY ONE O' FIVE.

THE following article, cut from an Australian paper, has been sent us by a friend, says the *Electrical Engineer*, and, unfortunately, the name of the newspaper has not been included. It reminds us that when we installed the telephone the first entry in the official directory was useless for two reasons, as both name and address were incorrect. The *Electrical Engineer*, 139-140 Salisbury Court, E.C., was changed into *Electric Engineer*, Salisbury House, E.C.* The Australian skit reads:

"Numbers of householders who are desirous of installing a telephone are deterred by ignorance of the departmental regulations and the fear of red tape. The procedure is really so simple that a few notes, forestalling the efforts of the proposed Post Office publicity department, may prove of interest to intending subscribers.

"The first step is to write to the Deputy Postmaster-General stating the position of the premises, and asking particulars of the fees payable. By return post you will receive a printed card (Form X.O., 982), stating that your letter has been duly received and is having attention. This card is sent by the office boy, and has no real bearing on the subsequent proceedings.

"After this effort the department takes a brief rest to recover its strength, and then plunges into a series of abstruse calculations over a period of some weeks. The result of this mountain in labour is an absurdly inadequate mouse, in the shape of a circular (Form C.B., 67), informing you that your telephone will cost you £5 per annum for a maximum of 2,000 originating calls. If this startling example of departmental omniscience does not overpower you you may write to the Deputy Postmaster-General, accepting his offer, and instructing him to proceed with the work.

"Within ten days, or thereabouts, you will receive another circular (Form C., 1,546) requesting you to sign the attached agreement and pay twelve months' rent in advance. Having done this you may safely take a holiday.

"After an interval of, say, a month, it is as well to write to the Deputy Postmaster-General, pointing out that you have only a lease of the premises, and are, therefore, anxious to have the telephone as soon as is convenient. You will receive no reply to this (Form X.Y., 1,273 being out of print), but a few weeks later a very civil-spoken young man will present a half-gallon 'billy' at your back door, and request a little hot water for breakfast. If you direct attention to the size of the billy the man will point out two of his mates who are sitting on your roof and two others are standing in an expectant attitude in your back garden; a sixth man will be found standing at the head of a linesman's handcart out in the right-of-way. The men on the roof are discussing where they will fix your telephone wire, while the men in the garden are waiting to catch them in case they roll off. This tends to show the perfection of the organisation which exists in all great Government departments.

"If the weather keeps fine the necessary wires will soon be connected, and nothing then remains but to obtain the telephone instrument. After waiting, say, two or three weeks without result, you should write to the daily papers, directing attention to the facts, and signing yourself 'Disgusted Taxpayer.' On the day following the insertion of your letter the 'official explanation' (Form X.O., 73) will appear in a prominent position in the news columns. The explanation will set out that the Postal department is not to blame, since it ordered seven telephone instruments in 1904, but the demand has been so great that these have already been used. It will further explain that tenders are being called for ten additional

instruments, and arrangements are being made for prompt delivery. Again, it will state that all applications are dealt with strictly in order of priority, and as soon as the 1,196 back orders are completed 'Disgusted Taxpayer's' application will receive immediate consideration.

"The same day's evening paper will contain an interview with the Minister concerned, who will express regret that 'Disgusted Taxpayer' did not write direct to the department under his own name. The Minister will add that he is completely reorganising the department, and, although only nine months in office, he has already had two telegraph-poles repainted and a piece of orange peel picked off the steps of the General Post Office. The interview will conclude with a statement that the Minister has 'called for a report.' This is a most arduous and dangerous undertaking, which cannot be safely attempted by anyone drawing less than £2,000 a year, with prospects of £200 increase.

"As the result of the publicity given to your case by the Press, a telephone instrument will be sent out to your house, and you must then act with the utmost circumspection if you would avoid disaster. Foolish people with no knowledge of departmental methods are apt to directly address the instrument-fitter, saying, 'I want the telephone placed here in the hall.' This, however, is a fatal mistake. The best way is to suggest, with due diffidence, that the telephone should be placed under the kitchen sink. The fitter will say that is impossible, and express his intention of putting it over the drawing-room mantelpiece. At this stage, with a little tact and a violently expressed preference for the sink, you will succeed in having the instrument set up in the hall, where you wanted it.

"Your troubles are now over, and at the modest charge of £5 per annum, in advance, you have a piece of furniture which is an ornament to any house. In the event of your ever desiring to use your new telephone, you should first read the instructions most carefully, and, if you are connected to a suburban exchange, it is always as well to drop a postcard to the manager the day before you ring up. Attention to this little point will ensure the prompt attendance of an operator when you do ring, and you will then learn without unnecessary loss of time that the number you want is engaged.

"Three months, or thereabouts, after the telephone is installed your name (incorrectly spelt and with someone else's initials) will be duly inserted in the official 'Telephone Directory,' and earth will hold no further joys in store.

"It will be seen from this that installing a telephone is a perfectly simple operation, and, if due regard is paid to the hints here given, the whole thing can be fixed up within the year."

GLASS POLES.

THE Chief Postal Administration in Cassel is, according to a communication to the *Frankfurter Zeitung*, about to make a trial of the Schütz system of glass telegraph poles on an experimental section of route. It will then be established whether these poles of glass, inlaid with wire, will offer sufficient resistance to the attacks of wind and weather. When it is considered what extensive use Siemens' wire-glass has attained, a favourable result may be expected from the experiment.—*Zeitschrift für Schwachstromtechnik.*

JOURNALISTIC COURTESY.

Telephony, a Chicago publication, makes a leading feature in its latest issue of an article describing the branch exchange fitted by the National Telephone Company on the *Lusitania*. The article is signed and it is liberally illustrated, but no mention is made of the fact that the article, with the illustrations, is "lifted" bodily from the *JOURNAL* for September. Nor has *Telephony's* contributor, although he has made a few slight additions and changes, thought it worth while to mention that the installation was designed and constructed by the National Telephone Company! Truly strange are the ways of a certain brand of American technical journals. It is not uncommon in these curiously edited periodicals to see a letter to some other paper reproduced in the guise of a signed original article!

* The *Electrical Engineer* has the Post Office service.—Ed. "N. T. J."

SHORE CONNECTION APPARATUS FOR THE CUNARD STEAMSHIPS "LUSITANIA" AND "MAURETANIA."

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

Owing to lack of space in the September issue of the JOURNAL the shore connection arrangements for the *Lusitania* and *Mauretania* were dealt with very briefly, although the apparatus involved was perhaps the most interesting feature of the whole scheme, and certainly presented the greatest difficulties in design.

The following article may therefore be taken as a continuation of that in the issue just referred to.

The conditions imposed upon the flexible cable, cable head and connection box were very severe. Many of these conditions had not previously been encountered in telephone work, and in order that they might be complied with novel devices were resorted to.

It was necessary that the flexible cable should be extremely flexible, light, of great tensile strength and capable of withstanding the roughest treatment. Its outermost covering must be such that the cable could be dragged over rough surfaces without that covering suffering appreciable injury, and the cable must withstand immersion in sea water. Its insulation resistance must be high, and must remain at a high standard during a reasonable period.

With these conditions in view, a specification to the following effect was drawn up:—Twenty conductors, each consisting of 23 strands of No. 36 S.W.G. copper, evenly tinned, were each to be covered with (1) a layer of best pure rubber, (2) two layers of best vulcanised rubber and (3) a layer of waterproof tape. External diameter 115 to 125 mils. These insulated conductors then to be evenly laid up in twisted pairs, around a suspender core of 35 galvanised steel wires each No. 35 S.W.G. This core to be covered with ozokerite braiding and to have a breaking strain of not less than 400 lbs. The cable thus laid up, to be covered with waterproof tape and then with two stout flaxen braidings, saturated with ozokerite. The insulation resistance of each conductor to be not less than 600 megohms per mile.

The resultant cable was very satisfactory, and exceeded all expectations with regard to lightness and flexibility. Its weight was only 6 ozs. per foot, and it was as flexible as an ordinary hemp rope of the same diameter, viz., about an inch.

It was necessary that the cable head should be so constructed as to withstand the roughest treatment. Consequently the castings are massive and as free as possible from prominent projections. The twenty contact studs are protected from injury by the projecting edges of the gunmetal casting.

In order that the cable conductors may be relieved of all tension, and a reliable mechanical connection made between the cable and cable head, the steel core of the former is drawn taut and made off on a stout screw fixed in the body of the latter. In

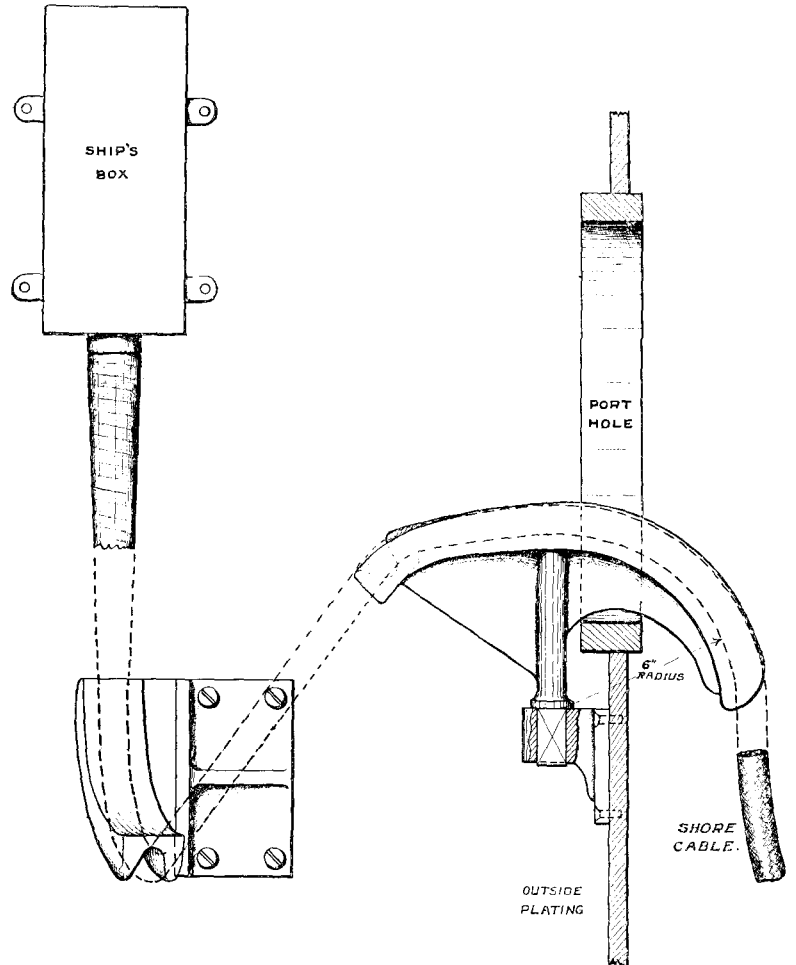


FIG. 11.—DIAGRAM OF SHORE CABLE ATTACHMENTS, S.S. "LUSITANIA."

addition, that part of the cable which enters the nozzle is tightly compressed by the action of screwing home the tapered gunmetal sleeve shown in Fig. 9.

To fill all interstices, and so prevent moisture creeping along

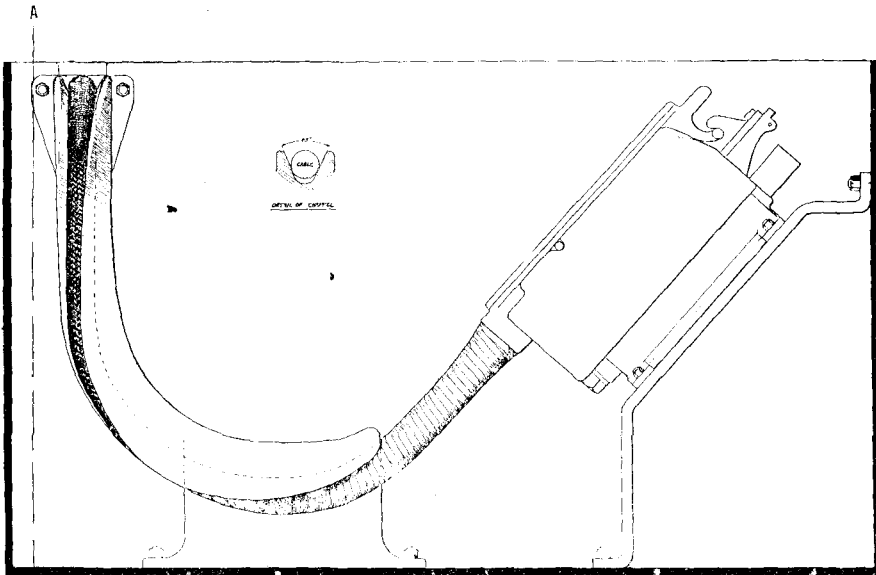


FIG. 12.—SUNK BOX, LIVERPOOL LANDING STAGE. LONGITUDINAL SECTION. APPARATUS IN POSITION.

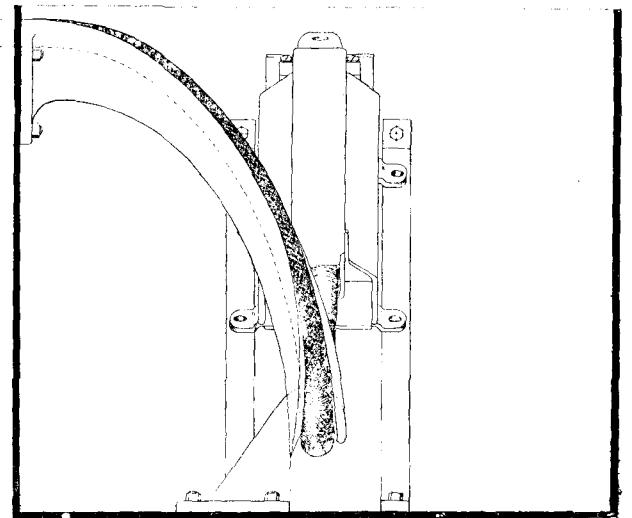


FIG. 13.—SUNK BOX, A SECTION AT A-B. APPARATUS IN POSITION.

the braiding of cable and into the cable head, the braiding is treated with a mixture of compound and beeswax for a distance of 9 inches exterior to the nozzle.

In order to insure that no sharp bending shall take place in that part of the cable adjacent to the nozzle, a helix of No. 12 steel wire which has been previously slipped over the cable covers the nozzle and 9 inches of the adjacent cable. The helix is then bound round with waterproof tape.

The ship and shore boxes are identical in construction, with the exception that the cover is omitted from the latter. These boxes are made up of massive gunmetal castings fitted with springs, etc., as previously described. The cable to be attached may be led in at either end of the box, as may be most convenient, the nozzle for one end and plug for the other (see Fig. 12) being interchangeable. The contact springs are protected from accidental injury by the side plates, between which the cable head is inserted (see Figs. 11 and 12).

A feature with regard to both the cable head and shore or ship's box is the ease with which they lend themselves to cleaning, in case of any deposit of salt or dirt on the ebonite panel. To remove such deposit, it is only necessary to wash with fresh water, preferably drying the surfaces afterwards.

To guard against the action of sea water and salt atmosphere, the only metals used in the construction of these heads

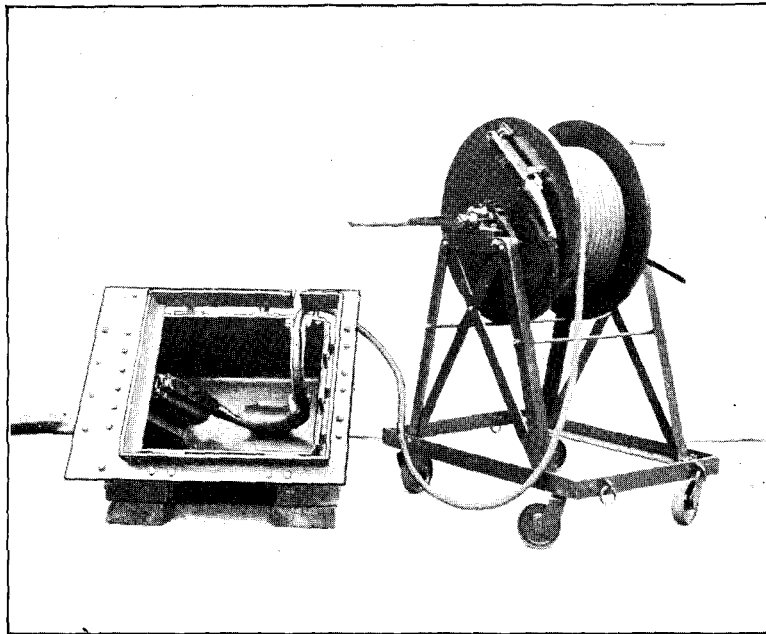


FIG. 14.—CABLE, DRUM AND SUNK BOX. SHOWING APPARATUS IN POSITION FOR LIVERPOOL LANDING STAGE.

and boxes are gunmetal, bronze, brass and platinum, and the cable head is designed to withstand immersion in sea water.

To prevent any possibility of the springs in the box being damaged accidentally, when the cable head is inserted, the two pieces of apparatus are so designed that no part of the latter head can reach the springs until the cable head is pressed home into the correct position.

In the case of the *Lusitania*, the end of the shore cable is taken on board through a porthole, below which is a socket for holding a detachable gunmetal casting grooved out to support and guide the cable. Immediately below the ship's box is another gunmetal casting similarly grooved to guide the cable (Fig. 11). In order that the cable shall not bend too sharply at these points of support, the radius of each bend in the grooves is not less than 6 inches. It was considered desirable that very little of the strain due to the cable hanging over the side of the ship should be transmitted to the ship's box. Advantage was therefore taken of the peculiar gripping property possessed by a curved groove, whose sides incline at an angle of 45° , and the grooves in the gunmetal guides were made accordingly. A section of the groove is seen in Fig. 12.

The sunk boxes for the accommodation of the shore connection

boxes on the Liverpool stage are made of rivetted boiler plate, with cast-iron frames to form seatings for covers. Each of these sunk boxes is fitted with a grooved casting for holding the flexible cable. This casting has a twist so designed as to ensure that portion of the cable which lies in the groove being gripped throughout its entire length. Figs. 12, 13, 14 show views of the sunk box with cable, cable head and shore connection box in position.

A special portable drum, seen in Fig. 14, is provided for holding the flexible cable when not in use, and for paying off to the ship when connection is required. The method of handling the shore flexible is as follows:—When the ship arrives off the stage, the drum is run out to the sunk box which will be nearest to the ship's box when the ship is made fast. This is possible because the berth of the ship is decided beforehand. The drum carriage is then fastened to the deck of the landing stage by means of special attachments. A line is thrown from the ship, made fast to the hauling lug on the cable head, and the cable is hauled on board, being paid off the drum as required. The whole of the cable is unwound from the drum, the cable head at the shore end is taken into the sunk box, and snapped into position in the shore connection box. The cable is laid in the twisted groove and along a channel cut in the deck of the stage to the water's edge. From the ship to the edge of the stage the cable hangs unsupported.

THE NEW CENTRAL BATTERY EXCHANGE AT GERRARD, OPENED SEPT. 28, 1907.

By P. T. WOOD AND A. WRIGHT.

WHEN this article appears the new Gerrard Exchange will have been in use for a month, and details of all the work that was entailed becoming but a memory. It may be interesting, however,



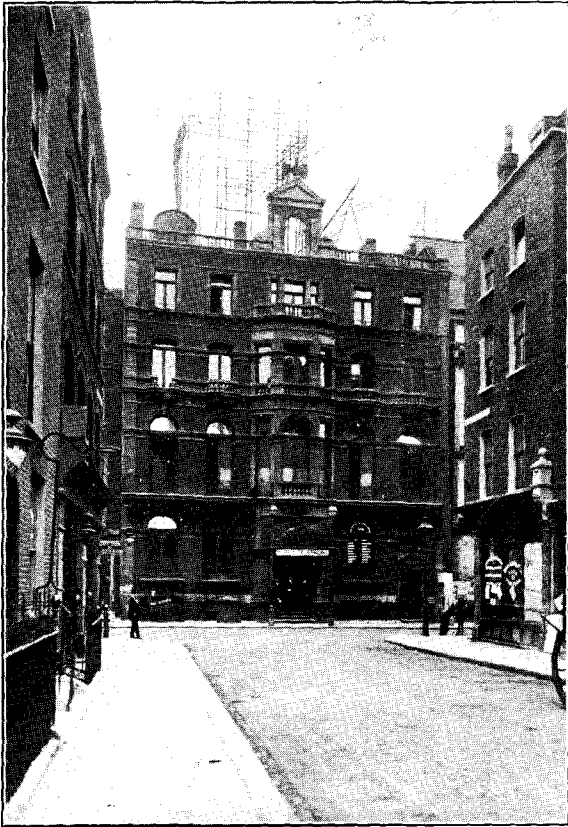
VIEW SHOWING OLD AND NEW BUILDINGS.

to others than those who were actually concerned in the work to know how many and varied were the arrangements to be made, contingencies to be allowed for and difficulties to be overcome.

Some years ago it became obvious that the present exchange

building would not be large enough to contain the equipment and the necessary quarters for operators, etc., at the rate the district was then developing, and a suitable site was sought for on which to erect the new premises. After considerable difficulty the Company obtained possession of two houses adjoining the present exchange, and three more at the rear of the newly acquired ones. As soon as the site was cleared a large three-storey building covering the whole area was erected, and allowance made for its extension over the ground at present covered by the old exchange. This old building is one of considerable interest, having formerly belonged to the Pelican Club. In the basement prize fights and cock fights were at one time held, the holes in the floor in which the posts were fixed to carry the rope forming the ring being still visible.

The new building in its completed form will contain the line and instrument stores in the basement, offices on the ground floor, operators' quarters on the first floor, and apparatus and switch-rooms on the second and third floors respectively. It will cover an area of 8,947 square feet.



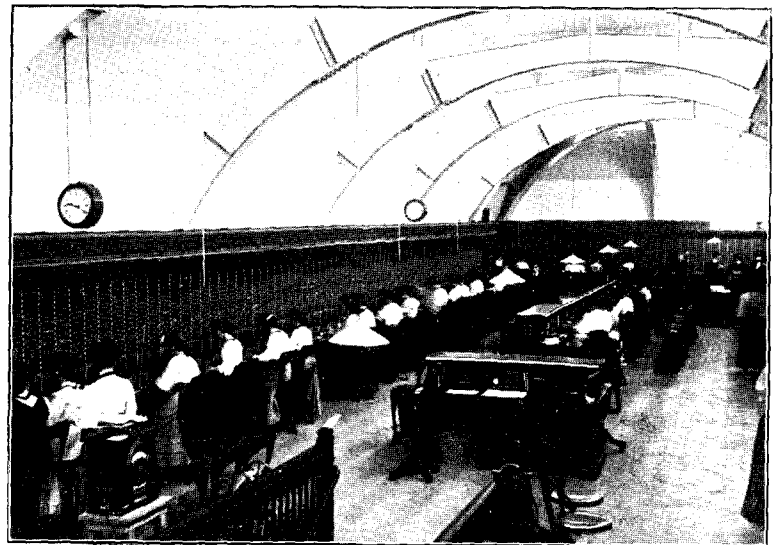
OLD GERRARD EXCHANGE, AT ONE TIME THE PELICAN CLUB.

The exchange is situated in the heart of the West End of London, and serves a large residential and shopping district. Most of the important hotels, clubs, theatres and music halls, the Embassies, Buckingham and St. James's Palaces, and the majority of the large West End shops and stores are connected to it. So rapid has been the increase in the number of subscribers that the total now reaches the high figure of 6,478, representing some 20,000 stations.

Apart from the installation of the switchboard and apparatus by the Western Electric Company, a vast amount of work has had to be done by the Metropolitan staff who were responsible for the satisfactory opening of the new exchange. It is intended to give in this article an idea of the work entailed. The first work to be done was to ascertain particulars of all subscribers' installations, and submit an estimate to Head Office for the fitting of condensers in all instruments and switchboard exchange line indicators. Lists were then got out from the street cards and handed to the condenser fitters who worked right through the district in street order. No attempt at "polarising" the receivers was made, as it was known that many months would elapse before the exchange would be

changed over, and that in the reconstruction of overhead line work many reversals were likely to occur.

While the above work was progressing, an estimate had been passed forward for the actual construction of the new exchange, and a start made by both the Western Electric Company and the Company's engineers. The work of overhauling the outside plant in the district extended over several months, and many cables which were quite satisfactory for the magneto system had to be renewed in readiness for the more exacting central battery system. A large manhole was built just in front of the old exchange, so as practically to surround the existing run of underground cables into the old building, and from this point tees were made to the main frame in the new building. The aerial cables were also teed on to the main frame, so that as soon as the new exchange was opened the legs of the cables running into the old building might be cut away, leaving the lines direct on to the new equipment. When the bulk of the line work had been completed, careful tests were made from old to new testrooms for reversals in leads, and these having been proved "O.K.," a retest of all subscribers' installations was commenced, including the test for reversed receivers, and the copper and insulation resistance of all lines. The test was made from the lightning arrester bars in the old exchange, a staff of about 30 fitters and ten test clerks being engaged for a period of two months.



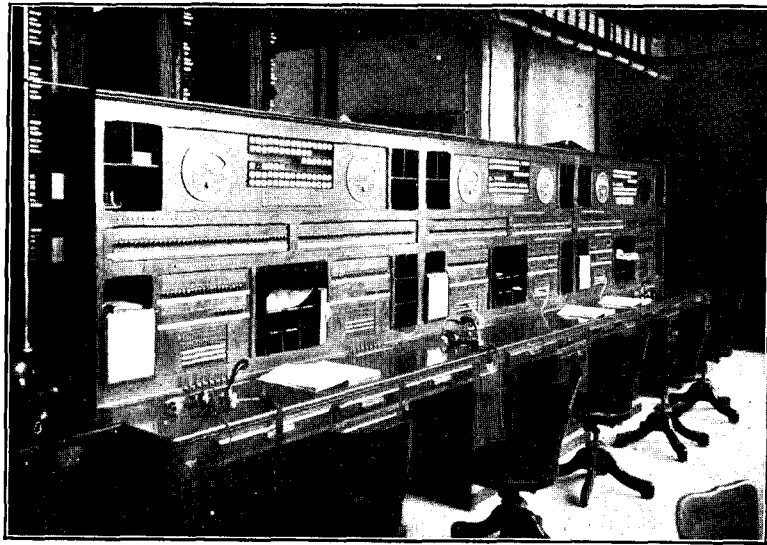
VIEW OF "A" BOARDS, NEW GERRARD EXCHANGE

Before this work was done, the Western Electric Company were ready for a start to be made on the testing out of the exchange equipment and a staff of twenty reliable men was told off to carry this through. The Engineer-in-Chief's schedule for "Testing out a Central Battery Switchboard" gives details of the tests made. In addition, however, a generator test was put on the multiple with the object of bringing on intermittent or high resistance faults which might exist, and every "B" line lamp was proved to be in its correct circuit, experience having taught us to look out for reversals.

A most important feature of the work was the test of all junctions with distant exchanges under working conditions. The circuits at Gerrard having been proved "O.K.," heat coils were inserted on the main frame and the test through carried out in the evenings. Although the alterations necessary had been carried out at the distant end, it was found that about 25 per cent. of the junctions under test were faulty in some particular. It was therefore considered advisable to make a triple test. It might perhaps be mentioned here that the Electrophone exchange is in the Gerrard building, and that 300 out of a total of 1,500 direct junctions pass through the electrophone board before reaching the central battery exchange. This added considerably to the difficulties of testing, as at seven o'clock each evening the junctions reserved for electrophone purposes were required, and had to be reconnected in the old exchange.

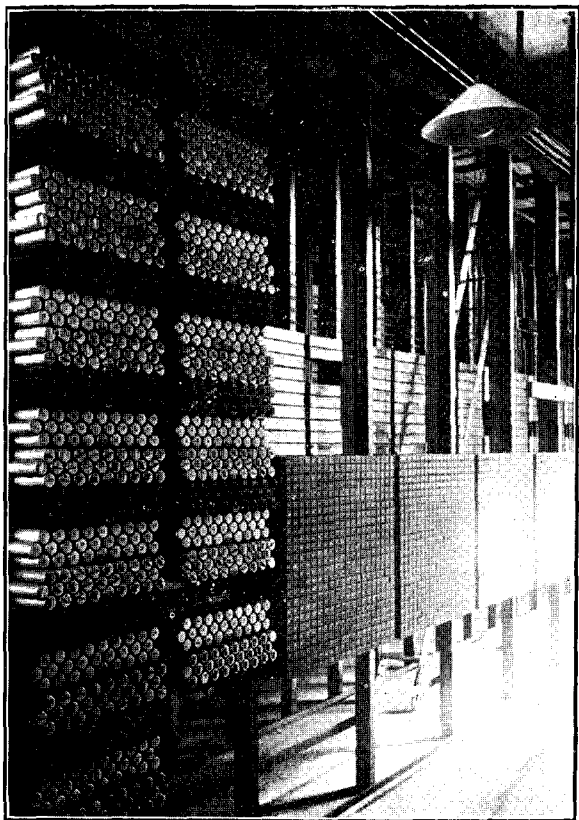
Further, it was necessary to rewrite the testroom record

cards with main frame numbers, position of private line jacks and through junctions. These cards become more important than ever at this exchange, as the outside cables terminate on the vertical side of the main frame, and to test a line from the frame



TEST CLERK'S DESK.

it is necessary in every case to obtain the location of the arrester from the cards. It was also found necessary to renumber both incoming and outgoing junctions, so that the numbers should run consecutively instead of odd or even as previously.

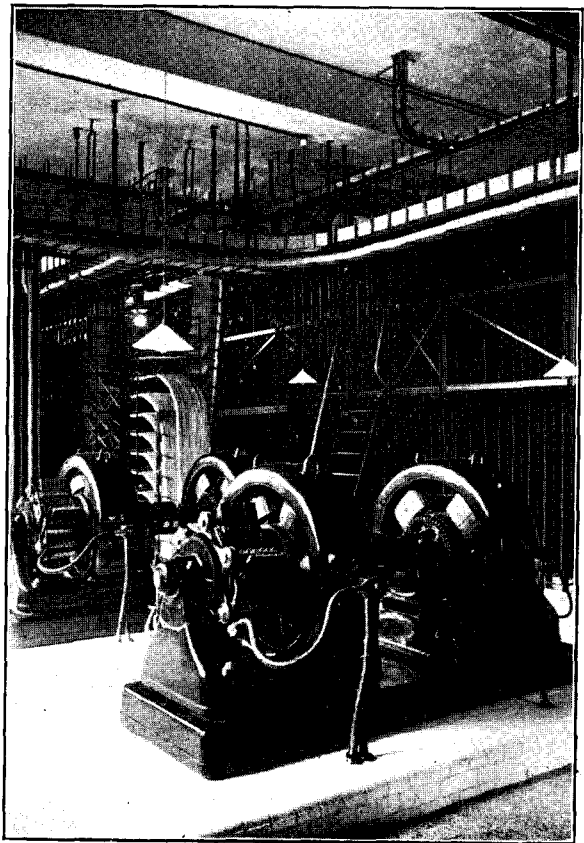


VIEW OF RELAY AND REGISTER RACKS, NEW GERRARD EXCHANGE.

The work of cross-connecting lines on the main frame was carried out by the Metropolitan staff, and owing to the short time at our disposal, and the magnitude of the job, some 12,000 jumpers having to be run, the work was carried on night and day. As soon as the jumpering was completed, the heat coils of

the private wires, through junctions and power leads were inserted, and these lines allowed to work through the new main frame, the object of this being to reduce so far as possible the amount of work to be done on the opening day. The jumpering on the I.D.F. was carried out by the contractors from distribution lists supplied by the Traffic Department. These lists were the result of careful records taken over a long period prior to the opening. The Traffic Department were further responsible for the marking on the switchboard and the education of the operators in their new duties.

The principal items for which the Electrician's Department is responsible have now been touched upon, space prohibiting a list of the multitude of minor matters incidental to such a change over. Final preparations were now made for the opening day. For a week previously the order wires were worked in parallel on both old and new switchboards, as were also the majority of the junctions. On the day itself subscribers' lines were dealt with in the following manner (I refer to the instructions issued by Mr. GREENHAM, who



A CORNER OF THE APPARATUS ROOM, NEW GERRARD EXCHANGE.

was personally responsible for the procedure in this as in the other details of work):—Small wooden wedges, $1\frac{3}{8}$ inch long, with a small hole drilled at the thick end, were inserted between the armature and coil of the cut-off relay so as to disconnect "A" and "B" lines, a length of thread having been passed through the holes in these wedges, one thread to a strip of ten relays. This was done a week or so previous to the opening.

These wedges having been fitted, the heat coils were inserted on the main frame. The heat coils of all the arrester bars in the old testroom had linen tape passed behind them, the tape being looped at each end. The bottom heat coil is removed and put into one loop and the coil reinserted between springs. At the given moment a staff of men stationed in the old testroom commenced to pull out the heat coils by means of the tapes, the top end of the tape being drawn outwards at right angles to the bar, thus pulling out all the coils on any bar by one movement.

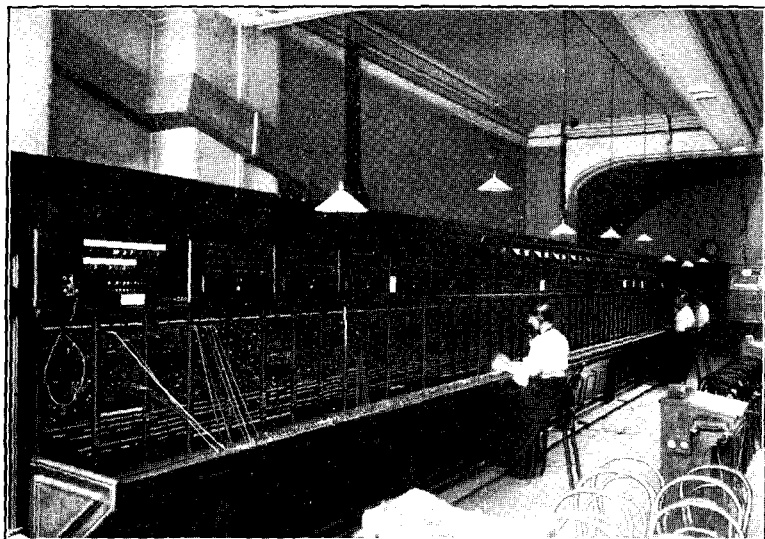
In less than five minutes every line passing through the testroom was disconnected, and word passed to another group of men in the new testroom to commence withdrawing the wedges before

mentioned, by means of the threads. The relay covers were then replaced and the men passed into the exchange to take up previously allotted positions at temporary testing tables stationed in



THE FIREPLACE IN THE OPERATORS' DINING ROOM, OLD GERRARD EXCHANGE.

the front of the operators' positions, and proceeded with the test of all subscribers' and junction lines. Within fourteen minutes the whole operation of disconnecting the old exchange and connecting the new had taken place. The faults on important lines were at once dealt



A CORNER OF OLD GERRARD EXCHANGE.

with by a staff of instrument inspectors, who also carried out tests from the various private branch exchanges on Gerrard.

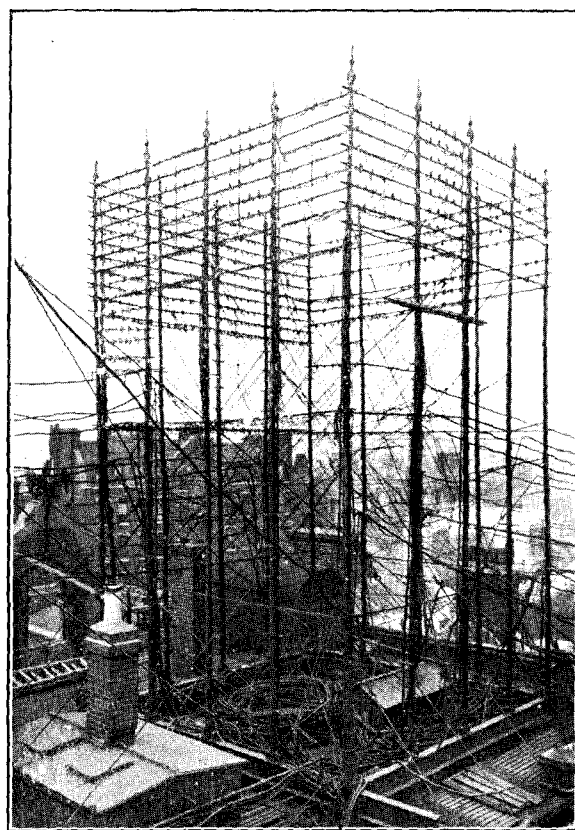
An idea of the extent and capacity of the new exchange will be gained from the following figures:—

The multiple capacity is of 10,400 lines. Present capacity of locals, 9,520.

- Number of "A" positions, 105.
- Number of "B" positions, 48.
- Number of circuits connected to main frame, 15,000.
- Number of working circuits, 12,000.
- Miles of jumper wire used on main frame, 60.
- Maximum discharge rate of battery, 2,125 amperes.
- Output of dynamos in amperes, 800.

As a side issue to the transfer, the electrophone switchboard had to be moved from its present position in the old building to a new position in an adjoining building. This operation commenced after the electrophone service had shut down on Friday night, and by Monday evening a partial service was given. The Electrophone exchange consists of a junction board through which the 300 junctions already mentioned pass, and a theatre board with lines to all the principal theatres and churches.

All the testing work in connection with the Gerrard transfer was practically completed by 8 p.m. on the Saturday, but a small



FRAME ON ROOF OF OLD EXCHANGE.

staff of men came on duty on Sunday to make a re-test of the junctions.

The work of changing the subscribers' instruments to standard central battery type has since been started.

All those engaged on this transfer felt themselves amply repaid for all the hard work and worry entailed when they received the following message from the President, Mr. FRANKLIN, especially as it was endorsed with additional words of commendation from our Superintendent:—

"C. B. CLAY, Esq.

Oct. 1.

"I desire that you will convey to the staff employed in the Equipment, Engineering, and Traffic Departments my entire satisfaction with the change-over which took place at Gerrard Exchange on Saturday.

"The transfer was accomplished with order, method and skill, and is highly creditable to all concerned.

"GEORGE FRANKLIN,
President."

(We are indebted to the courtesy of Mr. W. Gard for the photographs which we reproduce.)

The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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VOL. II.]

NOVEMBER, 1907.

[No. 20.]

PUBLICITY.

THERE has been noticeable for some time past an awakening in general electrical circles to the importance of systematic publicity. Managers of electrical generating plant have begun to realise that electrical energy, either for lighting or power purposes, will not sell itself, or at any rate will not sell itself as quickly as is desirable. As a result of this discovery there has lately been much discussion in the electrical press of methods for educating the great public to a juster and more practical appreciation of the advantages of electricity for lighting, power and heating. This subject of organised and systematic publicity and promotion is one of importance in the telephone business, since so much depends on effectively educating the public in the peculiar advantages of the telephone service. As a large proportion of the most active minds in telephone circles have this matter constantly under consideration—we now have some 40 Contract Departments, whose main object is systematic publicity and promotion—many readers of the JOURNAL will doubtless be interested in the view expressed in other electrical circles on a branch of effort which is somewhat of a novelty in technical work.

Mr. R. BORLASE MATTHEWS, who for some time past has made a special study of central station development, recently read a paper before the Birmingham and District Electric Club, entitled "The Possibilities of Electrical Development," in which some useful and suggestive points are made. At the moment of writing we have not had an opportunity to read Mr. MATTHEW'S paper in full, but we quote from the report and comments of our very practical and always interesting contemporary, *Electrical Industries*, as follows:—

"Right at the beginning of his remarks Mr. MATTHEWS tells a story with a moral. It seems that a chairman of a municipal electric lighting committee, during the course of a discussion on the *per capita* incomes of various electric lighting stations, remarked, when a particularly good instance was brought to his notice,

'Ah, but they have been established fifteen years.' From this simple remark Mr. MATTHEWS evolves a very strong argument in favour of active electrical publicity. It is a fact, observable on all hands, that the older a station the bigger is its business. But why should it be so? The solution, says Mr. MATTHEWS, must be found in the fact that the people of to-day need educating as regards the uses of electricity. Because the older station has had time in which it has gradually carried out this education of the people, it is therefore in a better position than the station only recently established.

"Such considerations as these lead at once to an enquiry as to why it should take so long a time to educate the public to use electricity. Now time is but the sequence of ideas, and the public in any district would take two years instead of ten in learning to appreciate electricity, provided that the sequence of essential ideas about electricity were accelerated five times. Mr. MATTHEWS next proceeds to inquire as to why these essential ideas about electricity are so slowly acquired. On reflection, it is evident that the reason may be found in the electrical information not being conveyed to the people in a simple and thoroughly digested form. 'Consider for a moment,' said Mr. MATTHEWS, 'the college youth of to-day, who starts at a point in the path of knowledge which the foremost philosophers of the past only attained after much patient investigation and original thought. This is possible because the student acquires only the essential and digested ideas of those who have gone before him, and who, in the process of acquiring these ideas, had to lead up to them by a long series of subsidiary ideas that could afterwards be discarded. Likewise the accumulated experience of many people in the application of electricity must be gathered together and the essence presented to prospective consumers in such a way that, busy though they may be, they may rapidly be brought to the point at which they can intelligently consider whether or not electricity would meet their needs better than anything else, and appreciate that nowadays electricity is a luxurious necessity rather than necessarily a luxury.'

If we substitute "telephone service" for "electricity" in the remarks of Mr. MATTHEWS we have our own case exactly and forcefully described. What we want to do is to accelerate the sequence of essential ideas about the telephone service. It has taken and is taking a long time to educate the public to use the telephone service, and in our case perhaps the difficulties are greater than with the purveyor of electricity for lighting and power, because we require to educate people not solely to use the telephone service but to use it in such a way as to get the greatest advantage from it themselves and to allow it to be operated so as to give the greatest advantage to all other users. Shortly put, that means that we want customers, but we want those customers to take the kind of equipment which will give both them and other users a good service.

The reactions in the telephone service are much more complicated than in electric lighting or power work. To the user of electrical energy for lighting or power purposes it matters not a farthing what lamps or motors some other customer has, or how many, or how he uses them. To the telephone user it matters very much what sort of telephone equipment some other user has, how much, and how he uses it. The simple and most numerous case of

the big user with a single flat rate line who is reported "engaged" a hundred times a day, is the most obvious illustration of this peculiar feature of the telephone service. Such a user causes constant bad service to perhaps dozens of others, and does not get himself nearly such a good service as he ought to have—and would have, if he were properly educated.

The "essential ideas" about the telephone service which we wish to instil into the public mind are a little more complex to-day than those which most of us would have catalogued a few years ago. Not only do we need to educate the public regarding the rapidity and completeness of the telephone service—practically instantaneous communication and message and reply complete in one operation—its relative economy in saving time and trouble and increasing efficiency, its actual cheapness from a message point of view, its constant availability and emergency value, and so on through a whole catalogue of indisputable advantages which the telephone has as a direct house-to-house telegraph system, but also regarding the importance of arranging the telephone equipment and service of the individual customer with due regard to the requirements of the customer. This last point, which in its turn encloses a whole battery of points familiar to the expert telephone educator, is one of the most essential of "essential ideas" for the future good of the telephone service. It is a point which is causing no little trouble just now, because its discussion puts an aspect on the telephone service question which is new, and consequently unwelcome, to a large proportion of the public. This only emphasises the necessity we telephone educators are under of "accelerating the sequence of ideas" not merely five, but ten times if we can.

SOME MEASURED RATE POINTS OF VIEW.

HERE and there the measured rate question is still under discussion, but the trend of each debate is along the familiar lines—the protest of the large user who fears that he is about to lose the bargain which the flat rate now gives him. This selfish, but quite natural, attitude of the old subscriber (who occasionally remarks with pride that he has "helped to build up the telephone business," quite forgetting those early days when he could be induced to use the service only by the offer of free supply), leaves some of the most vital points of view wholly obscured. There are three cardinal principles which govern the "telephone question." One is that the telephone service is a message business, another is that the value of the service to the business community—indeed to the whole community—depends upon its efficiency and reliability, and a third is that the value of the service depends also upon its development or scope.

It is noticeable that in the various discussions on the measured rate question many business men have freely admitted the correctness of the measured rate principle, and it is sufficiently obvious that any fair-minded man who examines the circumstances can reach no other conclusion. The telephone service is simply a means of exchanging messages—that is its sole object. What is the unit in other means of exchanging messages? The message, qualified by volume and by distance. No Postmaster-General or telegraph administrator has ever dreamed of charging a "flat rate," an annual subscription, for messages sent by post or telegraph. The posted message, the letter, is paid for by the letter,

with variations in charge dependent on weight and distance. The telegraphed message, the telegram, is paid for by the message, with variations dependent on number of words and distance. Similarly the correct method of charge for telephoned messages, collectively called "telephone service," is by the message, with variations dependent on volume (time the plant is occupied) and distance. The question is somewhat obscured in the public mind by the fact that the constant user of the telephone service has to have a line and telephone in order to send and receive messages, and the line and telephone have stuck in the public mind as representing the whole thing. But any business man must be able to see that labour and plant costs must vary according to the volume of messages handled and the distance over which they are carried. When we come to examine the subject in a practical way, we are forced to wonder how the early telephone administrators could have done such a fatuous thing as to establish a flat rate for telephone service.

Our second cardinal principle, the fundamental importance of efficient and reliable service, is almost entirely neglected in the popular measured rate discussion. Many people talk about the telephone service as if it were the same thing as it was fifteen or twenty years ago, when the rate they now pay was originally fixed. It is not. It has expanded in every direction, and the difficulties have grown proportionately. The area over which the service is supplied has extended, which greatly increases plant costs, and the volume of daily traffic has been multiplied many times, which increases both plant and labour costs. A more scientific style of plant and a more complex organisation are required to deal with a greater traffic flowing in all directions over a greater area. With the increased facilities there naturally grows an increased use and the tendency is in all classes of business to rely more and more on the telephone service and constantly to transfer messages from other means of transmission to the telephone. To cope adequately with this steady transfer of messages from post, telegraph and hand messenger to the telephone lines, it is essential that the service shall be highly efficient and reliable—that every call shall quickly and accurately find its billet. It is of the essence of the contract, to borrow a bit of business slang, that the telephone communication shall be instantaneous and effective. To the business man a large proportion of the value of the telephone service is lost if a large proportion of his daily calls are not instantaneous and are ineffective. At present the "engaged" trouble is the big blot on the efficiency of the telephone service, and it is a blot made by the flat rate. It is impossible to give from the inside an efficient service if many of those at the outer ends of the lines persistently—though often unknowingly—prevent the service from being efficient. This is precisely what the flat rate encourages a large proportion of telephone users to do. The measured rate, with the private branch exchange, provides a most effective cure for this great difficulty, whereas under flat rates it could only grow in intensity. The measured rate principle is therefore a powerful lever in raising the efficiency of the service, and to the business community a highly efficient telephone service is of prime importance.

The third cardinal principle, the value of high development of the telephone system, is also very generally overlooked. There is

occasionally found an extremely short-sighted person who says that if he can reach his particular circle by telephone that is all he wants, and that he would prefer a telephone system which should serve his particular circle only. But it is common experience in life that circles tend to widen, and in business a constantly widening circle is usually deemed desirable. That the value of the telephone service to the user depends in great degree on the number of other users whom he can reach or who can reach him by telephone is so patent as hardly to need argument or demonstration. Yet it is a point that is frequently lost sight of, and curiously enough it has been totally ignored in the recent discussion by the very people—retail tradesmen—to whom a large and constantly widening circle of telephone users should most forcibly appeal. The grocers have said that “telephones” are a necessity in the grocery trade, and consequently they oppose any change in rates. But why are “telephones” a necessity to grocers? Because a certain proportion of private houses now have telephones and buy their groceries by telephone. The measured rate scheme encourages the small user—the householder especially—to come on to the telephone service and so tends to make the service more valuable to grocers—and to all tradesmen—than it could possibly be under flat rates, which discourage the small user. One would expect to find all retail tradesmen strong supporters of the measured rate tariff, for the simple reason that it is calculated largely to increase the number of customers able to reach them by telephone. But the grocers, like many others, have overlooked the important principle that the value of the telephone service is largely dependent on its development or scope, and have not examined the subject closely enough to see that a measured rate tariff, with its low charges for small users, must result in a great increase of telephones in the very places where grocers and other traders most want telephones to be.

HIC ET UBIQUE.

THE *Globe* in a recent issue quotes from a somewhat old American humorous article: “After two or three lessons any American can use a foreign telephone. All he has to learn is which end to put to his ear, and how to keep two or three springs pressed down all the time he is talking. In America he takes down the receiver and talks into the ‘phone. Elsewhere he takes the entire telephone down from a rack and holds it the same as a slide trombone.” When this was written the common battery system was not very extensively used in Europe and was practically universal in America. Now various American telephone papers are exhibiting an advertisement showing a pleasing damsel, with the smile of a picture postcard actress, talking into a hand-combination set, and headed “The Easophone Girl Smiles.” No doubt she smiles because the “slide trombone” for which you require three lessons (according to the humorist of her native land) before you know which end to put to the ear, is now vaunted as the *dernier cri* in telephones.

An article in the *Financial Times* on Paraguay says that the telephone companies in Asuncion have to work for their money. Men ring each other up to say good morning, or to enquire kindly how they slept last night. Once a Paraguayan who had lost a mule insisted on all the subscribers being asked by the exchange if they had seen it. The mule was recovered but the telephone company “bust.” We can assure the writer that a telephone company which has to work for its money presents no element of strangeness, and as regards the mule story, he may not be aware that in some American exchanges sections of the switchboard are set apart specially for “kickers.”

A Scottish evening paper tells of a business man who rigidly set his face against the telephone in the home. He had enough of it at business and had the dread that if ever the dirl—we have made a mental note that in Scotland you say “dirl” of telephone bells and “skirl” of bagpipes—of the telephone bell sounded in his house, the home would never be the same place of restful quiet. However, one servant after another left the place on account of its loneliness, and great difficulty was found in getting a domestic to stop. At length a treasure was secured, or nearly secured, but she first demanded to know if there was a telephone in the house, as a house without a telephone was so lonely that she would not stay in it. Thereupon the householder surrendered. We do not know that this tale points any moral, unless it be that humble folk are often the instruments of conversion of the stiff-necked. Possibly it is to be taken as a sign of the times, and the lady help of the future when stipulating for the number of evenings out will add to the “use of the piano” the “use of the telephone.”

A GLOUCESTER correspondent sends us a wonder-moving account of the performance of a zoographic-mesmeric gentleman who hypnotises people over the telephone. The zoographic-mesmeric gentleman goes into a call office and rings up his subject at the Palace Theatre who straightway falls either asleep, shivering, perspiring, neuralgic, or what not, into the arms of a complaisant attendant pressman, at the bidding of the mesmerist. Our correspondent thinks that operators and linemen should be careful how they “come on the line” when this gentleman is in their neighbourhood, as it would be inconvenient to fall into a mesmeric sleep, the former at their posts at the switchboard and the latter perhaps at an uncomfortable altitude of 50 feet. He forgets, however, that there would be no convenient pressman’s arms to fall into, which we think would make all the difference in the performance.

A BRIDGE CABLE AT BURTON-ON-TRENT.

By J. E. GREAVES, *Local Manager.*

Two sections of armoured cable have recently been laid at Burton-on-Trent. One section is fixed to the Trent Bridge—a stone bridge 470 yards in length, over the river Trent, connecting the

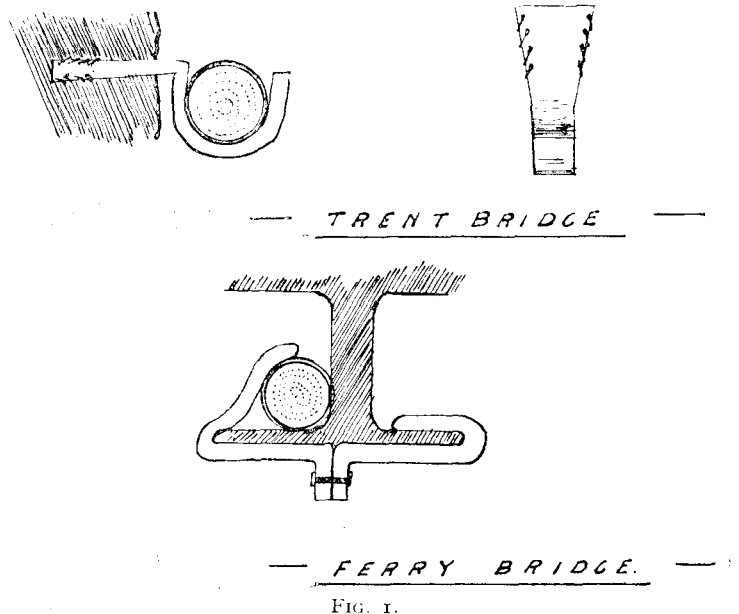


FIG. 1.

town with the suburbs of Newton and Winhill. The other section is fixed to the Ferry Bridge, a girder bridge 650 yards long over the river Trent and adjoining marshy ground, connecting the town with Stapenhill.

The cable on the Trent Bridge is an armoured 250-pair 10-lb. conductor; the ordinary lead sheathing is coated with tarred yarn and then covered with stranded steel wire, the whole being covered

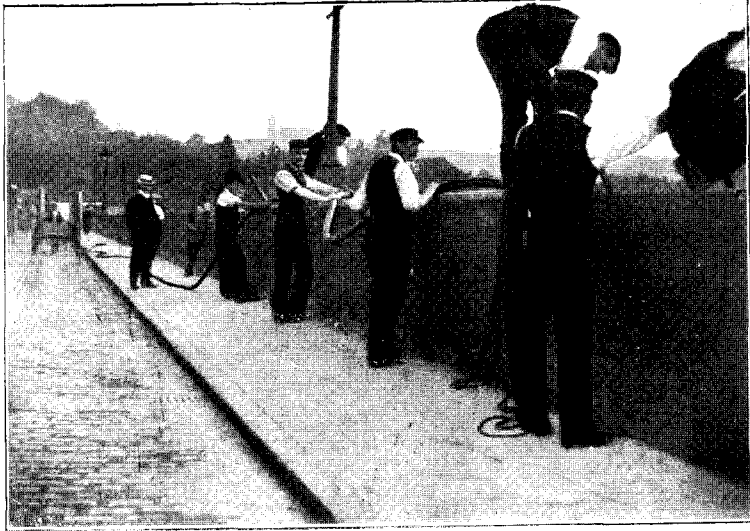


FIG. 2.

with a further coating of tarred yarn. The total diameter is $2\frac{1}{2}$ inches and the weight just over 7 lbs. per foot.

The part of the bridge crossing railway sidings was dealt with

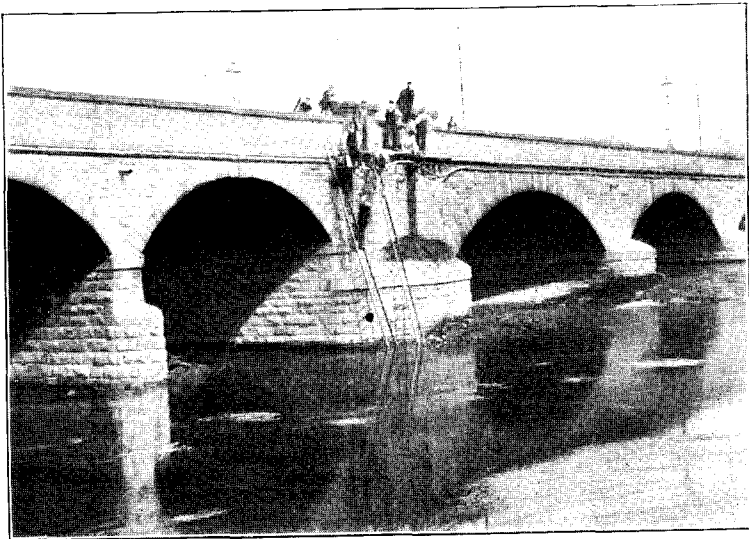


FIG. 3.

by ordinary pipe work underneath the metals, leaving some 380 yards of armoured cable to be fixed. The cable was suspended by means of special iron clips let into the stone work at intervals of about

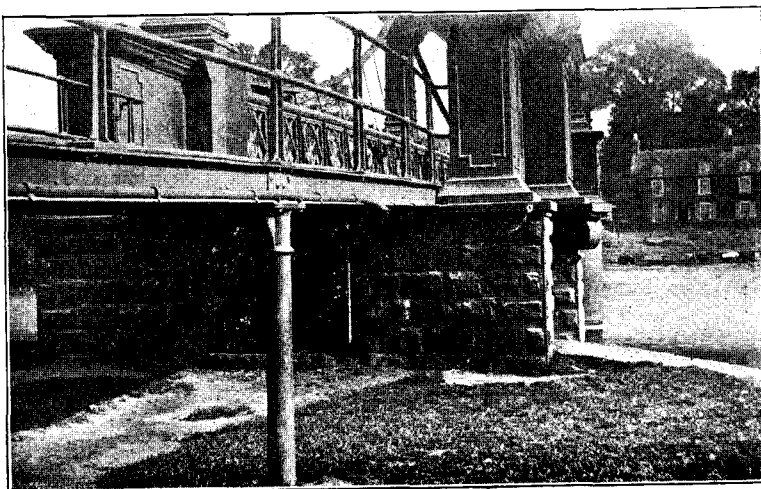


FIG. 4.

4 feet; the clips are shown by the drawing, Fig. 1; the shanks are from 4 to 6 inches long, the length being regulated according to the projections of the stone work so as to give the cable as straight a line as possible. As the facing stones of the arches could not be plugged, clips with longer hangers had to be provided for the centre of each arch. Clips with Lewis bolts were used for fixing to the buttresses of the bridge, these being adjusted after the cable was up. In all 259 clips were fixed, each clip being run in with lead. Stonemasons were employed for fixing the clips. The actual laying of the cable took two days. The cable was in two lengths. The force employed was nine men including the foreman.

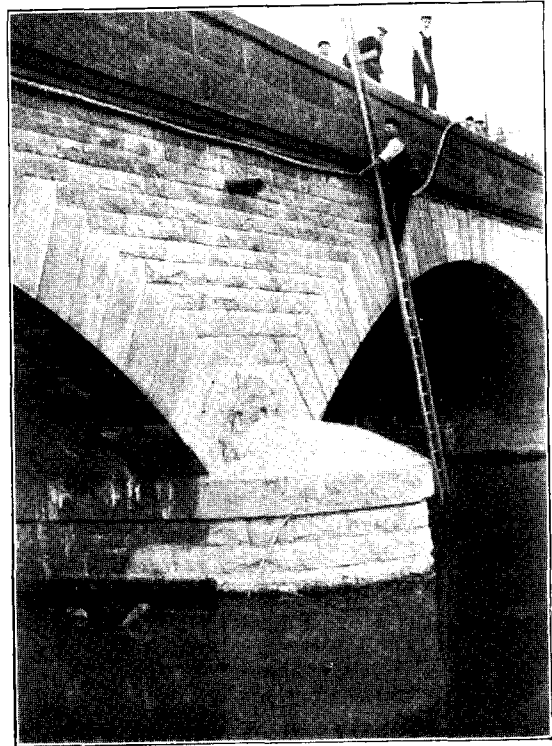


FIG. 5.

Fig 2 shows the cable being run out, and Fig. 3 gives a more extended view of the bridge.

Across the Ferry Bridge a 100-pair cable of similar type has been laid. The diameter of this cable is $1\frac{3}{4}$ inches and the weight about $3\frac{1}{2}$ lbs. per foot. The cable is laid along the flange of the girder and held in position by the clips shown in Fig. 4, which are fixed 3 feet 6 inches apart. Where the bridge crosses the river the cable is laid through the stone piers, and then runs along the lattice work underneath the bridge. The cable was laid in two lengths, one length being dealt with each day. Fig. 5 gives a view of the bridge and shows the cable at the side.

NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY.

The following entertainments have so far been arranged to take place during the coming winter in aid of the funds of this society:—Tuesday, Oct. 29: Cinderella Dance (Holborn Town Hall), tickets 2s. each; Wednesday, Nov. 13: Lecture by Raven Hill, of *Punch*, on "A Humourist at Large"; Wednesday, Nov. 20: Whist Drive; Wednesday, Dec. 11: Lecture by Madame Sarah Grand, on "Mere Man"; Wednesday, Dec. 18: Grand Concert (Holborn Town Hall), tickets 1s. each; Wednesday, Jan 8: Lecture by Richard Kearton, F.Z.S., on "Wild Nature's Ways"; Wednesday, Jan 29: Conversazione (Holborn Town Hall); Wednesday, Feb 12: Lecture by Miss Millicent Murby, on "George Bernard Shaw, Dramatist"; Wednesday, March 11: Lecture by the Rev. C. H. Grundy, M.A., on "Fads, Hobbies and Eccentricities." Tickets for all the above events may be obtained of any of the society's collectors, or of Mr. Guy Buckeridge, 114 Salisbury House.

At the monthly meeting of the above society the undermentioned grants were made:

1. Engineers' Department (a)	£4
2. Maintenance Department	£5

CORRESPONDENCE.

A PROTEST FROM BRIGHTON.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

This letter may not perhaps be of general interest, but it will at least ventilate a grievance.

It is not always pleasant to hear disparaging remarks made by fellow-workers. I understand that the remark has been made that there is "more sport than work in Brighton." This remark is probably caused by the fact that your special correspondent takes the trouble to hunt up the news from the various clubs existing among the Company's staff, and I think that if all districts were to do likewise the result would be a much more popular JOURNAL. At the same time, may I be allowed to remark that in Brighton the staff has been so busily engaged in the Company's interests that they have not had time to talk about it, and if some of those friends who pass such caustic remarks had happened to be in Brighton during the late pressure it would possibly have turned their hair grey.

At the end of June, 1905, the number of stations in Sussex was 5,093; at the end of last month it was 8,940. This result was not accomplished without work. Brighton, September, 1907. S. PARSONS, Special Correspondent.

[Mr. Parsons perhaps gives undue importance to a bit of idle gossip. Those who know Brighton and the Brighton staff, know that the opposition was not beaten to a standstill without plenty of hard work; that the excellence and thoroughness of the "team work" which accomplished such great results should also shine on the field of sport is only natural.—Ed. "N. T. J."]

RE HOSPITAL SATURDAY FUND AND CONVALESCENT HOMES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THE letter from Mr. Waller appearing in the September issue has been discussed, and it would appear that a simple way out of this difficulty would be for each weekly subscriber to be allowed to say in what way his penny shall be apportioned. For instance, the collector in a department would only require a slip of paper ruled into three columns:

Name.	To Hospital Saturday Fund.	To Convalescent Homes.
F. J. M.	d. ½	d. ½
M. J. F.	1	..

Collector

This would do away with the collecting card at present used.

The amounts would be remitted each week to a secretary, who would undertake to keep a record of all sums and from which department subscribed. No doubt many would be glad to give a penny each week to both funds.

The sum for the Hospital Fund could be remitted quarterly as at present, and the remainder be dealt with by a committee, who would have power to arrange with certain convalescent homes according to the amount at their disposal. This committee would also have to regulate the sending of members of the staff to the homes.

It is always difficult to get the staff to take an interest in a matter of this kind, and generally, those few who do move, are accused of a desire for self-prominence or even baser motives, but, realising that steps must be taken, the undersigned have decided to call a meeting of the members of the Metropolitan and Head Office staffs in order to bring the matter to a definite issue, and, if possible, to appoint the necessary officers.

It should be remembered that this effort is *entirely outside the Staff Benevolent Society*.

Meeting will be held on Monday night, Nov. 11, at the Committee Room, Salisbury House, 6 p.m.

There will no doubt be several ladies and gentlemen who cannot attend this meeting, but it is an easy matter to acquaint Mr. Waller or any one of us with their views which would be helpful.

It is certain there are many who do not at present subscribe, but who will do so under the new arrangement.

- T. CAPARN.
- J. K. WATERS.
- A. BASCOMBE.
- G. F. GREENHAM.
- V. BALDWIN.

RE HOSPITAL FUND COLLECTION.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to Mr. Waller's letter in the August JOURNAL suggesting that half of the amount collected for the Hospital Saturday Fund should be earmarked for the purpose of establishing a Convalescent Homes Fund, I, as a contributor to both funds, must entirely disagree.

The contributions to the Hospital Fund are given with a view to helping all classes who require medical treatment, etc., whether they are employed by the National Telephone Company, Limited, or any other firm, and I for one would refuse to contribute further to this fund if half my subscription were diverted to some other object.

I note from a recent circular that the income of the Benevolent Society is at present about £120 per annum and the amount of grants for the past half-year has been £66 5s., viz., about half the income.

If it is desired to start a convalescent homes branch, why not do so in connection with the Benevolent Fund?

Mr. Waller states that the cost of providing accommodation at either the Alfred Bevan, Morley House, or Rustington House Homes would be in the two former cases £40 per annum and in the latter £30 per annum.

Having some experience of the three homes mentioned I would like to point out that arrangements could be made at much less cost than that quoted.

Patients could be sent to the two former homes at a cost of 14s. per week for maintenance and 5s. railway fare, and to the latter for 12s. per week and railway fare of 5s. It might be considered desirable to make a small charge to those making use of the homes of, say, 5s. per week and the cost of their railway fare, and if this were done the cost that would fall on the Benevolent Fund would not be more than 9s. and 7s. per week respectively.

It may be objected that delay may occur in sending men away, but there are other homes equally as reasonable and efficient where there is little or no delay. Salisbury House, Sept. 6, 1907. ERNEST F. GRAY.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

CERTAIN members of the staff seem to have a very poor idea of charity. Some actually begrudge a paltry penny per week paid to the Saturday Hospital Fund, and suggest that half should be devoted towards the maintenance of beds at convalescent homes. I, for one, subscribe my penny not only for the benefit of my fellow-workers, but if any is to spare I consider it should be devoted in helping others outside the Company, and believe this is what the majority of subscribers do. They say, and rightly, that charity begins at home, but for heaven's sake do not let it stop there, or else it would not get very far and the suffering we see so much of around us will be greatly increased.

I shall be glad to hear views of other members through the medium of TELEPHONE JOURNAL.

Aug. 30, 1907.

F. A. WATERS.

CONVALESCENT HOMES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

ADMIRABLE was the suggestion made by Mr. A. T. Waller in your last issue concerning the use of the money collected by the staff for the Hospital Saturday Fund

He urged that half the contributions should go to the hospital and half to the convalescent homes. It is highly desirable of course that one should be able to obtain a bed in a hospital in the event of sickness, and it is equally desirable, if not more so, that one should have immediate access to a convalescent home at a period when a stay by the sea is so helpful towards recovery.

It is not a little singular that a scheme such as Mr. Waller suggests has not been in force long before this. Large firms in the Metropolis, as is well known, have placed these excellent facilities at the disposal of their employees, and, from a purely business point of view alone, the results have been eminently satisfactory.

Telephone employees, like others, are the victims of nervous disorders in this strenuous age. Short rests in convalescent homes would, I believe, obviate lengthy absences from duty.

Hammersmith, September, 1907.

FRANCES M. NELLER.

AERIAL CABLE SLINGS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. PEARSON'S letter in the JOURNAL for October misses the point. My diagram "B" does not show the angle which the cable will assume in practice, but by showing the possibilities of the case, proves that the sling will be less likely to bite than in the other direction.

It is also clear that for the same reason the end of the hook will not get entangled in the suspenders nor will it slip off. In my experience, though only five years, neither of these contingencies has occurred.

Cambridge, Oct. 9, 1907.

E. J. WOODS.

COMPLETION QUERIES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. W. S. COULSELL'S description of the system obtaining in the Portsmouth engineer's office is very interesting; but I hope he will pardon my saying it is somewhat beside the mark. One point, however, it does bring out very clearly, and that is, in common with the London practice of inviting inquiries as to non-completions, it involves a certain amount of unnecessary labour.

Where new lines are completed with such remarkable rapidity the necessity for recording progress on each individual line disappears, and therefore the card is superfluous.

The non-completion of lines brings about correspondence.

It is just as necessary for our engineers to avoid correspondence, and so be enabled to employ their time more profitably towards the completion of the lines, as it is necessary for the contract managers to avoid entering into detail of construction difficulties in order that they may employ their time looking for new business. The former is avoidable, the latter is unavoidable owing to the fact that the contract manager cannot—even if he be so inclined—avoid his responsibility to his customers.

Referring to the Metropolitan engineer's letter, I would say that granting the bulk of our orders are for single lines, the salesman who convinces his customer that his interest in him has not finished with the signing of the contract secures a friend and an enthusiast who recommends other single line customers.

I quite appreciate the engineer's desire to be brought as soon as possible into touch with the man requiring the line, but that is the sequence of his having received the order to carry out the work and is not affected by my proposition.

It will be generally agreed that much weight must be attached to Mr. Taylor's advocacy of the system he found in vogue in London, but that which will do for London will not do for the provinces.

Manchester, October, 1907.

HENRY ELLIOTT, Contract Manager.

POTHEADS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. FROST rather misses the point in my March letter. I do not suggest that the work of actually making the pothead should be divided between three or four men, but that it should be taken in hand by a smart man specially trained as cable joiner and picked out by eliminating those men who have not shown aptitude for the work.

It is not I think the rule to stand wiremen off in wet weather if any work can be found for them under cover, and the preparation of the leads was what I suggested. This would, of course, be done under the supervision of the foreman, who certainly ought to have sufficient control over his men to stop any nonsense as to choice of jobs, and I do not think any query would be raised over the small amount of 20/10, or 22/15 that might be cut to waste while the most handy men were being picked out, even if every man in the centre was allowed to try his hand at stripping leads. The great principle I aim at is to make my men as thoroughly "all round" as possible, and this particular job is only an example.

During the past three months I have completed a considerable section of underground work, including pipe laying, done entirely by my underground gang, not one of whom had seen a telephone cable before I picked them up—out of work—less than two years ago, and I think I may safely say that the cost and quality of the work would compare favourably with that done by any working party in the country.

It can hardly be denied that men trained all round, as far as it is possible to do so, are a better asset to the Company than those who would have to depend on someone else for the preparation of potheads, or other special jobs.

Of course local circumstances must always control the application of any principle, and I can quite realise Mr. Frost's difficulty in a scattered district, as the outlying exchanges in the Weybridge centre are only from three to five miles away from the stores and in each case nearly a mile from the railway station.

Weybridge, October, 1907.

J. STUART BEST.

STORES LEDGERS—"TOOLS ACCOUNT."

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. OLIVER appears very much perplexed, and anxious to secure a low average figure on the stock of tools, but if the suggestions he advocates were put into force I should be very sorry to see the results at stocktaking, although not surprised.

As a stores clerk I would ask Mr. Oliver to accept my remarks kindly, as it is my intention if possible to clear up confusion. If we refer to the Service Instruction Book, Div. B, sec. B2, page 6, paragraph 40, we there find the object of B 65 book explained to us: "It is an inventory of tools handed over to the possession of a foreman or workman for his use, who signs for the tools issued to him." This book is to be kept by the storekeeper or in the local office, and consequently this B 65 book is a receipt for the tools handed over by the storekeeper.

Further, it is the duty of the storekeeper, local manager, engineer, resident inspector or officer that may be in charge to compare these tool account books periodically with the tools held. If tools are found to be useless or worn out, paragraph 41 makes provision for credit being given when returned by the officer responsible for the tool, and for the defective tool being ultimately condemned by the district manager and replaced by new if necessary. On the other hand, if tools are lost or unaccounted for, paragraphs 42 and 43 are adhered to.

As far as value is concerned, it is not necessary that this information should be given in B 65 book, otherwise provision would have been made for it. The value of tools, as already known, is recorded on the stores ledger cards, controlled by the stores clerk. The stores clerk does not look to the B 65 book for the survey stock, but I require this information from the local office or engineering department in the same way as at annual stocktaking. As long as the tools are in stock and survey stock agrees with ledger, it does not matter to me who holds them. B 65 book is entirely an engineering or local office department book, to be kept and controlled by that department; the stores clerk has nothing whatever to do with that book, but is responsible for the clerical work and keeping a correct record of value, which can only be done by good management and careful attention from the local office.

In my opinion the present system cannot be improved upon, providing one and all strictly adhere to the service instructions. The B 65 book is indispensable. It is compact and fully adequate for its purpose. Instant information can be obtained of the length of time a tool has been in the possession of a workman, and it gives all useful evidence in case of dispute. The only purpose for which the tool account books are required in the district office is to see that they are being kept up to date in accordance with instructions and that any tools requisitioned for are absolutely necessary.

With regard to keeping down the average stock of tools, my advice is to act as you would in your own household or personal expenses:—Have only that which is really required. It is well understood that larger districts have less than the average figure, but in a smaller district with, say, six centres and stores, it is absolutely necessary that the various gangs should be fully equipped with good tools to turn out the quantity of work required by the National Telephone Company. If there is underground construction proceeding or if the district is being opened up by new exchanges extra tools are required, which handicaps that district for a time. However, Mr. Oliver has the consolation that Coventry is below Gloucester, and on this I congratulate him.

Gloucester, June, 1907.

S. G. HARE.

MATHEMATICS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. HERINK's suggestion of the issue of another mathematical course seems to me a very good one.

After mastering the use of logarithms and algebra, say to indices, anyone wishing to understand the calculus is faced by the task of wading through about three stages of pure mathematics, a too lengthy process for most of us; failing that he may proceed to tackle an "Introduction to the Calculus" directly.

These truly awful works produce an indescribable impression on the ordinary mind, and in my opinion if a man after reading, say, three chapters of such a work proceeded to kill the author of the same, "justifiable homicide" ought to be the verdict.

A course, or even a book which really did form an introduction to the use of engineering calculus, providing it were written so as to be comprehensible to any ordinary man, would be of great value, as many advanced engineering works simply bristle with calculus formulae.

If any member of the staff knows of such an introduction would he kindly oblige with the names of author and publisher? But please note that I have two of the usual introductions for sale cheap and in splendid condition, "only used a few times."

Carnarvon, Sept. 9, 1907.

J. B. SALMON.

WHAT THE COMPANY IS DOING.

DURING the past month the Company has opened exchanges at Draycott (Nottingham), Bratton, Beckington, and Lavington (Bristol), Castletroy and Crosshaven (Cork), Staveley (Barrow), Helston (Plymouth) and Redbourn (Herts and Beds), making a total of 1,387. New stations were added during September to the number of 2,689, total 437,409.

LONDON.—Private branch exchanges have been arranged for on the latest principle at the Hans Crescent Hotel, with twelve junctions, 26 stations, and 8,000 calls; Mortons Hotel (Russell Square), with two junctions, two stations and 3,000 calls; Carlton Hotel, with ten junctions, 150 stations and 25,000 calls; and Great Western Railway, Paddington Telegraph Department, with seven junctions, 23 stations and 40,000 calls.

LANELEY.—The laying of conduits for underground work has been completed and the cable is on order. This is a joint scheme, one-half of the town being dealt with by means of overhead lead cables, to carry which several poles have already been erected, and the other by underground work.

EAST KENT.—The new district offices for East Kent were opened at 11 Bench Street, Dover, which replaces the old address at Canterbury.

LIVERPOOL.—A new common battery party line section equipped for 360 lines, with capacity for 480 answering equipment, is being fitted at the Royal Exchange, with a three-position transfer section. The repeating coil rack has a capacity for 432 repeating coils, and is fixed in the basement of the building, the cables being carried by a special trough passing through two floors. An additional private branch exchange fuse panel for 200 lines for alternating, positive and negative pulsating ringing is provided, both sections being fitted with machine ringing keys for selective ringing. It is also intended to provide ringing current to outside private branch exchanges from this fuse panel.

At Central Exchange a six-position monitors' table is being installed, the table being fitted with common battery apparatus, adapted for a magnet system, and is equipped for 120 incoming lines, 36 lines being provided for observing and intercepting calls, with special cords and calling equipment for observing party lines. An instruction circuit is being fitted to 93 operators' positions and calling circuits for thirteen supervisors.

EDINBURGH.—Large underground extensions have been recently completed in the Southside, Lauriston and Murrayfield districts, giving a total additional mileage of 5,356 miles. The extension in Morningside district is expected to be finished soon and will add yet another 2,200 miles. The completion of these works removes great obstructions from the Contract Department's way, and the districts tapped should yield a good return, as they are populous and growing.

Portobello and Granton systems are in course of conversion to underground working, the estimates together totalling nearly £11,750.

At the Central Exchange a two-position exchange manager's desk and a two-position exchange monitor's desk have been installed and have justified their introduction in the better working and neatness of the exchange.

The private branch exchange principle has met with immediate appreciation in the city, the number of private branch exchanges completed to Oct. 17 being 88, with a total of 476 stations.

BRISTOL.—An order has been obtained for a private branch exchange at the Queen's Hotel, Clifton. The present installation will consist of two exchange lines and 21 extensions.

WINDSOR.—An order is being arranged with the Crown authorities for an important extension of the existing telephone system to various points in Windsor Great Park. The installation at the

Castle includes 50-line and 20-line switchboards, with junction lines to the Windsor and Westminster Exchanges.

OXFORD.—It has been arranged to add a third multiple section to the Oxford switchboard, owing to the rapid growth of the system.

SUSSEX.—The Western Electric Company have begun the installation at Kemp Town exchange of the new common battery switchboard.

The Hastings switchboard is being increased by 360 subscribers.

PORTSMOUTH AND ISLE OF WIGHT.—A contract for a private branch exchange installation has just been obtained from a large firm of shipbuilders in Cowes. The installation will consist of 28 stations, three junctions and 10,000 calls.

BRADFORD.—*Central Exchange.*—The Western Electric Company have commenced operations for the installing of five common battery subscribers' sections and three junction sections, also for the erection of a new main frame and intermediate distributing frame and power plant.

Underground Cable.—The work of drawing in and connecting up a length of 2 miles 1,087 yards of 205-pair composite cable has been completed. This will enable subscribers to be connected in the best residential part of the city. The exchange derrick has been demolished and the subscribers connected through underground distributing points in the immediate locality.

ABERDEEN.—During the month of September nine orders were received for private branch exchanges, representing 21 junctions, 46 stations and 42,700 calls.

CORK.—*Underground Extensions.*—One mile 1,140 yards of cable has been put down.

A private branch exchange has been fitted at the Hotel Imperial with six stations, and another one at the Hôtel Métropole with thirteen stations.

CARDIFF.—*Rhondda Valley Tramways.*—The construction of tramways throughout the whole of the Rhondda Valley renders it necessary for the Company to reconstruct ten miles of their main junction routes.

Porth Exchange.—The exchange here has been transferred to another room in the premises and an additional 50-line switchboard has been erected, the old pattern test board having been replaced by a new 120-line cabinet board with lightning arresters and heat coils.

Aberdare Exchange.—The exchange here has been removed to another part of the premises. An extra 50-line board has been installed. The new testroom occupies the site of the old switchroom, a 250-line test frame fitted with lightning arresters and heat coils having been fitted.

Newport Underground Work, Pill Section.—This section of the underground scheme has now been completed, and 938 yards of pipe have been laid. The length of the various sizes of cable used is 1 mile 1,326 yards. In connection with this scheme 1,040 yards of aerial lead-covered cable has also been erected owing to difficulty in obtaining wayleaves for underground pipes on private property.

LOCAL TELEPHONE SOCIETIES.

Manchester.—The following is the syllabus for the coming session:—1907.—Oct. 25: "Pages from a Notebook," A. Magnall; Nov. 8: "Rubber as Applied to Cables," C. Speigelhalter, B.Sc.; Nov. 22: "Telephony as a Career; Its Present and Future Prospects," J. Scott; Dec. 6: "Sound," W. Wilson, B.Sc.; 1908.—Jan. 10: "Development Studies and Why They are Necessary," A. Watts; Jan. 24: "Office Routine and Organisation," T. J. Clark; Feb. 7: "Common Battery Working," W. M. France; Feb. 21: "Members' night"; March 6: "Copper. From the Mine to the Scrap Heap," A. Stewart; March 20: General meeting. The Engineer-in-Chief, Mr. Gill, has promised to address the members during the session.

Glasgow.—The syllabus of meetings for 1907-8 is as follows:—1907.—Nov. 6: Inaugural address, Mr. F. Douglas Watson; Nov. 20: "The Value and Application of the Scientific Spirit," Mr. A. B. Gilbert; Dec. 4: "Some Further Notes on Technical Terms," Mr. T. Pettigrew; "Telephone Accounting," Mr. J. W. M'Donald; Dec. 18: "Some Notes on Engineering Matters," Mr. J. T. Whitelaw. 1908.—Jan. 15: Announcement will be made later; Jan. 29: Symposium—"The Measured Rates," Members; Feb. 12: "Telephone Operating as a Profession," Mrs. Peters; "Some Experiences of a Lady Contract Officer," Miss McIntosh; Feb. 26: "Development Studies and Why They are Necessary,"

Mr. A. Watts (Engineer-in-Chief's Office, London); March 25: Business meeting.

Bradford.—The first meeting of the session was held on Oct. 16, when about 30 persons were present, the chairman (Mr. H. B. Sutcliffe, District Manager) presiding. A paper was read by Mr. J. H. Hall, district office cost clerk, on "Capital and Revenue." The subject-matter was of an interesting nature, dealing with the compilation of the budget, and was an exposition of the details which are necessary to make up this form.

A further paper was given by Mr. J. W. Stelling, local manager, Halifax, on "Division of Inspectors' Districts." This paper, which included a large number of statistics showing how various areas can be divided up economically, was listened to with interest, and several of the officers present desired that the details should be copied.

The following is the syllabus for the session 1907-8:—1907: Oct. 16, short papers, members of staff; Nov. 20, "Telephony as a Profession: Present and Future," Mr. J. Scott; Dec. 18, "Common Battery Working," Mr. France; 1908: Jan. 15, "Why Development Studies are Necessary," Mr. Watts; Feb. 10, "Some Natural Phenomena in their Relation to Telephone Practice," Mr. C. Wicker; March 18, "Secondary Batteries," Mr. C. Wood; April 15, general meeting.

Birmingham.—On Sept. 30, at a meeting of representatives from the operating staff, it was decided to form an operators' telephone society for Birmingham, having for its object the reading and discussion of papers of general interest on matters concerning telephone practice. The society is to be called "The Birmingham Operators' Telephone Society," and the meetings are to be held on the second Thursday in each month and to be open to all members of the Traffic Department. A strong committee was elected with Miss Morrall as secretary.

The first meeting of the session was held on Oct. 10, when a paper was read by Mr. C. W. Piggott, Traffic Manager, on "Some Aids to Good Service," the chair being taken by Mr. E. Williamson, District Manager, who, in his opening remarks, welcomed the new society and wished them every success.

At the next meeting, on Thursday, Nov. 14, a paper will be given by the District Manager, Mr. E. Williamson, on "Some Notes on the History and Development of the Telephone Service," which will be fully illustrated with the oxy-hydrogen lantern.

Other papers have been promised, and from the interest already shown it is thought that this society gives promise of a very successful season.

Cardiff.—A general meeting of the staff was held on Sept. 26 to appoint officers and arrange the programme for the following session, 1907-8. Mr. J. James was in the chair. The following officers were appointed:—Mr. R. A. Dalzell, Mr. J. James, Mr. B. Waite, Messrs. J. D. Duncan, W. Kirk, W. Riley, S. F. Whetton, W. Edwards and C. Hooper and the secretary. The following is the syllabus for the session:—1907: Oct. 10, "Wireless Telegraphy," Mr. Field, Newport; Nov. 7, "The Loading of Telephone Cable Lines and other Transmission Studies" (limelight), Mr. Cohen, London; Dec. 5, "The Works Order," Mr. Kirk, Cardiff. 1908: Jan. 9, "Contract Department Working," Mr. Duncan, Cardiff; Feb. 6, "Review of Past Twelve Months' Work in the Province," Mr. Dalzell, Bristol; March 5, "Practical Side of Underground Construction," Mr. James, Cardiff.

The first meeting of the above society for this session, 1907-8, was held on Oct. 10, and there was an attendance of 54, including eight visitors (operators). The chair was taken by the vice-president, Mr. J. James. A paper was read by Mr. G. Field on "Wireless Telegraphy," which was thoroughly appreciated by all present. In the first part of his paper the lecturer dealt with the growth of wireless telegraphy from its inception, followed up by explanations of the experiments that were conducted by various scientists, bringing it to its present state of perfection. He next outlined the general theory of wireless telegraphy, and with the aid of some very excellent diagrams explained in a very lucid manner the working of the various parts of the transmitting and receiving apparatus. He afterwards demonstrated with a model apparatus. It is pleasing to note that this apparatus was constructed by the lecturer himself, and that the demonstrations were carried out in a highly satisfactory manner. A lively and very interesting discussion followed, after which the usual vote of thanks to the lecturer and chairman brought a most interesting meeting to a close.

At a general meeting of the operating staff held on Sept. 30, it was decided to form an "Operators Telephone Society." The District Manager (Mr. B. Waite) was elected president, Mr. Marsh (Exchange Manager) vice-president, and Miss E. Compton (supervisor) secretary, with a committee consisting of Misses E. Collier, M. Osborne, N. Loyn and D. Chandless. In order that no time should be lost, it was decided to hold the first meeting on Oct. 8. The District Manager presided at this inaugural meeting, when Mr. Marsh read a short paper introducing the subject of "Observation Service Testing," and also explained by blackboard illustrations how the various classes of calls were dealt with. A very interesting discussion took place, several members bringing forward a number of important questions, which had special reference to their work. Unfortunately, the weather turned out very stormy on the night of the meeting, so that it was not quite so well attended as had been anticipated, although 35 members were present out of a possible 50. At the close of the first meeting, the president suggested we should extend the list of vice-presidents, with the result that Messrs. J. James (Local Manager), W. H. Kirk (Chief Clerk), J. D. Duncan (Contract Manager), S. F. Whetton (Chief Inspector) of Cardiff, and J. Riley (Local Manager, Barry) were duly elected.

Coventry.—The annual meeting of the members was held on Oct. 14, Mr. John Mewburn, District Manager, in the chair. Mr. W. H. Oliver presented the annual report and balance sheet, the chairman moving their adoption. The average of working expenses worked out at 2s. 8d. per member, while the average attendance worked out at 95 per cent. Eight meetings were held during the session and interesting papers were given at each. The election of officers for the coming session resulted in Mr. A. Coleman and Mr. J. Mewburn becoming hon. presidents, Mr. J. N. Lowe president, Mr. W. Dickinson and Mr.

E. J. T. Leaney vice-presidents, while Mr. W. H. Oliver was re-elected hon. secretary and treasurer. It was decided to hold a whist drive on Thursday, Nov. 28.

Liverpool and Birkenhead.—The general meeting of the above society was held on Sept. 11, when the officers were elected for the ensuing session. It was resolved to alter the name of the society from the Liverpool Telephone Society to the Liverpool and Birkenhead Telephone Society, the subscription being reduced from 1s. for Liverpool members, and 6d. for Birkenhead, to 6d. and 3d. respectively. In connection with the society Mr. G. H. Robertson has presented two cups, which will be awarded for the best results attained in the Correspondence Classes by members of the Liverpool and Birkenhead staff (who are members of the society for the 1907-8 session). Mr. R. H. Claxton has also kindly consented to give a prize, value £1 1s., for the best essay, entitled "A Description of the Liverpool and Birkenhead Telephone Exchange System," which is open to the junior staff of all grades, being members of the Society, in receipt of not over 30s. per week.

The syllabus for the ensuing session is as follows:—1907.—Oct. 24: Social evening. Presidential address, Mr. T. A. Prout, entitled "Life in the Telephone Company." (Mr. Prout has kindly offered to provide refreshments on this evening); Nov. 21: "A Visit to the Christiania Exchange," Mr. J. G. Whittle; Dec. 19: "Instruction of Operators," Miss E. M. Jones. 1908.—Jan. 30: "Exchange Maintenance," Mr. E. W. Rowson; Feb. 27: "Recent Developments in Wireless Telephony," Mr. G. J. Drysdale; March 26: "Relays," by Mr. A. Savage; April 30: "Competition Night." Ten minutes papers; £1 1s. and 15s. to be awarded for the two best papers, which are to be sent in to the president by April 21, 1908. Mr. W. Wolstenholme, the Liverpool District Engineer, has also kindly promised to read a paper on "Costs," the date of which will be announced later. The present session promises to be one of the most successful in the history of the Liverpool Telephone Society, which is one of the oldest in the country. It is anticipated that at least 160 members will be obtained before the session starts.

Brighton.—A general meeting of this society was held on Oct. 17 for the purpose of electing officers for the coming session and to pass the report and balance sheet. Offers to read papers during the ensuing session were made and accepted, and a vote of thanks was passed to Mr. O. S. Flower, the hon. secretary and treasurer.

Nottingham Factory.—At a united meeting of the Nottingham Factory and testroom permanent staffs, held on Oct. 18, with Mr. C. E. Fenton (Factory Manager) in the chair, it was unanimously resolved to commence immediately a telephone society at the factory, which all the employees are eligible to join.

Greenock.—At a general meeting of the staff held on Sept. 18, the District Manager presiding, it was unanimously agreed to form a telephone society. The following office bearers were elected:—Hon. president, Mr. F. Douglas Watson; president, Mr. A. Ramsay Lamb; vice-president, Mr. J. A. Swanson; secretary and treasurer, Mr. Geo. Archibald.

A committee of seven members was also appointed. Meetings will be held every three weeks. The opening meeting was held on Oct. 18, when 38 members were present. The president read a most interesting and inspiring paper on the telephone service generally, which was much appreciated.

Bolton.—A meeting of the district staff has been called to inaugurate a local telephone society.

Reading.—A class has been started at Reading for the benefit of members who are taking any of the Company's Correspondence Courses. The class meets in the testroom about a week after the issue of each paper, when the paper is gone through, and the manner of dealing with the questions shown by the District Manager. So far, the arrangement appears likely to have good results, and it is hoped it will sustain the interest of members in the Correspondence Classes throughout the session.

Portsmouth.—The first meeting of the session was held on Oct. 8 when a paper was presented by Mr. F. Bennett entitled "Elementary Magnetism." In his introductory remarks Mr. Bennett sketched briefly the history of magnetism, commencing from the earliest times down to the present day. He touched upon the various great discoveries and their influence upon the knowledge of the day. The reading of the paper was followed with close interest by a large audience, the lecturer's various points being illustrated by many experiments. In order to promote additional interest the committee are offering prizes for the best paper written on the work of the session.

Leeds. The following is the syllabus for the present session:—1907.—Oct. 23: "Educational Policy of the Company," Mr. G. H. Gould (some criticisms and suggestions); Nov. 20: Discussion on Current Number of JOURNAL, Mr. C. H. Crawshaw; Dec. 4: Common Battery Working, Mr. W. D. Scutt; Dec. 18: Short papers (various). 1908.—Jan. 8: Social evening, "Highways and Byways of Broadland" (illustrated), Mr. E. J. Gillett; Jan. 17: Annual staff dance; Jan. 22: "Contract Department Working," Mr. J. R. Peacock; Feb. 5: "Cable Distribution," Mr. W. Cowburn; Feb. 19: "Commercial Side of Company's Working," Mr. T. A. Crowther; March 4: Mr. France, Engineer-in-Chief's staff; March 18: Social evening.

Norwich.—The "Norwich Telephone Association" has been formed by the staff for social and intellectual purposes. A general committee has been elected, consisting of O. W. Stevens, District Manager (president); H. H. Wigg, Local Manager (vice-president); W. J. Pratt, Costs Clerk (secretary); J. W. Fairhead, Chief Clerk (treasurer); H. J. Allen, Contract Manager; H. J. Herrink, Exchange Inspector; G. Platten, Stores Clerk; and Miss Birch, Operator. This decision was come to at a representative, well-attended second general meeting of the staff held on Oct. 11, the District Manager presiding.

Blackburn.—The first meeting of this society, which is now in its fourth year, was held on Oct. 18. Mr. Remington took the chair and read letters from Mr. Claxton, past president, and Mr. Shepherd, president, conveying their good wishes and appreciation of the work the society is doing and regretting their

inability to be present. A unanimous vote of thanks was passed to both these gentlemen for their kind wishes. Mr. Frost, Engineer, then read a paper on the "Design of Circuits." The subject was dealt with in a very able and comprehensive manner, and a striking feature of the meeting was the keen discussion of the various points contained in the paper despite the fact that it was of a highly technical nature. It was evident from the questions that the members had listened in a most attentive and interested manner, while they were considerably aided by a number of well-executed diagrams, which enabled them to have a keener appreciation of a difficult subject.

Bristol.—The first meeting of the session took place on Oct. 19, Mr. R. A. Dalzell being in the chair. A lecture was given by Mr. F. Gill, Engineer-in-Chief, and the questions of progress and the fore-casting of development were extensively treated. A number of statistics and plans were shown by means of lantern slides, the lecture being greatly appreciated by all present.

An operators' telephone society has been formed here. The meetings will be held monthly.

Swansea.—The first sessional meeting, 1907-8, of the Swansea operators' society took place on Oct. 2, when a lecture was given by Mr. W. E. Gauntlett (District Manager) on "The Commercial Aspect of Telephony as Applicable to Operating." There was an attendance of 90 per cent. of the available staff, and a very interesting and instructive time was spent.

Sheffield.—A meeting of the Contract Department debating class was held on Oct. 8, Mr. Wrigley taking the chair. A paper was read by Contract Officer Jacobs on "Private Branch Exchange Canvassing." The class was fully attended, and a very interesting discussion ensued, much valuable information was gained, and points brought out with regard to the various difficulties in soliciting for private branch exchange contracts. It was suggested that the Contract Manager should endeavour to arrange for a meeting of all contract officers to be held at Birmingham for purposes of a general discussion, each contract officer paying his own expenses. This was unanimously carried.

Plymouth.—A general meeting of the staff took place on Sept. 12, for the purpose of receiving the secretary's report of the work done last session, and to elect the officers for this session.

On Oct. 8, the first meeting this session took place, when the District Manager, Mr. G. Hooper, gave an interesting lecture on "Measured Rates." There was a good attendance of the staff, the meeting coming to a close about 9.30, after a lively discussion and a vote of thanks to Mr. Hooper, proposed by the chairman, Mr. A. R. Wran, and warmly supported by all present.

Western (Metropolitan).—A meeting of this society was held on Oct. 7, when Mr. A. M. B. Newitt read a paper on "The Maintenance of a Small Exchange." The paper proved very interesting, and a long discussion followed the reading. The chair was taken by Mr. G. F. Greenham, who, after a hearty vote of thanks had been given to Mr. Newitt, announced that the next meeting would be held on Oct. 31.

Leicester.—At a general meeting the following officers were elected for the ensuing session:—Honorary president, Mr. Alfred Coleman; president, Mr. John Ashton; vice-presidents, Messrs. Price and F. H. Tyas; treasurer, Mr. E. Rendell; secretary, Mr. M. Marsden. The following were elected on the committee:—Messrs. W. Marshall, C. L. Hague, J. Thorpe, W. Bailey, H. Warren, J. Bagley, A. Revitt, Miss M. A. Law, Miss A. Barr, and Miss C. Horner.

STAFF GATHERINGS AND SPORTS.

Northern Province.—The final tie for the Chambers' Challenge Cup took place on Aug. 31 last at Middlesbrough. The competing teams were Newcastle and Mid-Yorks, the latter proving themselves victors by nine wickets. C. W. Blackburn's analysis in this match deserves comment as he bowled six overs, taking six wickets for eight runs. After the match, Mr. Swithenbank, District Manager, Middlesbrough (in the absence of Mr. Chambers), presented the cup to Mr. A. Sanderson, captain of the Mid-Yorks team, complimenting him on his success and the good form shown. Mr. Sanderson, replying, proposed a hearty vote of thanks to Mr. Chambers for having presented the cup for competition, and this was seconded by Mr. Bellerby, captain for Newcastle. After the match tea was taken at the Bodega Restaurant, and a very pleasant day ended by the usual courtesies being exchanged. At least 40 (including the District Manager, Mr. Morten) travelled in a special saloon from Leeds to see the match.

Swansea.—A successful smoking concert was held here on Sept. 20, in connection with the general telephone society. The District Manager (Mr. W. E. Gauntlett) presided and he was supported by the local officials and Mr. C. G. Wright (Head Office) and Mr. A. G. Mackie (Ex-Corporation Manager). An excellent programme was gone through, Messrs. Radford, Bevan, Kenworthy and McArthur making excellent secretaries.

The first financial year of this club, of which there are 75 members, ended Sept. 30 last. During the year an amount of £83 17s. has been paid in, and £54 5s. withdrawn, leaving a balance on hand of £29 12s. Another successful year is being looked forward to. Messrs. C. A. Bevan and R. A. Skinner have made energetic secretaries, and Mr. W. H. Crook a capable treasurer.

Leeds.—The telephone society, which has just been formed in Leeds had a very successful whist drive and social evening at Collinson's Café on Oct. 9. It was announced during the evening that every prospect was forthcoming of a successful winter's syllabus in connection with the society, and a very pleasant evening terminated with thanks being given to two or three of the employees who entertained the company from the social side.

[A few reports of Staff Gatherings have been unavoidably held over.—*Ed. "N. T. J."*]

NEWS OF THE STAFF.

Mr. L. HARVEY LOWE, Chief Accountant for London, has been appointed Assistant Metropolitan Superintendent. Mr. Lowe entered the service in May, 1887; was Local Manager at Coventry, 1893; District Manager, Chester, February, 1896; District Manager, Western (London), June, 1903; Service Manager, London, January, 1905, and Chief Accountant, London, July, 1905.



L. HARVEY LOWE.

Mr. S. C. SMITH, District Manager at Ipswich, has been transferred to Maidstone. He entered the service in 1894, was made Local Manager at Southampton in 1895, and District Manager at Ipswich in 1896.

Mr. A. G. MACKIE, late Manager of the Swansea Corporation system, has been appointed District Manager at Ipswich.

Mr. A. A. FORROW, Chief Wayleave Officer, Brighton, has been promoted to be Local Manager at Weybridge.

Mr. H. WILES, Chief Inspector at Hastings, who has been transferred to the same position at Aldershot, was on Oct. 7 presented with a silver watch by the members of the Hastings staff.

Mr. P. SANDOM, Inspector, Brighton, has been promoted to be Chief Inspector at Hastings, vice Mr. H. Wiles.

Mr. J. A. ARD, Inspector-in-Charge, Darlington, completed 21 years' service with the Company in September last. He entered the service at Dewsbury in 1886, was transferred to Wakefield in 1897, and appointed to present position at Darlington in 1906.

Mr. ROWLAND H. CLOUGH, Contract Officer, Manchester, was, on the occasion of his leaving the Company's service to commence business on his own account, presented by his colleagues of the Contract Department with a handsomely engraved silver cigarette box as a token of their esteem for his sterling qualities as an ever willing and helpful worker.

Miss McSHANE, Senior Operator, has been promoted to be a Supervisor in Dublin Central Exchange.

Mr. J. LOCKE (Manchester electrical staff) obtained second-class honours for telephony at the London and City Guilds examination held in May last.

Mr. J. MAGNALL (Manchester electrical staff) obtained a second-class ordinary certificate in telephony in connection with the City and Guilds examination, and a certificate for a second years' mathematics course at the examination held at the Manchester Technical School in connection with the Board of Education.

Miss MARY McINTOSH, Senior Operator, Royal Exchange, Glasgow, has been appointed Supervisor in Hillhead Exchange.

Miss JEANIE DRENNAN, Operator-in-Charge, Langside Exchange, Glasgow, has been appointed Chief Operator in Langside Exchange.

Mr. R. McHARDY, Test Clerk, Edinburgh, has been promoted to be Local Manager at Berwick-on-Tweed.

Mr. THOMAS CORNFoot, Electrician, Edinburgh, has been promoted to be Electrician at Birmingham.

Miss FLORENCE M. BONING, late of Cambridge, has been appointed Chief Operator, Guildford.

Miss M. A. RANDAL, Clerk-in-Charge, Dewsbury, who has been with the Company since 1895, has now resigned her position. She was presented by the Dewsbury staff with a gold locket and chain.

Miss A. E. L. WOOD, Senior Operator, Cleckheaton, has been promoted to be Clerk-in-Charge at Dewsbury, in place of Miss Randal.

Mr. F. DENT, Wayleave Officer, Dewsbury, has been promoted to be Sub-Engineer in the same centre.

Mr. W. E. WALKER, Leeds, has been promoted from the position of Draughtsman to that of Sub-Engineer.

Mr. T. J. SELBY (first class), and Messrs. E. ASHLEY and R. E. WHARTON (second class) of Notts Factory, obtained certificates in connection with the local South Kensington examination in magnetism and electricity (first stage).

London Traffic Department—Promotions and Transfers:

Miss A. REEKIE, Senior Supervisor, Operating School, has been promoted to be Clerk-in-Charge, Bank Exchange.

Miss H. WORMALD, Supervisor, Operating School, has been made Senior Supervisor.

Miss F. YORSTAN, Supervisor, Avenue Exchange, has been transferred as Supervisor to Gerrard.



S. J. SMITH.

Miss H. COMPTON, Operator, Croydon Exchange, has been promoted to be Supervisor, Hop.

Miss E. HUMPHRIES, Operator, London Wall Exchange, has been promoted to be Supervisor, Avenue.

Miss A. J. SMITH, Operator, Avenue Exchange, has been promoted to be Supervisor, Gerrard.

MARRIAGES.

Mr. WM. McPHAIL, Assistant Engineer, Paisley, was presented by his colleagues on the line staff with a marble clock on the occasion of his marriage.

Miss C. M. BOYD, of the Post Office Fees Department, Cardiff, who was married on Oct. 7, has been presented by the district office staff with a dinner service and salt cellars.

Mr. C. H. JOHNSTON, of the Inspecting Department, Wolverhampton, was presented by the staff with a tea service, table and coal vase on the occasion of his marriage.

Mr. G. GRINDLEY, Stores Clerk, district office, Wolverhampton, was presented by the staff with a timepiece on the occasion of his marriage.

Mr. J. A. GORDON, Audit Department, Head Office, was married on Sept. 6. His colleagues presented him with a marble clock.

Mr. A. E. HULL, of the Western Contract Office, London, was presented with a marble clock on the occasion of his marriage early in September.

Mr. WILLIAM BLUNDY, Switchboard Filter, Nottingham Factory, was, on the occasion of his marriage, the recipient of a handsome case of carvers from his colleagues.

Miss H. HODGRINSON, Clerk-in-Charge, Southampton Exchange, left on Oct. 12 to be married, after eleven years' service with the Company, during which period she has seen the growth of the exchange from a 200-line switchboard to a system serving 2,800 subscribers' stations. She was presented with a dinner service by the operating staff, and a silver dinner cruet by the district, local and contract office staffs.

Miss AGNES HEATHCOTE, Senior Operator, Manchester Central Exchange, was presented by her colleagues with a dinner service, trinket set and several other useful and ornamental articles on the occasion of her resigning from the Company's service on Sept. 25 to get married.

Mr. W. BLACKBURN, Switchroom Manager, Bradford, on the occasion of his marriage was presented by his staff with a case of useful silver ware, and by the night operators with a set of carvers.

Miss A. BLACKBURN, Supervisor, Huddersfield, recently left the Company's service after eleven years of active work to get married, and was presented by her colleagues with a silver teapot, the male staff presenting her with a cruet.

Miss J. K. HORTON, Senior Operator, Milnsbridge Exchange, Huddersfield, left the Company's service after eleven years' service to enter the married state, and was presented by the operators in the Huddersfield area with serviette rings, the male members of the staff presenting her with a cruet.

Miss BEST, Recording Clerk, Hull, left the Company's service to be married on Oct. 25. She was presented with a walnut coal cabinet by the members of the office staff.

Mr. H. J. CALLIS, Local Manager, Burnley, was married on Sept. 10 to Miss K. CLEGG, who was formerly in the service. The occasion was signalled by a present of a handsome set of carvers from the staff of the area.

Mr. A. J. WILLIAMS, Inspector, Pontypridd, was married on Sept. 30, the ceremony taking place at St. Mary's, Glyntaff. He was presented with a marble clock which was subscribed for by the members of the staff.

Miss ERNA WYLIE, of the Fee Department, Glasgow, has left in view of her approaching marriage, and was presented by her colleagues with a handsome case of cutlery.

Mr. F. H. TYAS, Contract Manager, Leicester, was presented by his staff with a case of fish knives and forks on the occasion of his wedding.

London Traffic Department.—Resigning to be married:

Miss M. HICKS, Operator, Gerrard Exchange, on resigning to be married was presented by the staff with a case of cutlery.

Miss M. DENCH, resigning from the same exchange, was presented with a dinner service, a pair of salt cellars and a silver sugar sifter.

Miss R. GREEN, a Senior Operator at Kingston, upon leaving to be married on Oct. 10, was presented by her colleagues with a china tea service.

Miss M. BOYCE, Operator at Paddington, on leaving to be married was presented with a tea service, butter dish and knife by her colleagues.

OBITUARY.

Mr. JOSEPH KERR, one of the Brighton Wiremen, died on Sept. 24 from a fall from the top of a 50-feet pole to the ground below. Every attention was given to the unfortunate man, who was conveyed on an ambulance to the Sussex County Hospital, Brighton, attended by a Steyning doctor, but death occurred almost immediately after admission to the institution. At the funeral, which took place in the Brighton Cemetery, the staff were represented by the Local Manager and several members of the Company's and the General Post Office Engineering staffs. Wreaths were sent, two from the outside staff, two from the instrument and office staffs and one from Foreman Wilson's gang, of which the deceased was a member.

Miss H. BELLMAN, Senior Operator, Central Exchange, Liverpool, died on Sept. 19, after a very long and painful illness. She had been in the Company's service for ten years and her decease was much regretted by her colleagues.

Miss LILIAN EVANS, Operator at Lark Lane Exchange, died on Sept. 25 of pleuro-pneumonia, after three weeks' illness. She had been in the Company's service three years and was a very capable operator. Her early decease is much regretted by the other members of the staff.

Mr. J. PRENTICE, Packer, Stores Department, Head Office, died on Oct. 24, after an illness extending over several weeks. He had given eleven years faithful service to the Company, and his decease is much regretted throughout the Department.

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TELEPHONE MEN.

XIX.—CHARLES MCFARLANE BAILEY.

MR. BAILEY was born in London in May, 1861. After some years of private tuition he went to the Battersea Grammar School. On leaving school he entered the office of a colonial broker in Mincing Lane, but having a strong desire to take up employment of a more scientific nature, he left in 1883 and entered the service of the London & Globe Telephone Company, a company which started an exchange system in London in opposition to the United Telephone Company. This latter company, however, brought an action against the London & Globe Telephone Company, but the matter was eventually settled by the United Telephone Company absorbing its competitor. Various companies had been formed to exploit the telephone business throughout the country, one of which was the Northern District Telephone Company, and in 1885 Mr. BAILEY was offered by this company an appointment as Local Manager of the West Hartlepool district, which at that time comprised the Hartlepoons and several surrounding towns. This district at that time was of course entirely undeveloped, and the duty of introducing the telephone into this part of the country was entrusted to Mr. BAILEY.

As a matter of interest we might mention that at the time of Mr. BAILEY'S appointment the only telephones in operation in the area assigned to him, belonging to the Northern District Telephone Company, were those in connection with a private line, which, remarkable to relate, occasionally responded when called upon. This state of things, however, soon changed and under Mr. BAILEY'S management exchanges were opened in a number of towns in the district and trunk lines were erected, giving communication between all those towns and with Sunderland and the Tyne district generally. Mr. BAILEY only remained here three years and in 1888 he received promotion, being appointed Local Manager at Newcastle-on-Tyne. This town appears to have been distinguished by having been practically the pioneer of underground telephone work. Not only was there a larger proportion of wires underground in Newcastle than in any other town in the country, but even the exchange itself was in underground premises, which had previously formed part of

a wine cellar. The system, however, was a twin-wire system, and the wires consisted of straightaway G.P. wires, but later four-wire cables with twisted pairs were substituted for the single wires. This of course was in the very early days and long before paper cables had been thought of. Even Patterson-filled cables had not then been introduced for underground work.

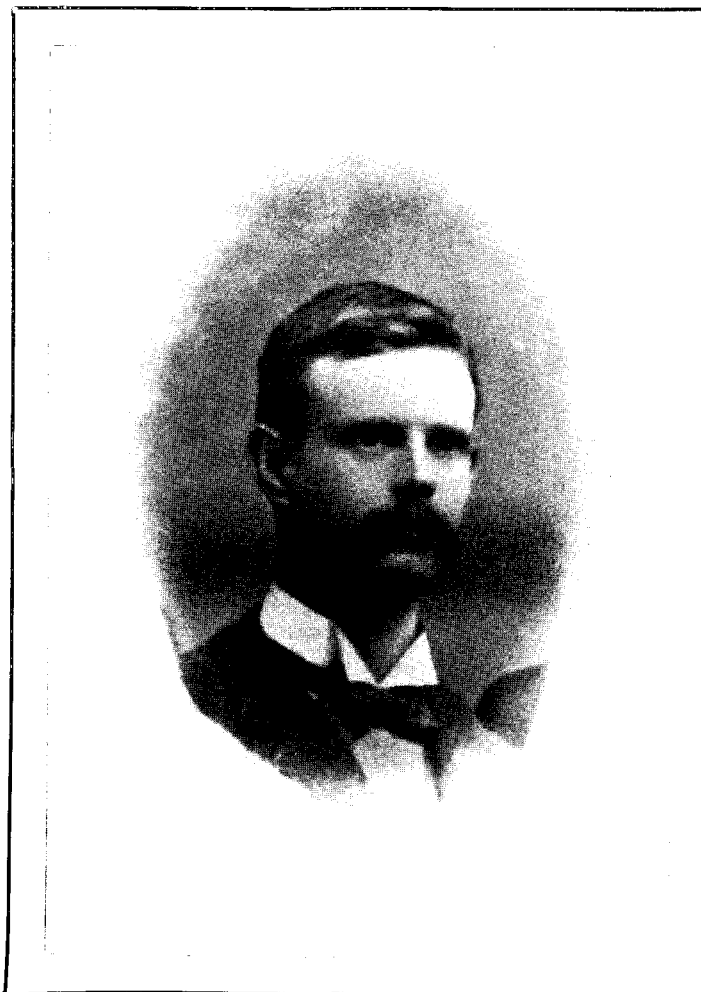
During Mr. BAILEY'S term of management at Newcastle exchanges were opened at Jesmond, Elswick, Byker, Gateshead, Blaydon, Felling, Gosorth, Hexham and Corbridge.

In 1891 Mr. BAILEY received further promotion and was appointed Engineer of the Northern District, which position he retained after the Northern District Telephone Company was taken over by the National Telephone Company. In 1893, when the management of the National Company was entirely reorganised, Mr. BAILEY was appointed District Manager of the Northern District of the Northern Province, with offices at Newcastle. Whilst acting in this capacity several important works were carried out in his district. In order to cope with the largely increasing business, it was found necessary to obtain larger accommodation for the Newcastle Exchange. A site having been obtained in Pilgrim Street new premises were built and a multiple switchboard was installed. This was of course at that time quite the most modern and up-to-date exchange equipment, and the transfer of the exchange from the old premises to the new was carried out under Mr. BAILEY'S supervision.

In 1898 Mr. BAILEY was appointed District Manager at Leeds, and whilst in charge of that district was responsible for the conversion of an overhead single-wire system to an underground metallic system. This

work not only involved complete new equipment so far as underground work was concerned, but generally the reconstruction of the whole of the line plant in the area.

In August, 1902, he received further recognition of his ability by being appointed to Manchester as District Manager. Mr. BAILEY had, on taking up this position, to face an extremely arduous and difficult task, which involved practically an entire change of system.



The system which had been in force in Manchester was the call-wire, and this was changed over to the automatic ring-through system, this work necessitating the reconstruction of the existing switchboards.

In 1905 Mr. BAILEY was again promoted, being appointed Assistant Metropolitan and Service Superintendent in succession to Mr. DALZELL, who had been promoted to be Superintendent of the Western Province. In this capacity, as in each of the others in which he has served in the National Telephone Company, Mr. BAILEY soon endeared himself to all the staff with whom he came in contact; his prompt, decisive way of dealing with all matters that came before him secured for him universal respect and admiration. Appeals against his decisions were almost unknown, and no member of the Metropolitan staff enjoyed greater popularity among all ranks. In his long illness he has the sympathy and good wishes of all those with whom he has been associated during his long period of service.

TELEPHONE RATES.

DURING the last few weeks there has been considerable agitation in the provinces, due to the new policy of the National Telephone Company in refusing to make further contracts on a purely flat rate. This change of policy does not mean that existing contracts will be in any way interfered with, but new subscribers will not have the opportunity of paying, say, £10 for an unlimited service, costing possibly double that amount. Users of the telephone have become so accustomed to the flat rate, that to many of them it appears quite irrational to suggest that any other rate is desirable, except for the subscriber who wishes to use a telephone to a comparatively small extent. Yet the larger user would never expect to have an unlimited supply of gas or electricity for a fixed sum per annum, or if such terms were arranged the sum would certainly be fixed so high that no consumer would consent to accept the terms. There are very few commodities or services in which an unlimited supply is given for a fixed sum. The railway season ticket is an exception, but in that case it is a simple matter to estimate approximately the extent to which the ticket will be used. Domestic water supply is another case, and electricity supply on the continent and in a few of the less important towns in the colonies is also, to some extent, an exception to the general rule; for in the case of systems generating electrical energy by means of water-power it is not unusual to accept certain small consumers at a fixed price per lamp per annum in order to avoid the cost of a meter.

A telephone service, however, is a somewhat different matter. Originally telephones were used simply as private lines in order to connect different sections of a business together, or to put an office into communication with a warehouse or works, and in such cases as these the service was an unlimited service as a matter of course. When, however, these users of the telephone were gradually connected together by means of an exchange, additional costs of another kind arose. The capital costs increased rapidly, as large switchboards were put down and the necessary exchange premises and wayleaves were obtained. The result of this change from a private to a public system is that the subscription has now to cover a much larger number of items. At the present time the capital cost per subscriber amounts to something approaching £35. In any case, therefore, the capital charges on this amount must be met; but, apart from this, there are the running charges, consisting of maintenance of the lines, instruments and exchanges, and the item of labour for handling the calls. The extent to which subscribers vary in the use of their telephones is enormous, and the cost of labour and of a great deal of the plant is in direct proportion to the number of calls. Moreover, the extension of a telephone system is a serious business. If the number of subscribers is doubled, this does not mean that the capital expenditure is merely doubled, for the capital increases very much more rapidly. This fact is forgotten by those who compare the telephone system of London with that of Stockholm, and always to the disadvantage of the former.

The result of the flat rate has been that if a subscriber does not feel it is worth his while to pay a comparatively heavy annual sum he changes to the toll system, but where he reaches the opposite

conclusion he retains the flat rate, and probably works his line very much more heavily than it should be worked with any regard to efficiency. Consequently other subscribers are apt to ring up and find the number of this particular subscriber continually engaged, until they come to the conclusion that the telephone service is very bad, that it is hopeless to ring up this subscriber in future, and the subscriber in question may thus lose a good deal of business which he might otherwise secure.

To those who are accustomed to deal with problems of power supply, and the rates which should be charged, it will appear only reasonable that the National Telephone Company should abandon the flat rate, as has been done in many other countries already, and should adopt the message rate exclusively. By the proposed system of charge a subscriber can contract for any number of calls per annum, the rate for which decreases as the number of calls increases, until a limit of something less than $\frac{1}{2}d.$ per call is reached. Considering that a subscriber is generally called up as frequently as he calls other subscribers, this means that he will pay at the rate of about $\frac{1}{2}d.$ per call if he is a very large user. A rational basis of this kind enables all classes of subscribers to be treated fairly, whereas, if a subscriber who uses his telephone to a large extent is given a rate which is unremunerative to the Company, the small user is simply penalised to make up the difference. Naturally the large user objects to any movement that may tend to increase his payments. This is only what must be expected, but it is certainly strange that Chambers of Commerce, which are supposed to have the welfare of the small as well as the large trader at heart, should engage in agitation against the introduction of sound business principles.—*The Electrician*.

THE USE OF THE TELEPHONE.

THE following notice was found fixed at the side of a Gloucester subscriber's telephone. If all subscribers performed their part of the service in this sympathetic and farseeing spirit, the gain would be incalculable:—

The manner in which a person uses the telephone indicates his character to a great extent, and makes either a good or bad impression, and this impression is reflected directly upon the establishment from which such a message comes.

It is a pleasure to do business with a house which performs every detail in a clear-cut and satisfactory manner; but it leaves a sting to be answered abruptly or discourteously over the telephone.

It is folly to lose one's temper because one does not get immediate connection.

This is rarely ever the fault of the telephone operators, who are nearly always courteous and prompt.

When one is called to the telephone he should respond quickly, and the person calling should not be left to hold the wire too long—something decidedly irritating and often unnecessary.

Let us throughout the whole house strive to excel in satisfactory telephoning.

PRESENCE OF MIND—AND OF THE TELEPHONE.

ONE of the Company's linesmen recently had the following unusual experience:—While at work on a pole, his dog, which generally accompanies him, was at the foot of the pole safeguarding his tools, when two men came along in a cart and called to the dog, which, however, refused to desert its charge.

Upon completing his testing our man descended from the pole and found the dog had disappeared. Shortly afterwards, however, it came running back, minus its collar. Re-ascending the pole, the linesman connected up his portable instrument, rang up the police and gave information which, later on, resulted in the capture of the guilty parties.

PERSISTENCE REWARDED.

A CONTRACT officer called on an old-fashioned firm in the Chester and North Wales district with the usual object. He was told that they had repeatedly refused before, but nothing daunted he called. After some trouble he interviewed the principal, who again refused to have the telephone in his shop "at any price." A week or two elapsed and the contract officer called again: this time no interview was granted, although he waited about for some time in the hopes of catching the principal leaving the shop. Again he called, and happening to see the proprietor outside the shop he entered on his subject immediately, and his flow of eloquence, pointing out the advantages which accrue from the use of the service, was only checked by the prospective subscriber's request—which was made in language rather more forcible than polite—to betake himself to the warmer regions. The contract officer bade him good morning and said that he would carry out his wishes.

A fortnight afterwards he called again, saw the principal, informed him that he had "been there" and that the climate was very well suited to his health, and he had returned only to obtain this particular contract. As a reward for his "d— cheek" in the matter he got it and was told to "clear out." The subscriber is now working and well satisfied with his investment in telephone service.

COMMON BATTERY EQUIPMENT AT JESMOND EXCHANGE, NEWCASTLE-ON-TYNE.

By W. U. LONNON.

On Saturday July 20, 1907, the above exchange was successfully transferred to a new common battery equipment, which has been erected in premises built for the Company in Osborn Road.

The new building consists of two floors and a basement, the



FIG. 1.—SWITCHROOM.

first floor being occupied by the switchroom and accumulator room, and the ground floor by the apparatus room and operators' quarters, while the basement is occupied by stores and hot-water heating apparatus.

The switchroom has capacity for eighteen operators' positions,

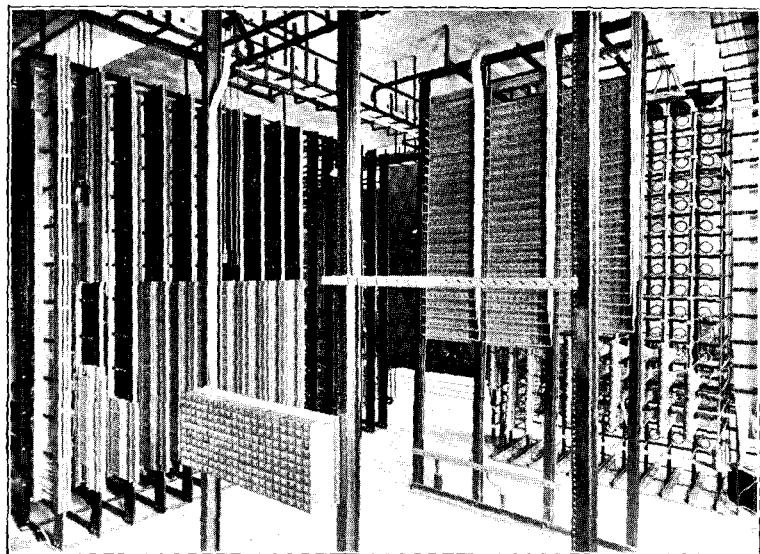


FIG. 2.—MAIN FRAME.

which will give accommodation for about 2,400 subscribers' lines. The junction and subscribers' sections are lined up together, and spare junction positions have been left at the commencement of the line of boards, so as to allow of all the junctions being kept together when an extension is necessary.

The present equipment is five subscriber operators' positions

equipped with a total of 700 subscribers' lines, two junction positions of 27 lines each, and a testing operator's position. The subscribers' lines are multiplied throughout the switchboard every eight panels and the outgoing junctions every six panels.

The switchboards are of the standard common battery pattern, fitted with iron and uraltite fireproof partitions and are wired to the standard circuits.

A one-position desk for the clerk-in-charge completes the equipment in the switchroom, a photograph of which is shown in Fig. 1.

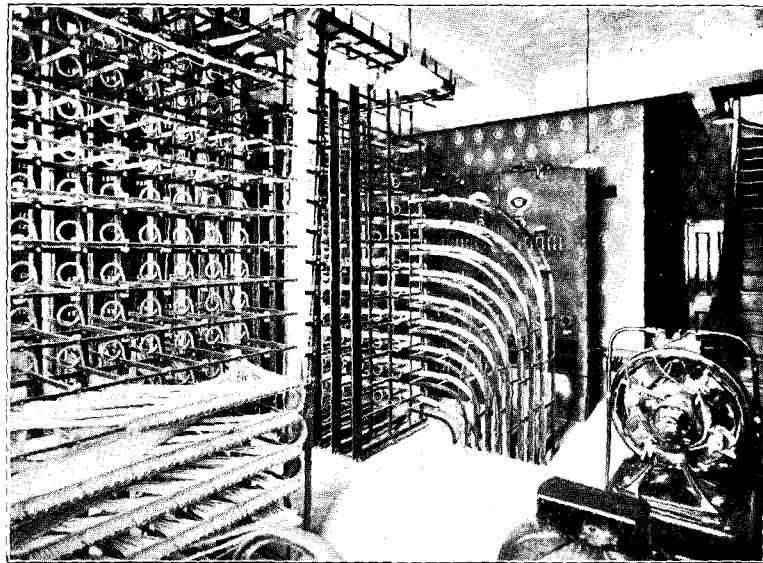


FIG. 3.—POWER PLANT AND I.D.F.

The apparatus room contains the main distributing frame, the intermediate distributing frame and relay racks, the repeating-coil rack and fuse panel, the service register rack and the power plant, consisting of two motor generator sets each with an output of 100 amperes at 30 volts, driven from the supply mains, two ringing machines, one driven from the supply mains and one from the 24-volt battery, and a power board carrying all switches and controlling apparatus in connection with these machines.

Photographs of the apparatus room are reproduced in Figs. 2 and 3, the former view showing the vertical sides of the main and intermediate distributing frames and the relay and register racks, and the latter showing part of the power plant, the horizontal side of the intermediate distributing frame and the method of bringing the outside cables on to the horizontal side of the main frame.

A testing panel is provided for the use of the test clerks, and this is equipped with the same circuits as are usual on the standard common battery test clerk's desk.

A general view of the accumulator room is shown in Fig. 4. This room contains a set of eleven cells capable of a discharge of 115 amperes for nine hours, and an additional set of four cells capable of a discharge of thirteen amperes for nine hours, the latter being necessary for working the registers on the subscribers' lines.

GLASGOW'S MUNICIPAL TELEPHONES.

At a meeting of the Glasgow Town Council last month, Mr. Scott Gibson asked if the town clerk would give a statement as to the deficit on the Corporation telephone scheme. The clerk said he would be glad to do so if instructed by the Corporation. Mr. Gibson said he understood the town clerk had an exhaustive statement on the subject prepared, and full information ought to be given to the public. He believed the deficit amounted to some £16,000 or £17,000. In such a case the convener would be merely a parrot—(laughter)—and he wanted a statement with the full legal authority of the town clerk behind it. The public had every right to know how the deficit occurred. Bailie Stewart (presiding) said there was no doubt about the deficit. It exceeded £16,000, and was less than £17,000. They could not say exactly within a few pounds. Mr. Gibson: Or a few thousands. (Laughter.) The Convener gave assurance that a statement would be made, and the subject dropped.

COMMON BATTERY TEST SETS.

By P. T. Wood.

UNDER the above title I am including a few of the test sets made up at our Metropolitan workshops. As the portable set is now part of the equipment of all central battery exchanges a description will doubtless be of interest to readers of the JOURNAL.

Like all other apparatus a test set has developed from a simple form to one which is more complex—from the battery jack at a magneto exchange to the combined Nos. 1 and 2 box as used at a modern central battery exchange. It is not proposed to go through all the details of routine testing, it being sufficient for my purpose to note briefly some of the tests for which the different sets are used.

Before a new central battery exchange is accepted from the contractors a very careful test is made of all apparatus and cabling to ascertain if they are free from faults and up to specification. Test box No. 1 (Fig. 1) is used for testing subscribers' cord circuits and calling equipments, also for incoming junctions in conjunction with box No. 2. The purpose of the various keys is briefly as follows:—

No. 1 key is used to throw a loop of 916ω across the plug or line under test to ascertain if the supervisory (or line) relay will work through this resistance.

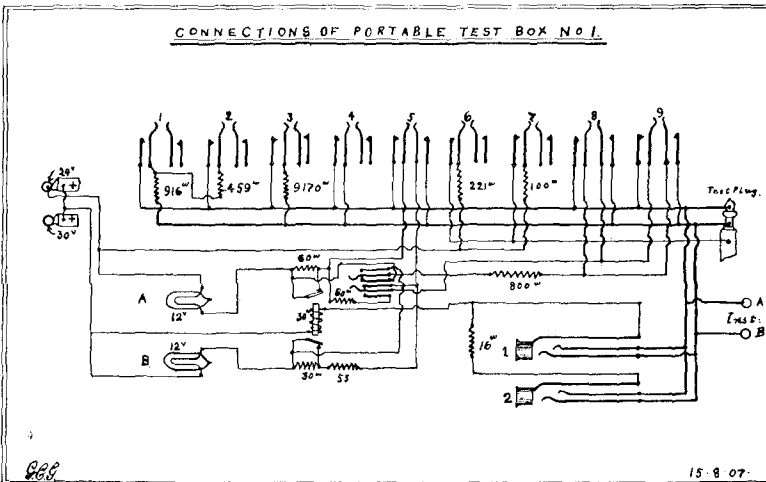


FIG. 1.—Box No. 1.

If the relay be required to work through $1,500\omega$ at 24 volts then key No. 2 is depressed instead of No. 1, thus giving a resistance of $1,375\omega$ for the 22-volt test.

No. 3 key shows if supervisory (or line) relay sticks when resistance in circuit is varied from $1,375\omega$ to $9,170\omega$. This test covers with a margin of safety the case of a calling cord used on an outgoing junction to a central battery exchange before and after completion of conversation.

No. 4 brings a short circuit across the circuit under test and is used for testing if relay sticks after exposure to maximum current.

No. 5 puts an earth on the B line and battery on the A line of the cord or circuit under test. The circuit is proved "O.K." by both A and B lamps glowing.

Key No. 6 completes the circuit of the cut-off relay on the line under test, and if 5 be depressed first the lamps should be extinguished. Key No. 7 reduces the resistance in circuit and will show up an ill-regulated relay as distinct from a disconnection.

Keys No. 8 and 9 test party-line ringing keys, key No. 8 being used to test J and X circuits (B lamp intermittently glowing with the alternating ringing current and the A lamp glowing continuously); key No. 9 tests L and Y circuits, and the lighting of the lamps is of course the reverse of the former case.

Key No. 10 connects ringing return to earth or battery.

For the test of outgoing junctions box No. 2 (Fig. 2) is used.

Two men at the main frame and switchboard respectively carry out the test, the box being at the switchboard. The box having been connected up as shown in Fig. 2, keys Nos. 2 and 7 are thrown, thus lighting lamps A and B when the plug is inserted at the switchboard. It will be noticed that the A relay is actuated by—current on ring of plug and the B relay by—current of battery connected on test box. The resistances inserted represent a line but make a severer test than normal working conditions. The line is also spoken over, and finally the clear is given by throwing key

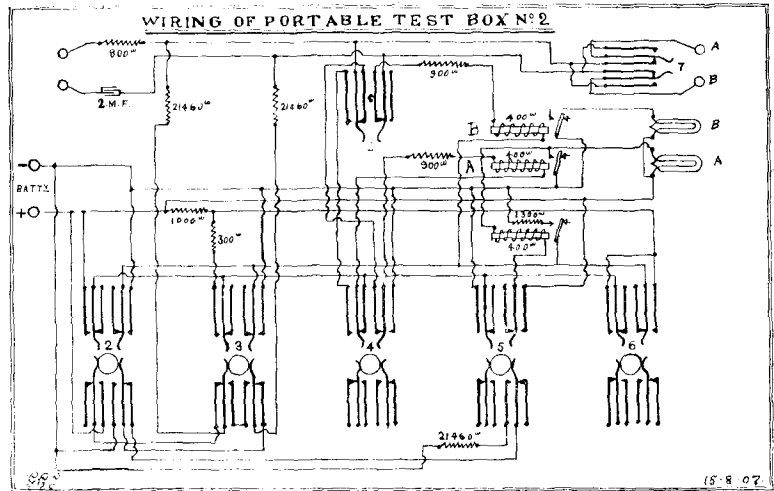


FIG. 2.—Box No. 2.

No. 1, which disconnects both lines allowing A and B relays to fall back.

If the junction under test does not control the supervisory signal key No. 6 alone is thrown. No lamp will light until the plug is withdrawn from the switchboard, when the current normally on the A line (picked up from spare line and cut-off relay) pulls up relay A and lights lamp A.

For testing incoming junction equipment boxes 1 and 2 are used in conjunction; the latter box contains seven testing keys, thus allowing for all different types of incoming junctions to be tested. It will be sufficient to give particulars of the test made

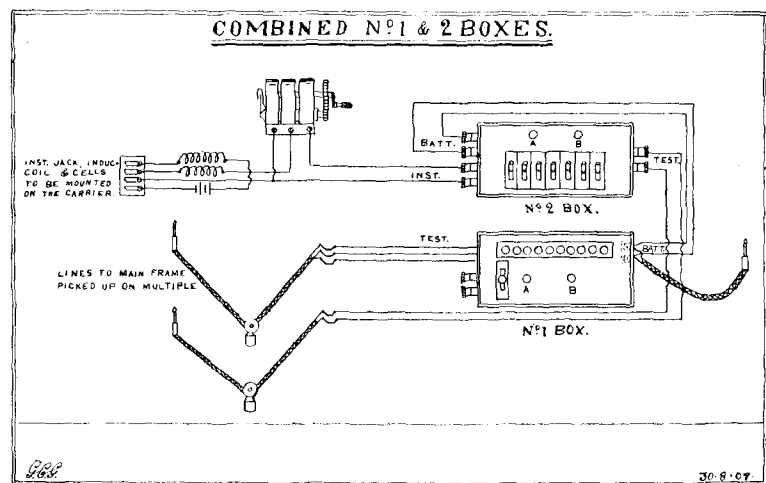


FIG. 3.—BOXES 1 AND 2 COMBINED.

on a central battery junction from another central battery exchange.

By throwing key No. 2, battery is put on line of incoming junction as if distant exchange were calling, thus lighting lamp on switchboard. It will be noticed that the current is supplied through the A and B relays of box 2. By inserting the plug into jack No. 2 of box 1, the $83\frac{1}{2}\omega$ relay on the third conductor of the cord is pulled up and the lamp is extinguished. The cord is then spoken over to test contacts of $83\frac{1}{2}\omega$ and 40ω relays. Press key No. 5 on box 1 and note that the A and B lamps on this box light, proving continuity of circuits. By restoring key No. 2 of box 2 these lamps

are extinguished showing that the 400 relay has been released, also the clearing lamp on switchboard lights showing that the 12,000 relay has released. This test completed, throw key No. 2 once more and test supervisory and speaking circuits as on cord test; the correct working of the clearing signal at the distant exchange is seen by lamps A and B on box 2 lighting when supervisory is released on B position under test.

Finally, throw key No. 1 of Box 2; this cuts battery off line except through the two resistances of 21,460 (one on each line) and will give clear to exchange, as the current that can pass this resistance is insufficient to actuate the 12,000 relay.

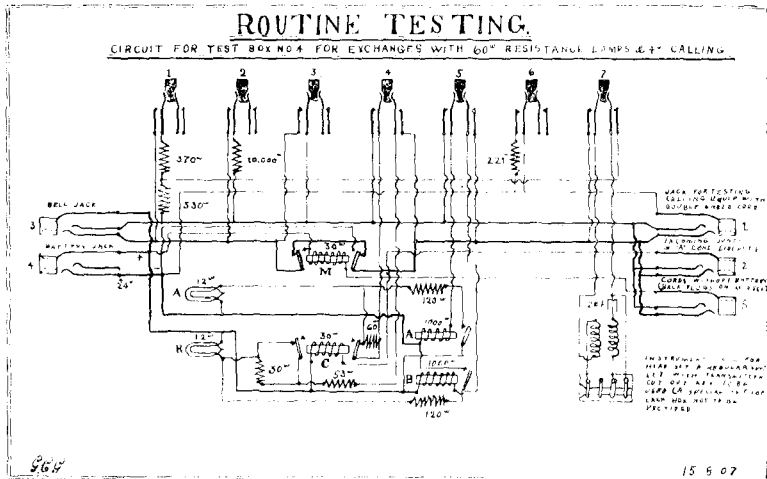


FIG. 4.—Box No. 4.

Boxes 1 and 2 are now combined; they are mounted together on a travelling stand and connected up as shown in Fig. 3. Box No. 4 (Fig. 4) is used for the weekly routine testing of central battery exchanges. It is similar in purpose to the No. 1 box and is arranged for the testing of cord circuits on A and B positions and calling equipment.

Keys 1 to 4 are used for the testing of the cord circuits as previously described.

Key No. 5 operates the line relay and proves continuity of circuit by energising both 1,000 relays and lighting the lamps A and B.

ROUTINE TESTING.
NO. 5 TEST BOX - FOR MULTIPLE TESTING.

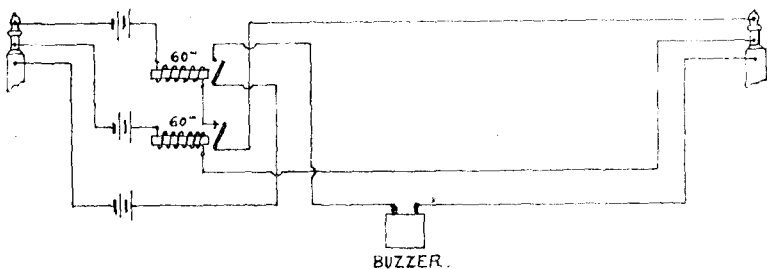


FIG. 5.—Box No. 5.

Key No. 6 operates the subscribers' line and cut-off relays, and allows relays A and B to fall back, extinguishing lamps.

Key No. 7 puts telephone in circuit and restores machine key when testing B position cords, by operating tripping relay through 600.

Jack No. 5 and relay M have recently been added in order to test back cords on monitors' desks, which are without battery.

It will be noticed that relay C is energised only when cord circuits are under test, thus bringing in the resistances of 60Ω and 30Ω in A and B lamp circuits respectively. When calling equipment

is under test these resistances are cut out through back contacts of relay.

The test made by this box is not quite so severe as that of the No. 1 box, as it is not desirable to maintain relays under working conditions at the standard required of the manufacturers at the time of the delivery of the apparatus. Box No. 5 is used for testing the multiple. This circuit has been recently devised with a view to prevent the momentary impulse sent out on a subscribers' line by the testing current which was such an objection to the older type of visual test box. If the subscriber had an indicator it was dropped, and as this test is carried out during the night another method of test was obviously desirable. If the A, B and test lines are "O.K." relay B will pull up, then relay A, and finally the buzzer will work. Any disconnection or short circuit will prevent buzzer from sounding. As this test is carried out by the night operators it is not necessary to have the set capable of localising or even of showing the nature of the fault. Of test sets for routine work there remains to be described that in use for line testing at various magneto exchanges in the Metropolis. Of these rather more than a dozen have been constructed at the workshops during the past eighteen months. The diagram (Fig. 6) does not need much remark, as the purpose of the keys is sufficiently explained by the

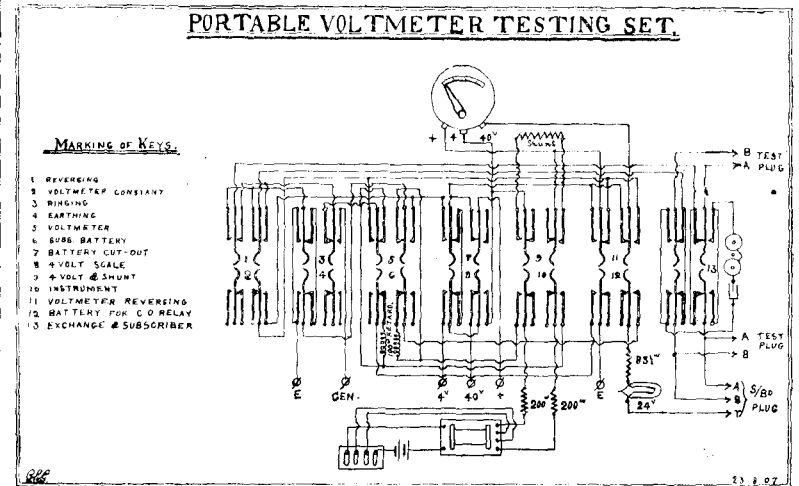


FIG. 6.—TEST BOX FOR MAGNETO EXCHANGES.

lettering. It will be noticed that the 40-volt battery is out on the line when speaking to the subscriber; this is to facilitate the detection of reversed receivers. The test set is made up in portable form and mounted on a wheeled carrier, the cells of the 40-volt battery being placed in the cupboard at the base incidentally impart steadiness to the stand. This set can also be made use of for testing lines from the subscribers' multiple of a central battery exchange. For this purpose the cut-off relay is worked by throwing No. 12 key.

I conclude my list with a set made up for the Head Office Investigation Department. This box is wired to represent 30 miles of telephone cable and is so arranged that various lengths of 40-lb. or 70-lb. cable may be represented, and by inserting loading coils at any or every mile the inductance artificially increased.

For those non-technical readers to whom the subject of transmission is unfamiliar I might mention that among various factors, capacity and conductor resistance are most responsible for attenuation of the speaking current over long lines. For the effect of capacity there is an antidote, if such an expression be allowable, and it was first practically applied by Professor M. I. PUPIN, who made use of the previously ascertained fact that if inductance be added to the circuit, the effects of capacity are greatly diminished. The purpose of this test set is to provide a handy and portable means of carrying out experiments with a view to the determination of the results from different dispositions of the coils for loading the line. Capacity is added to the artificial cable at every mile by means of condensers, and terminals have been fitted so that the inductance coils may be inserted on either leg of line. The effect upon the transmission of adding or cutting out these coils is thus readily noted.

The coils representing the cable are wound inductively, to approximate more nearly to actual conditions. The 70-lb. cable is obtained by cutting out the resistances of $9\frac{1}{2}\Omega$.

ARRANGEMENT OF CONDENSERS & RESISTANCES IN ARTIFICIAL CABLE.

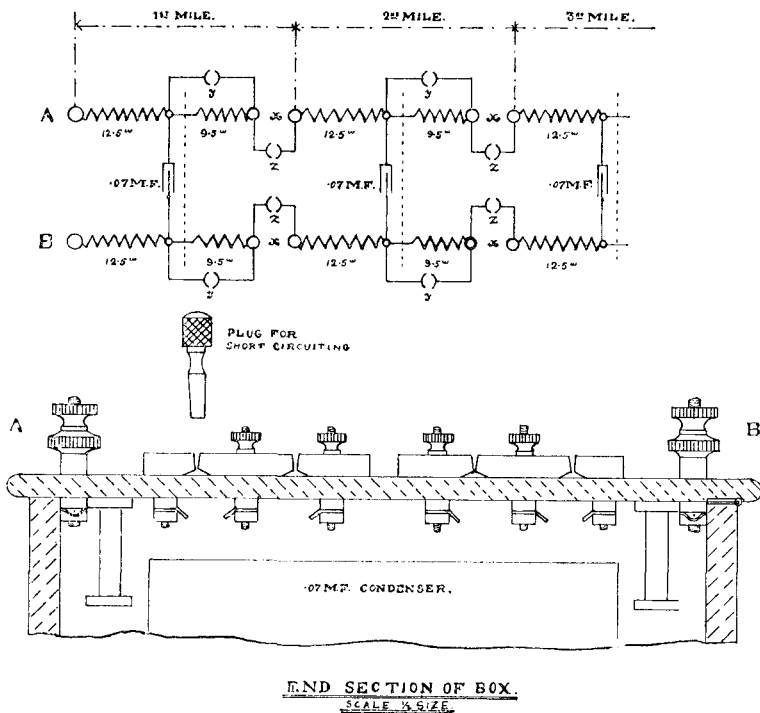


FIG. 7.

I think it will be agreed that the careful thought and careful design evidenced by the test sets here briefly described do credit to the engineering staff of our Company.

WHAT THE COMPANY IS DOING.

THE following exchanges have been opened during the last month, making a total of 1,395 in all:—Aughton (Warrington), Starcross (Exeter), Wollaston (Coventry), Endon (Potteries), Slindon (Brighton), Hampton-in-Arden (Birmingham), Caerwys (Chester district) and Darley Dale (Sheffield district); 3,073 stations were added during October, making a grand total of 440,483.

LONDON.—Private branch exchanges have been arranged for on the latest principle at the New Imperial Club, York Street, St. James'; Park Mansions, Knightsbridge; Howard Hotel, Norfolk Street, Strand; the Sports Club, York Street, St. James'; Earle's Hotel, Grosvenor Street; Crosse & Blackwell's, Charing Cross Road (two junctions, thirteen stations); The Gordon Hotels, Limited, Central Offices (two junctions, eight stations); the Hotel Cecil (fourteen junctions, 21 stations).

SWANSEA.—Orders have been obtained for two private branch exchange systems, one for Messrs. Cleaves & Company with three junctions, seven stations and 12,000 calls; the other for the Graigola Merthyr Company for three junctions, ten stations and 12,000 calls. Both these firms are large coal shippers.

NOTTINGHAM.—*Private Branch Exchanges.*—Messrs. Jessop & Sons, King Street, Nottingham, one of the largest drapers, etc., in the city, have now an exchange with three junctions and 28 extensions working.

Ten additional stations have been fitted to the switchboard at the Black Boy Hotel, making a total of twenty.

Switchboards and Sub-Exchanges.—The Long Eaton switchboards, comprising three 50-line exchange pattern boards, have been replaced by 300-line. An additional 50-line switchboard has been fitted at Langley Mill.

EDINBURGH.—The largest private branch exchange contract yet secured in Edinburgh has been concluded with the "Edinburgh Evening News, Limited," three junctions and 42 internal and external extensions having been taken for a start.

LIVERPOOL.—New premises have been acquired in South John Street, for the new Bank Exchange. The new building will be designed to accommodate two 10,000-line exchanges. A piece of ground has also been purchased at Wavertree, on which the Company will erect a building to accommodate a new exchange and stores, in place of the existing one; 802 yards of 600-pair underground cable, rendered necessary under the re-arrangement of exchange areas, has been laid.

Macintyre jointing sleeves have been issued to the gangs—Liverpool being chosen as one of the places where experiments are to be carried out with these sleeves, as an alternative to the ordinary method of soldered joints.

Owing to the extensive pulling down of property between Back Lime Street and Great Charlotte Street, our distributing pole (a 90 feet creosoted) has had to be recovered, together with 27 yards of 77-pair cable. The subscribers' circuits which remain have been re-arranged by lead-covered cable distribution and cable terminals from the old branch cable.

The number of private branch exchanges obtained during the past month are as follows:—Thirteen orders, 32 junctions, 53 extensions and 64,250 calls, making the total up to date of 160 orders, 437 junctions and 1,035 extensions. The total calls contracted for to date are 1,045,750.

MANCHESTER.—Amongst the contracts recently signed for private branch exchange service in Manchester are one from a firm of newspaper proprietors for ten junctions, 60,000 calls and 35 stations; one from a firm of ironmongers for nine junctions, 40,000 calls and 32 stations; one from a firm of home trade warehousemen for four junctions, 14,000 calls and 49 stations; one from a firm of dyers for four junctions, 12,000 calls and thirteen stations; one from a bank for three junctions, 8,000 calls and 6 stations; and one from a firm of shippers for three junctions, 12,000 calls and ten stations. This brings the total number of orders up to 91, representing 267 junctions, 1,331 stations.

ASHTON-UNDER-LYNE.—A contract has been accepted from the National Gas Engine Company, Limited, for a private branch exchange comprising four junctions, 35 stations and 17,000 calls. There will be 23 internal and 12 external stations, and when complete, each department of these large works will be in communication. A 50-line switchboard is being fixed, and the Company is supplying a trained operator to work the installation. This business has been secured as a result of the efforts of the Local Manager, Mr. W. T. Leeming.

BARRY.—The underground scheme at Barry is now approaching completion, 4 miles 274 yards of pipe having been laid, 5 miles 1,462 yards of cable, and 20 miles 958 yards of overhead wire were drawn in.

GUILDFORD.—A comprehensive scheme for an underground cable system throughout Aldershot town has been sanctioned, as also the erection of aerial cables throughout the camp to North Camp Exchange and Farnborough. It may interest readers to know that the camp covers a distance of three miles and has accommodation for 35,000 troops.

THE NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY.

At the monthly meeting the secretary reported the following donations had been received:—

C. B. Clay	£2	2	0
H. Snowdon	1	1	0

The following grants were made:—

Metropolitan Office	£1	10	6
Traffic Department	4	0	0
Engineers (a)	2	0	0
Engineers (b)	5	0	0
Maintenance	3	14	6

"NO FURTHER USE."

PREVENTING disconnections of people perfectly well able to pay for telephone service is one of the things necessary for the healthy growth of any telephone system. The way in which this problem strikes many a telephone manager is well stated in a query published in the *Transmitter*, issued by the Colorado Telephone Company. It is "What can be done to reduce the number of disconnections made because subscriber has 'no further use' for the telephone?" The letter in which this question appeared goes on to say:

"Thirty-five per cent. of the disconnections in my district are made because the subscriber has 'no further use' for the telephone, and I find it almost impossible to persuade any of this class to retain our service.

"It is not encouraging to be confronted at the close of the month with a very small net gain, after a month of soliciting, with its consequent expense, and a good amount of business written up."

In response Mr. JOHN F. GREENAWALT, editor of the *Transmitter*, indicates the right method of dealing with the situation as follows:—

"In the first place, it is not a difficult task to sell a man something that he needs, and knows he needs, and has decided to buy. A long list of such sales to one's credit is no evidence of superior ability on the part of the salesman; but where the prospective customer has decided in his own mind that he has not sufficient need of an article to warrant his purchasing it, he affords a splendid opportunity for a test of salesmanship. The man who is able to point out the advantages that would accrue to the 'prospect,' by having the article, in a way that convinces him beyond doubt that he is making a mistake in *not* having it—that man has proven his right to the title of 'salesman.'

"But there is still another case which puts the ability of the salesman to a severe test, and we may as well apply it at once to the selling of telephone service. A majority of men are taken with periodical spasms of retrenchment. They decide that bills must be cut down forthwith, and immediately they cast around for the commodities that can be dispensed with. Take the case of a man who decides that the telephone must go. He has had it for some time; it is no novelty, and its use has become a sort of mechanical procedure, so that he does not realise how important a factor it is in his daily life. He accordingly 'orders out' his telephone.

"Now, it is not enough to send the collector around and let him, as he presents the bill, suggest that 'We're sorry you don't feel that you want to keep the telephone'; or to have the installer, when he goes around after the instrument, suggest that 'you better keep it.' That is a case for a *salesman*. The subscriber needs the telephone, but he does not realise it. He must be shown, and the point is that a canvasser, who is at the same time salesman enough to convince a non-subscriber that he needs and can afford telephone service, should have the ability to prove to the subscriber who already has it that he still needs it, and that he cannot afford to be without it.

"In the opinion of the writer, the best man in your exchange is none to good to send out to interview the man who has 'ordered out' his telephone."

ENERGY.

BY CHARLES F. STREET.

THE word energy is one which is constantly in use, and is most commonly used in connection with some mechanical appliance. Thus if one sees a revolving flywheel, a conception of the energy stored in it is entertained by the difficulty which would be experienced in stopping the wheel. This, in fact, forms a true conception of the energy stored in the wheel, for the work done in this way is a measure of the stored energy. This, however, is only one form of energy; there are, of course, others, such as chemical, thermal, electrical, etc., and the amount of energy stored in any one of these forms can be expressed in terms of any one of the others.

An example of heat energy being stored chemically is found in ordinary lime, for if water be added to it and the lime be slaked a considerable amount of heat is evolved. This heat was stored in the lime and water in some particular molecular form as chemical

energy, and by converting the lime into slaked lime the amount of heat equivalent to the amount of chemically stored energy is liberated. If now we can conceive the slaked lime being converted back into lime and water again heat would have to be taken in by the lime in order to store up the necessary chemical energy. This essential heat for the process would be taken from the containing vessel, and thus leave it (the vessel) and the surrounding objects at a lower temperature. This is the principle of chemical refrigerating machines, *i.e.*, providing the necessary conditions for the conversion of one substance "A" to some compound "B," such that the energy stored in "B" is greater than in "A," the necessary heat for the process being abstracted from the material to be frozen.

A well-known example of chemically storing electrical energy is found in the ordinary lead-plate accumulator.

Another example of energy stored chemically by natural means is found in petrol.

During the formation of petrol from its elements heat must be absorbed, and is stored up in the petrol as chemical energy, for in converting one gallon of petrol with a suitable quantity of air into so much soot and waste gases by burning it sufficient heat is given out to raise 140 gallons of water at 60° Fahr. to boiling point.

Suppose two equal quantities of petrol be taken and one portion be burnt in a suitable burner and all the heat so evolved be measured. Suppose also the other equal portion be utilised in driving a petrol motor under load, and all the heat proceeding from the motor be carefully measured. Then it would be, and has been, noticed that more heat is obtained from the burner than from the motor. The reason for this is that upon the instantaneous ignition of the fuel in each case exactly the same amount of heat is evolved, but in the case of the motor some heat entirely disappears, being converted into work, this being an instance of the convertibility of the different forms of energy referred to previously.

A very good idea of the amount of heat equivalent to a certain amount of mechanical work done is obtained by rubbing together, say, two flat pieces of wood. The heat so evolved is an exact equivalent of the work done by rubbing. It must be borne in mind that the work done by rubbing and the heat so evolved are convertible. That is to say that if an amount of heat equal to that generated by friction were given, then it would be possible with a perfect heat engine to do just the same amount of work as was done in the first place by rubbing.

If it be considered how much work would have to be done by rubbing two surfaces together to produce as much heat as proceeds from the exhaust of, and by radiation from, a petrol motor an idea is gained as to how much more mechanical work a motor would do if absolutely thermally perfect. In such an engine the exhaust gases, having been robbed of all their heat energy and converted into work, would be cold, and the fuel consumption per unit of work would be correspondingly decreased.—The *Autocar*.

THE DEVELOPMENT OF THE TELEPHONE IN THE ENGLISH COUNTIES SINCE 1892 GEOGRAPHICALLY CONSIDERED.

BY W. H. GUNSTON.

(Continued from page 159.)

V.—WEST MIDLAND COUNTIES.

THIS group of counties, although it includes the densely populated region known as the Black Country is in reality chiefly rural and agricultural.

Telephonically it is extremely well developed, especially as regards Gloucestershire, Worcestershire, Warwickshire and Staffordshire. The Welsh borders of Salop and Hereford do not present a very favourable field for the telephone, but the principle towns in these counties are provided with the service. Gloucestershire, however, not only contains the major part of Bristol, but is studded with fair-sized towns which have long had the telephone, the extension of which to intermediate and surrounding villages followed almost as a matter of course. Warwickshire, although comprising Birmingham and Coventry, is chiefly agricultural, and

so also is Worcestershire. In both of these shires, however, the telephone has reached every place of importance, and the rural parts are well provided for.

Gloucestershire.—In 1892 the Company possessed exchanges at Bristol, Gloucester, Cheltenham, Tewkesbury and Clifton. The latter has since been merged in Bristol. Churchdown (afterwards closed), Lydney, Sharpness and Kingswood were opened in 1903; and Avonmouth (since closed), Westbury-on-Trym, Fishponds, St. George's, and Bishopston in 1894. The two last were subsequently merged in Bristol. The Company's system was extended to Stroud, Brimscombe and Stonehouse in 1895; Nailsworth, Barnwood and Stoke Bishop in 1896; Cinderford in 1898; Cirencester, Cleeve Hill, Coleford, Newnham and Parkend in 1899; Berkeley, Fitton and Dursley in 1900; Churchdown (re-opened) and Painswick in 1904; Amberley in 1905; Wotton-under-Edge and Lydbrook in 1906; Hardwicke, Saul, Fairford, Lechlade, Bream, Drybrook, Westbury-on-Severn, and Long Ashton in 1907. What few country towns of any importance were not reached by the Company's system have been supplied with the service by the Post Office, who opened at Winchcombe in 1902; Moreton-in-the-Marsh, Thornbury, Bourton-on-the-Water, Stow-on-the-Wold and Badminton in 1904-5; and Alderton and Tetbury 1907. There are thus 45 exchanges working in the county.

Herefordshire possessed no exchange until the Company opened one at Hereford and another at Colwall, near Malvern, in 1898. The Post Office opened at Leominster and Ross in 1903; at Ledbury in 1906; and the Company at Burghill and Bartestree in 1907; bringing the total number up to seven.

Worcestershire.—The northern border of the county includes part of the Black Country and several of the suburbs of Birmingham. In this part the telephone was established in 1892 at Moseley and Selly Oak (both afterwards merged in Birmingham), Dudley, Lye, and Kidderminster, and there was also an exchange at Worcester. The Company opened at Oldbury in 1893, and in 1896 commenced the development of the rural part of the county with exchanges at Evesham and Malvern, following these with Redditch and Stourport in 1897, and Pershore in 1898. Stourbridge and Cradley (on the Staffordshire border) were opened in the same year; Acocks Green, Kings Norton, and Halesowen (all near Birmingham), Barnt Green, Bromsgrove and Bewdley in 1899; Droitwich and Badsey in 1901; Bredon in 1904; and Selly Oak (re-opened), Stechford and Moseley (now Birmingham South) in 1905. The Post Office opened at Broadway and Shipston-on-Stour in 1904. The telephone is therefore extended to all parts of Worcestershire, which now has 26 exchanges.

Warwickshire.—In 1892 there existed four exchanges in Birmingham and one each at Coventry and Warwick. Leamington was opened in 1893 and Nuneaton in 1894. In the latter year Small Heath also was opened, but this exchange, like Aston and Edgbaston, was subsequently closed and the subscribers run into Birmingham. Tamworth was opened in 1897; Rugby and Kenilworth in 1898; Stratford-on-Avon and Erdington in 1899; Sutton Coldfield in 1901; Solihull and Knowle in 1902; Bedworth, Edgbaston (re-opened) and Aston (re-opened; now called Birmingham East) in 1905; Small Heath (re-opened; now called Birmingham Victoria) and Shirley in 1906; and Wolston and Hampton-in-Arden in 1907. The Post Office opened an exchange at Atherstone in 1903 and one at Moreton Morell in 1905. With the exchange which the Company is about to open at Berkswell here are now 24 exchanges in Warwickshire.

Staffordshire suggests to the mind the Black Country and the Potteries, but the county is a very extensive one with a large rural area. The Company's exchanges in 1892 consisted of two groups of exchanges—one near Birmingham, comprising Smethwick, West Bromwich, Wolverhampton, Wednesbury, Walsall, Bilston and Darlaston, and one in the Potteries, comprising Hanley, Stoke, Burslem, Tunstall (all three since merged in Hanley), Longton and Newcastle-under-Lyne—and also exchanges at Stafford, Burton-on-Trent, Leek and Stone. Brierley Hill was opened in 1894; Chesterton and Blythe Bridge (Potteries), Lichfield and Uttoxeter in 1897; Cannock, Rugeley and Trentham in 1899; Alsager in 1900; Aldridge and Handsworth (now Birmingham North) in 1902; Tettenhall in 1906; and Sedgely, Willenhall, Great Barr, Endon and Rocester in 1907. The Post Office have recently opened exchanges

at Cheadle and Tutbury, so that Staffordshire possesses in all 32 exchanges.

Shropshire is a large county, chiefly agricultural, but with a busy area, lying between Shrewsbury and Staffordshire. The only exchange existing in 1892 was that at Shrewsbury. The next to follow were Wellington, Bridgenorth and Oswestry in 1899. Ironbridge was opened in 1904, Oakengates in 1905, Shifnal in 1906, and Much Wenlock in 1907. The Post Office have opened exchanges within the last few years at Ludlow, Church Stretton, Whitchurch, Ellesmere, Market Drayton, Newport and Clee Hill, so that the county now possesses fifteen.

Monmouthshire.—The telephonic development of Monmouth was at first confined to those parts of the South Wales coalfields which lie within the county. Subsequently Usk and Chepstow were opened by the Company and Monmouth by the Post Office.

Newport, Pontypool, Tredegar and Abergavenny were the only exchanges the Company possessed in 1892, but by the year 1899 they had established Chepstow, Maindee, Abercarn, Llantarnam, Risca, Blackwood and Usk Exchanges, and the Post Office had opened at Newport, Pontypool, Ebbw Vale, Talywain and Abergavenny. Other exchanges were opened as follows:—1900, Abertillery by the Company, Blaenavon and Tredegar by the Post Office; 1901, St. Mellons, Caerleon and Crumlin by the Company, Blaina, Newbridge, Pengam, Crumlin and Rhymney by the Post Office; 1902, Maescycimmer, Abercarn, Risca, Aberbeeg, Griffithstown and New Tredegar; 1903, Monmouth, Castleton, Beaufort, Llanhilleth and Waunllwyd (all by the Post Office); 1904, Ebbw Vale; and 1905 Machen, both by the Company. Altogether 41 exchanges are working in this comparatively small county.

VI.—NORTH MIDLAND COUNTIES.

The Telegraph Act of 1899 embodied an arrangement made with the National Telephone Company confining its operations to those telephone areas in which at the time of the passing of the Act it had an effective exchange. Where these areas are large, or where they cover a considerable part of the surface of a county the Company has been able to effect a steady development of the rural districts, as in the case of Herts, Hampshire, Kent, Devon, Dorset, Gloucester, etc.; but the rural development of counties in which the telephone areas are far apart or which possessed few exchanges in 1899, had to be left in the hands of the Post Office, as in the case of Lincolnshire, Rutland, Bucks, the North Riding, and parts of Leicestershire and Norfolk.

Leicestershire.—In 1892 the Company possessed exchanges at Leicester, Loughborough and Hinckley, and the Post Office had dwindling exchanges at the two former towns. Wigston was opened by the National in 1892, Stonegate (since closed) in 1896, Anstey and Ashby-de-la-Zouch in 1898, Market Harborough in 1899, Syston in 1900, Oadby in 1901, Kirby Muxloe in 1905, Kibworth in 1906, and Narborough, Birstall and Coalville in 1907. About 1902 the Post Office opened exchanges at Billesdon, Gaddesby and Melton Mowbray, and with those about to be opened by the Company at Lutterworth and Earl Shilton the total will be 21 in all.

In *Rutland* the Company possessed no exchange in 1892. The Post Office opened at Oakham in 1905 and have since established exchanges at Somerby, Langham and Uppingham, making four in all.

Lincoln.—In this, the second largest county in England, there are comparatively few large towns and those few are far apart. National Telephone exchanges existed at Lincoln, Gainsborough and Grimsby in 1892, but no further development by the Company took place until Boston, Stamford and Louth were opened in 1899, and Grantham in 1900. The major part of the county was abandoned in 1899 to the Post Office, who opened at Spalding and Skegness in 1901; Sleaford in 1902; Bourne and Brigg in 1903; Wainfleet, Holbeach and Scunthorpe in 1904; Market Deeping in 1905; Horncastle and Woodhall Spa in 1906; and Sutton Bridge, Long Sutton, Little London and Saxilby in 1907. The Company, meanwhile, had established an exchange at Cleethorpes in 1905. The total number of exchanges in Lincolnshire is thus 23.

Derbyshire.—The Company were well established in this county in 1892. They had exchanges at Derby, Duffield, Belper, Chesterfield, Ilkestone, Baslow, Bakewell, Long Eaton and Glossop, and at

Dronfield, Beauchief and Eckington in the Sheffield District. Buxton was opened in 1895, Matlock in 1896, Swadlincote in 1897, Langley Mill and Ashbourne in 1898, Ripley in 1899, Chapel-en-le-Frith in 1904, Wirksworth in 1905, Bolsover and New Mills in 1906, and Draycott in 1907. Not only are the Derby, Chesterfield and colliery districts well served, but the Peakland, and the Derwent, Wye, and Dove Valleys are not neglected, and with the recently opened Post Office exchanges at Alfretton, Riddings, Somercotes and Shardlow and one which the Company has just opened at Darley Dale there are now 28 exchanges working in the county.

Nottinghamshire is well covered by the Company's system, which extends from Bawtry on the north to Nottingham and from Sutton and Mansfield across to Newark. The only exchanges open in 1892 were Nottingham, Mansfield and Basford (which has since been merged in Nottingham, as was also Carrington, opened in the following year). Worksop was established in 1893, Beeston in 1894, Retford and Newark in 1895, and Hucknall Torkard and Bulwell in 1896. No further development took place till 1906, when Sutton-in-Ashfield, Carlton-on-Trent, Southwell and Ruddington were opened, followed by Radcliffe-on-Trent and Bawtry this year. The only exchange worked by the Post Office is that at East Kirby, which brings the total for the county up to fifteen.

(To be continued.)

THE OPERATION OF A COMMON BATTERY SUBSCRIBER'S INSTRUMENT.

By M. BLIGHT, District Maintenance Engineer, London.

RECEIVING.

The incoming speech currents pass from the "A" line through the 15-ohm winding of the induction coil, and then divide a portion going through the transmitter, and a portion through the receiver, 30-ohm winding of coil and condenser (see Fig. 1). The currents

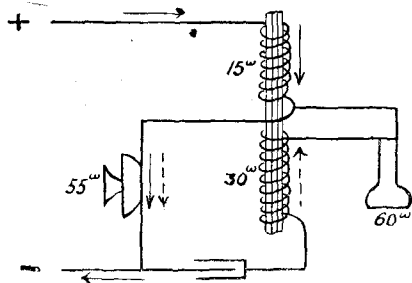


FIG. 1

which thus reach the receiver direct are so small as to be practically negligible owing to the existence of the much easier non-inductive path offered by the transmitter. The currents that really affect the receiver are induced in the 30-ohm winding of the coil by the passage of the currents in the 15-ohm winding and circulate in the circuit in the direction indicated by the dotted arrows. The slight direct effect, it will be noticed, is in the opposite direction to that of the induced currents.

TRANSMITTING.

The transmitter acts in two distinctly different ways; first, by varying the resistance of the line circuit, it directly varies the current flowing out through the repeating coil at the exchange, and secondly, by effects induced in the 15-ohm winding of the induction coil, it controls the variation of the line current. To make the operation clear, consider the transmitter diaphragm is moving outwards and its resistance consequently increasing (see Fig. 2). The current flowing in the line in the direction of the arrows is then decreasing. The condenser is normally charged by the potential difference existing at the transmitter terminals. When, with an increase in the transmitter resistance, this potential difference increases, a current flows into the condenser, passing through the 30-ohm winding of the coil in the direction of the arrow. Thus is

there induced in the 15-ohm winding an electro-motive force in the direction of the dotted arrow, and this, it will be noticed, is opposing the line current and consequently diminishing it. The direct and induced effects of the transmitter thus both assist in the reduction of the line current.

When the transmitter diaphragm recedes the reverse takes

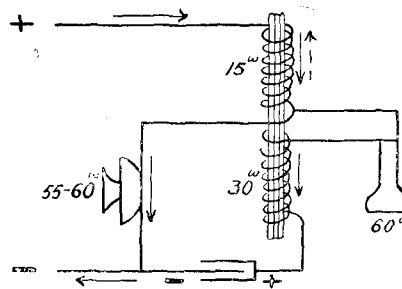


FIG. 2

place (see Fig. 3). The line current is strengthened by the induced effect. The falling potential difference across the transmitter terminals causes the condenser to discharge proportionately and a current flows through the 30-ohm winding in the direction of the arrow. This induces an electro-motive force in the 15-ohm winding in the direction of the dotted arrow, which assists the line current and thus further increases it.

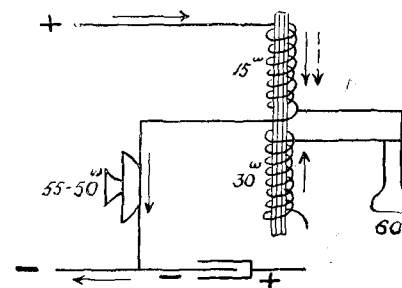


FIG. 3

Note.—To make the matter clearer, in the above sketches the two windings of the induction coil are shown one behind the other. Actually they are wound in the usual way, one over the other.

This explanation should enable those concerned to deal with any faults that may occur on these instruments. Two faults may be mentioned, one at least of which has a rather unexpected result: a high resistance in the transmitter circuit will have a detrimental effect upon the receiving; and the reversal of one winding of the induction coil in relation to the other will greatly diminish the transmission, but will not sensibly affect the receiving.

COMMENT ON THE ANTWERP FIRE.


ONE can imagine the consternation in shipping circles, and in business circles generally, if Liverpool, Manchester, or even Belfast, Bristol or Cardiff, were, without warning, deprived of telephonic communication for several weeks. This is what has happened at Antwerp, a city of 355,000 inhabitants, and one of the most important ports of Europe. The city was served by one central telephone exchange, which was completely destroyed by fire last week. Those who are accustomed to criticise our own progress in telephony will doubtless be surprised to learn that the Antwerp telephone exchange, which is part of the telephone system of the Belgian Government, is—or rather was—of an absolutely obsolete and inefficient type, with single-wire instead of metallic circuits, break-jack multiples and hand-restored indicators. A new exchange building has been erected for three years, awaiting the order to proceed with the equipment, which has been constantly postponed—in fact, if such a state of affairs had obtained in a town of equal

importance in this country, one could almost imagine that the engineers responsible for the maintenance of the telephone service had themselves been guilty of arson to make further postponements impossible. The arrangements that are being made for restoring the service temporarily during the completion of the new exchange are particularly interesting in view of the peculiar conditions to be fulfilled.—*Electrical Engineering.*

SUSPENDER TROUBLES WITH AERIAL CABLES.

By J. K. MURRAY, *Glasgow.*

In running out these cables sometimes difficulty is experienced in getting the pig-skin suspenders quite even—some appearing to be longer than others at the end of the run. This is due to slight differences in the quality and thickness of the pig-skin, but more particularly to the fact that even with the greatest care one will get more strain than another on some part of the route when passing the pulleys which are indispensable for heavy lead-covered cables, and even where no pulleys are used the handling in unhooking and rehooking at each pole tells on the pig-skins by the time the last spans are reached, when frequently many have to be rejected and scrapped.

It is also a general practice in running to use, say, only every second pig-skin till the last span is reached, when all are put on and closed, thus having every second pig-skin strained. I have found that this difficulty is almost entirely eliminated by the following method:—A separate set of pig-skins (preferably a size larger than the pig-skins assigned for the particular job) is made use of. I had the hooks of these bent to form a simple S hook, so , which

can readily be clipped off and on the steel suspenders at the poles, the narrow portion of the hook being just wide enough to pass over the steel suspender wires with slight pressure.

These were made use of as runners only, and an extra boy was employed at the drum for placing these on the cables, it being found that one every 6 or 8 feet apart was sufficient according to the size and weight of cable being run. The spacing of these need not interfere with the regular pig-skins, which are put on 2 feet apart, these having been carefully selected and classified, odd sizes and defective ones being rejected.

The special pig-skins, which might be called runners, are taken off at the last span and each of the permanent pig-skins hooked on and closed. These being hung on for the first time are quite fresh and are subjected to no undue strain, there being no more poles to pass. The appearance of the job is thus improved, and the ultimate life of the pig-skin must be much greater under these circumstances. A great saving of time was also effected on each run tried (the trials were at Bowling and at North Kelvinside), as with the runners the men could handle the cable so quickly that the winch could be worked not only without stoppages but at more than double the usual speed until the last spans are reached. The extra time in taking off the runners on the last span is negligible. The same runners are, of course, available for many runs, and there is thus an ultimate saving in pig-skins, as without the runners a number which have stretched abnormally by the time the last span is reached have to be taken off.

DIFFICULTIES OVERCOME.

By JOHN HY. SINGLETON, *Blackburn.*

The article by Mr. GREENWOOD, Beverley, on "Pole Erecting in Towns" suggests recording the following similar job at Blackburn:—

A 70 feet pole had to be erected in a yard bounded by very high buildings, one being a church over 50 feet high and the others over 40 feet. The only course open was to erect four derricks in the church grounds to enable us to get the pole so far on its road home, after which another difficulty presented itself, and it became necessary either to pull down the gable end of a house or go through an ordinary window. The latter being considered the cheapest way

the work of getting the pole through was proceeded with, and after getting the weight on two derricks, a third one being erected near the pole hole in the yard where the pole had to be fixed, the blocks were attached to the 70-foot pole and slowly it was brought through the window, the head of the pole towering higher and higher in the air until it finally landed upright and was safely erected in the desired position.

On another occasion I had to surmount a difficulty in connection with a distributing pole required for the extension of our present underground scheme in Blackburn. A position for the pole having been selected, the permission was arranged with the grantor, when it was found that the passage through which it was planned to carry our pipe and cable to the pole did not belong to the grantor. As it was not deemed advisable to enter into agreements with various owners, it was arranged to lay the pipe through the parlour and kitchen of the house of the original grantor into the yard where the pole was to be erected. On this novel wayleave agreement being completed, the work of digging up the floors and laying the pipe and cable was duly carried out without any hitch.

Of course I do not suggest that a difficulty can always be overcome, but it is an old saying, "Where there is a will there is a way," and it behoves us as telephone men to find the way and never give in, no matter how difficult or unusual the road to the desired end may prove to be.

UP-TO-DATE TELEPHONE METHODS IN A BIG SHOP.

WANAMAKER'S INSTRUCTIONS TO EMPLOYEES.

At each station on the main floor in the Wanamaker's Philadelphia store a tablet has been hung on which are instructions to salespeople for handling telephone calls. Nearly 2,000 of the 3,000 telephones contracted for have been installed, although but two sections of the store are now finished. Other stations are being installed each day as new counters and sub-departments are arranged.

TELEPHONE MESSAGES MUST RECEIVE INSTANT ATTENTION.

1. Speak close to the mouthpiece in a clear, pleasant tone of voice.
2. Calls must be answered promptly, courteously and distinctly.
3. The nearest disengaged employee must answer a call immediately. If all salespeople at a counter are busy the one nearest should answer the telephone, first asking to be excused by the customer being waited on.

4. In answering, do not say, "Well, well, what is it?" Best say, "Wanamaker's Shoe Department," or "Wanamaker's Furniture Department."

At the close of the conversation, say, "Thank you."
A "telephone customer" is as much our guest as if he or she were here in person and MUST be given quick, cordial and accurate attention.

5. In cases where the customer may want some other department, inform the customer of the fact that you will arrange it for her. Then work the telephone hook up and down, and after you have secured the operator's attention, say, "Please transfer this customer to the ——— Department," naming the department.

6. In getting information for a customer or answering a request to have someone else called to the telephone, ask the customer to wait a moment, then find or send for the person wanted. If there is any unusual delay, do not allow the customer to wait, but inform her as to your inability to get the desired information or find the person wanted. Take her name and telephone number with the message and say that her request will be attended to promptly.

When in doubt: as to what reply should be given to a customer call your aisle manager and leave the case with him.

7. If the telephone does not work properly, report the fact immediately to the operator over another telephone.

8. Each telephone message received must be written down instantly, leaving nothing to the risk of memory. The official "telephone memorandum" book must be kept on hand at each instrument, and only the pages of this book are to be used in writing down messages.

Messages must be taken with the greatest care to ensure accuracy in every word and figure. Always include customer's name, address and telephone number.

9. In filling out sale schedules for telephone orders the customer's telephone number must be entered in full on the schedule.

10. After a message has been attended to and if the "telephone memorandum" is not otherwise required, give the latter to an aisle manager. Aisle managers will turn in these "telephone memorandums" at the close of the day at the superintendent's office, with their exchange schedules.

If the message is an order for merchandise, the amount of the order must be noted on the "telephone memorandum" before the latter is handed in.—*Philadelphia Telephone News.*

These instructions show very plainly the importance given to shopping by telephone in America. Similar careful organisation of the telephone service in large English shops would be greatly to the advantage both of the establishment and of the customers. We have edited the American terms a little. "Aisle manager" we take to be American for floor-walker.—*Ed., "N. T. J."*

TELEPHONE WOMEN.

VII.—LEONORA MAY GIBSON.

MISS GIBSON entered the Company's service at Hull in November, 1893. At that time the system in vogue was magneto call and clear, and the Hull Exchange was equipped with a bridging board with self-restoring indicators. The number of subscribers then was about 600, and the operating staff mustered just a dozen. Miss GIBSON made rapid progress in the work and was promoted to the position of Senior Operator in February, 1895.

In February, 1900, the telephone service of Hull was almost completely stopped as the result of a severe snowstorm, which wrecked the whole of the overhead system. This for a time relieved the operating staff of the greater portion of their duties, but considerably increased the duties of everyone else. It is one of the misfortunes of the telephone operator that she can do little to help her fellow-workers in times of stress due to mechanical injury to the plant. She can only sympathise. In March, 1901, the



original exchange was abandoned and the change-over to the new premises took place. This new exchange was provided with one of the first common battery equipments installed in this country. Miss GIBSON took a prominent part in training the operators to work the new system, which, after twenty years' of indicator working, was a great novelty to all hands in all departments.

Miss GIBSON was promoted to Clerk-in-Charge in November, 1903. By this date the subscribers' stations had increased to over 3,000, and the operating staff to 28.

Miss GIBSON, in her fourteen years' telephonic career, has seen service under three district managers, and during that period the system has been extended to eight outlying districts, and the Hull area has grown to be one of the most important telephone centres in the country. The total number of lines now working in the Hull Central Exchange alone is over 5,000, with over 6,411 stations, and the staff has increased to 62. It is common knowledge that the Hull Corporation started an opposition service among the friends of the corporation a few years ago, but the superior service and facilities of the Company have resulted in the Company's service remaining the more popular, and the corporation system serves only a few hundred subscribers who are not also provided with the National service. Miss GIBSON has done her full share

in establishing and maintaining the high standard of efficiency at Hull which has so well maintained the supremacy of the National system.

Miss GIBSON is a keen believer in outdoor exercise, and any scheme for the benefit of the staff in this direction has her whole hearted support.

LINE SIGNAL LIMERICKS.

BY GERTRUDE BERRY, *Operating School.*

SOME time ago there appeared in the JOURNAL a suggestion, the excellence of which has since been proved, that learners might find memory assisted by the presentation of the various operating rules in rhyming form.

It has since occurred to me that these might be still more acceptable to the intellect of the modern learner if presented in the form so popular at the present time—the limerick. For instance:

If the signal is plain black or white
The trouble it gives you is slight,
You connect straight away
Any number they say,
And there's nothing whatever to write.
If for "Trunks" a subscriber should call
You must raise no objection at all,
Saving signals that are
Marked across with a bar,
You connect these to "101 Wall."
When a green signal calls at your board,
Every call on a ticket record.
If it's marked with an S
This doth clearly express
"Outer London" the sub. can't afford.
If the signal is red that you see,
Recollect you must ask for a fee,
If marked with a dot,
It's a call-box, if not,
A message rate sub. it will be.
When T on a signal is shown
It expresses *Trunk Service* alone,
This subscriber must be
Put on to L. T.
Whenever he uses his 'phone.

As regards the ticket system:

If the call to the "Service" should be,
You record on your register key,
But a ticket you make
With a mark like a snake (S)
And an S to denote that it's "free."

Certain modifications might be necessary before these could be brought into use.

INTERNATIONAL TELEPHONE LINES.

ACCORDING to the daily papers, direct telephonic communication between Berlin and Copenhagen has already been efficiently established, not *via* Hamburg, but by Fehmern Island, and preparations are also well advanced for a direct line between the German capital, Gothenberg and Stockholm; long-distance submarine telephone cables being now considered as having established their practical utility. The question is also to be resumed of direct telephonic communication between Berlin and London, *via* Emden.

Presumably the type of cable referred to is that provided with Pupin loading coils. An experimental cable with loading coils, containing seven pairs of conductors, was recently laid by Messrs. Siemens & Halske in the Lake of Constance, and sufficient experience was gained, we believe, to show the way of overcoming the various mechanical difficulties incidental to such a cable.

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"BY THE STAFF FOR THE STAFF."

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DECEMBER, 1907.

[No. 21.

A CALAMITY.

At the end of October, while last month's JOURNAL was being printed, the telephone exchange at Antwerp was completely destroyed by fire. The sympathy of all telephone men will go out to their Belgian *confères* in such a disaster. National telephone men have had some experience of telephone exchange fires: such experiences are hardly possible to escape in a system numbering over a thousand exchanges. They know full well what a terrific blow is struck at the ordinary working of a telephone service by the destruction of an exchange, even when the exchange destroyed is one of a group and by dint of strenuous effort and unstinted expenditure of material can be replaced within a comparatively short time. But in this case the disaster is complete and overwhelming, as Antwerp had but one exchange for the whole area, and the entire exchange equipment has been reduced to ashes.

To the Belgian Telegraph Administration, which for a good many years past has operated the telephone service in Belgium, we offer our most sincere sympathy, in which no doubt all readers of the JOURNAL will heartily join. The loss of property is not so important a matter to the State Administration, as in this case the equipment demolished was to have been superseded next year and then would have had only an old metal value; but the long interruption of the service inevitable when the sole exchange of a system has been destroyed, the harassing work of reconnecting thousands of wires to a different exchange building and a temporary switchboard, and the strain and worry of dealing with thousands of subscribers suddenly and for a long period deprived of a service which had become an integral part of their daily business machinery these are other matters, and those who have to cope with them are deserving of all sympathy.

It appears that the fire broke out in the early morning of Oct. 29, when only two night operators were on duty, so that there was no panic and no injury to any of the staff. The actual cause

of the fire is not known. The building was an old one and the equipment was one of the oldest series magneto boards in Europe, so the flames spread rapidly and in a short time the whole contents were consumed and the immense roof fixture collapsed, fortunately not falling into the street. The Belgian Administration had so far progressed with the work of reconstructing the Antwerp telephone system on modern lines as to have completed a new exchange building, some distance from the old exchange, and to have laid conduits and cables in a part of the town, although neither the exchange equipment nor the distributing plant had been begun, as it was not intended to open the new exchange until the middle of next year. Had the fire happened a year or two ago, Antwerp would have been without telephone service for a long period; but with a building and a certain amount of cable plant available, it is expected, by the aid of a temporary equipment, to begin to restore service within a few weeks.

AND ITS LESSONS.

DURING the recent discussions on the measured rate question some of our critics have quoted, always inaccurately, some of the Continental rates for telephone service and have held up Continental telephone conditions as superior to ours. We have been told at meetings, and the figures have been inserted without any attempt to check their accuracy in an official document issued by a Chamber of Commerce, that telephone service is supplied in Germany at £5 a year and in Belgium at £6 a year. The places where telephone service is supplied in Germany at £5 a year are places having between 50 and 100 subscribers. In Germany there are both flat and measured rates and the tariffs are graduated according to the size of the town or according to the size of the telephone system, so it does not give a very fair idea of the German telephone tariff to quote only the rate for the very smallest places. In Antwerp, however, we have a concrete instance, with some very interesting lessons to be studied by those critics of British telephony who are always extolling the virtues of Continental telephone tariffs and of Continental telephone practice.

The telephone rate in Antwerp is not £6, as freely stated in several recent rate discussions in the North, but £10, for *single-wire* service within 1.86 miles of the exchange. If the subscriber desired metallic circuit service he paid £4 a year extra, or £14 in all. There was only the one exchange for the whole city, so that subscribers in the outlying parts and in the suburbs would have to pay mileage charges, which in the case of places only a few miles distant from the centre of the town would make a very high rate. Antwerp is a city of over 300,000 inhabitants, one of the leading ports of the Continent and a very busy place. It had only 4,400 subscribers at the time of the fire, a very moderate development, so that it is fair to suppose that the serving of a large city area from a single exchange resulted in the rate for service in a considerable proportion of that area being sufficiently high to check development. These simple facts show how very easy it is entirely to misrepresent the real telephone conditions of a Continental town by simply quoting a rate for service, even when the rate is quoted correctly; of course it is much worse when a figure considerably below the true one is quoted, as is generally the case in the telephone rate discussions in this country.

Even granting that £10 is a cheap rate for unlimited service in a big city like Antwerp, it is certainly open to question whether the Antwerpians have anything to be thankful for in being supplied with a nominally cheap telephone service by a benevolent Government Administration. They have had a service which clearly has not been developed so as to serve a large proportion of the population or to reach out to the more outlying parts of the area. They have had a service which clearly cannot have been of the highest efficiency, as a single-wire telephone system in a city with electric tramways and other electric systems is not likely to give first-class communication, while a switchboard dating from the early "eighties" cannot be supposed to have been capable of uniformly speedy and accurate working. And under these conditions and with this style of plant, the exchange housed in an old building used also for other business purposes, the Antwerp telephone service had been carried on until the almost inevitable fire came, and a prolonged period of total interruption of service results.

Perhaps it may occur to some that cheapness is not everything; that it might possibly have been better for the Antwerpians, as a whole, if some had paid a little more than £10—or even £14—a year, and some a little less, as occurs under measured rates, and they had had a modern telephone service, well-developed, serving all parts of the area, with modern exchanges in modern buildings, metallic circuit lines laid underground—in short, an efficient and extensive system practically proof against total interruption of the service. It is quite possible to carry cheapness too far, even in the interests of the customer, and in the case of telephony it is assuredly the community as a whole, but especially the business community, which would be the chief sufferer from an attempt to run the telephone business of this country on lines of false economy which would undermine its efficiency and check its development.

PROGRESS IN WIRELESS TELEPHONY.

The range of practical wireless telephony seems to be rapidly extending. The daily Press has reported that satisfactory wireless talking has been carried on by the German experimenters, using the Poulsen system, over a distance of between 40 and 50 miles, the two communicating stations being on opposite sides of the city of Berlin. This is a remarkable feat and fuller accounts of these experiments will be read with much interest. The *Times Engineering Supplement* reports that the United States Navy Department has ordered 28 sets of wireless telephone apparatus of the Radio Telephone Company. This is the system of Prof. R. A. FESSENDEN, recently described in the JOURNAL. It is intended to equip all the battleships and armoured cruisers of the American fleet with wireless telephone apparatus, as the experience with the ships already equipped shows that satisfactory talking can be had over distances of about eleven miles and on one occasion talking was carried on over a distance of 25 miles. For communication between vessels of a squadron telephony has a great advantage over telegraphy. As already pointed out in these columns, the wireless telephone is bound to displace the wireless telegraph for ship communication when it reaches a thoroughly practical stage of development, and this seems to be near at hand—so rapid has recent progress in wireless telephony been.

THE SEASON'S GREETINGS.

BEFORE the next issue of the JOURNAL appears Christmas will have come and gone, and a New Year will have begun. The year now closing has been a year of active work in the telephone world and has seen one great improvement in telephone practice in this country—the general introduction of measured rates. Although much discussed at present and although the most loudly voiced criticisms are somewhat unfavourable, there is little doubt that when the natural prejudice which such an innovation has to encounter is overcome and the good features of the measured rate tariff are better understood, this change will be generally admitted to be a great step for the advancement of telephone conditions in Great Britain.

To all readers of the JOURNAL, to all members of the great Staff of the National Telephone Company, we wish unlimited—not measured—good things during the season when all the Christian world rejoices—a happy Christmas and a bright New Year.

THE EDITING COMMITTEE.

TELEPHONE SOCIETIES.

THE particulars of the following telephone societies are to hand:—

	No. of Members	Entrance Fee	Annual Subscription	Is there a Library?	Meetings held every
Birmingham	100	Nil.	2s.	—	—
Blackburn	90	Nil.	2d. per week	Yes.	Month in outside hall.
Bradford ..	25	Nil.	1s.	—	Month in Co.'s office.
Brighton ..	54	3d.	Nil.	—	—
Bristol ..	84	Nil.	Nil.	—	Month in outside hall.
Cardiff ..	78	Nil.	1s.	—	Month in Co.'s office.
Chester ..	25	Nil.	Nil.	—	—
Coventry ..	20	Nil.	1s.	—	Month in outside hall.
Dublin ..	60	Nil.	1s.	—	Two weeks in Co.'s office.
Glasgow ..	251	Nil.	1s.	—	Two weeks in outside hall.
Hull ..	61	—	—	—	—
Leeds ..	41	Nil.	1s.	—	—
Liverpool & Birkenhead	—	Nil.	(6d. Liverpool) (3d. Birkenh'd)	—	—
London ..	369	(Ladies 6d.) (Gentn. 1s.)	Ladies 1s. (Gentn. 2s.)	—	Month in Co.'s office.
Manchester	152	6d.	6d. per month	—	Two weeks.
Newcastle	—	Nil.	1s. seniors (6d. juniors)	—	—
Nottingham Factory ..	184	Nil.	1s.	—	—
Plymouth ..	25	Nil.	2s.	—	Three weeks.
Portsmouth	77	Nil.	1s. 6d.	—	Two weeks in outside hall.
Sheffield ..	159	Nil.	(Nil. (member-ship cards 1d.))	—	Month.
Swansea ..	75	Nil.	Nil.	—	..

A TRANSMISSION EXPERIMENT.

IN his paper on loading telephone cables, before Section G of the British Association, Sir WILLIAM PREECE recounted one of his characteristic anecdotes, the point of which was to emphasise the importance of the frequency and wave form of the ideal vibration for telephonic transmission. He said that HUGHES was exhibiting the telephone in Paris in 1881, and made the somewhat remarkable statement that the instrument would transmit the name of an Englishman better than that of the citizen of any other nation. To prove this, he shouted the names of HELMHOLTZ, GALILEO and FARADAY into the transmitter, but the last-named was heard much more distinctly than the others in the receiver. He mentioned this to call attention to the fact that the resonance of the diaphragm was a most important factor.

THE VALUE OF GOOD ENGLISH TO THE ENGINEER.

TECHNICAL men are peculiarly prone to offend in the use of their mother tongue, because they have not, as a rule, read deeply in classical literature, or been instructed thoroughly in the construction of the language. Their higher education is generally almost entirely technical. Yet the character of the man's language is important in his social and business intercourse: in his business and professional correspondence: in the promulgation of orders, rules and regulations for the guidance of those under his direction: in the preparation of specifications, contracts and reports: in writing and delivering addresses and technical papers, and in writing technical books for the advancement of his profession. A technical man is, presumably, an educated man, and if he does not speak and write like one, suspicion is cast upon the entire range of his learning. When a man cannot spell correctly, or use ordinarily good grammar, it is difficult to convince others that he is professionally able. There are many vocations in which it is not essential that a man be cultured and intelligent, but the technical professions are not among them. Nothing so surely makes a man's secret habits of thought, his real character, as the little tricks of speech which are exhibited when his mind is on the matter, rather than the manner of his speech.

In business correspondence the value of good usage is still more manifest than in conversation, since the written word is permanent, and correspondence greatly extends the field of one's intercourse. A letter often passes through many hands and multiplies the good or bad impressions it produces. If its import is not clear, it may cause disagreement or involve serious financial disadvantage. Even bad punctuation will often seriously alter the entire meaning of a sentence, and bad grammar in particular at once stamps a writer as being something of an ignoramus. The art of letter writing, like a knowledge of grammar, is commonly considered to be within the range of everyone; but anyone who has had large experience in business correspondence knows that few men write good letters. It is so rare to find a matter which is composed of more than one or two items clearly, concisely and thoroughly discussed in a letter that favourable attention is immediately attracted to its writer. Not a few men owe the opportunity for advancement to their ability to write a good letter.

The detrimental results of bad English in conversation or in correspondence are by no means as great as in formal technical articles. Every normal, healthy-minded technical man desires to leave a permanent record of the results of his best thought and work to aid his co-workers and those that come after him. An ably written description of work performed, discoveries made or methods developed accomplishes more for the advancement of science than many well-designed and well-executed works. In the preparation of articles for the technical press and papers for the learned societies, there is time to study form and style and to eliminate errors due to haste; hence, when such matters are ill-written, it is not unfairly argued that the writer is ignorant of the correct use of the language. Such an opinion is exceedingly detrimental to the writer. It weakens his arguments, causes him to be misunderstood, or so detracts from the interest of his readers that the matter is not read. The idea that a technical paper is dry at best, and that the English employed in it is of small consequence has long been proved incorrect. Certain of the better magazines print only carefully selected matter and reject everything but scholarly, well-written articles. Their influence upon the language is quite as good as that of the better books of the day; but the well-written article costs more money than the "pot-boiler," hence the magazine is more expensive, its circulation is limited, and it influences a smaller number of readers than its cheap and less worthy competitor. Yet there is so much nowadays that is well written that no busy professional man is willing to spare the extra time and effort necessary to read and digest an ill-written paper.

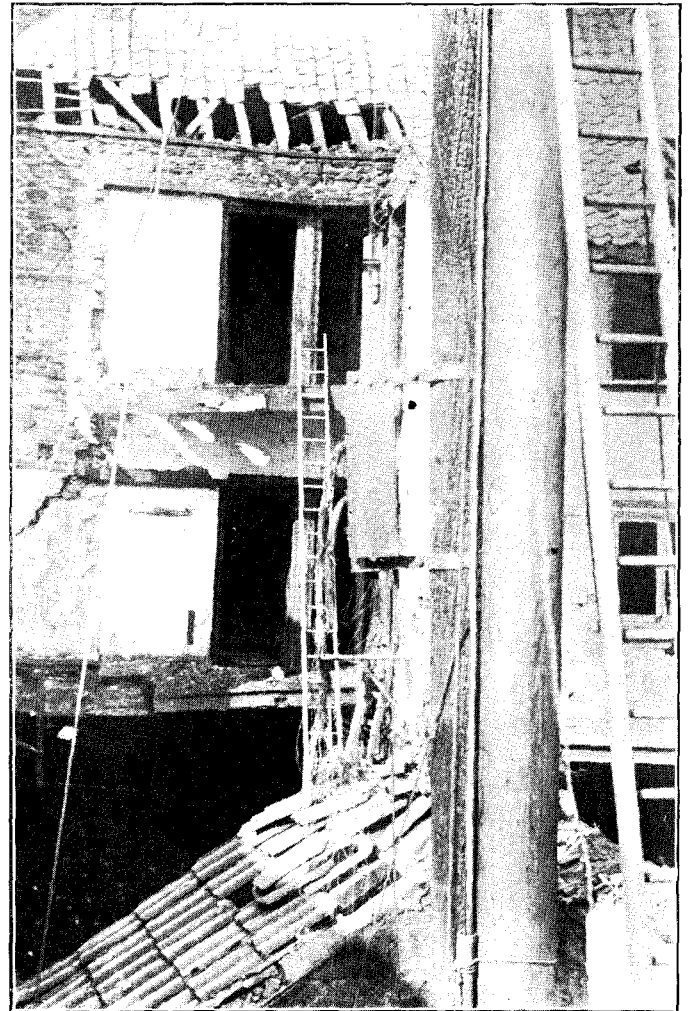
The style should be crisp and clear. An elegant, showy style is often a sign of lack of breeding. Short words of English origin are invariably stronger and more rugged than their longer and more elegant synonyms which are derived from the Latin or Greek;

hence their use is nearly always to be preferred. Simplicity and force demand simple direct language. The style should be so smooth and so unostentatious that the hearer's attention is not drawn to the language, but is left entirely free to follow the course of the thought.—*Abstract of an address by John Lyle Harrington before the Technological Society of Kansas City, in Sound Waves, September, 1907.*

FIRE RECONSTRUCTION AT BRISTOL.

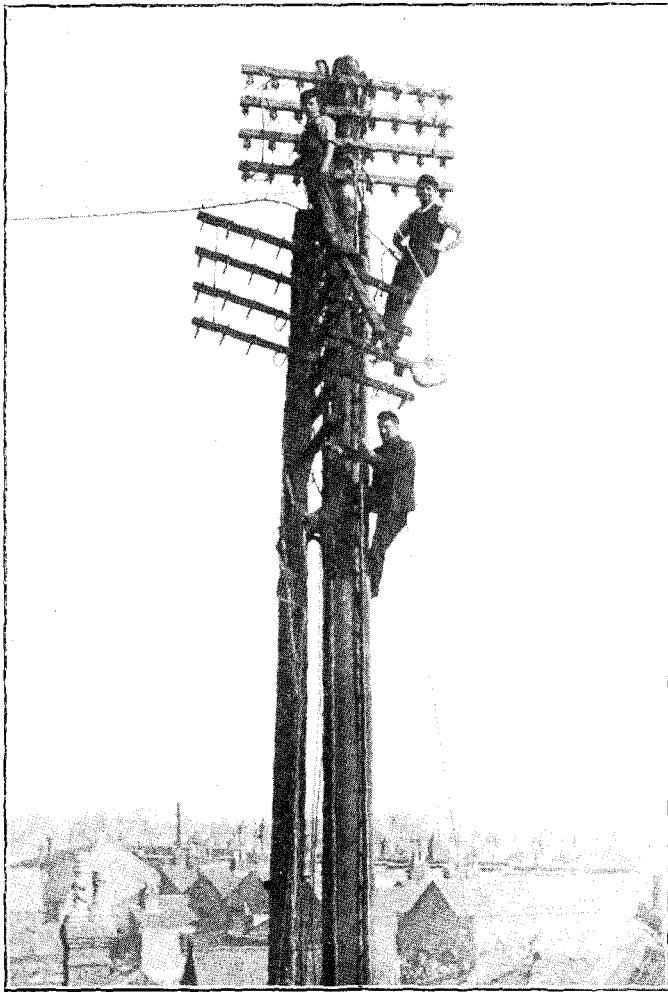
By E. L. PRESTON, *Local Manager.*

FIRES in Bristol are pretty frequent, but it is not often that the Company's plant suffers to any extent. We were not so fortunate during the recent fire at Lawrence Hill, as all the subscribers connected to a 52-pair distributing pole were cut off. A few particulars may prove interesting.

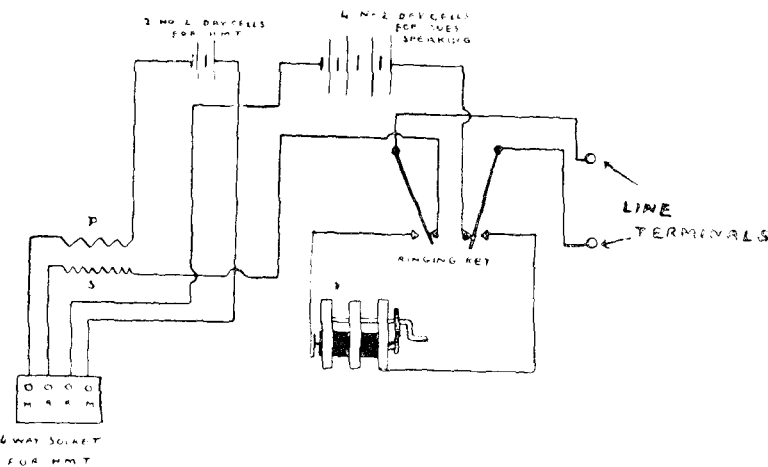


The night operator was informed of the occurrence at 4 a.m., and he immediately telephoned to Foreman ALLEN, who attends all fires if the Company's plant is likely to be involved. Knowing that the Company had a distributing pole at the back of the premises on fire, he at once made his way to the spot, and seeing that we were going to suffer he called up Supervising Foreman PASKER. The district manager was also notified by telephone, and he at once dispatched one of the night operators to my residence, and by 6 a.m. I was one of the crowd at the fire. The firemen were still busy, but we were able to make an inspection of the extent of the damage between 6 and 7 a.m. We found that everything had been destroyed or rendered unusable. The only loss we did not grieve about was that of the cable head and box and the heavy bed of wires crossing the trolley wires, as we now had a fine opportunity (which we took full advantage of) of bringing the distributing pole

into line with the majority by fitting a pothead and erecting a dry-core cable over the trolley wires. The accompanying photographs were taken the day after the fire by Inspector BABIDGE, and show the new pole by the side of the old one. The bridle wires that



were left hanging from the cable head box were minus their insulation and burnt very thin. The head of the pole suffered most, and the arms were only just hanging together, having been burnt through in places.



Having discovered the extent of the damage we had to consider the quickest way of re-establishing communication. I at once made a study of the records and had the necessary lists made of the subscribers affected. It was found possible to transfer a few circuits to other distributing poles. This was done and the remaining subscribers were advised that every effort would be made to reconnect them within 48 hours. This, I am pleased to say, was

carried out, thanks to the way all members of the staff on the job did their respective parts: the result, I think, can be considered very creditable, seeing what an amount of work had to be done. The wires from the surrounding fixtures were first cleared away and the fixtures themselves, which were naturally affected by the wires coming down, were straightened. A new 65-foot pole was erected in rather a difficult position by the side of the damaged one. Suspenders were run, aerial cable jointed to potheads, tested and erected on the span over the trolley wires. A pothead and a length of lead-covered cable was jointed on to the underground cable and about three miles of open wire erected. The circuits were then tested back to the testroom, the subscribers rung up and the connection made good, the final tests being made by the fault clerks. All was finished within the 48 hours. The lineman's testing set being of no use in testing from distributing poles to subscribers' stations with the exchange side (common battery system) disconnected, owing to the testing set having no battery, I had a portable testing set constructed, as shown in the diagram. This set is made up in a wooden case and is invaluable in cases of this kind. Perhaps it would be well if a similar set were always available where the common battery system is in use.

AERIAL CABLES.

By HARRY GREEN, A.M.I.E.E., *Engineer (South Manchester).*

In estimating for aerial cable schemes it is quite a general thing to have only the ground measurements of pole to pole (centres) for each span. The query suggests itself what is the correct allowance to make (for a span of given sag) of extra length for this span over and above the ground measurement?

I made enquiries in telephone engineering quarters to ascertain the prevalent allowance in practice, exclusive of jointing requirements.

The replies were various, ranging from 2 per cent. upwards, and in each case based, apparently, on the "rule of thumb" method, i.e., "never short of cable."

Although a suspended cable hangs in what is termed a "catenary" curve for our purpose (the sag being so small proportioned to the span) I have calculated it as a curve forming part of a circle.

Adopting this assumption I obtained the following results for three fairly common spans:—

Span (yards).	Sag (inches).	Percentage extra.
60	35	0.18
70	40	0.20
80	46	0.26

I might state that the 70 yards span is one of which the details are those of an actual case of an erected 100-pair lead-covered aerial cable.

Thinking this may be of interest to others I submit it to the JOURNAL.

WHAT THE BIG USER WANTS.

THE Chambers of Commerce have secured from an unexpected quarter an ally in their telephone crusade. At its autumn meeting on Saturday the Association of Municipal Corporations asked the council to consider whether steps should not be taken, either alone or in conjunction with the Associated Chambers of Commerce, to induce the National Telephone Company to revert to its old unlimited service tariff. It is not often that municipal and commercial interests come together except as opponents; but telephony acquaints a man with strange bedfellows. Both parties are in effect asking that the little user shall help to pay the big user's telephone bill, or that the telephones shall be worked at a loss. While they are about it they might press for a uniform season ticket rate for all tramways.—*Electrical Times.*

LIST OF AWARDS.

THE following awards have lately been made by the Company for inventions and suggestions:—

	£	s.	d.
A. Magnall, Manchester, name plate for identifying poles	2	0	0
W. Goulden, Brighton, bothway junction engaged test	1	0	0
A. Warner, London, plugging up circuit	1	0	0
J. Johnstone, London, circuit for "out of order" board	2	0	0
M. C. Fray, Head Office, scale for calculating cable equivalents ..	1	0	0
W. Stewart, Glasgow, silk and cotton cables	2	0	0
N. Noble, Warrington, ticket holders	2	0	0
J. H. Frost, Blackburn, leader clip	1	0	0
R. W. Hunt, Liverpool, clip for leaders on distributing poles ..	1	10	0
W. Hudson,	1	10	0
F. N. Ward, London, cord test	1	10	0
G. H. Bryant,	1	10	0
G. Bullimore, London, rings for running leading wires on connections on ground poles.. ..	2	0	0
J. W. Banks, Head Office, improved number peg	2	0	0
C. S. Corke, London, plug protectors	2	0	0
F. Woolard, London, message rate automatic boxes	1	1	0
London Telephone Society.. ..	4	8	0
Southern (London) Telephone Society	4	15	0

FIRE AT ANTWERP TELEPHONE EXCHANGE.

At one o'clock in the morning of Tuesday, Oct. 29, the Belgian Government's telephone exchange, with 4,400 subscribers' lines, at Antwerp was entirely destroyed by fire. A new central battery exchange has been in construction for five years, but although the building has actually been completed some three years the equipment has not yet been commenced. The destruction of the old



like the old one, will serve the whole town, and the use of junction boards will therefore be obviated. We publish two photographs showing the wreckage of the derrick and wires.

"THE MAGIC TELEPHONE."

IN an article in the *Daily Chronicle* on the London fever hospitals, describing the organisation of the Metropolitan Asylums Board for dealing with fever cases all over London, Mr. HAROLD SPENDER writes as follows:—

"If you want to understand the working of the system, stand in the central telephone room at the Board offices on the Thames Embankment, and watch. There comes a ring. It is from a doctor. 'Case of scarlet—45, Paradise Row, Peckham—can you send an ambulance?' A note is taken. The records are consulted. If there are beds in the nearest hospital, the case will go there. If not, it will be sent to the nearest hospital where there are beds.

"The hospital is rung up, and arrangements are made for the bed to be ready. The hospital is rung off, and a ring is given to the ambulance station nearest to that hospital. The ambulance is ordered, and within an hour—in case of extreme urgency, even half an hour—the patient is safe and snug in the hospital.

"Note the part played by the telephone in this work. It is all a matter of telephones. The telephone is the great centraliser—the magic unifier. If the telephone breaks down for half an hour, the fever service breaks down too. Some time ago a receiver was left off at one of the stations, and for that time the fever service of London in that district was blocked. Without the telephone this wonderful work would come to a dead stop.

"Two of the most amazing sights in London, to my mind, are the telephone switchboards of the central fire brigade station and of the central hospital service. Thanks to those two human miracles, the dangerous fires in London have been reduced to about 1 per cent., and the annual deaths from scarlet fever have been reduced from 5,000 to 500. Long live the telephone!"

single-wire exchange, with its ancient break-jack multiples and hand-restored indicators, may therefore come as a blessing in disguise, for although it will place the second seaport in Europe without the indispensable telephone service for some weeks, it must of necessity precipitate the completion of the new exchange. This,

HIC ET UBIQUE.

If any apology were needed for dealing with so serious a matter as telephone rates in a column usually devoted to lighter matters, it would exist in the fact that many people who rush into print on the telephone question must either get their information from comic papers or else live in a comic world similar to that spirit world which Novalis (we quote from *tramory*) said lay parallel with, but distinct from, the real world.

A Yorkshire newspaper says that the directors of the Dundee Chamber of Commerce have "information" that the following charges are made for telephone service abroad:—

Sweden	£3 5 0	per annum.
France	5 12 0	"
Germany	5 0 0	"
Belgium	6 0 0	"

These French and German rates are said to cover unlimited service; but in fact such rates in France are £16, £12 and £8, according to the size of the town, in addition to which the subscriber pays the initial cost of installing his telephone. In Germany the rates are £9 and £8 10s. It is true there is a £5 rate for towns of 50 to 100 subscribers, but telephone rates for large cities cannot be adjusted by the standards of Moreton-in-the-Marsh or Ashby-de-la-Zouch. The only £3 5s. rate we can identify in Sweden is a *four-party line* rate at 60 kroner!

THE letter from Mr. J. H. PATTMAN which we publish in reply to an enquiry from a correspondent for a simple introduction to the calculus, reminds us of the Modern Major-General in the *Pirates of Penzance* who knew "the scientific names of beings animalculous and all about the integral and differential calculus."

Furthermore he says:

"About binomial theorem, I'm teeming with a lot o' news
And many cheerful facts about the square of the hypotenuse."

WE learn from a daily paper that a Vienna subscriber has been sent to prison for a month for calling a telephone operator a "lazy cat." The zoological nomenclature of operators always seems to be attended with unfortunate results. It will be remembered that the telephone agitation in Paris, the formation of a subscribers' league, and other matters of moment, arose in the first instance from the prosecution of an exasperated lady-subscriber who had called the operator a "camel." Some epithets of this kind are esteemed opprobrious; others pass for terms of endearment. Their values change with the ages. Chaucer says approvingly of a girl: "Sche was a primerole, a piggesneyghe;" and in Shakspeare a lady affectionately calls the huge Falstaff her "little pigney." It may be doubted if the application of either of these terms to an operator would tend to facilitate a connection.

IN reply to an advertisement headed "Telephone service" in a southern daily paper the following extraordinary application was received:—

Madam, etc., Sir,—I write in consequence of being fathomed against a Southern or Daily Echo or else not understanding getting or not suited with a good ideal place in service thoroughly domesticated and learnt the way to work most honestly, and just. A early reply from which ever Station its nearest or not to will oblige. Please send earliest and fullest particulars of the nearest Hampshire or else Dorset line wether its best Servants Maids wanted or else not.—Yours Obligeingly,—

P.S.—If its not to do with going to proper service what is called Servants which I am wanted at on or else a Maids situation which is female I do not understand why I am chiefly interpreted to of the Land Lady or the Man of the house as if I was him or they me or not.—Yours respectfully,—

If its such place without saving much time I am ready to except at once waiting now except anything temporary.
Yours respectfully,—

As the handwriting is obviously not that of a foreigner, the strange phrases, the absence of the most rudimentary grammar,

and the consequent lack of sense present a strange puzzle. If the letter were pieced together out of a dictionary by a foreigner who did not understand English some basis of explanation could be found, but what can be made of "being fathomed against" a newspaper, "which ever Station its nearest or not," or "interpreted to of the Land Lady"?

FOREIGN INTELLIGENCE.

Russia.—At the end of 1905 the number of telephone stations in St. Petersburg was 10,948, in Moscow 10,454, in Warsaw 6,938, in Riga 3,703, in Odessa 2,431, in Baku 1,225 and in Rostov on the Don 1,086. These systems are in the hands of private companies. The principal State systems were in Kiev where there are 2,266 stations, Kharkov 1,910, Tiflis 1,124, Saratov 926, Astrachan 838, Irkutsk 842 and Kasan 879. It is interesting to note that there are large exchanges in Irkutsk, half-way across Siberia, and also at Tiflis and Baku on the other side of the Caucasus. During the year the private systems in Reval and Libau were taken over by the State, and that in Nijni Novgorod by the corporation. Trunk wires were erected between Simferapol and Sebastopol, Simferapol and Jalta, and Old Crimea and Feodosia.

Hungary.—In Buda Pest the telephone system increased during 1906 by 1,701 stations, making a total of 11,236. Exchanges in Hungary increased from 975 to 1,045, and the telephone stations from 30,002 to 34,725. The length of lines was 22,102 kilometres and the mileage of wire 213,558 kilometres. The total number of local calls was 102,915,958, and of trunk calls 1,107,152. An establishment for the impregnation of poles at Püspökladány commenced operations in October, 1906, and by the end of the year 5,819 poles had been treated. The yearly requirements are 40,000 poles.

Bavaria.—The number of telephone centres increased in 1906 from 356 to 368, and the stations from 55,722 to 61,625. The total length of telephone lines stood at 272,654 kilometres.

Ethiopia.—In the Abyssian or Ethiopian Empire there exist trunk lines between Adis Ababa, the capital, and Harar, the chief commercial town, from Harar to Dirch Daa, and from Adis Ababa to Dauro, and to Massaua. Besides the local system in Adis Ababa, consisting of five speaking stations, there are call offices at the other towns mentioned, and at the railway stations. The line is reserved in the morning for official purposes, but afterwards it is available for general use. The charge for a five-minutes' call over the 450 kilometres from Harar to Adis Ababa is 3s., and for the 600 kilometres from the latter place to Dauro 9d. The trunk system of Abyssinia seems to be well developed.

CORRESPONDENCE.

MATHEMATICS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

MR. SALMON'S plaintive appeal for a suitable "Introduction to the Calculus" is a very common one among aspiring mathematicians.

The idea is prevalent that after dabbling in pure mathematics and assimilating a knowledge of algebra up to "indices," and of plane trigonometry up to the "solution of triangles," students then consider they are capable of wading through the diabolical intricacies of the calculus.

This is a very wrong impression indeed.

Their algebra should be extended to a sound knowledge of the "binomial theorem" and the "exponential series," and their trigonometry up to the ratios of compound angles, *i.e.*, values of "sin. (A + B)," "sin. A, sin. B," etc.

Given this knowledge and a certain logical instinct, which is inherent with some, they may then consider the advisability of studying the calculus.

A knowledge of the practical application of both the differential and integral calculus is best obtained by a sound knowledge of co-ordinate geometry, including, of course, curve plotting.

By this I mean that the terms "dependent" and "independent variable" must be considered as the ordinate and abscissa of a curve, the equation to the curve giving the value of the function of "x" under consideration.

Basing my opinion upon a practical acquaintance with the book, I should certainly recommend "A Course in Practical Mathematics," by F. M. Saxeby, M.Sc., B.A., published by Longman's at 7s. 6d.

This book contains a vast amount of information upon all calculations relating to applied mechanics and physics, a sound introduction to solid geometry, and last, but by no means least, a series of questions giving practical examples upon the gentle arts of differentiation and integration.

Holborn Exchange, London, Nov. 6, 1907.

J. H. PATTMAN.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

REFERRING to Mr. J. B. Salmon's enquiry in the November JOURNAL, Wansbrough's *A.B.C. of the Differential Calculus* is a useful introduction to the subject, on popular lines. The book is published by the Technical Publishing Company Limited, Manchester, and the price is 3s. X. Y. Z.

THE HOSPITAL SATURDAY FUND AND CONVALESCENT HOMES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

As an outcome of the recent correspondence on the above subject, a meeting was duly held at Salisbury House on Nov. 11, under the chairmanship of the Metropolitan Superintendent.

As the first meeting of the committee then formed cannot take place until after the last day for receiving matter for the JOURNAL, as honorary secretary I would ask for space to lay before the readers what I venture to think are the

objects of the committee, and to disperse if possible the misunderstandings which I am told exist in some quarters.

It is to be deplored that owing, among other reasons, to the inclemency of the weather there was not a larger attendance, especially of those collectors who have done such splendid work for the Hospital Saturday Fund already, and it is to those I would emphatically state that there is no wish or intention to in any way curtail their efforts or powers, but rather to give them greater facilities.

We are merely desirous of placing the collections and the method of dealing with the applications for benefits on a more practical basis, enabling not only the collectors, but each subscriber to be in a position to learn at any time (a) the amount of contributions from the staff, (b) the many different ways in which the Hospital Saturday Fund is in a position to assist, (c) the actual benefits the staff are receiving.

I cannot think that anybody giving their pence gives from any but a really charitable motive and the desire to help sufferers outside the staff as well as their fellow-workers, but as to the actual benefits the latter receive, it appears to me—such a departmental company as we are that each individual in the 70 odd collectors may, from experience confined to their own department, think that comparatively few claims are made on the fund, and under the present system they are certainly not in a position to ascertain to the contrary.

To them, and I think to many, it may be news to learn that during the past ten months of this present year the total number of letters supplied to members of the Company's staff has been no less than 327, made up as follows:—

General and special hospitals and dispensaries	120
Dental (alone in value over £100)	143
Hospitals for diseases of the chest	25
Surgical appliances	16
Convalescent homes	14

Although the question as to what can be done to facilitate entry into convalescent homes has yet to be considered by the committee, I think the speech of Mr. Davis, secretary to the Hospital Saturday Fund, at the meeting referred to, has not only dispersed the feeling that we have something to gain by endowing beds but shown it to be impracticable. To those who still have convictions to the contrary, however, may I give briefly what I personally feel are arguments against.

The Hospital Saturday Fund has 32 homes to which persons suffering from illnesses may be sent, and on account of the large grants to these institutions naturally has preferential treatment in connection with letters.

The fund's letters cover all varieties of illness, and are for any dependents of a subscriber, man, woman or child.

If we endowed a bed it would be a very great question as to in which home. If for a tuberculous patient we could not send a person recovering from an ordinary illness; nor, on the other hand, if our bed at the sanatorium was filled could we send a tuberculous patient to another home.

If we endowed a men's home, neither his wife, sister, or any of our army of operators could benefit, nor could the children participate.

Convalescent homes are intended for more than periodical "rest cures," such as one writer suggests, although I would point out there are homes of rest and holiday homes available for the purpose she evidently intends.

While apologising for this lengthy epistle may I say in conclusion that to my own personal knowledge, in no single case has an application been made to the Hospital Saturday Fund and not satisfactorily met, and I feel sure that by making proper use of the fund, all the requirements of the staff would be more efficiently dealt with than through any other institution.

FLORENCE J. MINTER, Examining Matron.

Dictating and Typing.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

WITH reference to Mr. Thyne's figures of May last, and Miss Keir's of February, and their further remarks in the October JOURNAL, it would appear that the average number of letters typed, 60, quoted in the first issue, does not agree with the figures of October.

Four typists average 60 letters = 1,440 for the week, which would appear to be 840 more than Mr. Thyne's actual results show. I think it is a good thing that the point was raised, but it appears to me that the figures given were based on some special test. On the other side, allowing 100 words for each letter, which I think sufficiently high, and assuming that the Glasgow typist's record is 62 words per minute, this would equal 3,720 words per hour, whilst the letters to be typed would equal 10,000 words. On this basis, one typist would do the whole of Glasgow's letters in three hours, but the strain would be too great. Perhaps Mr. Thyne will look into these figures, which may, of course, possibly be erroneous, as they go to show that on the basis assumed only about 16-13 hours would be worked at actual typing.

Leeds, November, 1907.

T. A. CROWTHER.

Correspondence Classes.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

THERE are a number of the staff who have taken the classes from their inception, but with the exception of the two last sessions these members have nothing (except the marked papers) to indicate their progress. Is it too much to ask that certificates be issued to those students who obtained a given percentage of marks during the period in question? We presume the records are still available, and it would be possible to obtain the percentages in each course?

If this is thought too large an order, perhaps a covering certificate embodying the several years could be granted. Only those students who applied would be so treated, and they would undoubtedly be pleased to furnish details of the courses taken, and the marks obtained, which could be then verified by the Head Office records. The work involved would thus be lessened, and the task a comparatively simple one.

This plan, or a somewhat similar one, is carried out by the Schools of Art,

who grant an individual certificate and also a covering certificate (embodying certain others) to the student passing successfully through the whole course.

Even if certificates were granted only to the students who obtained 60 per cent. or over in the Courses "A," "B" and "M," it would be appreciated, and would no doubt prove an incentive to good work in the classes.

Those members of the staff in other parts of the country who are interested will perhaps communicate with the JOURNAL and explain their views. It is improbable that the matter will be seriously considered unless it is well supported by the persons mainly concerned.

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|------------------|-------------------|---------------|
| A. O. PIKE, | R. J. HILL, |) Cheltenham. |
| D. G. ALLEN, | W. TAYLOR, | |
| J. L. A. MEDEWS, | F. W. SCAETS, |) Gloucester. |
| H. W. HAYDON, | H. G. HENDERSON, | |
| E. W. SMART, | |) Stroud. |
| A. E. RYLAND, | GEO. R. COLLINGS, | |

September, 1907.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

LOOKING through the JOURNAL I noticed a class had been formed really for the benefit of the staff who take the Company's correspondence classes. May I point out that a class of this kind was started here, and is taken by Mr. Herink, the Exchange Inspector, who I believe first made the suggestion.

Norwich.

VERNON JOHN HOLLOWAY.

Men and Matters of the "Eighties."

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

AMONG the number of the staff whose service dates back to pre-Notts Factory days, there must be many with interesting reminiscences of strange faults and queer methods of clearing them, and doubtless many have photographs and sketches of early telephone work which would be of interest to the younger members, as showing the conditions under which the pioneers of the telephone service worked if space could be set apart for them.

I enclose herewith a print of the old No. 3 High Street, Belfast, derrick, which unfortunately, is not very sharp in detail, as it was enlarged from a small lantern slide I made in 1888.



I believe I am right in saying that this old framework carried the wires of three different companies, the United, the Scottish and the National, and supported at different periods old cotton-covered No. 11 iron, 18 copper and finally bronze wire.

In the group is a man still in the service, who, I believe, ran one of the first telephone wires erected in the North of Ireland. Also in the group is his son, since killed by an accident in the service, when working as a line foreman sixteen years ago.

If you think this of sufficient interest to publish, I have no doubt there are many more who would follow up, and it might perhaps lead to what a good many of us old hands have often wished for—some sort of an association for the men of the "eighties," of whom I am one.

Weybridge, October, 1907.

J. STUART BEST.

Journalistic Courtesy.

WITH reference to the paragraph under the above heading in the last issue of the JOURNAL, we have received a courteous letter from Mr. H. B. McMEAL, the president of the Telephony Publishing Company, explaining that severe sickness had for the past three months prevented his giving personal attention to the editorial pages of *Telephony* and regretting the breach of etiquette which occurred.

LOCAL TELEPHONE SOCIETIES.

Coventry.—The following is the syllabus for the present session:—1907.—Oct. 14: Annual meeting and election of officers. Nov. 18: "Line Construction," Mr. F. Alcock. Nov. 28: Social evening in All Saints' parochial rooms. Dec. 16: "Mechanics of Line Construction," Mr. E. E. Sleath. 1908.—Jan. 20: "Contract Department Working," Mr. E. J. T. Leaney. Feb. 10: "Aerial Cable," Mr. V. Swettenham; "Accumulators," Mr. L. E. Watkins. Feb. 24: "Co-operation," Mr. A. Kelly; "Magnetic Field," Mr. L. Meek. March 16: "Local Office Routine," Mr. W. Dickinson; "Faults," Mr. C. B. Robinson.

Sheffield.—The following is the syllabus for the present session:—1907.—Nov. 1: "Wireless Telegraphy and Telephony" (with experiments and lantern slides), Mr. E. S. Byng. Nov. 29: "Measured Rates," Mr. E. J. Johnson. Dec. 20: Lantern evening (slides contributed by members, with suitable remarks); lanternist, Mr. W. A. Skinner. 1908.—Jan. 17: "Operating Notes," by several of the operating staff; "The Local Manager: what he is, and how to become one," Mr. F. Barr; "Contract Department," Mr. J. Wrigley. Feb. 14: "Development Studies, and why they are necessary," Mr. A. Watts (Head Office). March 13: "Engineering," Mr. F. G. C. Baldwin, A.M.I.E.E. March 16: Social evening (date to be announced when arranged). April 3: Business meeting. The committee expect another paper this session from a Head Office official. The date is still open, but the members will receive notice in due course.

Bristol.—The following is the syllabus for the present session:—1907.—Oct. 18: Lecture, Mr. F. Gill. Nov. 14: "Construction," Mr. W. Mann. Dec. 12: "Plant," Mr. T. O'C. Parnell. 1908.—Jan. 23: "Telephone Service," Mr. S. O. Allen. Feb. 21: "Underground Construction," Mr. L. F. Monce. March 7: —.

Bristol (Operators).—The following is the syllabus for the present session:—1907.—Nov. 4: "The Efficient Operator," Mr. S. O. Allen. Dec. 2: "Operating Apparatus," Mr. J. E. Jones. 1908.—Jan. 7: —. Feb. 4: "The Relations of Junior and Senior Operators and Supervisors," Miss F. Nicholls.

Brighton.—The following is the syllabus for the present session:—1907.—Oct. 30: "Electrical and other Qualities of Telephone Material," Mr. F. W. Roberts. Nov.: "Magneto Extensions," Mr. H. Hatton. Dec.: "Petrol Motor Pump," Mr. F. W. Taylor. Jan.: "Common Battery Exchange Faults," Messrs. Davidson & Jenkins. Feb.: "Instrument Fitting," Mr. A. W. Dalton. March: "Contract Work," Mr. C. F. Moorhouse. April: "No. 9 Switch-board Equipment, Kemp Town," Mr. W. Goulden. May: "Outside Construction," Mr. W. Knight. A paper will be read by Mr. B. S. Cohen on the "Loading of Telephone Cable Lines," on a date to be fixed.

At a meeting on Oct. 30, under the presidency of Mr. F. W. Taylor, District Manager, Mr. H. Hatton, Chief Inspector, read a paper on "Magneto Extensions." There was a very fair attendance considering the inclement weather, and a good deal of interest was displayed in the subject.

Chester.—The following is the syllabus for the present session:—1907.—Oct. 9: "Derby Exchange Transfer from E.C. Magneto to Common Battery," Mr. Salmon. Other papers to be read are "Underground Cables," Mr. Salmon; "Aerial Cables," Mr. Pearson; "Instrument Work," Mr. Ferguson; "Switchboards," Mr. Jones; "Contract Working," Mr. Berry; and "District Office Work," Mr. Meaking.

Cardiff (Operators).—The following is the syllabus for the present session:—1907.—Oct. 18: Short introductory paper on "Observation Tests," Mr. W. J. Marsh. Nov. 11: "Exchange Development at Cardiff and General Information," Mr. W. J. Marsh. Dec. 9: "Measured Rate and Recording of Calls," Mr. B. Waite. 1908.—Jan. 14: Operators' night. Feb. 11: Traffic and Operating," Mr. R. A. Dalzell. March 10: Paper by Miss Compton.

The second meeting took place on Nov. 18, the president, Mr. Waite, being in the chair. An excellent paper on "Exchange Development at Cardiff and General Operating," was given by Mr. W. J. Marsh, Exchange Manager. It is interesting to note the growth of the telephone system in Cardiff. Thirteen years ago the number of subscribers was 510, while at present there are upwards of 4,000. Mr. Marsh pointed out several improvements which had been made during the five years of his management, more particularly as regards junction working. In speaking of operating, he laid particular stress on the fact that speed must not be obtained at the expense of accuracy, and in closing invited the hearty co-operation of the whole of the staff in giving a good service. A short discussion brought a very pleasant and profitable evening to a close.

Dublin.—The following is the syllabus for the present session:—1907.—Oct. 28: "Contracts and Measured Rate," Mr. R. J. Bartley. Nov. 11: "Instrument Faults," Mr. P. Gardiner. Nov. 25: "Joining L.D.C. Cables," Mr. O. Hiney. Dec. 9: "Traffic Studies," Mr. G. L. Wallace. 1908.—Jan. 13: "Party Line Transfer Positions," Mr. J. McCann. Jan. 27: "Electrical Testing," Messrs. M. E. Connor and D. Kirkwood. Feb. 10: "Line Construction," Mr. J. Hunt. Feb. 24: "Slide Rule and Curve Plotting," Mr. G. Sutcliffe. March 10: "Operating," Miss Boylan. March 24: "Office Work," Mr. A. Bury.

Nottingham.—At a largely attended meeting held on Oct. 12, under the presidency of Mr. Sibley, it was unanimously resolved to start a telephone society for the district, under the name of "The Nottingham District Telephone Society." A large amount of business was done at this meeting, the rules were finally settled upon, and the officers elected for the coming session. The following is the syllabus for the present session:—1907.—Nov. 8: Vice-President's address, Mr. C. H. Sibley. Nov. 29: "Common Battery Switch-board Testing and Maintenance," Mr. N. Facer. Dec. 20: "Works Orders," Mr. P. R. Cockrem. 1908.—Jan. 10: "Traffic," Mr. W. Napier. Jan. 31: "Underground Construction," Mr. J. D. Pierpont. Feb. 21: "Measured Rates," Mr. W. Haimes. March 13: "Operating," Misses Tait, Bradshaw and Dixon. April 13: "Subscribers' Station Apparatus," Mr. M. B. Oldbury.

Portsmouth.—The following is the syllabus for the present session:—1907.—Oct. 8: "Elementary Magnetism," Mr. F. Bennett. Oct. 29: "Batteries," Mr. T. Collins. Nov. 12: "Conductors and Insulators," Mr. S. J. Pharo. Nov. 26: "Transmitters and Receivers," Mr. H. E. Newnham. Dec. 10: "Switchboards," Mr. J. Lees. 1908.—Jan. 28: "Operating Multiple Boards," Miss H. N. Yeakes. Feb. 11: "Underground Cables," Messrs. J. Ireland and H. Shanahan. Feb. 25: "The Works Order," Mr. F. E. Collins. March 20: Special.

The second meeting of the session was held on Oct. 30, under the presidency of the District Manager, Mr. J. Stirling, when an attendance of 80 listened to a lecture given by Mr. Collins, Exchange Inspector, on "Batteries." The subject was treated in a clear and concise manner and was effectively backed up by a working model of an accumulator, projected on the screen by means of a tank lantern slide.

Plymouth.—The following is the syllabus for the present session:—1907.—Oct. 8: "Measured Rates," Mr. G. Hooper. Oct. 29: "Central Battery Working," Mr. E. Laidlaw. Nov. 19: "Works Orders," Mr. A. E. Ball. Dec. 10: "Contract Department Working," Mr. D. J. Meikleham. 1908.—Jan. 7: "Magnetism," Mr. A. R. Wran. Jan. 28: "A Review of Twelve Months' Work in the Western Province," Mr. R. A. Dalzell. Feb. 18: "Estimates and Expenditure," Mr. G. A. G. Evans. March 10: "Overhead Construction," Mr. W. S. Griffiths. March 31: "Instrument Department," Mr. W. E. Walton.

London Telephone Society. The following is the syllabus for the present session:—1907.—Oct. 30: "Loading of Telephone Cable Lines and other Transmission Studies," Mr. B. S. Cohen. Nov. 25: "Hotel Installations and Wiring of large Buildings," P. Skinner. Dec. 2: "Publicity and Promotion," H. Laws Webb. Dec. 16: "The Operators' Point of View," Miss W. Etheridge; "Observation Records," Mr. J. E. Collins. 1908.—Jan. 27: "Block Wiring," Mr. A. Watts; "Type of Apparatus," Mr. Watkins. Feb. 26: "Operating: Old and New," Miss E. M. Ralph; "Exchange Organisation," Mr. W. Benham. March 30: "Theory and Practice of a Measured Rate Tariff," Mr. S. J. Goddard. April 29: Junior competition.

The first meeting was held on Oct. 30. There were about 150 present (including six guests), representing about 39 per cent. of total membership. Mr. T. Fletcher was in the chair. The alteration of Rule 4 (notice of which was given at the last meeting) whereby lady members of the staff are now admitted as members of the society was confirmed, and then Mr. B. S. Cohen, of the Engineer-in-Chief's Department, was called upon to give his lecture on "Loading of Telephone Cable Lines." He clearly showed, both by his lecture and demonstrations, that in the words of the chairman he is eminently qualified to deal with this subject. One of the most interesting demonstrations was made with an artificial cable, some loading coils, a reflecting galvanometer and a baretter, by means of which the ratios between loaded and unloaded lines under various conditions were demonstrated by means of deflection on a scale. Some very interesting lantern slides were also shown. A discussion followed in which Dr. Moorhouse, Mr. F. Gill and Mr. J. Edmonds took part.

Birmingham.—The following is the syllabus for the present session:—1907.—Oct. 1: Opening address by Mr. A. E. Cotterell. Nov. 14: Paper by Mr. E. Williamson, "Some Notes on the History and Development of the Telephone Service." Dec. 3: Paper by Mr. F. G. C. Baldwin, "Transmission Studies." 1908.—Jan. 7: Paper by Mr. A. Watts, "Development Studies and Why they are Necessary." Feb. 4: Competition papers. Feb. 17: Paper by Mr. Herbert Laws Webb, "Publicity and Promotion." March 3: Competition papers. April 7: Paper by Mr. H. J. Maclure, "The Telephone from the Point of View of the Man in the Street. How to Help and Educate Him."

The first meeting was held on Oct. 1, when Mr. A. E. Cotterell (vice-president) gave an opening address, in which he pointed out the great educational facilities now existing in the telephone world—contrasting them with those in the early days of telephony.

Southern (London).—The first meeting of the session was held on Oct. 23, the paper given being by Mr. J. T. Leete. The subject was "Junction Working," and was illustrated by lantern. The reading of the paper was followed by a discussion in which several of the members took part. The general meeting is to take place on the evening of the next lecture.

Wolverhampton.—An electrical society has been formed in this district, the inauguration meeting taking place on Oct. 25 at the district offices. The chair at the opening was taken by Mr. Alfred Coleman, president of the society, who gave a much appreciated opening address, and afterwards by Mr. Archer W. Smith, vice-president, who in an interesting address gave the aims of the society and a short account, illustrated by diagrams, of the history and development of the district. A well thought-out paper on "Underground Work" was then read by Mr. C. H. Redhead, the Wolverhampton Local Manager, which was followed by a discussion. The number present was 63, all departments from each quarter of the district being well represented, and a very interesting evening was spent. Future meetings are being looked forward to with much interest.

Swansea (Operators).—The second sessional meeting took place on Nov. 5, when a paper was given by Mr. A. E. Coombs (Exchange Manager) on "Common Sense, Perception and Intelligence." The District Manager (Mr. Gauntlett) presided, and an interesting discussion ensued.

Swansea (General).—The first sessional meeting was held on Oct. 21, when the president, Mr. Gauntlett (District Manager), delivered his presidential address to an attendance of nearly 60, including staff from Neath and Llanelly. The address laid special stress on co-operation and enthusiasm, and the paper was much appreciated by all present. Mr. R. Williamson (Local Manager) ably supported the address, and an interesting discussion ensued. The attendance augurs well for a most successful session.

The second sessional meeting of the general telephone society took place on Nov. 18. The president (Mr. W. E. Gauntlett) was in the chair, 85 members and visitors being present. A paper was read by Mr. A. E. Coombs, Exchange

Manager, Bristol, on "Traffic Studies," the subject being dealt with in a most studied and complete manner, and an interesting discussion ensued.

Glasgow (Operators).—The first meeting of this society and club was held in the Masonic Rooms, 100, West Regent Street. An attendance of 283 operators recompensed the efforts of the committee to make the first meeting a success, and this was undoubtedly due to the indefatigable efforts of Mr. Rodger, the Traffic Superintendent, and Miss Allison, the Clerk-in-Charge at Hillhead Exchange, who is hon. secretary. Mr. Valentine, the District Manager, occupied the chair, and gave a lucid explanation of the object of the club and what the aim of each employee should be in order that the successful working of the Company should be maintained. He afterwards introduced Mr. Brown, the Contract Manager, who gave a very able paper on "The New Measured Rate and its Working." Mr. Brown is a well-known authority in these matters, and, needless to say, his remarks were much appreciated. He was accorded a very hearty vote of thanks. He then invited criticism on any remarks which he had made, but no one responding, Mr. Valentine said a few more words on the working of the new measured rate system. On the motion of Mr. Brown the chairman was accorded a hearty vote of thanks for presiding that evening, and thereafter the proceedings of the club developed into a social evening.

Oldham.—The first meeting of the session was held on Oct. 31, when a very interesting discussion, opened by the District Manager Mr. Pugh, on "Staff Co-operation," was conducted. Several of the members took part, and a very interesting evening's debate resulted.

Leeds.—The first meeting of the session was held on Oct. 23, before a good number of the staff. The president, Mr. W. V. Morten, District Manager, took the chair. A paper was given by Mr. G. H. Gould, entitled, "The Educational Policy of the Company." He dealt with the subject in a very enterprising way, criticising the various routines of the Company, and suggesting certain alterations. At the conclusion of the lecture a discussion was opened, and entered into by ten members of the staff, the Chairman summing up the value of the different points raised throughout. The evening's attendance gave every promise of a successful session.

On Nov. 6, the second paper in connection with the society was read by Mr. Hare, of the General Superintendent's staff, the subject being "A Cost Clerk's Duties." The meeting was well attended, the chair being taken by the Provincial Superintendent (Mr. Chambers). An instructive discussion by the members present followed, the several points which were raised being satisfactorily dealt with by Mr. Hare.

Nottingham Factory.—The syllabus for the present session is as follows. Meetings will be held on the following dates:—Nov. 18, Dec. 9, Jan. 13, Feb. 3, Feb. 24, March 16, April 6. Particulars of the dates on which the following papers will be read will be exhibited on the notice board of the Factory seven days prior to the date of meeting:—"Exchange Equipment," Mr. D. Macadie. "Workshop Methods and Mechanicians," Mr. A. H. Baxter. "Testing," Mr. J. W. Hambleton. "Early History of the Telephone," Mr. D. Macadie. "Electrical Measuring and Testing Instruments, and Testing," Mr. F. Pinder. "Electro Plating," Mr. A. J. Bone. "The Hub of the Factory," Mr. A. E. Smith. "Switchboards, Past and Present," Mr. J. E. Stanton. "Timber and Some of Its Uses," Mr. T. H. Wallace. "The Use and Abuse of Tool Steel," Mr. W. Fox. "Workshop Worries," Mr. R. Cubbon. "Mechanical and Theoretical Knowledge," Mr. J. W. Ingleton.

The inaugural meeting took place on Nov. 18, there being present 165 members and 79 guests, the latter including Mr. Bonathan (Local Manager) and others from the Nottingham district telephone society. Mr. Fenton expressed his delight at so many responding to the invitation to join the society, and in the course of his presidential address explained that the object and aims of the society were to improve individual knowledge of the general principles involved in telephony, and especially the section in which the members were immediately concerned. He pleaded the necessity of regular attendance, and then proceeded to urge those who were preparing the papers, as well as those deputed to criticise, not to deal with the subjects in a general way, but rather to treat and enlarge upon points not common knowledge. All were invited to join in discussions, and encouraged to follow up the new ideas which would be opened out. Slides were then shown upon the screen illustrative of exchange equipment, Mr. Macadie, Electrician, briefly explaining each. These were followed by views illustrating both the business and social life of the factory, concluded by thanks to Mr. Macadie for his explanations and to Mr. J. E. Stanton for manipulating the lantern.

Hull.—The following is the syllabus for the present session:—1907.—Nov. 11: Inaugural address by the president, Mr. C. C. Worte. Nov. 11: Joint paper, "Tariff Rates," Mr. C. C. Worte, "Measured Rate Bookkeeping," Mr. F. Robson. Nov. 25: "A few Notes on General Telephony," Mr. A. E. Pinnock. Dec. 16: "Underground Work, Past and Present," Mr. J. T. Tattersall. 1908.—Jan. 6: Aids and Hindrances to Operating," Mr. R. Morgan. Jan. 27: "Publicity and the Telephone," Mr. A. H. Sergeant. Feb. 17: "Magnetic and Electric Properties of Apparatus," Mr. A. Akester. March 9: "Contract Department," Mr. A. K. Murray. March 30: Open Evening. To be arranged later.

Leicester—The following is the syllabus for the present session:—1907.—Nov. 29: President's address, J. Ashton; "Central Battery System at the Birmingham Exchange" (illustrated by limelight views), Alfred Coleman, jun. Dec. 20: "The Inspectors' Point of View," K. O. Ashby; "Call Key System in the Potteries," P. V. Sansome. 1908.—Jan. 17: "Curves," H. Marshall; "Leicester Switchboard," E. Rendell. Feb. 10: "Publicity and Promotion" (illustrated with limelight views), Mr. H. Laws Webb. Feb. 14: "Instrument Faults, their Nature and Cure," H. Warren; "Organisation of Work," J. Ashton. Feb. 28: Paper not decided upon, L. Price; "Line Construction," J. Eaton. March 13: "Contract Department as an Advertising Medium,"

F. H. Tyas. March 31: "Wayleaves," A. W. Garrard; "Stores and Storekeeping," G. E. Thorpe.

Hanley.—At a meeting of the society on Oct. 10, 1907, the following officers were appointed for the ensuing year:—President, A. E. Ruddock; vice-president, S. E. Goodwin; secretary and treasurer, T. H. Schofield. It was decided to give two prizes, value 10s. each, for the two best junior papers read during the session. The following programme has been arranged by the Secretary:—1907.—Nov. 15: "Electrical Experiments with Introduction to Wireless Telegraphy and the X-Rays," H. Watkins. Dec. 13: "Capital and Revenue Expenditure," T. H. Schofield. 1908.—Jan. 10: "Aerial Cables," J. Frost. Jan. 31: "Storage Batteries and Power Plant Maintenance," R. E. Leakin. Feb. 19: "Publicity and Promotion," H. Laws Webb. Feb. 28: "Measured Rate Bookkeeping," T. M. Woodyatt. March 13: "Storekeeping and Stores, including Delivery of Stores in Scattered Areas," S. E. Goodwin. April 3: "Central Battery Working," F. Gresswell. April 24: "The Microphone," W. Edwards. The first paper of the session was given on Nov. 15 by H. Watkins on "Electrical Experiments," introducing the X-rays, and also dealing with wireless telegraphy. He first showed by experiment the relationship between magnetism and electricity. Before passing to the question of wireless telegraphy the lecturer gave a description of the action of a trembling bell, and described the coherer which was used in wireless telegraphy, and the action of the Hertzian waves. The lecturer then gave a demonstration of the use of the X-rays by means of an induction coil, and a Crookes' tube. The opacity of certain articles when subjected to the rays was shown, whilst other articles were shown to be exactly opposite, being penetrated by the rays. A discussion was raised on the paper, in which a number of the members took part. The debate was closed by the lecturer replying to the various points raised. Several of the operators attended the lecture, which was much enjoyed, and it is hoped that they will become permanent members of the society.

Cardiff.—The second meeting of this society was held at the St. John's school-rooms, Queen Street, Cardiff, on Thursday, Nov. 7, 1907, and there was an attendance of 48. The chair was taken by the vice-president, Mr. J. James, and a paper read by Mr. B. S. Cohen (of London) entitled "The Loading of Telephone Cables and other Transmission Studies." This was illustrated with limelight views. Introducing his subject, the lecturer mentioned that, owing to the importance of and the large field covered by the first part of his paper, *i.e.*, "The Loading of Telephone Cables," he would practically have to confine himself to this subject alone. In the course of his lecture he made special mention of the Pupin coils, pointing out the economies that would probably be effected by the introduction of these coils into long telephone lines. He next gave some very interesting explanations, illustrated by views, of the various testing apparatus used at Head Office. In the last part of his paper Mr. Cohen dealt with "Transmission" and pointed out the important part this particular study now played in telephony. An interesting discussion followed, after which a very hearty vote of thanks was passed to Mr. Cohen for his paper.

Liverpool and Birkenhead.—The opening meeting of the session was held on Oct. 24, Mr. R. Shepherd, past president, in the chair, when the president, Mr. T. A. Prout, gave an address on "Life in the Telephone Service." Mr. Prout briefly described the present organisation of the National Telephone Company, and dwelt on the attractions and fascination of telephone work, speaking words of encouragement and advice to the members on the "Essentials of Success" under the four heads "Earnestness," "Method," "Study and Work," and "R.S.V.P." He urged upon members of the staff the necessity of continually preparing themselves for better positions by such means as he had described and by joining and working hard in the Company's Correspondence Classes and the telephone society, and utilising the manifold daily opportunities afforded by their work. His address was listened to with the greatest interest by the 200 members and friends who were present, and the presence of about 50 lady members of the staff marked the occasion as being a notable one. After Mr. Prout's address a magnificent series of lantern slides were shown, embracing views of Liverpool and the surrounding districts, old castle and abbey ruins in various parts of the country, various pictures of telephone work in Liverpool, and views of the machinery, etc., of the new Cunarders, the *Lusitania* and *Mauretania*.

Greenock.—The second meeting of the session was held on Nov. 7, when about 30 members were present. The president, Mr. A. Ramsay Lamb, occupied the chair. Mr. J. A. Swanson, Chief Clerk, read a very comprehensive and instructive paper on "District Office Work," which was listened to with great interest. The following is the syllabus for the present session:—1907.—Oct. 18: "Some Notes on the Telephone Service generally, and our own share of it in particular," Mr. A. Ramsay Lamb. Nov. 7: "District Office Work," Mr. J. A. Swanson. Nov. 28: "Contract Department Working," Mr. J. E. Duncan. Dec. 19: "Notes on Telephone Development," Mr. C. R. Rutherglen. 1908.—Jan. 16: "Principles of the Telephone," Mr. A. Wilson. Feb. 6: "Operating Experiences," Miss Masterton. Feb. 27: "The Chemical Composition of an Instrument" (with experiments), Mr. P. Smith, jun. March 12: "Publicity and Promotion," Mr. H. Laws Webb. April 2: "The Telephone: From Contract to Service," various members.

Birmingham (Operators). The second meeting of the session was held on Nov. 14, the chair being taken by Mr. H. J. Maclure, Contract Manager. A very interesting paper was given by Mr. E. Williamson, District Manager, entitled "Some Notes on the History and Development of the Telephone." On this occasion the meeting was a joint one with the Birmingham telephone society. The paper was illustrated by lantern slides, showing some of the earlier telephone switchrooms, which, especially those of the earlier Birmingham Exchanges, proved of great interest. The lecturer gave some striking illustrations in the improvement made during recent years, and it is hardly necessary to say the meeting was thoroughly enjoyed.

STAFF GATHERINGS AND SPORTS.

London.—An inauguration dinner of a social movement formed by the Western contract staff and a committee of five was held at the Boulogne Restaurant on Nov. 4. The Divisional Contract Agent, Mr. J. H. Bigland, was in the chair, assisted by Mr. J. H. McKean. Preceding the dinner a most interesting and helpful paper on "Telephone Rates and Development, etc., in America," was rendered by the Contract Manager, Mr. W. F. Taylor. The dinner was followed by an excellent programme of music and toasts, the arrangement of which was in the hands of Mr. A. F. English. Valuable assistance was given by Mr. F. Barker, W. Blogg, R. M. Crawford, P. W. Heanly, J. H. McKean and W. Rae. A large number of visitors were present, including all the engineers of the Western district.

Staff Benevolent Society Lecture.—On Nov. 13 the first of the series of lectures was held at Bishopgate Institute—it having been necessary, in consequence of the great demand for tickets, to transfer the venue from the Great Hall, Salisbury House. An extremely enjoyable evening was spent by some 420 members of the staff and their friends, who from the continual applause and laughter evidently thoroughly appreciated the humour and the clever pictures of that well-known humorous artist, Mr. L. Raven-Hill, of *Punch*, who made the evening in question the opportunity for his first appearance in London as a lecturer.

Norwich.—The Norwich telephone association held its opening meeting on Nov. 11 at the Café Central. It took the form of a social evening, the company numbering 66. Refreshments were provided. A selection of vocal and instrumental music was greatly appreciated, several items being contributed by members of the association. The success attained augurs well for the future of the new movement. The next important item in the season's programme is an illustrated lecture entitled "Publicity and Promotion," to be given by Mr. H. Laws-Webb on Dec. 6.

Bristol.—At the close of the paper read by Mr. S. O. Allen to the Bristol operators' society on Nov. 4, a presentation of a pair of bronzes and sovereign purse, subscribed for by various members of the staff, together with a photographic group of the Bristol operators, was made to Mr. Allen on the occasion of his transfer to Birmingham. Mr. R. A. Dalzell, in making the presentation, referred to the years of service spent in the Bristol district by the recipient and his constancy of service and obliging manner. He reminded these present that Mr. Allen not only possessed knowledge, but exercised it for the Company and his fellow employees; such service would always bring its due reward. After the singing of "For he's a jolly good fellow," and a few congratulatory remarks by other members, Mr. Allen briefly replied and mentioned it as the happiest time of his life to hear praise from his Provincial Superintendent, District Manager and fellow employees.

The Clerk-in-Charge of the Bristol Exchange (Miss F. Nicholls) writes, sending us a print of the photograph (which we hope to reproduce later) and a copy of the inscription expressing the operators' esteem and appreciation of Mr. Allen.

Liverpool.—A whist drive was promoted by the Central Exchange operators on Nov. 15, at the Avondale Café, Church Street. An attendance of 153, occupying 38 tables, proved the popularity of this form of recreation. Eight prizes were awarded by the Committee and the successful players were: 1st prize (ladies'), Miss A. Edwards (supervisor); 1st gentleman's prize, Mr. Clements.

A whist drive and dance under the auspices of the Royal Exchange, Liverpool, was successfully carried out in spite of the inclement weather, at the Hardman Street Assembly Rooms, on Oct. 25.

Blackburn.—The staff held a very successful whist drive in the Criterion Café on Nov. 14. About 80 ladies and gentlemen were present, and a most enjoyable evening was spent. Proceedings commenced at 8.20 p.m., and supper was served at 10 p.m. Afterwards play was resumed until 11.45 p.m., when it was announced amid enthusiasm that Miss Healey, clerk-in-charge, and Miss Baxter, operator, had won the ladies' prizes, whilst Mr. G. Stevenson, chief clerk, and Mr. Alan Holt, correspondence clerk, were the successful gentlemen.

Edinburgh.—The first whist drive of the season was held on Nov. 7. About 50 ladies and gentlemen were present, and 48 engaged in play. Mr. Stewart, District Manager, presented the prizes to the winners—Miss Brown, Mr. E. J. Fraser and Mr. Alf. Robson, and received a vote of thanks for doing so.

Oldham.—A very successful whist drive and dance was held at the Reform Club, Oldham, on Oct. 26. The programme comprised whist drive 7 to 9 p.m., refreshments 9 to 9.15 p.m., and dancing 9.15 to 11 p.m. A highly enjoyable evening was spent by about 70 of the Oldham staff, with a few friends. Mr. W. B. Cheetham acted as M.C., the preliminary arrangements being conducted by Miss Taylor, clerk-in-charge. The District Manager (Mr. A. Pugh) and Mrs. Pugh were present, and the former distributed the prizes for the whist drive, the first (gentleman's) being won by Mr. Blackburn of the district office staff, while the two consolation prizes fell to members of the operating and instrument staffs.

Hanley.—On Nov. 1 the members of the local telephone society met at tea at the Mecca Café before entering upon the serious part of the session. The operating staff also joined them and a most enjoyable evening was spent. After tea was over a whist drive was indulged in, the winners of the prizes offered being Miss Ellis, Mr. Woodyatt, Miss Buckley and Mr. Baines. Mr. Ruddock, the District Manager, was unfortunately unable to attend, owing to an injury to his foot which kept him at home.

Cardiff.—The National Telephone and operators' societies held their first whist drive and dance at the Old City Hall, St. Mary Street, Cardiff, on Nov. 14. There was a gathering of about 200 of the staff and their friends, and among those present were Mr. B. Waite, the District Manager, and Mr. J. James, the Local Manager. During the evening musical items, interspersed

with dancing, were rendered by the following artists:—The Misses Lathey and Merrett, and Messrs. Hugh Brown, J. A. Thomas, Tony Lucas and Granville Tate. A most enjoyable evening was spent, dancing being kept up until 1.30 a.m.

Swansea.—A gathering of the Swansea district indoor staff was held at the Central Hotel, Swansea, on Nov. 7, to give Mr. A. E. Coombs (Exchange Manager), who had been promoted to Bristol, a hearty send off. There was an attendance of about 60. Mr. W. E. Gauntlett (District Manager) presided, and he was supported by all the local officials, including Messrs. R. Williamson (Local Manager), W. H. Crook (Chief Clerk), J. Radford (Chief Electrician), H. M. Pope (Engineer), H. G. McArthur (Contract Manager), etc. The Chairman handed Mr. Coombs on behalf of the operating staff a handsome marble clock suitably inscribed, and on behalf of the contract, electrical and clerical staffs a fine pair of bronzes to match. Allusion was made to Mr. Coombs' past services, and the wish for future success was expressed by all. The meeting also consisted of a knife and fork tea and musical items by various members of the staff, which were excellently rendered.

Edinburgh.—A largely attended and really representative meeting was held in Telephone House on Oct. 3 to consider a proposal to found a thrift club. On the motion of Mr. Wilson, Chief Clerk, the District Manager took the chair. He explained that there seemed to be prevalent a feeling that such a club would be a good thing if regarded as a convenient means for the small depositor with neither time nor facilities to deposit his small sums otherwise. The proposal was approved, and Mr. Stewart read suggested rules, based on the experience of similar clubs in other districts. These were approved, and the following office-bearers appointed for the first year, and all have accepted office:—Hon. president, Mr. F. Douglas Watson, Superintendent for Scotland; president, Mr. J. D. W. Stewart, District Manager (*ex officio*); vice-president, Mr. Robert Wilson, Chief Clerk. Executive: the Vice-President, Mr. A. McNab (secretary), Mr. A. F. Dunn (treasurer), Miss A. St. Clair Johnson, Miss D. Graham, Mr. A. Lumsden, Mr. H. Craig, Mr. D. Pagan, Mr. J. W. Hobson, Mr. J. McKerrell Brown, Mr. James Graham, and Mr. H. R. Lindsay. Auditor, Mr. James Bald, district office. Mr. Stewart said that it was suggested to leave the method of bookkeeping to be adopted to be settled by the committee, with the proviso that they report and explain it at the first general meeting. A vote of thanks to him for presiding closed the proceedings. It may be mentioned that already 140 members have joined.

Local classes have been started for those taking the "A" and "M" courses of the Company's Correspondence Classes. These are under the tuition of Mr. R. B. Rae, and are intended for and are being taken advantage of by those who feel that elaboration of the explanatory papers will be welcome.

Blackburn.—The second annual cricket match between teams representing the Married and Single was played at Gawthorpe Hall on Sept. 21, by permission of Lord Shuttleworth. The Singles batted first, and after knocking up a total of 145, with six wickets down, declared. Mr. Tom Hargreaves made a very very creditable performance with 105 not out. The Married were all out for 44 runs.

Norwich.—The Norwich staff arranged a very successful whist drive at the Central Café on Oct. 7. Several friends joined the party. Eight tables were set. Five prizes were offered, and all were won by members of the staff, the booby prize going to Mr. Allen (Contract Manager). It is proposed to arrange further parties during the winter months.

Portsmouth.—A smoking concert in connection with the winding up of the 1907 cricket season was held at the Richmond Hotel on Nov. 8, when Mr. H. Legge, Engineer, presided over a good muster of the members. An excellent programme was gone through, during the interval of which the Chairman presented Mr. J. Ireland with a set of pipes, subscribed for by the members of the cricket club as a mark of their appreciation of his services as honorary secretary. The cricket club are this year leaders of their division of the Portsmouth Cricket League, having won fifteen games and lost three. A National Telephone cricket club man won the ball given by the League for the best bowling average.

Reading.—The Guildford staff played the Reading staff at football in Prospect Park, Reading, on Nov. 9. Guildford showed excellent form and gained a handsome victory. The day was finished off with tea and a smoking concert at the "Tudor Arms."

NEWS OF THE STAFF.

Mr. H. REID, District Manager, Barrow-in-Furness, has been transferred as District Manager to Exeter vice the late Mr. H. Distin.

Mr. L. SHORROCK, at present acting District Manager at Barrow, has been made District Manager vice Mr. H. Reid.

In our notes last month it should have been stated that Mr. HARVEY LOWE was made Inspector-in-Charge at Coventry in 1890, and Local Manager there in 1892. He was made Local Manager at Birmingham in 1893.

Mr. S. C. SMITH was made District Manager at Ipswich in 1903 and not 1896 as stated.

Mr. S. J. SMITH, on leaving Maidstone to take up his duties as District Manager at Portsmouth, was presented by the West Kent district with a tantalus, as a token of their esteem and regard. The staff also presented Mrs. Smith with an oak and electro-plated waiter.

Mr. H. SCDELL, recently promoted from Wayleave Officer to be Assistant Engineer, was presented with a marble clock by the Maidstone staff on the occasion of his leaving Maidstone to take up his new duties at Tunbridge Wells.

Mr. JAMES STIRLING, on the occasion of his leaving Portsmouth to take up the position of Chief Accountant in the Metropolitan district, was presented with a revolving bookcase in oak, bearing a suitably engraved silver plate, subscribed

for by the whole of the staff. Mr. Albany (Contract Manager) made the presentation in the presence of a large gathering of the staff.

Mr. HOLDER, Local Engineer, Woolwich, has been transferred to Gerrard as Assistant Engineer.

Mr. CLARKE, Local Engineer, Bank Exchange (London), has been transferred to Woolwich as Local Engineer.

Mr. AKHURST, Assistant Engineer, Gerrard Exchange (London), has been transferred to City as Assistant Engineer.

Mr. A. E. SMITH, Chief Inspector, Aldershot, has been transferred as Chief Inspector to Weybridge.

Mr. JOHN LAW, Chief Clerk, Dover, on the occasion of the anniversary of his twenty-first year in the Company's service, was presented by the District Manager and the members of the district office staff with a silver-mounted walking-stick, accompanied by a note conveying their congratulations and good wishes.

Mr. H. C. FLINT, Inspector, Leicester, has been transferred as Service Inspector to Birmingham.

Miss B. M. SMITH, Operator, Liverpool, has been transferred to Leicester Exchange.

Mr. JOHN ROBERTSON, Chief Inspector, Dundee, has been transferred to Edinburgh to fill the position of Electrician. On leaving Dundee the staff presented him with a case of pipes, together with a gold brooch for Mrs. Robertson.

Miss E. G. MULLETT, Watford, on leaving the Company's service on Nov. 14, was presented by the Watford staff with a gold curb bracelet, in recognition of the high esteem in which she was held by them.

Miss ETHEL BROOKS, Junior Operator, Central Exchange, Manchester, resigned on Oct. 24 owing to ill-health. As a token of regard she was presented by her friends with a silver-backed brush and comb.

Miss ALICE KENT, Senior Operator, Central Exchange, resigned on Oct. 24 owing to her leaving Manchester. She was the recipient of a gold brooch from her friends and colleagues.

Mr. C. ARCHER has been transferred from Wigan, where he was Inspector-in-Charge, to the position of Head Storekeeper at Manchester, upon which occasion he was presented with a silver fruit and flower stand by the combined staff of the South-West Lancashire district.

Miss ALICE GRAHAM, Operator, Carlisle, was presented by the local staff with a dressing case on the occasion of her transfer to Barrow to take up the position of Chief Operator.

Mr. R. J. SKELTON, Inspector, Harrogate, has been appointed Lecturer in Telephony at the Harrogate School of Science for the Winter Evening Session.

Mr. W. D. SCUTT has been appointed Lecturer in Telephony at the Leeds Institute for the Winter Evening Session.

G. D. ETCHES, Apprentice, Stafford, has been successful in obtaining certificates in the following subjects at the Stafford Technical Schools for the session 1906-7:—1st class Advanced Magnetism and Electricity; 2nd class Elementary Mathematics.

Mr. A. E. COOMBS, Exchange Manager, Swansea, has been appointed to a similar position at Bristol. Mr. Coombs entered the Company's service in August, 1900, as Cashier at the Cardiff district office, and was transferred to Swansea as Observation Clerk in September, 1904, being subsequently appointed Exchange Manager in August, 1906, from which he now takes his present position.

Mr. A. G. BRISTOW, Inspector-in-Charge, Penzance, has been appointed Exchange Manager, Swansea.

London Traffic Department.—Promotions and Transfers:

Mr. A. L. MAY, Exchange Manager, Deptford, transferred as Exchange Manager, Leeds.

The Deptford Exchange district has been amalgamated with the Hop Exchange, and Mr. F. GROVE, Hop Exchange Manager, placed in charge.

Miss A. BUCKWELL, Senior Supervisor-in-Charge, Gerrard, has been promoted as Clerk-in-Charge, to Westminster. The staff at Gerrard presented her with a gold brooch as a farewell gift.

Miss MARY JAMESON, Senior Supervisor at London Wall, has been promoted to be Senior Supervisor-in-Charge at Gerrard. She was presented with a gold curb bracelet by the London Wall staff.

Miss ETHEL TRINGHAM, Supervisor, Holborn, has been promoted as Senior Supervisor, to London Wall.

Miss BROWNE, late Clerk-in-Charge, Westminster Exchange, left on Oct. 31, when she was presented with a gold bangle, on which was engraved her initials and the date of presentation.

Birmingham Traffic Department—

Mr. SYDNEY O. ALLAN has been transferred from Bristol to Birmingham as Exchange Manager at the Central Exchange vice Mr. S. R. VAUGHAN transferred to Nottingham as Inspector-in-Charge.

Miss M. LEEK, Operator, Central Exchange, Birmingham, has been promoted to be Supervisor.

Miss E. MORETON, Operator, Central Exchange, Birmingham, has been promoted to be Supervisor.

Miss J. HART, Operator, Central Exchange, Birmingham, has been promoted to be Supervisor.

Miss R. COCKBILL, Operator, Central Exchange, Birmingham, has been promoted to be Supervisor.

Mr. H. C. FLINT has been transferred from Leicester as Observation Officer.

Mr. G. DUDLEY has been promoted from Inspector to be Observation Officer.

MARRIAGES.

On Sept. 28 Mr. and Mrs. ALFRED COLEMAN celebrated their silver wedding, in commemoration of which the principal officers throughout the Midland province, over which Mr. Coleman presides as Superintendent, have presented

them with a solid silver tea service suitably inscribed. Owing to the subscribers being scattered all over the province, the presentation was made informally on their behalf by Mr. A. E. Cotterell, Assistant Superintendent, and Mr. Williamson, District Manager, Birmingham.

Mr. T. RICHARDSON, Local Manager, Peterhead, was presented on the occasion of his marriage to Miss Thomson, of the Peterhead Post Office, with a handsome double set of carvers by the local staff.

Miss N. FAYLE, Operator, Douglas, Isle of Man, who is leaving this Company to be married, after ten years' service, was presented with a handsome cake dish by the staff.

Mr. G. H. ROGERS, formerly the Local Manager at Ramsgate, who is now with the Bell Telephone Company in Montreal, was married at Holy Trinity Cathedral, Quebec, to Miss EVA GARDNER.

Mr. J. APPERLEY, District Office Stores Clerk, Barrow, was on the occasion of his marriage with Miss G. DAWSON, late Chief Operator, presented with a marble timepiece by the members of the staff as a token of their good wishes.

Miss A. COPLAND, Senior Operator, Edinburgh Central, resigned in October to be married. She was presented with a dinner service by the operating staffs in Edinburgh and Leith.

Mr. F. EASTWOOD, Chief Electrician, Southport, was married to Miss Pemberton on Aug. 20. He was presented by the local staff with an oak-cased timepiece.

Miss MABEL BOURNE, Senior Operator, Manchester Central Exchange, resigned to be married on Nov. 7. She was the recipient of numerous useful presents, including dinner and tea services, coal vase, oak tray and flower stand, etc. At the invitation of Miss Bourne a number of the operating staff were entertained at a party and whist drive prior to her leaving.

Miss ADA TAYLOR, Senior Operator at the Midland Hotel, Manchester, resigned to be married on Nov. 7. She was presented with a tea service and teapot by her colleagues, and with a firescreen by the staff at the Central Exchange.

Miss K. KERR, Operator, Liverpool, resigned on Oct. 31 to be married. She had been in the service since 1903, and was presented by the Central Operating Staff with a dinner service and with several other presents from her friends and colleagues.

Miss AGNES GARDINER, Senior Typist, Liverpool, left the service on Nov. 9 to be married. She had been in the Company's service since November, 1903, and was presented by the staff with a handsome gold bracelet and several very pretty and useful presents by her colleagues in the office.

Mr. LUTHER EVANS, ex-Corporation Collector, Swansea, was presented with a handsome biscuit barrel on the occasion of his marriage, the contributors were some of the ex-corporation staff and the district office staff. It was felt that Mr. Evans thoroughly deserved this recognition owing to his genial and enthusiastic nature, which has won many friends. Mr. W. H. Crook, Chief Clerk, made the presentation.

Miss J. RIDDELL, Senior Operator, Argyle Exchange, left on Oct. 17 to be married. She received from the staff a handsome dinner service and a silver cake basket. She was also the recipient of numerous other presents from her fellow workers, whose good wishes she carried with her.

London Traffic Department.—Resigning to be married:

Miss FLORENCE PEACHEY, Operator, Gerrard Exchange (London) has resigned to be married. She was presented on Nov. 15 with a tea service from her fellow workers.

OBITUARY.

We regret to announce the death of Mr. H. S. DIXON, District Manager, Exeter, which took place on Nov. 9 after a short illness. Mr. Dixon was educated at Hill House School, Totnes, and Finsbury Technical College, and entered the Company's service in October, 1892, being under Mr. Sinclair, the then Engineer-in-Chief. He was appointed District Manager, Swansea, in June, 1901; and was subsequently transferred to Exeter in March, 1906.

The burial took place at Totnes on Nov. 14, representatives of the Company attending being Mr. R. A. Dalzell (Provincial Superintendent), Mr. D. Stuart (Engineer-in-Chief of the Department, London), Mr. G. E. Williamson (Torquay), Mr. J. Wilkinson (Barnstaple), Messrs. F. V. Squire, F. W. Humphriss, H. P. Martin, R. Balle, F. Bennett, A. Dunn (Exeter) and W. Seaford (Totnes).

In addition to those from his widow and members of the family, floral tokens of sympathy were sent by Mr. R. A. Dalzell (Provincial Superintendent); Mr. H. Fedden and members of the Western local Board (Bristol), late colleagues Engineer-in-Chief's staff, London; the Post Office engineering staff, Exeter; and the staffs of the Company at Exeter, Torquay, North Devon and Swansea.

Mr. ALBERT THOMAS, Night Operator, Swansea Exchange, died on Saturday, Nov. 9, after an operation for internal complaint. He had only been absent from his duties a little over a week. A particularly sad feature of the case is the fact that he leaves a widow and six young children practically unprovided for. He entered the Company's service in August, 1904, as Night Operator. He has always been a very conscientious and satisfactory worker for the Company, and his death is greatly regretted by the whole staff.



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TELEPHONE MEN.

XX.—ALFRED PERKINS.

ALFRED PERKINS was born in Leeds in the year 1850, and was educated at St. Mark's College, Chelsea. Upon leaving school he joined his father, Dr. JOHN WILLIAM PERKINS, and assisted him in carrying out many interesting chemical experiments, and in studying and assaying mineral ore, Dr. PERKINS being a well-known mineralogist.

The question then arose as to the possibility of procuring sulphur in Iceland at such a cost, and in sufficient quantities, as to make its importation commercial, and with a view to answering this question Mr. PERKINS left London for that chilly, but interesting land in 1868, and spent twelve months there in superintending work in some of the sulphur bearing regions, which have since been more fully developed. Being satisfied with the result of his prospecting, he returned to London, and assisted in the formation of a private company to carry on this work. A small schooner was chartered, and in her Mr. PERKINS and his brother left again for Iceland in 1870, arriving on Christmas morning.

Had it been any other morning the history of that expedition might have been different, for undoubtedly the captain, reckless through the joyous spirit of the hour, to say nothing of other spirits, was bent on showing those on board how his schooner could be sailed through narrow rock-bound seas, regardless of risks, and found, too late, that the warnings given him were well founded. The great rocks shut out the breeze, and slowly the ship drifted towards the surf, and so on to the rocks, becoming a total wreck. For fifteen hours the men clung to her, until at last a French sailor got ashore with a rope, and so all lives were saved, but all else was lost.

The plight of Mr. PERKINS, his brother, and the crew was pitiable, but by good fortune a sum of £40 in gold had been saved, and with this ponies were purchased, and with their assistance a terrible journey of 100 miles was accomplished to Reykjavik. Here Mr. PERKINS and his brother had to remain waiting for a

ship to sail, and they eventually started for Spain in a small brigantine, carrying a cargo of salted cod. On their journey most terrible weather was experienced, and again the sea threatened to cut short the career of a future telephone man. The ship

went through a storm of such violence that of her bulwarks and deck fittings not a vestige remained, but she came safely to port after a month's voyage. Arrived in Spain, Mr. PERKINS bribed the captain of a homeward bound ship by the gift of his revolver, all that remained to him, to take him to Swansea, and so reached home in safety.

After this no further attempt was made to revive the venture, and Mr. PERKINS joined an iron merchant in business with whom he remained for some four years, acquiring most useful knowledge, and then left to join Sir Charles Wheatstone's Company, known as the British Telegraph Manufacturing Company, in 1875. In his capacity as Engineer to that Company he erected a great deal of overhead plant in London, principally galvanised iron wire, attached not only to brackets but to poles and standards, and was, it is believed, the first to use iron tubes for roof standards.

It is therefore not to be wondered at, with this experience, that we find Mr. PERKINS appointed in 1880 an engineer by Colonel WEBBER in the United Telephone Company, in which capacity he had charge of the Company's works in the east of London, being subsequently appointed Engineer for all that portion of London north of the Thames.

Not only was this a large and busy area, but during Mr. PERKINS' administration the circuits throughout had to be transformed from single to metallic, a work of no small magnitude.

In January, 1896, Mr. PERKINS was appointed Manager of the Bristol District, which at that time comprised also the present Gloucester District. Here again all circuits had to be transformed from single to metallic, and many underground schemes were



undertaken; and in Bristol the first common battery equipment in this country was brought into operation.

As to growth, it is enough to say that when Mr. PERKINS went to Bristol there were 23 exchanges in operation with just over 2,000 stations, and that now there are 80 exchanges with over 12,000 stations.

Mr. PERKINS is one of those men who puts his soul into his work. No man can pass through life without exercising a far-reaching influence, and a strong character such as that of Mr. PERKINS has been an influence for good throughout the past years, infusing energy and determination into those, and they are many, who have been trained under him.

Mr. PERKINS is to be envied in that he has had the constant companionship of his wife for now over 26 years, and, although not a musician himself, he appreciates the delightful music with which Mrs. PERKINS and his daughters, one of whom is a brilliant harpist, are always ready to provide him.

After telephony, Mr. PERKINS' hobby is photography, and perhaps when one remembers the knowledge of chemistry which he acquired in his father's laboratory, one can better realise the thoroughness of his work in this line. There is hardly any branch of the science of photography which he has not studied, and it is enough to say that the photographs he finishes are as perfect as one can conceive. The very high ideal at which he always aims shows prominently in this as in his other work.

SHIPS' TELEGRAPH IMPROVEMENTS: A PERMANENT RECORD.

THE following is a brief description from the *Liverpool Journal of Commerce* of an invention by Messrs. R. H. DOUGAN and A. W. BIBBY, two members of the Company's Royal Exchange electrical staff, Liverpool, with regard to ships' telegraphs:—

This system of telegraphing ships' orders is an entirely new departure, and has for its object the recording of all orders transmitted from the bridge to the engine-room.

The system is mainly electrical, and consists of a series of key levers on the bridge, mounted upon a pedestal and occupying a similar amount of space to that of the present mechanical telegraph; each key is spring-impelled, and so constructed that it may occupy one of three positions.

The method of operation is quicker and easier than the existent system. The central or neutral position is the one that all the keys save one normally occupy, and any individual key may be swung forward and kept there to give and maintain one particular order, or it may be swung backward to give and maintain another particular order. Thus any forward movement of any particular key may be used for "ahead" orders, and any backward movement for "astern" signals.

When all the keys are in the neutral position no orders are being transmitted. Immediately a key is operated it closes a circuit and sets a powerful bell ringing continuously in the engine-room, and at the same time shows the transmitted order on an illuminated dial. The engineer replies to the order by actuating a lever corresponding to the signal given, which stops the bell ringing and restores the dial to its normal position in readiness for another order, at the same time indicating to the officer on the bridge by the ringing of a single-stroke bell and the lighting of a lamp that the correct order has been taken.

The recorder consists of a clock and a travelling band of paper there is a series of styluses so arranged that when an order is given from the bridge and repeated from the engine-room the stylus makes an impression corresponding to the order in an appropriate column. There is a stylus and a column for each order, and there are time lines at right angles to the travel of the paper.

By the use of this system it is claimed that shipowners can tell what precautions are exercised by their captains when entering and leaving port during fog and in cases of emergency, as all orders given, whether right or wrong, and the time they were given, remain permanently recorded.

CARD INDEX RECORDS IN CONTRACT WORK.

By E. W. NEWTON, *Divisional Contract Agent, London.*

IN no branch of the service is the "card index system" of more value than in the Contract Department. But is the value of card work properly understood and taken advantage of? Are we by its aid, using the best ways to help and minimise our work? I feel sure a great number of us are alive to its many advantages, query then, why not all?

As I am deeply interested in the "card system" as applied to our work, I should be grateful to those who have had experience with it for any valuable hints, and perhaps the following method I have adopted for checking the contract officers' work may be of interest to others who are enthusiastic on the subject.

First and foremost be *thorough*, and keep the cards up to date; otherwise, much of the valuable time and labour spent will be thrown away. It is almost of equal importance to instil into the minds of the contract officers the advantages to be derived from thoroughly mastering the methods adopted, and from keeping the cards up to date.

The usual procedure of entering up "unsuccessful interview" and "new business" cards is carried out, but in order to obviate the necessity of "booking out" and "booking back" papers given to contract officers to deal with, I have adopted, in place of the old method of book records, what I call "the diary box."

For example: All batches of papers which are "diaried up," are taken out of the current file the day previous to the diary date, and the unsuccessful interview card corresponding to each batch of papers is taken from its place in the card cabinet.

The cards and batch of papers are then sorted under each contract officer's name and handed to the chief contract officer, who then takes each card and corresponding batch of papers, and hands the card to the contract officer who is to follow up the case; he in turn inserts the date at the back of the card and initials it, and then returns the card to his chief, who, in exchange, gives him the corresponding batch of papers. Thus, the chief contract officer holds the initialled and dated unsuccessful card as a receipt for the papers.

The "unsuccessful interview" cards thus dated and initialled by the contract officers represent the papers they are actually dealing with on the date shown, and are placed by the chief in a separate division in the card cabinet called the "diary box," being classified by guide cards bearing the contract officers' names.

By this method, a reference to the "diary box" at any time will give at a glance what each contract officer is doing and what papers he has actually in his possession at that time.

Upon the contract officer's return each evening, he at once makes out his reports on the papers dealt with during the day, and the chief, for each batch of papers received from the contract officer, gives in exchange the corresponding card from the "diary box" for him to enter up. When this is done the chief cancels the entry on the back of the card and initials same. The batch of papers is then "diaried up" again, or filed if necessary, and the corresponding card is transferred to its proper place in the card cabinet in alphabetical street order, to await its appearance at the next "diaried date" of its papers.

ADVERTISING TELEPHONE SERVICE.

A GOOD many of the old timers in the telephone business were in the habit of thinking that the only reason for the existence of a Contract Department was to make a place for the company to keep employees who would be able to tell a man what he could not have. In these old-time Contract Departments, if, after all explanations had been made, the enquirer at the office persisted in wanting a telephone, the aforesaid employees would give him the necessary papers to sign.

If one of these people had been told that the time would come when advertising would play any part in extending telephone service, he would have thought his informer was making a mistake in using the word telephone, and that the subject of the conversation was really some other business. Nowadays, however, the people who control most of our telephone companies realise that they are in the business of selling telephone service. They are in it for a profit, too, and it takes no very keen vision to see that once facilities are provided, and classes of service and rates to be charged are fixed, the ratio to investment is going to depend on the amount of business transacted over the wires.—*American Telephone Journal.*

THE COST CLERK: HIS WORK AND RELATIONS WITH OTHER DEPARTMENTS.*

BY EUSTACE HARE.

IN a general way the cost clerk's main duty is to gather up threads, technical and commercial, and weave them into a pattern, statistical and financial; and I place "statistical" first advisedly, because statistics may stand for "preparation" and finance for "finality." This is clear when we remember that the great aim of our business is to save money—and time, which we are told is the same thing. First we save the money of the telephone user, and secondly for the telephone shareholder; and to this end we must first see that our machinery is working to its proper capacity and that every employee has a working load consistent with his position and calling. This we learn by statistics; and having gained this information, we count the cost of it all and find the price at which we can sell our work and leave a margin for the proprietors; and we call this finance.

And first, a word as to the title "Cost Clerk," of which I believe I was the inventor. I have an idea that it is not popular; but whether its lack of euphony outbalances its charm of alliteration and makes it objectionable, I cannot tell, but I am afraid that its very comprehensiveness has, in a great measure, helped to obscure its real and full meaning. In my own mind these two words represent the man who watches and makes clear the day to day and month to month progress of the Company's work. Not an easy matter, as I who have been engaged upon it for eleven years can testify. There are two things, however, which the cost clerk emphatically is not; he is not an assistant chief clerk—for he has nothing to do, for example, with the supervision of the the staff, the collection of revenue or with correspondence with the public. Nor is he to be confused with the works order clerk; this official's duty being to deal with works orders from start to finish and to keep the cost clerk supplied, not with raw, but with finished material, when needed. The cost clerk is the summer-up—the financial adviser, under the chief clerk, to the district manager. He it is who gives warning that if such and such work be undertaken, some innovation be agreed to, or extra staff be employed, there will be a shrinkage in the net financial result as regards a particular month or half-year; it is to him that the district manager looks to be supplied with information which may lead him to alter arrangements here or there, without waiting for some sudden upheaval to force the necessity unpleasantly upon him, or to be in the position of judging from the financial point of view whether some scheme suggested by his technical advisers can be prudently put forward. On the other hand the cost clerk may convey the pleasing news that if certain suggestions of his own be entertained the district will without doubt reap rich advantages from their virtue. But, so far as his own reward is concerned, he may expect this—that every man's hand will be against him.

It has been suggested that more complete and definite rules than now exist might be compiled at Head Office and issued with the Service Instructions for the use of cost clerks; but herein lies a difficulty. The opinion of the late General Manager and of the General Superintendent has always been that the very essential of the cost clerk is his freedom, his commission being more or less a roving one, and the more rules you lay down for his use the more you may fetter his initiative and restrict his inventive skill. It is a truism that a new way of putting things may substantially change their usual aspect and bring to light unexpected and possibly unsatisfactory conditions, and it is largely in this direction that the duty of the cost clerk lies, though within reasonable and sensible limits; while to do it effectively he must not occupy himself in so much routine work that he has little time left for thought, discovery and reasoning. I desire therefore to make it clear that in my following remarks I am laying down no fixed rules for rigid observance, but merely trying to fashion a few hints from the results of my own methods.

As a beginning, then, I would recommend the broad rule that all checking of expenditure for purposes of analysis should originate

by *deduction* and not from *induction*: that is to say, we are to reason from general conditions or results to particular facts, and not from particular facts (or details) to general conditions. A very simple example of this and one that touches cost clerks very closely is the checking of works orders. I don't know how many works orders are completed every month in Leeds; but suppose the cost clerk were to set himself the task of checking each one with a view to discovering waste, what would happen? What has happened in the past? I have a very distinct recollection of, in my audit days, wading day after day drearily through bundles of defunct works orders; filling page after page of foolscap with appalling lists of notes and queries, obtaining explanations thereof—excepting in cases where the fortunate engineer or foreman had left the centre or, perhaps, was as dead as the works order itself—and finally, making up a report on the whole. Now observe this: I knew half the so-called explanations were, to put it mildly, guesswork—for in those days a full separate works order was made up for each new installation, and to remember the details of each was impossible—I knew that for practical purposes many such belated enquiries were absolutely futile; I never remember once having discovered any irregularities as regards stores by this means; it was the most wearisome and dissatisfying part of my work, and yet I thought I was doing the right thing, and did it with all my might for three years. This was work by induction; it told me piecemeal that, from certain figures which by long practice had become fixed in my mind, certain jobs were costing too much money; and by much searching I was able to find that wages or material were charged in some instances to the wrong works order; but usually the work was chargeable to the same account and no one was one penny the worse or better. Had I classed the jobs under their respective headings, or compared the cost of work carried out under separate foremen and arrived at comparative figures, the chances are that I should have arrived at better results in half the time. The system was not, of course, without its use, both to the Company and myself, but the method, I feel now, was wrong and costly; and it exists in some quarters to some extent at the present day. In any case it paved the way to the present system, the system of grouping different classes of work, which I think we all agree is a decided improvement, making comparative investigation so much easier, summarising, and so lessening, our book entries.

What is the best method to-day of checking expenditure? In the first place, all expenditure is divided for us between capital and revenue and then subdivided into wages, stores and sundry expenses (travelling, etc.). Then we have further divisions of capital and revenue costs, viz., expenditure on Head Office estimates, on special works dealt with locally, on ordinary installations and on expenses not directly chargeable to particular works; these are mainly on the capital or construction side. Then on the revenue or maintenance side we have line and instrument repairs, operating, etc., and having arrived at our totals for fixed periods we find our factor, usually the station, and work out our costs. Here the cost clerk's work begins, for up to this point everything is stereotyped, and it is not enough to leave the rest to Head Office—which has quite enough to do to collate the doings of the centres and focus the whole—but to delve and probe for ourselves.

We may begin, then, by diving into the past and finding, for example, what has been the proportion of wages to each class of expenditure and what has been the proportion of material, and how they vary with every form of work, and then make comparisons with the present, month by month. We will pit centre against centre and man against man. Does the heavy supervisory cost in this place result in cheaper and speedier work as a whole? Is the capital cost per station excessive in another direction, and if so, is the maintenance cheaper and are faults and complaints less? or, on the other hand, is the high cost balanced by a higher return in revenue? or again, is it attributable to a scarcity of orders or to outstanding orders increasing? You will now observe in passing that already we are in touch with nearly every department; the capital cost influenced by the nature of the work; if the running of a new line—with the preliminary work of the Contract Department which involves the return on our outlay; with the Maintenance Departments, whose work may be increased by faulty construction, which again reacts on the operating, and so forth. All such points demand our watchful eye. If there are no

* A paper (slightly abstracted) read before the Leeds Telephone Society, November, 1907.

ready reasons for high cost, then it is time to bestir ourselves; to turn to the works orders, to examine time sheets, or to investigate the stores records; but always to be sure of our ground before calling for reports and explanations, and to present our case with a full and clear knowledge of facts; for to cry "wolf" unnecessarily is to produce irritation which, above all, it is to our interest to avoid. If we are dealing with the cost of maintenance—is increased expenditure due to an increase in faults or to a higher cost per fault? If the latter, have we become wasteful in our wages bill, which shows itself in a reduced number of jobs per man? For general purposes we are accustomed to use mileage of wire and instruments as factors in arriving at the cost of maintenance, and up to a point these serve very well. But we are not content with this locally. All kinds of expenditure are classed under these generic headings, and we are anxious to specialise. A man who attends to a fault does not necessarily overhaul a mile of wire, nor does an instrument inspector find a fault to put right at every inspection. Therefore to know what we are spending under these heads we want to find the total cost of these particular jobs and divide them by the number of faults and inspections per month.

Another very important part of our work is that connected with the increase of business; in the number of new orders obtained and their value, the number ceased and the number connected up; for the cost clerk is the inquisitor of the Contract as well as of other departments. It is necessary that we should at least maintain our rate of increase and if possible increase the rate every year; and the cost of obtaining new revenue—not stations only or chiefly—must not be allowed to increase. In this connection we may also find it interesting to know whether our added revenue is increasing at a higher or lesser rate than our revenue expenditure, and we may make this a particular feature of our procedure.

Then there is the question of operating. We have grown accustomed to use the exchange station as the factor, and at one time it was the only one available; and there being one class of service only, viz., the unlimited, the traffic over each line may reasonably be supposed to have been fairly equal. Now, from time to time, records of calls are taken, and it is possible to arrive at the cost per call in particular exchanges, which gives us much truer data for our purpose. Where the calls per line are low, the cost per station should be low also, but all other things being equal the cost per call should remain stationary; or we can go deeper than this and find the operating cost of message rate as against flat rate calls. We may also consider and show whether our extra charges in the way of supervision, monitors, etc., are making their mark on the service as well as on the pay sheet, by adding to the number of effective calls, reducing complaints, etc., and many other things we can do by making a commercial use of the operating statistics.

Another item of expenditure is the cost of our office work. As a whole we know fairly well what should be the cost per station, and we are allowed roughly a staff in proportion to the number of stations in the district. But the chronic backward state of one division of our work may warn us that we are growing too economical, or that a re-arrangement of duties is necessary, and it may be as well if we find what is the percentage of the cost of each division in regard to the whole.

All these are mere suggestions and are capable of much multiplication, but I must leave them now and go to another branch of the subject, without which all I yet have said is useless; and that is what use are we to make of our information when we have got it? In its final stage it is, so to speak, not our own property, but the district manager's, and it is, of course, left with him to say what shall be done with it. But we must remember that a district manager has already many other things on his mind foreign to our particular work, and that time with him is precious: therefore it behoves us to submit our results in the simplest and most comprehensive form. For this purpose I unhesitatingly recommend curves and not figures, and these are particularly desirable when the fluctuations in costs are considerable and where small figures—decimal points of a penny—represent large aggregates. This can easily be proved if we plot out on squared paper the cost of operating for each of twelve months, connecting the plottings by a curve, and then place the actual costs (worked out to two decimal points) in a vertical column. The latter will, of course, show the cost per month clearly; or you may work out an average, but it

will not show except by close investigation the trend of the expenditure, up or down, which is the chief thing we want to know, and is instantly seen in the curve.

I take the opportunity here to submit a little personal explanation. Some of you may have read an article of mine which appeared a few months ago in the JOURNAL and which, I am afraid, from a later article from our Assistant Engineer-in-Chief, gave rise to some misapprehension. In no way did I intend to belittle the use of curves for commercial purposes, for I use them largely myself and have found them of the utmost value. What I meant to suggest was that they should not be overdone or abused, nor be treated too much in the way of finished articles, but as indicators to show which way the wind is blowing; and it is quite possible to overlook the fact that we are not dealing with mathematical drawings but with pounds, shillings and pence. For showing plainly what we have done and what we are doing curves are admirable; they are like the pulse which tells the condition of the patient; but who can say what will be the condition of the pulse to-morrow? We all know well enough that our business depends appreciably on the state of markets, money and otherwise, and it takes very little to upset these delicate factors. Would it therefore be prudent to extend the curve of five fat years and flatter ourselves that no more lean years are possible, basing our calculations of future profit and laying out our money solely on such a foundation? Certainly not. But curves are infinitely better than figures for showing at a glance the twists and turns of the many tributaries which we hope will ultimately flow into one pool of profit.

One way of dealing with statistics in curve form I strongly recommend, and that is to employ percentages rather than averages; for if we consider for a moment, I think we shall see that it is much more important to know at what *rate* we are spending money than how much we are spending during long periods, which by themselves is all that averages can tell us; but to what extent curves should be used, or what particular purposes they should serve, I must leave to the good sense of the cost clerk, who will no doubt be guided from time to time by his manager and by his own judgment.

There is one characteristic of a good cost clerk which I should like to touch upon, and that is the importance of being tactful. He has to depend so much on the work of others that he will always find it of great advantage to cultivate friendly relations with all departments, and as far as possible to leave animadversions and criticisms to his chief.

TELEPHONES IN MANCHESTER LIBRARIES.

THE Libraries Committee of the Manchester Corporation, recognising the public convenience of telephone call offices, have arranged with the National Telephone Company to place suitable cabinets at the principal branch libraries. Public telephone call offices have accordingly been opened at the following free libraries:—Blackley, Cheetham, Deansgate, Gorton (Belle Vue Street), Hulme, Longsight, Openshaw, Rochdale Road (Livesey Street) and Rusholme Road. Anyone can telephone from these offices to a subscriber within a radius of about four miles from the city for a penny, and to others within an area covering 200 square miles for twopence.—*The Manchester Guardian*.

HOTEL BRANCH EXCHANGES.

WHEN a man can say that he has done something comparable to making two blades of grass grow where there was but one before, it is safe to set him down as a genuine producer. That is why the telephone men who are pushing the hotel branch exchange business are doing a great deal more than giving their companies a revenue provider of a new type. They are incidentally helping the telephone business in general all over the country, and, for that matter, their influence is becoming quite noticeable abroad. One of the first things the observant European traveller tells his friends at home is that he could talk to anyone he wished to reach without going out of his room in the American hotel at which he stopped.

In many cases the advantages derived by the telephone companies from the introduction of this room service have been shown up very clearly by disproving objections based on the belief, entertained by some hotel proprietors, that the only returns which they might expect from the entire costly plant would be the equivalent of the sum deposited in the pay station previously maintained in the lobby. As a matter of fact, experience has shown in hundreds of instances that pay station collections are practically undiminished after the installation of telephones in the rooms. It seems to be in the strictest sense a matter of creating a new demand by providing improved facilities. The telephone on the wall is not only available as a means for carrying on conversations already decided upon, but seems to act very frequently as a suggestion for uses which would not be thought of if the means of communication were not so ready to hand. By making it so much easier to talk the telephone company increases the amount of talking.—*American Telephone Journal*.

WIRELESS TELEPHONY.

WE recently announced, says *Electrical Engineering*, that wireless telephony apparatus is to be installed on all the vessels of the United States Pacific Fleet, and are now enabled to give some further particulars of the experiments which led up to the installation of the original apparatus on the U.S. battleships *Connecticut* and *Virginia*. This apparatus is distinct from the wireless telegraph gear, and is placed in the emergency room on the bridge, to be used directly by the commanding officer for inter-communication purposes. The system is being exploited by the Radio-Telephone Company, of New York.

Although the serious work of putting the system into commercial operation is of relatively recent date, the success thus far obtained is exceedingly gratifying. It demonstrates conclusively that we have now a ready means of transmitting human speech without wires which is at once applicable to well-nigh every vessel, requiring small space on shipboard, apparatus sufficiently simple to be operated by any intelligent electrician, mate or engineer, the range of which is already "commercial." As regards the method of producing the continuous oscillations, POULSEN described one method of increasing the frequency of the alternating currents with the Duddell arc into the "Hertzian" range, at which frequencies energy begins to be radiated into space. Other methods are equally or more efficacious than that of putting a direct current arc into hydrogen gas, but the principle of obtaining high frequency alternating currents from a relatively low potential arc is far simpler, cheaper and generally applicable than the use of elaborate, and necessarily costly, alternators of exceedingly high frequency and extremely small energy output.

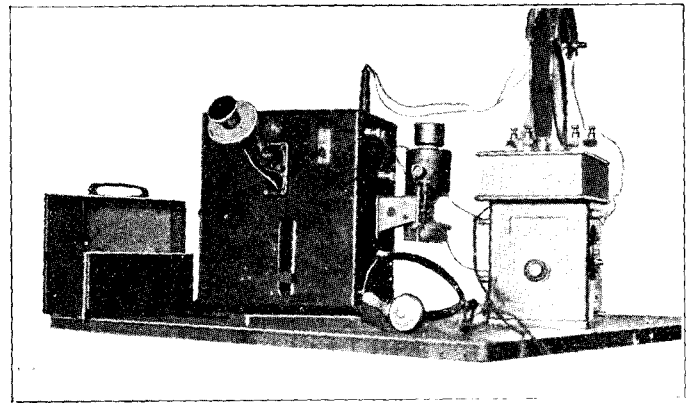
To effect wireless transmission of speech it is only necessary to secure a spark frequency exceeding the tones used in speech, but if this frequency be far higher, say, over 40,000 per second, so that the note of the spark becomes altogether inaudible to the human ear, the articulation and clearness become perfect instead of approximate. The sustained oscillations from the arc fulfil these conditions, but long and painstaking experiments have been necessary to render the arc quiet and free from the hissing or "popping" sounds which, if present, render the speech at the receiving station more or less "cloudy." Given the continuous radiation of Hertzian energy it remains to vary not the frequency of the electrical oscillations but their amplitude, in accordance with the sound modulations of the voice. This is accomplished in a surprisingly simple manner, merely by placing the microphone in the earth lead, between the source of oscillations and the ground, at a point where the high frequency currents are maximum, and the potentials are minimum.

Placed thus there is surprisingly little wear and tear on the microphone, at least, for radio-telephone transmitters up to 1 kilowatt capacity. The microphone does not even require water cooling if of a self-ventilating type. This arrangement and method of governing the character of the radiated energy by the minute vibrations of the microphone diaphragm is described in U.S. patents No. 836,015 and 836,072, issued to LEE DE FOREST. The receiver necessary to reproduce every fluctuation of the energy of the transmitter may be of any of the various forms of automatically restoring "responders," using a head telephone as signalling adjunct.

The "microphone" coherer, magnetic detector, electrolytic "polarphone," carborundum or silicon detector—all serve as radio-telephone receivers, all being more or less perfectly "quantitative" receivers. Of all forms tried, however, the "audion," or hot-gas responder, seems not only the most sensitive, but to give the clearest and most perfect quality to the reproduction. Its various members are absolutely fixed relatively to each other, and the tuning qualities of the audion, therefore, are absolutely determinate and unchanging; its electrostatic capacity is considerably less than that of any of the before-mentioned types. The problems of syntonisation here are the same as in the radio-telegraph, with the difference that by virtue of the sustained, or weakly damped oscillations the attunement at the receiver may be much more accurate than in the "spark" telegraph. This means, of course, a larger number of simultaneous communications without interferences. Moreover, it is easy to read human speech during a great amount of "cross-talk," wireless telegraph signals, atmospheric disturbances

and induction noises, when even the keenest ear of the most experienced "wireless" operator would be helpless to decipher a Morse message of monotonous dots and dashes coming in under similar conditions.

The first actual application of radio-telephony to practical work anywhere in the world was made at Put-in Bay, in Lake Erie, during the week July 15 to 20, in reporting the regatta of the Interlake Association. The Radio-Telephone Company installed the De Forest wireless telephone on board of the cruiser-yacht *Thelma*, owned by Commodore W. R. HUNTINGTON, of Elyria, Ohio, and also equipped a shore station at the Fox Dock at Put-in Bay. The *Thelma* is thus the first craft in the world to be fully equipped with the wireless phone, an honour which it is fair to say will make it historic in coming years. Although not well suited to the task on account of her short spars and wooden hull, the *Thelma* gave a most excellent account of herself by the radio-phone throughout the entire regatta. The distances which were attained exceeded the hopes of those in charge of the apparatus. The *Thelma* followed the competing yachts, or motor boats, around the course through most of the races, and full and graphic accounts of the races were telephoned into the shore station exactly as the events occurred. Speech alone was not transmitted during these convincing demonstrations, but singing, whistling and gramophone music or dialogues were interpolated with the news reports. It was really astonishing to note the clearness and fidelity of the reproduction. Friends



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FIG. 1.—DE FOREST TRANSMITTER AND RECEIVER FOR WIRELESS TELEPHONY.

recognised one another's voices without difficulty. The scratching of the gramophone needle over the disc after the record had been played through, even the tapping on the mouthpiece of the microphone transmitter with a pencil was distinctly heard at a distance of three miles from shore.

The greatest distance at which the reports from the yachts were heard and recorded was four miles. The *Thelma's* equipment comprised a 220-volt generator of 1 horse-power capacity, the De Forest oscillator and transmitter, and for the receiving apparatus an audion detector and "pancake" form of syntoniser or tuner. Her aerial wires led through the roof of the wheelhouse to a small cross-arm on top of the foremast, and thence to a smaller arm on the mainmast. Ground connection was at first made to the propeller shafts of her twin screws, but as this was found insufficient, more area was added by fastening two sheets of zinc to the yacht's hull at the bow. The *Thelma* is a trim little cruiser-yacht of 17.82 tons net, length over all 72 feet, with 10 feet 8 inches beam and 5 feet draught. She carries two 20 horse-power Lacy engines and is schooner rigged. The telephone dynamo was belted direct to the flywheel of her starboard engine, aft, and the rest of the radio apparatus was mounted on a small table in her main cabin convenient to all. Fig. 1 shows the apparatus complete and assembled in working order.

On shore 110-volt direct current was available, and this was transformed to 220 volts by a motor generator. This current was led through a rheostat and choke coils to the oscillator. Connected to this oscillator is a shunt circuit consisting of a condenser of

peculiar construction and a primary coil, the exact number of turns of which could be varied at will to alter the tune or wave length of the electrical waves which were generated. A second coil within this primary had its upper end connected direct with the antennæ or aerial wire, while its lower end led first through the microphone transmitter and thence to the earth plate. The microphone transmitter and the telephone receiver are exactly the same as used in the wire telephone, with which all are familiar. The "oscillator" and the "responder" are the only new and additional features, and the ether takes the place of the connecting wire.

As a sample of the excellent service which the radio-phone performed during the Put-in Bay Regatta, the following synopsis of the report of the morning races of Friday, July 19, will be of interest. The man in charge of the shore station, not being a stenographer, it was possible for him to write down only the first words of a conversation, or brief heading of the reports. This illustrates incidentally the great advantage in point of expedition of business of the radio-telephone over the wireless telegraph. From three to four times the number of words can be transmitted in a given length of time. "9.57½ a.m. I will tell you when the first boat crosses the line. First boat is about crossing the line. 9.59. *Spray* crossed the line at nine fifty-nine. *Spray* crossed about 25 seconds after nine fifty-nine. Nine fifty-nine and five seconds is the exact time." (This was followed by gramophone music played on the *Thelma*.) Later—"Second boat just crossed 10.07½. First in the cat boat race crossed at 10.01½. *Cleveland* finished second; time, 10.03½, *Borcalis*, 10.04}.

THE NODON VALVE RECTIFIER.

By H. G. TOWNSEND, Glasgow.

PERHAPS a few notes on the above will be found useful and interesting by the readers of the JOURNAL, especially in those districts where the town supply is alternating current.

Before an alternating supply can be brought into use for, say, charging accumulators, some means must be found to transform the alternating into continuous current.

The Nodon valve rectifier offers a ready means of doing this and does away with the necessity of installing a motor generator. It transforms alternating into continuous current, without the aid of moving machinery, which is very desirable, especially in districts where there is no special staff with experience of electrical machinery. It is a very cheap and compact piece of apparatus, inexpensive to maintain in comparison with a motor generator, and there is not as much danger of breakdown.

The rectifier consists of cells comprising one lead and one aluminium element, the solution being phosphate of ammonia and the electrolytic actions are as follows:—

When current passes in the positive direction from aluminium to lead, there is instantly formed on the surface of the lead an insulating film which presents an enormous resistance to the passage of current. On the other hand, if current passes in the positive direction from lead to aluminium the film is instantly

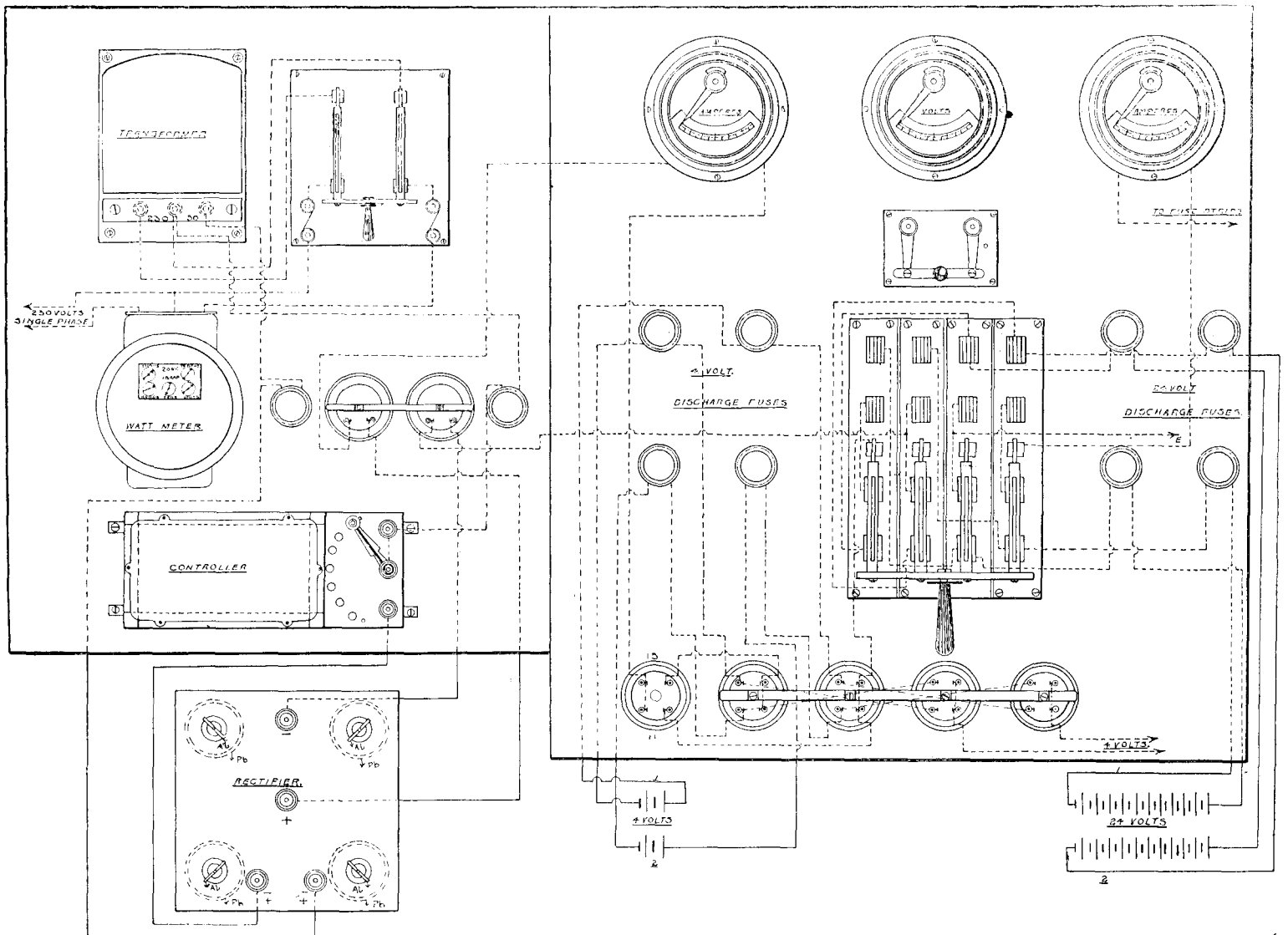
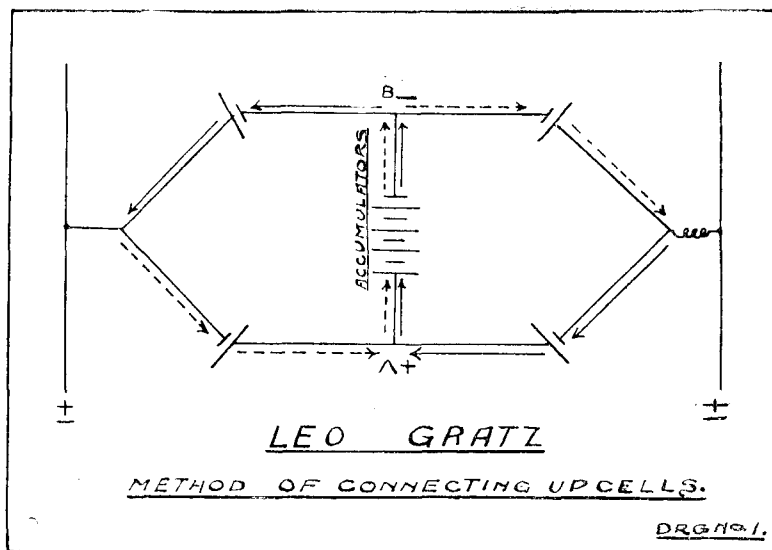


DIAGRAM OF CONNECTIONS, NODON VALVE RECTIFIER.

reduced and current flows freely. If we group four cells according to what is known as the "Leo Gratz Method" (Fig. 1) it is obvious that owing to the repeated reactions taking place, the current will continue to flow in the same direction.

We have one of these rectifiers fitted in our Clydebank Exchange, and it gives every satisfaction. It is used for charging accumulators and for working the calling and clearing lamps at 24 volts. Fig 2 shows the apparatus as connected up and working in this exchange.



Before the rectifier was fitted the exchange calling and clearing lamps were worked by means of eleven E.P.S. 66 ampere-hour portable accumulators, which had to be carted back and forward between Clydebank and Royal Exchanges, a distance of five miles.

Obviously this method was very expensive and at the same time very inconvenient. The saving in maintenance charges brought about by the use of the rectifier is shown below:—

Portable accumulators for twelve months.	Rectifier and stationary cells for twelve months.																																								
<table border="0"> <tr> <td></td> <td>£</td> <td>s.</td> <td>d.</td> </tr> <tr> <td>Cartage between Royal and Clydebank ...</td> <td>15</td> <td>10</td> <td>0</td> </tr> <tr> <td>Cost of charging ...</td> <td>6</td> <td>10</td> <td>0</td> </tr> <tr> <td>Labour, etc. ...</td> <td>8</td> <td>13</td> <td>4</td> </tr> <tr> <td></td> <td>£30</td> <td>13</td> <td>4</td> </tr> </table>		£	s.	d.	Cartage between Royal and Clydebank ...	15	10	0	Cost of charging ...	6	10	0	Labour, etc. ...	8	13	4		£30	13	4	<table border="0"> <tr> <td></td> <td>£</td> <td>s.</td> <td>d.</td> </tr> <tr> <td>Cost of current ...</td> <td>9</td> <td>10</td> <td>0</td> </tr> <tr> <td>Cost of renewals ...</td> <td>1</td> <td>4</td> <td>0</td> </tr> <tr> <td>Labour, etc. ...</td> <td>5</td> <td>2</td> <td>0</td> </tr> <tr> <td></td> <td>£15</td> <td>16</td> <td>0</td> </tr> </table>		£	s.	d.	Cost of current ...	9	10	0	Cost of renewals ...	1	4	0	Labour, etc. ...	5	2	0		£15	16	0
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The cost of installing the rectifier and stationary battery amounted to £44 17s., but the annual saving quite justified the installation.

Before the rectifier is brought into use the first time, the cells should be filled until the solution is about an inch from the top. When the alternating current is sent through the rectifier, these cells should be seen to gas pretty freely; if this does not take place, the current should be switched off, and the inner aluminium electrodes removed and rubbed with a piece of emery paper, as a scale may have formed on the surface of the aluminium.

Before closing the continuous current main switch, it is necessary to wait until the voltmeter shows a direct voltage, this to allow for the "forming" of the electrodes in the case of valves put to work for the first time. This operation takes from five to twenty minutes. Care should be taken not to overload the rectifier and this can be regulated by means of the controller. If the valve is allowed to work above the stated output, the temperature of the cells rises very rapidly, and the efficiency of the rectifier falls at an alarming rate. The temperature of the solution should never exceed 50° Centigrade. Evaporation in the cells should be made up with distilled water, and the rectifier kept free from dirt. If the rectifier is rubbed over with a paraffin rag or vaseline, corrosion will be prevented to a great extent.

NOT ON THE ESTABLISHMENT.

"No," said the charwoman to her assistant as she rested her pail on the district manager's table preparatory to beginning operations, "No, Liza. I'm ony a common charwoman, but I've my feelin's, same as other folks. There's that 'ere young chap as calls hisself the chief clerk—'im wif the gold-rim bi-lamps. Last week he ses to me, wen I arsked if I was to be took over by the Guvment, 'The Postmarster-Genril 'asn't promist to take you, Mrs. Finch. You see, you're not on the establishmint. You're just a sort o' soopernoomeray, as it were, an' you gets paid thro' the No. 5.' 'Not on the establishment!' ses I. 'Ow's that?' 'Well, Mrs. Finch,' ses 'e, 'it's not customary to put charwomen on the establishmint.' 'Well,' ses I, 'I thinks you're wrong about me bein' paid thro' the No. 5. My wages is waitin' me every Satterday mornin' in a envelope on the boy's table outside. I 'ave never wunst been paid thro' nothin' else, excep' wunst wen I was paid thro' the railin' of a 'ouse where the missis didn't want me to go back up the steps arfter washin' 'em down.' An' then he larfed, Liza, like as if it was a larfin' matter, the silly 'ed he is. 'Is Jim Baker on the establishment, might I arsk?' ses I. You know Jim, Liza—that silly lookin' chap in the stores as is called a stores *labrir*, altho' if some was to speak as could 'e wouldn't be called no sich thing. 'Yes,' ses the chief clerk. 'Well,' ses I, 'there's some on the establishment as shouldn't be, an' some as isn't as should, an' then 'e walked orf, most uncivil. An' 'ere's Jim Baker goin' to get a Guvment appointment an' me an' you, Liza, lef' out in the cold. Ony larst week I ses to Jim as I was passin' thro' the stores, 'Jim,' ses I, 'wot's them small rows o' round 'oles in that bit o' wood?' 'Them,' ses 'e, 'them's jacks.' 'Jacks,' ses I, 'that's a funny name for 'em. Why're they called jacks?' 'D'you ever play at cards, Mrs. Finch?' ses 'e. 'I'm more parshul to chess,' ses I, 'but I 'ave p'ayed at 'em.' 'Well,' ses 'e 'd'you know the name ov the card as comes atwixt the ten and the Queen?' 'The Knave,' ses I. 'Well, Mrs. Finch,' ses 'e, 'the Jack is another name for the Knave.' 'Well,' ses I, 'wot's playin' cards got to do wif them 'oles?' 'Well, Mrs. Finch,' ses 'e, 'if I was to stan' 'ere hexplainin' my job to you, where 'ud I be, tell me that? An' tell me this too, Mrs. Finch,' ses 'e, tremblin' all over wif temper, 'wy d'you call that 'ere thing on your harm a pail, eh?' An' went off leavin' me that weak, Liza, I could 'ardly drink my beer wen I got 'ome. That's the sort o' owls as they puts on the establishmint.

"There's our little lad at 'ome—little Alf. I'm goin' to make a contrac' orficer ov Alfred wen 'e gets up a bit. There's some contrac' orficers I knows as is goin' to be in the Guvment, I suppose, as could 'ardly, I b'lieve, say their alfabit. They don't know their business. I saw in the noospapers a short time back as 'ow wot is called the flat rate is stopped, an' I arsked that smart lookin' wite-'aired contrac' orficer as looks as if he was a director wot the flat rate was.

"Well, Mrs. Finch,' ses 'e, 'the flat rate was £10 a year an' as many calls as you likes.' 'An' wy is it stopped?' ses I. 'Well, Mrs. Finch,' ses 'e, 'becos there's no sense in givin' as many calls as they like for £10, wen the right way is to sell the calls in the same way as the butcher sells beef—so many calls for a pound, so much beef for a pound.' 'An' wy,' ses I, 'is it called a flat rate?' 'Well, Mrs. Finch,' ses 'e, 'the English langwidge is pekooliar, an' if I was to stand 'ere an' explain to you wy they calls it a flat rate, it might be necessary for me to go back to the root of the thing.' An' wen I was telling our little Alf about it, 'e ses, 'Wy, mother, if they stopped it becos it was senseless, o'course it means that flat rate means SILLY rate.' There's a contrac' orficer for you, Liza. 'E's clever, is little Alfred. Ony larst week 'e drored a character curve ov 'is father on wood arfter readin' in the JOURNAL 'ow it's done in Manchester, an' then 'e cut out the curve wif 'is little fret saw, an' father sat down on the sharp bit as comes out at 'Abits,' an' little Alfred 'as been sleepin' wif 'his Uncle Ned since in the nex' street. 'Father,' 'e ses—but, lawk-a-mussy, look at the time, Liza. You *do* stand talkin' an' idlin' the preshus moments. This room'll do if you gives it a fether dust. Not on the establishment! Drat their imparence."

"NATIONAL TELEPHONE."

By J. K. MURRAY, *Assistant Engineer*, Glasgow.

THESE words appear on the front of the uniform caps worn by a large proportion of the Company's staff, and there is no doubt that a good impression of our Company and its service can be conveyed by a well-regulated and workmanlike staff of men, whose operations are so much under the "public eye." Such impressions some might be tempted to think trifling, but they are perhaps further reaching in their effects than is commonly believed.

We occasionally see notes of appreciation in the Press by someone who had observed our men working, it might be, at a great height from the street, adjusting cable slings or something of the sort. I should like to mention a case which serves to illustrate how the behaviour of the men even under normal conditions is noted by others.

A distributing pole was required in the garden of a large villa with beautiful grounds, and an underground cable was to be laid through the grounds from the main road. The owner, who was at first unwilling to consent, finally agreed to give the facilities asked, provided he should be in no way inconvenienced by the operations, and the wayleave officer accordingly arranged a meeting on the spot, when the head of a firm of contracting gardeners was present. After much deliberation the owner of the property referred the matter to the gardener, who was asked if he thought the work in the garden could be safely entrusted to our men, and whether he would advise giving the Telephone Company facilities for entering the grounds. The reply was that it depended upon the men sent by the Company, but he knew that the men wearing the uniform cap usually in the locality had a good name for work and would cause no trouble. The wayleave was accordingly granted.

I had another gratifying experience of a similar character. The case was one where the owner in granting permission for a distributing pole in his garden and cable through the grounds made stringent conditions as to making good the paths and other ground disturbed for our trench. A few days after the pole had been erected he stopped me in the street and said, "I see your men have got the pole up allright, but what about the cable? You are bound to make a mess with a trench through the avenue, and it must be left in a satisfactory state."

He was satisfactorily astonished when I told him that pipe and cable were already laid down and the trench filled in!

Such cases are creditable to our foremen and to those under them, who earn thus a good reputation both for themselves and for the Company.

It is of course easy to imagine the other side of the picture, when something has gone wrong, but by uniform courtesy to subscribers and wayleave grantors and careful work good feeling will be maintained between the Company and the public, and this is more necessary now than ever, as we depend very much upon wayleaves in private gardens for distributing in residential districts now that underground schemes are so general. In such localities, and in fact in every locality, special attention should be given to the caps worn by the men to see that they are not used after they become too shabby, even at the cost of using up more caps. The handcars should also be kept tidy and not entirely devoid of paint, and any lettering on the wheels kept clean and fresh. In this way the work of the contract officer will, in many cases, be indirectly facilitated.

LOW INSULATION AT DOVER.

ONE day this autumn a considerable leakage was noticed on the 24-volt batteries at the Dover Exchange. Special tests were made, and the trouble was traced to about a dozen party-line subscribers' internal installations, and was found to be due to the extraordinary atmospheric conditions, a very sudden change of temperature having caused a certain class of walls to "sweat" very considerably, soaking the office wires in the building.

The installations which suffered most were those where the inside wiring was fairly old, and the rubber covering partially perished. Twelve subscribers' offices had to be re-wired.

A very peculiar effect of the atmospheric conditions was noticed on the platform of the town railway station. That portion of the platform underneath the roof was "sweating" to such an extent that porters were busy sweeping large pools of water off it, whilst the part of the platform which was unsheltered was perfectly dry.

TELEPHONE IMPROVEMENTS IN AUSTRALIA.

Telephony has received a letter from a correspondent in Melbourne, New South Wales, a telephone man, in which he gives some interesting information concerning telephone improvements in that city. JOHN HESKETH, whom he mentions, will be remembered as the famous expert who participated in the electrical and telephone congress at the World's Fair at St. Louis in 1904. Among other things the correspondent writes:

"Further information concerning the programme of improvements of the Melbourne metropolitan telephone system, which is to accompany the introduction of the measured rates system, has been given out by Mr. HESKETH, the chief electrical adviser of the Central Postal department, by permission of the Postmaster-General. Mr. HESKETH, more than any other man in the public service, is responsible for the conversion, first of the Postmaster-General next of the Government, and finally of the Commonwealth Parliament, to the substitution for the present flat, or unlimited, service rates of a system of measured rates or toll charges. Alongside his work for the Commonwealth as a whole, Mr. HESKETH has been making preparations for a regeneration of the extremely unsatisfactory and defective telephone service rendered in Melbourne and suburbs, and when it was resolved last year to expand the General Post Office by building a new permanent wing, he was successful in inducing the Postmaster-General to seize the opportunity for introducing reforms which will within the next few years result in a complete metamorphosis of the metropolitan telephone system. These reforms involve the expenditure of £250,000, at the rate of about £50,000 a year, during the next five years. As a preliminary, 7,000 new telephones for the existing subscribers are on order, and will be installed as fast as they can be delivered. The grievances of the suburban exchanges are to be met by action which will in a few months cause the removal of many disabilities under which subscribers outside Melbourne proper are labouring. This action involves the erection of a large number of lines between branch exchanges and the central exchange. Malvern and Hawthorn subscribers, whose local exchanges are much congested, will be amongst the first to benefit. The metallic circuit is to be introduced in districts where the lines are subject to much interference.

"It has been announced that the annual rate for Melbourne, Sydney, Adelaide and Brisbane, covering 2,000 free calls, will be £5 for an exclusive line. To many this has conveyed the idea that the rate applied only to Melbourne proper and the heart of the other capitals, and did not cover the suburban exchanges. Mr. HESKETH dissipated this notion. 'The rate of £5 a year for an exclusive line,' he said, 'applies to the whole of the metropolitan networks. By metropolitan networks we mean the area embraced in a circle around the General Post Office with a radius of ten miles. Anybody within that circle must pay at the rate of £5 a year for an exclusive line.'

"There is now great activity in the Victorian electrical branch of the Post Office department with regard to the changes now in progress, Messrs. JENVEY and T. HOWARD, the principal officials in charge of local details, having been working at high pressure for some weeks in order to keep pace with the directions of the Postmaster-General and the central administration."

TELEPHONE WOMEN.

VIII.—AGNES ST. CLAIR JOHNSON.

MISS AGNES ST. CLAIR JOHNSON, Clerk-in-Charge at Edinburgh, counts her service to telephony from 1881. In that year she entered the service of the pioneer Scottish Telephone Company, which had in February, 1880, introduced the telephone to Edinburgh. Now at the head of one of the newest and most complete exchanges of the Company, with a staff of over 50, serving 7,350 stations, she was at first one of four operators who conducted the original exchange in St. Andrew Square. She recalls with some amusement the primitive arrangements of it. There, subscribers were

rung up by a weird apparatus something of the nature of a foot bellows worked by a large pedal, and subscriber asked for subscriber by name, the operator having to learn the names and their corresponding numbers by rote.

The Scottish Telephone Company gave way to the United Telephone Company, which in turn lost its identity in amalgamation, and our own National Telephone Company carried on the work of extension and improvement. Miss JOHNSON has witnessed the vicissitudes and present triumph of this public service and saw the opening of various exchanges in the city and in Leith until, ultimately, under her own *regimé*, the final work was crowned by the conversion of the city systems to underground working, the adoption of common battery equipment, and the centralisation of the whole operating and administrative staffs in the present extensive and admirably equipped buildings.

A feature in these buildings with which Miss JOHNSON is particularly identified is the dining-room and the necessary offices,

decisions of a wide experience. Miss JOHNSON's interests outside the Company lie in Church work, where she lends disinterested service in choir and Sunday school.

IX.—KATE FOTHERBY.

KATE FOTHERBY entered the Company's service at Leeds in the early part of the year 1892 as Operator. The operating staff at that time numbered about twenty, with five exchanges in the area. Miss FOTHERBY's abilities met with early recognition; she was promoted to Supervisor within three years of entering the Company's service, and was subsequently promoted to Clerk-in-Charge of the Central Exchange in 1900, which position she now holds.

During her term of service the subscribers have increased from 900 to over 4,000, with 6,076 stations, and there are now 65 operators, with five supervisors, in the Leeds Central Exchange.

In addition to the central, there are fifteen sub-exchanges, an



AGNES ST. CLAIR JOHNSON

where the operators may have daily an ample and excellent two-course dinner at a charge of 3d. each, rising only on two days a week to 3½d., a result which other districts with a larger patronage and no better fare find it difficult to equal.

Miss JOHNSON was born in Edinburgh, but she lived for some years and was educated in the country. She is peculiarly fitted in character and temperament for her position in a large exchange. Patience, firmness and good sense in no common degree, added to the almost "uncanny" intuition of the Scot, have enabled her to bring her staff to that high standard required by their work. She is in the best sense of the term a very womanly woman, capable withal of the firmness of conviction which is the basis of a quick and just decision. If at times sternly just, that fact but accentuates the worth of her praise or blame and none knows better than she the educative value of both. She sets a high ideal for her staff, exemplifying it herself, with the result that those under her esteem her, and those who work with her value her opinions as the mature



KATE FOTHERBY.

increase of ten, with 2,733 subscribers, three having over 300 subscribers each, all under Miss FOTHERBY's supervision.

Many changes have taken place in the staff and exchange equipment during Miss FOTHERBY's service. The old switchboards (indicator system) still remain, but have been improved, and of course greatly extended during this period. Quite recently a new central battery equipment for 800 party lines has been installed, filling the switchroom to its utmost capacity, and to provide for future requirements new premises have been acquired for an additional City Exchange.

Miss FOTHERBY is a strong advocate of systematic training of operators prior to their entering the switchroom, and her wishes in this direction are likely to become an accomplished fact in the near future by the establishment of a training school in this centre.

Miss FOTHERBY is a typical telephone woman—enthusiastic, energetic, and courteous and a good disciplinarian. She is thoroughly popular with her staff and proud of their work, with the natural sequence of good results.

The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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VOL. II.]

JANUARY, 1908.

[No. 22.]

THE MEASURED RATE DISCUSSION.

THE discussion on the question of measured rates *v.* flat rates still continues to occupy space in a few newspapers and time at Chamber of Commerce meetings. The reasoned arguments of the POSTMASTER-GENERAL and of the PRESIDENT of the National Telephone Company, which, in answer to the Memorial of the Association of Chambers of Commerce, have set forth very fully and clearly the case for measured rates, seem to have convinced the greater portion of business public opinion in the country of the soundness of the principles on which the measured rate tariff is based. Several Chambers of Commerce, indeed, have publicly stated their agreement with the correctness of the principle, while reserving their opinion on the actual figures of the tariff. This is precisely the conclusion which one would expect any reasonable business man to arrive at after a careful examination of the facts in the case. That payment in proportion to service rendered in a sound business principle no business man will dispute, and this principle is the basis of the measured rate tariff.

Although by the great majority of those who at first opposed the measured rate scheme it is now accepted as a reasonable and proper scheme, there are still a few who cling tenaciously to the flat rate and defend in every possible way the position of the large user who wants unlimited use of a rapidly growing service at a strictly limited rate. The methods by which this defence of the big user's present bargain are conducted are interesting, because reasons are always more interesting than assertions. One of the principal arguments of the opposition is that the National Company has made a profit on flat rates; therefore, why change? This quite ignores the point that the measured rate tariff lowers the rate to many users. It is a very powerful argument, however, because nowadays many people think it sinful for a commercial concern to work at a profit—according to the Socialistic idea all businesses ought to be either in the Bankruptcy Court or in the hands of the Municipalities.

Another very powerful argument is to say that all references to American conditions are ridiculous and to quote apocryphal figures of Continental rates. With some of these we deal in an article below. Why it should be "ridiculous" to mention the fact that the telephone service has developed prodigiously under measured rates in America, and "serious" to understate the rates on the Continent by 50 to 75 per cent. is a little difficult to understand—if you have a sense of humour. Another pro-flat rate authority compares telephone service to office accommodation, quite ignoring the fact that office accommodation is usually a fixed quantity, whereas the telephone user's demand on the service is a varying quantity. This ingenious comparison may very well be used, though, as an argument for measured rates, as "office accommodation" varies all the way from the single small room in a back street up to an entire building, and telephone accommodation varies all the way from a party line station up to a private branch exchange completely equipping an entire building.

Some of the provincial newspapers also supply most interesting reasons and arguments, though it must be admitted that not a few newspaper articles lack that temperate and judicial tone one prefers to associate with leaders of public opinion. One prominent journal, for example, heads an article on the measured rate question "The Telephone Folly," having progressed to this elegant title from one a little less graceful, "The Telephone Squeeze." Another says that telephone officials are suffering from "curious delusions," calls the measured rate a "retrograde system" and advises "small tradesmen and suchlike folk" to dispense with the telephone! Still another, probably the most serious journal in the kingdom next to *The Times*, prints the statement that the capital cost of a city telephone system is nearer £5 than £6, so that the small subscriber pays the whole cost of his installation in a year! This outdoes even the famous municipal systems which were to be built for £18 per subscriber.

When the smoke and dust of this extraordinary discussion, with its volleys of errors and delusions, shall have cleared away, it will perhaps have educated the public in two highly important features of the telephone business—first, that it is essentially a message business, and not an instrument hiring business; and second, that only by treating it as a message business can the service be widely developed and made highly efficient. The discussion, even with all the regrettably inaccurate figures of foreign rates and curious comparisons and errors circulated by the advocates of flat rates, is welcome, because it enables the correct view of the telephone business to be thoroughly expounded. Every discussion must have two sides, and in the end truth, reason and common sense must prevail. No reform was ever accomplished without opposition and abuse. We are now in the warm period of opposition and abuse, but a year or two hence people who review the subject will wonder that so much objection should have been made to the application of a common-sense business principle to a great public service.

TELEPHONE SERVICE ON THE CONTINENT.

A STRIKING feature of the measured rate discussion is the extraordinary amount of misinformation regarding telephone rates and service on the Continent which has been circulated by those who have placed themselves in opposition to the most valuable

reform yet attempted in British telephony. Although there is authentic information regarding Continental telephone rates in the numerous Telephone Inquiry blue books, and it should be no difficult matter for a Secretary of a British Chamber of Commerce to obtain accurate information from abroad even if it were not easily available at home, which it is, the country has been circularised with a statement containing purely imaginary figures of telephone rates in Sweden, Germany, France and Belgium. This statement, being signed by the Secretary of a Chamber of Commerce, is readily accepted by the average reader and by the newspaper editor, with the result that although a sort of qualification was prefixed to the original statement the next stage naturally is positive statements in the newspapers to the effect that in Germany unlimited service of high efficiency is supplied for £5 and in France for £5 12s. The facts are quite different, but everyone knows that a false statement, once given a fair start in the Press, is never overtaken by prosaic fact—encumbered, as facts usually are, by such *impedimenta* as details and reasons.

In Germany there are both flat and measured rates, the tariff in both cases being graduated according to the size of the system. The maximum flat rate is £9, and the rate of £5, quoted in the Chamber of Commerce circular as if it applied to the whole of Germany, applies only to places having under 100 subscribers. In France there is no such rate as £5 12s. for unlimited service. The rate in Paris is £16, which, taking the cost of labour and the size of the area into consideration, is relatively dearer than the London rate of £17. In Lyons the rate is £12, which is 20 per cent. higher than the rate in Manchester, Liverpool and Birmingham. The Chamber of Commerce statement was put forth in such a way as to imply that in Germany and France the Government supplied highly efficient unlimited service at extremely low rates. This implication has been transmuted into positive statements of fact in various newspaper columns.

As to the service in Germany we get an interesting sidelight from the article on telephone operators, extracted from a German review, which we print in another column. Frequent reference is made to the "telephone miseries" of Berlin. It is well known that the telephone service of Berlin has been in a state of confusion for some years past, owing to the gradual reconstruction of the system. There have been several debates in the Reichstag and long newspaper discussion on the inefficiency of the Berlin service. As viewed from Dundee, the German telephone service is found to be both highly efficient and wonderfully cheap, but on the spot the users of it term it "telephone misery." Where are we to turn for guidance amid such conflicting views? Is Dundee better informed on Berlin conditions than Berlin, or can Berlin be believed to know its own business?

Not much is said in the circular on the sins of telephony in this country of the superior efficiency of the French telephone service; this is fortunate, because it is notorious that the Paris telephone service has long been in a state of chaos, and Paris is the only place in France having a telephone system of any size. Our daily newspapers have frequently allowed their Paris correspondents to tell us of the disorganised state of the French Post Office in general and of the Paris telephone system in particular. It is public knowledge also that for several years past there has existed in Paris an association of

telephone subscribers, formed for the express purpose of bringing pressure to bear on the French Post Office in favour of the adoption of modern methods of working the telephone service. This association has finally been so far successful that after much hesitation the French Administration has decided to adopt the common battery system and to reorganise the telephone service completely, separating its management from that of the telegraphs.

Viewed in the cold light of actual facts the telephone services of Germany and France display neither the high efficiency nor the astonishing cheapness with which they have been clothed by the Dundee circular. In the last issue of the JOURNAL we showed that Belgium could boast neither of rates nor of character of plant and service which could be held up as object lessons worthy of imitation by this country. If telephone conditions in the principal Continental countries be investigated a little more closely it will be found that the Continent of Europe is the last part of the world to go to for examples of correct telephone practice, either as regards business methods or as regards plant and systems of working. The rates on the Continent have in general been founded on single wire overhead working, and as with the growth of the systems the rates have either become unprofitable or yielded an extremely small margin of profit the improvement of the plant has been put off year after year until it has in many cases become necessary to make a complete reconstruction of the plant under the most disadvantageous conditions. Inefficiency of service inevitably results, and inefficient telephone service is the rule in the principal Continental countries instead of the exception, as our home critics would have the public believe. The effect of carrying on the telephone business with an antiquated plant and under an antiquated tariff—having all sorts of extra charges for instruments, installation of lines, metallic circuits, mileage, night calls, and so on—has naturally been to restrict development and to limit the usefulness of the telephone service to the public in general. The public telephone is hard to find in most Continental towns; the hotel branch exchange is non-existent; the residence telephone is a rarity. There is far more in the telephone business than the mere figure of the flat rate, even when that is correctly stated. The British public gets much greater value for the money it spends on the telephone service than the public of most Continental countries.

KELVIN.

THE death of Lord KELVIN removes from our midst the foremost man of science of our time. It was the permissibly proud boast of the National Telephone Company and its progenitors, "The Telephone Company" and "The United Telephone Company," to have retained Lord KELVIN as their scientific consultant from the commencement, and it was the special privilege of several members of our staff to have come into personal contact with him, either in his class at Glasgow University or in submarine cable factories. He was frequently an honoured guest at our annual dinner, where he was always sure of an enthusiastic welcome. At those festivals it would have been regarded as a misfortune if he were not called upon to address the assembly, and his breezy remarks were immensely enjoyed by all present. Those who were present on the occasion when, at the invitation of the Company, Lord KELVIN unveiled the FARADAY memorial

at Barnsbury, will recall with grateful pleasure that venerable figure, and the simple, though enthusiastic, language in which he then dwelt upon FARADAY'S noble life and work. Lord KELVIN had the advantage of seeing BELL'S early forms of magneto telephone at Philadelphia in 1876, and it is a somewhat curious fact that in his innocent enthusiasm he came perilously near to wrecking the Bell patent in this country by a cursory description which he gave to the members of the British Association at Glasgow in that year.

The writer was privileged to serve under Lord KELVIN many years ago, and like all who knew him, can testify to the fact that there was a conspicuous gentleness and a notable absence of asperity in him which marked him as one of Nature's gentlemen. No student in the Natural Philosophy class at Glasgow, and no member of his staff, ever feared to appeal to him for instruction and advice, nor did he ever appeal in vain. Lord KELVIN'S name will go down to posterity in conjunction with those of his great prototypes, NEWTON and FARADAY, for whom he had a veneration amounting almost to hero worship, and whom he so closely resembled in all that goes to ennoble the human mind

T. FLETCHER.

NOTICES.

REPRODUCTIONS of the portraits of Sir CUTHBERT QUILTER and Messrs. S. J. GODDARD, F. D. WATSON, J. C. CHAMBERS, T. FLETCHER and W. J. GRAY, which have appeared in the JOURNAL can now be obtained on art sunk-plates, price 6d. That of Mr. PERKINS is on order. The earlier portraits are still obtainable.

Reading cases with cords for holding twelve numbers of the JOURNAL can be obtained, price 9d.; and cloth binding cases, neatly lettered, for binding Vol. I, price 1s. 6d.

The Committee are prepared to repurchase a limited number of copies of the April, 1906, issue at 6d.

HIC ET UBIQUE.

AN American reader in renewing his subscription makes the following gratifying observations on the JOURNAL:—

It is one of the few journals that I read carefully from cover to cover, and it is the best possible evidence to us in the United States who are interested in telephony that the British Telephone Service is advancing by leaps and bounds.

No doubt the NATIONAL TELEPHONE JOURNAL is thoroughly appreciated by the men for whom it was originally published, but it may be pleasing to you to hear me say that it is equally appreciated and valued in the United States.

ACCORDING to *London Opinion*, "Telephone subscribers on the 'message rate' plan will be interested in the admission recently made by a U. T. Co.'s official that the method of recording calls was not infallible. Most of us have had a lurking suspicion of that for some years."

We don't think up-to-date telephone subscribers will be very interested in the remarks of officials of the United Telephone Company, which has been defunct some thirteen or fourteen years.

A CORRESPONDENT sends us the following:—

The enlightened town of Brighton still holds a few benighted individuals. In the course of their visits our inspectors come across some curious cases, one of them the other day finding a lady subscriber very much alarmed at the buzzing noise in the instrument. The good lady complained that she was so terribly frightened of the instrument as it made such an unearthly noise. As a matter of fact, the receiver was lying on the ground tunelessly responding to the busy-back in the exchange, while the lady herself was endeavouring to hear out of the mouthpiece of the transmitter.

AMERICAN telephone journals often contain paragraphs upon the ridiculous and impossible tasks which are given by ignorant subscribers to enquiry clerks at exchanges, but they are capped by a true story from Cardiff of a trunk call in which the calling subscriber tried to get in communication with a constable by giving the exchange the number on his helmet as his telephone number.

"THE MUCH-ABUSED TELEPHONE GIRL."

Translated by W. H. GUNSTON.

THE *Zeitschrift für Schwachstromtechnik* quotes the following article by MARGARETE PICK in a German *Woman's Review*:—

"Mankind continually resists its own soul, and since culture has existed it has struggled for and against its progress. In the conflict for and against new technical developments the subscribers to telephone systems take part from time to time, and especially those in Berlin just at present. A perfect hail of official regulations pours into all offices; nervous subscribers get into a most unspeakable condition at the instruments, and even strong-minded ones become nervous. They curse and storm; but the operator at the exchange must be an angel of patience, and take all whence it comes. If she does not, then at once the most absurd consequences result. Not the new conditions (to which, of course, both parties—operator and subscriber—must first accustom themselves) are to blame, but it is again the woman who is unfit, and—'It would be better if the State relied more upon male assistants' is the cry.

"God be thanked, the scapegoat is found who is to blame for the telephone miseries of Berlin. Once again woman can be grumbled at as fit for nothing, and in this manner the spleen which is aroused is worked off; but are there really people so naive as to suppose that with male operators in the exchanges the conditions would be bettered? The patience of a woman *versus* the temper of a man! If in this transition period male operators were supplied for the service, so many actions in respect of insult to officials would arise that the Berlin courts would never get through them in a century. Has anyone ever heard of a business woman amongst those who abuse the operators? No; it is always the choleric, hot-tempered lords of creation whose strained patience finds relief in insulting words. It is therefore as clear as day that in a wordy duel between two men the acme of injury would be reached, and it is a pity that no actual example can be brought forward, as from experience men are no improvement on women in this respect." (We are not altogether able to agree with the German writer. Setting aside the famous lawsuit in Paris, we know from experience that some of the most impatient and unreasonable subscribers are ladies, who cannot or will not believe the statements of operators that lines are "engaged" and, if they do not actually abuse them, sometimes come perilously near doing so.—*Ed.*, "N. T. J.")

"At the debates in the Reichstag on the telephone miseries of Berlin, Mr. SYDOW, the Under-Secretary of State, said that the introduction of a new system would require some patience, as the operators had to instruct themselves in it and to go through a course of training. In addition, they were short of operators, so that 800 new ones had to be installed in Berlin. The old system would no longer be retained, as it was dangerous to health and quite a number of operators had been rendered permanently unfit for work by it.

"This is sufficient reason, we suppose, to bring in an amendment by which the operators should be discharged on account of the new conditions! What male official, we should like to know, would silently ruin his health, without complaint, without petition, for his calling? . . .

"The call for men as operators arises largely from the supposition that they have greater endurance and are quicker of perception; two properties which only exist in the imagination of the crowd. Woman is both more tenacious and more adaptable; this she has shown for centuries and since, some decades ago, she adopted various business callings, it has been conceded on all sides. Man with his logical and slow manner of thinking (especially the German), does not adapt himself to novelty as does the more impressionable and quick-thinking woman, who accepts and applies it without query.

"The boy breaks a toy in order to see what it is like inside; the man takes to pieces a clockwork article in order to find out how it is put together, and how it goes. Woman, placed in front of a machine, and having had its application explained to her, will straightway make use of it; what is in many cases judged to be indifference is really an important quality in an official confronted with a new apparatus, and is the quickest way of adapting oneself to any technical alteration in a service. Because woman has this quality she

can for certain work, as in the case of the Berlin telephone service, never to be replaced by men. Just the reverse of what the subscribers promise themselves from the change would happen; the men would work more slowly and more impatiently, and there would be no end to the lawsuits."

THE STOMBAUGH GUY ANCHOR.

Communicated by MESSRS. W. N. MATTHEWS & BRO.

THROUGH the courtesy of the Telephony Publishing Company, of Chicago, Ill., U.S.A., the article written by Mr. MAGNALL on his tests of the Stombaugh guy anchor has been brought to our attention. Owing to the many misleading statements it contains, we hope to have your permission to reply to his article through the columns of your paper, and to point out to Mr. MAGNALL and your readers the discrepancies in the report, which, if allowed to go unchallenged, might do much harm to us and to the fame of the Stombaugh guy anchor.

In the first place we wish to call attention to the fact that Mr. MAGNALL has used our *list prices* as a basis for his cost, without taking into consideration the liberal discounts that are deducted. The proper corrections of his figures would bring the cost down considerably. For instance, in figuring the cost of our 6-inch anchor with 5/8-inch round rod, Mr. MAGNALL's report puts this down at 9s. 6d. This is his cost for the anchor installed. Our figures after deducting the discounts would be 5s. We show below a comparison of his and our method of obtaining these totals:—

MR. MAGNALL'S COST.	OUR COST.
9s. 2 1/2d. cost of anchor.	4s. 6d. cost of anchor.
2 1/2d. cost of labour.	3 1/2d. cost of labour.
9s. 6d. total cost.	1 1/2d. cost of freight.
	1d. cost of wrench with first 100 anchors.
	5s. total cost.

Comparisons of the figures of the 10-inch anchor would be as follows:—

MR. MAGNALL'S COST.	OUR COST.
46s. 10 1/2d. cost of anchor.	22s. 6d. cost of anchor.
6 1/2d. cost of labour.	6 1/2d. cost of labour.
47s. 6d. total cost.	7 1/2d. cost of freight.
	23s. 8d. total cost.

These figures show an overcharge of 23s. 10d.

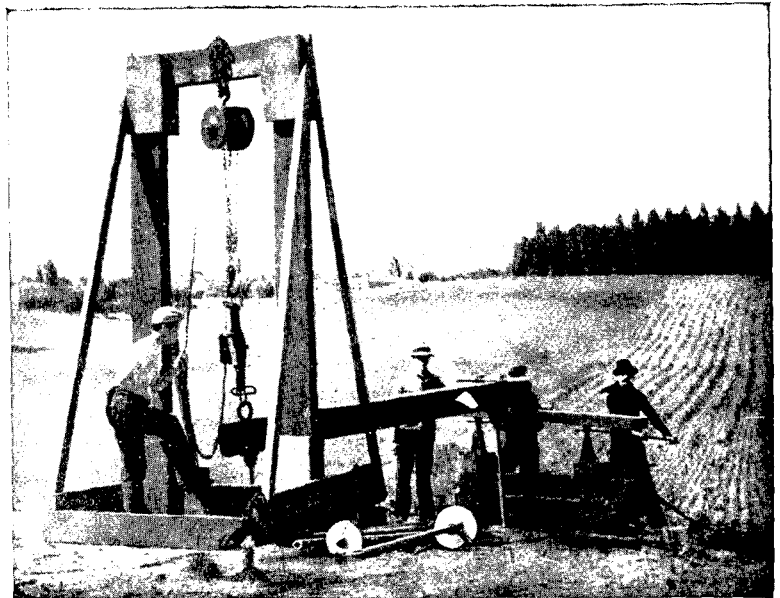
Mr. MAGNALL in his report says that he was compelled to report against their use by the National Company for the following reason:—"They are far more costly than the rod now in use." The above figures will no doubt account for this fault (?). He further states, "They are not applicable generally for use in this country. In towns we are compelled to place our stays in corners and against walls, and in the country we have to place them close to fences, and therefore we are unable to use the handle of the wrench."

If city ordinances prohibit the installation of guy rods or anchors in the ground, this, of course, it is not possible for us to overcome, and is therefore not to be considered. In regard to the matter of placing Stombaugh guy anchors close to fences, we feel sure that Mr. MAGNALL has not seen our latest wrench, which is so constructed that the handles may be removed and the anchor turned in by the use of an ordinary Stilson wrench. We know of a number of instances where this has been done with great saving of time and labour in the United States.

Mr. MAGNALL says further, "The present standard rod and block are superior in holding power when properly fixed, and there is not the slightest reason why they should not be properly fixed in all cases." We have never claimed that the Stombaugh guy anchor could be made to hold as much as the rod and block in all cases, as we know full well that it is possible to dig a hole deep enough and make your block or dead man big enough to withstand enormous strains—strains far greater than the largest Stombaugh guy anchor is designed to hold. We do claim, however, that for the ordinary run of anchorage, such as is needed by telephone, telegraph, street railways and electric light companies, that the Stombaugh guy anchor will hold their strains and will save greatly

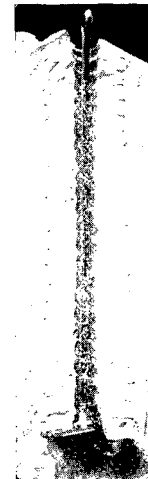
and more than its cost in the item of labour. We think that this is well proven by the fact that since 1899, when this anchor was first placed on the market, we have sold over 500,000 of them, and we have yet to hear of their failure to hold through any fault of the anchor.

Stombaugh guy anchors are approved and used extensively by such engineering firms as Westinghouse, Church, Kerr & Co., and



THE APPARATUS USED BY PROF. CARPENTER IN HIS TESTS OF THE STOMBAUGH GUY ANCHOR.

J. G. White & Co. The Engineering Department of the American Telephone & Telegraph Company have approved them, and they are used in large quantities by the various Bell Telephone Companies owned by this corporation. Mr. MAGNALL states in his report that "Although the results obtained are not so satisfactory as those mentioned in the illustrated catalogue, these Stombaugh guy anchors have a remarkable holding power and prove the advantage of being able to get hold of undisturbed ground."



SHOWING THE PATH OF A STOMBAUGH IN MODELING CLAY, ONE-HALF HAS BEEN CAREFULLY REMOVED

This refers to the tests made by Professor R. C. CARPENTER who has charge of the experimental engineering department of Sibley College of Cornell University, Ithaca, N.Y. Professor CARPENTER bases his reports on 70 odd tests that he made in all kinds of soil in and around Ithaca. The apparatus is shown in the accompanying photograph. Professor CARPENTER occupies a foremost position among American electrical and mechanical engineers. He has

obtained and held his position by using care in his experimental work to see that his statements are absolutely correct when he subscribes his signature to them. We do not wish it to be understood that we are criticising Mr. MAGNALL'S tests, as his method is perhaps the best that could be devised for the purpose and is in all respects practically the same as that used by Professor CARPENTER, the only difference being that Professor CARPENTER was more exhaustive in his search for data and followed carefully the instructions furnished him by the manufacturer. As Mr. MAGNALL'S tests were made without our knowledge, we do not know that he was able to get the results from the anchor he tested that he would be able to get later with more experience in their use. No matter how simple a device may be, it is natural to suppose that experience will show the best way of using it, and directions based upon experience would tend to produce better results.

Stombaugh guy anchors can be furnished the consumer in England at practically the same cost that they are sold in the United States. This point being equal we feel that if given a good opportunity they can demonstrate their economic value to British users as well as they have to American.

In closing we wish to point out a fact which curiously is often overlooked, that Stombaugh guy anchors are not practical where the ground contains rocky formation which would obstruct the path of the helix as it enters the ground. We notice that the time of installation of one of the 10-inch anchors mentioned in Mr. MAGNALL'S report was greatly lengthened by the effort to install the anchor in the ground where rocky formation occurred.

[We append Mr. MAGNALL'S comments on the above communication.—*Ed. "N. T. J."*]

With reference to Messrs. W. N. Matthews & Bro.'s letter dated Nov. 21, 1907:—One is pleased to have the privilege of replying to such a courteous criticism, and I take the earliest opportunity of disclaiming the slightest intention to minimise the general value of the guy anchor, or to do anything which might be construed as harmful to the manufacturers.

My report was based simply and solely upon the value of the guy anchor as directly applied to the use and requirements of the National Telephone Company.

The prices quoted in my report were taken from Messrs. Matthews & Bro.'s illustrated catalogue which makes no reference to "liberal" discounts. The price list merely states "subject to discount" and in view of a qualification so intangible and indefinite, I submit it was not unreasonable to adopt for the purpose of calculation the precise figures quoted in the price list.

If such discount is intended to be on a "liberal" scale and to thus materially affect the net prices, I think the price list should be more specific, as this would be obviously the simplest and most direct course to avoid any results which can be regarded as misleading.

Taking, however, Messrs. Matthews & Bro.'s own figure of 23s. 8d., the 10-inch anchor costs 17s. 10⁷/₅d. more than the 8-foot rod now used by the National Telephone Company.

There is a vast difference in the outside telephone construction work in this country as compared with the United States, for the simple reason that here the Telephone Company have no compulsory wayleave powers.

The result is that in cities and towns all the poles are situated on private property, and in the country districts either on well-defined roads or across cultivated land, and in all cases, subject to the conditions and restrictions imposed by the wayleave grantor who, perhaps not unnaturally, fails to regard the Company's engineering conditions and general convenience as the primary consideration. Consequently, it is not always possible for the Company to fix posts and stays in the positions most suitable from an engineering standpoint, and for this reason I incline to the conviction that the guy anchor is not suitable for general use by the Telephone Company in this country.

I am quite prepared to admit that for the ordinary run of anchorage the guy anchor will do what is claimed for it, but having conceded this, I think I need only point out that the rod now in use by the National Telephone Company has a greater holding power and costs less.

With regard to the holding power of the guy anchor, I am

sure Professor CARPENTER'S experience will justly command the interest and respect of all concerned in the subject. I can only say that the figures obtained by myself were the result of careful observations, using a well-pivotted lever and dead weights for drawing out the anchor, and I abide by the results thus obtained.

On referring to the cuts or drawings, both in the illustrated catalogue and the one sent with Messrs. Matthews & Bro.'s letter, the timbers used by Professor CARPENTER present the appearance of pressing down on the ground he is trying to lift. If this were really so then it would follow that he is testing the breaking strain of the anchor and not the actual holding power of the ground with a given helix.

THE PURSUIT OF HOBBIES.

By GEO. COLQUHOUN, *Edinburgh.*

ALTHOUGH not strictly speaking a telephonic subject, the above cannot fail to be of interest, especially to the younger members of the Company, and also to a large portion of the clerical staff, to whom the heavy theoretical articles in the JOURNAL are more or less incomprehensible. What then are the benefits to the individual and the Company consequent on the pursuit of a hobby? There are two great principles in life—one is to think, the other to act, and anything that calls for the exercise of those principles has a correspondingly beneficial effect on the mind. The law of evolution applies to the intellectual side of nature as well as to the physical. By constant exercise our faculties reach a higher state of perfection. The mere act of thinking enlarges our powers of conception, and forces us to use our ingenuity if we are to follow up the abstract principle of thinking by the more practical one of acting.

As a rule the tendency is to engage in something entirely different from that in which we are engaged during the day. Consequently, a hobby is really a pastime, but how much more elevating and beneficial to the follower than the over-indulgence in modern so-called pastimes. Each member of the community should, of course, aspire to possess a healthy mind in a healthy body, but we are very much inclined to develop the latter to the neglect of the former. HERBERT SPENCER once revenged himself on a young man who had beaten him at billiards by remarking that such proficiency was evidence of a misspent youth.

There should be practically no difficulty in each individual choosing a hobby, as there is probably no one of average education who can deny that there exists within them an impelling force that tends to guide their energies towards certain ideals. Art, literature, science on the one hand, and carpentry and other mechanical pursuits on the other have each their votaries, who feel, when engaged in their different hobbies, to be in congenial surroundings.

We may not be able to explain it, but the fact remains that we are attracted to certain fields of activity, in which we find real pleasure, and it is this activity that braces the mind, keeping it clear and alert, and responsive to newer influences. Let the hobby be anything, so long as it forces us to use our intelligence towards the fulfilment of some ideal.

There is little mental exercise involved in watching football or cricket match, and yet much of the spare time of the workers of this country is taken up following with enthusiasm the fortunes of local clubs, and in factory, warehouse and office it is a never-failing source of discussion.

Having endeavoured to point out the benefit to the individual by this development of the mind, it seems unnecessary to add that such wise use of our spare time must also better fit us for our ordinary duties. Perhaps it would be a good thing if members of the Company who have indulged in hobbies would contribute short articles to the JOURNAL, describing the good they have derived, thereby impressing on all readers the pleasure, satisfaction and increased knowledge consequent on the contemplation of subjects that are really worth studying.

THE annual dinner in connection with the Engineering Department of the Post Office will be held on Tuesday, Feb. 18, 1908, at the Grand Hotel, Trafalgar Square, W.C.

EDUCATE THE PUBLIC.

By THOMAS JUSTIN, *Chief Contract Clerk, Nottingham.*

"FAMILIARITY breeds contempt," is a well-known saying, and there is nothing in which it is more evident than in connection with the telephone. Every day we see it in the indifference and apathy displayed by members of the public in many ways in those who contemplate becoming users of the service, and in those who do not. The indifference to the vast superiority of telephonic over every other means of communication is truly surprising. If we could only get the public to *think* of it and to realise the tremendous facilities and possibilities offered by the telephone, the contract officer's task would be one, not so much of arguing as getting agreements signed.

We often hear people saying how convenient the trams and omnibuses are, how they save time and boot leather, and how convenient they are on a wet day. Do they ever think that the money they spend on trams would amply cover the cost of telephone service. They have very hazy ideas concerning cost. Do they know that by spending on telephone service what they spend on tram and cab fares they could save the bustling and worry of journeying about town, save getting wet and catching colds and such ills, and save the time for other matters, getting two days' work into one, *easily*, by simply becoming users of the telephone service. When people go out it should be for fresh air and health, not for travelling in badly ventilated trams and omnibuses. Yes, the telephone can be used to *avoid the rough work*. Contract officers, get the people to *see* this. It does away with a lot of letter writing, and saves the time spent in writing them; little matters forgotten can readily be set right without the trouble and loss of time of a special journey. Just think what the telephone saves in *time*. Contract officers, *you* think of it and get the public to think too.

Is it still a question of cost? Well, here is Miss Snodgrass who writes about twelve letters and six postcards on an average each week and spends not less than 3s. per week on car fares. This amounts to over £11 per year. She could do it all by telephone, saving £3 or £4 a year, as well as wear and tear of body and mind, clothing and boot leather.

What about the old-fashioned grocer, Jones, at the corner? Is anyone so blind as he? There is talk of him going bankrupt. No wonder, half of his old-time customers became telephone users. and as Jones was not on, and, as he said himself, "wouldn't go on for nothing," they went to Mr. Quick, who has been on for some years.

What about the big firm of Large & Company, Limited? They are progressives. Last half-year they paid a dividend of 12 per cent. I notice the telephone men are making some alterations there. Yes, Large's are going in for the new system of private branch exchange, the most up-to-date thing in telephony—*simply ideal*. They know it will cost a few pounds a year more. But they are wise in their generation. They are *business men*. They know it will *put money in their pockets*, prove a paying investment without risk—so many hours of time saved daily is money gained. How much do Large's pay on postage now? £3 a week. It used to be £5. The telephone is saving them £100 a year in this department.

If people would *only reason and examine themselves* financially, there would be fewer failures. Many business people go on blindly doing the same as their fathers or predecessors did. They never think of being before the other man and forestalling him; in short, of being *quicker* than he is. The telephone is the thing for *that*. They would find by its use they could save money in addition to increasing their profits. They can't see this at first. They have a good shop connection. *How did they obtain it?* The first thing, of course, was to get and open a shop. Then to develop the trade. Why should they not have a telephone business connection? The first essential is, of course, to get a telephone; then they can develop their telephone connection in the same way as they did that of their shop. Nurse and foster the one telephone customer they have until they get two. These two will tell their friends about it, and so on. That's the way it's done. Get them to do it and see how well it works.

Everybody will eventually be telephone subscribers. They are coming on daily in hundreds, but there are so many still to come.

There's that eminently successful lace manufacturing firm of Cripps & Company. Have they kept to making their lace on John Heathcoat's old style of machine? No, of course not; as the machine was improved they discarded the old one and got in the improved one. It cost something, of course, to throw away the old one and buy the new one, but where would they be now if they had not done that. They could not compete with other big firms, in fact, they could do no business at all probably. At one time, years ago, had they a telephone? No, but they have now and have had it for a long time. They could *no more do without it* than without their machines. But have they the same one as they had at first? No, certainly not. They did with their telephones what they did with their business and lace machines—kept it up-to-date, and now they are on the ideal private branch exchange system.

Why let the public stick in the rut. Educate them to the present-day advantages of the telephone, its lightning speed and its unerring accuracy. Calculate and show them what they are *losing* by not being on the telephone. Do it. They'll be surprised.

Why is it that America is so far advanced in telephone use? Well, because they have educated themselves by their go-ahead business instincts to the necessity of it in the business and in the home. Let us telephone men by our go-aheadness educate the stolid British public.

THE LOCAL OFFICE CLERK.

By W. ALEX. WILLIAMS, *Maidenhead.*

MUCH has been written regarding the training and work of our technical staffs, and the Clerical Department, so far as the district office is, concerned has also come in for a goodly share of discussion, but up to the present the local office staff has hardly been commented on. Consequently, I venture to offer a few remarks, albeit with some diffidence, about a branch of the staff whose members are in no small degree responsible for the maintenance of good relations between the Company and the public generally.

The local office clerk is the man of whom I wish to speak, and if, as I have heard it expressed, the office is the hub of our system, this clerk may be aptly likened to the bearings of the hub of his own particular centre; for unless he is fully alive to the responsibilities of his position the staff wheel will not work with the smooth regularity so necessary to the satisfactory management of a centre.

Unlike the clerks in a district office the local office clerk has an endless variety of work to worry through at practically one and the same time. Take for an illustration a day's work in a local office controlling, roughly, 750 stations.

On reaching the office our clerk opens the letters and after reading them through in case any urgent trouble requires immediate attention, places them ready for entry by his junior. He then rings through to each of seven exchanges for the result of the operator's morning test—perhaps the office in question is a little out of the ordinary, as the whole fault system is under our clerk's control and having got his list of troubles, real and sometimes a few imaginary—these latter to appear in the "O.K." summary column later on—the faults must be passed on to the inspectors and linemen, any additional assistance required from the gangs being arranged for with the local manager.

Letters are entered by now and must be attached to the correspondence relative to the various matters, all papers finished with being filed.

Being cash day our clerk must check out and write up his pay roll, assemble his petty cash vouchers and write up the No. 5 return, cash the wages check, pay out wages and expenses and then balance up, let us hope to the proverbial farthing. In a centre with four or five gangs working this is pretty well a day's work, but time must be found to clear the day's correspondence—sometimes no light matter—receipt accounts, and bank all cash received, besides writing up the necessary fault records and clearing up any completed works orders.

All day long touch has to be kept with the fault work, involving a pretty frequent use of the office telephone.

Should the junior be out of the office the call office demands attention, and in the satisfactory management of this considerable time and tact is necessary. To all who have call office duty to perform I would say, speaking from many years' experience, be polite and obliging, but be firm and stick to the regulations or you may lose not only your caller's good opinion, but cash as well.

In some offices the clerk has to deal with the stores, and this, though a very substantial addition to his office work, gives him a fine opportunity to become familiar with the various materials, apparatus and tools in use by our Company.

I have only mentioned a few of the principal points of local office work; innumerable others constantly claim attention, and I doubt if any conscientious local office clerk, who takes a thoroughly intelligent interest and pride in the well-being of his centre, has a spare moment throughout the day.

If the clerk in a local office takes an interest beyond his own sphere and honestly does his best to gain experience of the technical work, is it too much to hope that in time we may find him in the management ranks, holding a position for which I venture to suggest no better training ground exists than the local office of a busy centre?

If the reading of this article throws some light on the work of those whose position at first sight appears somewhat insignificant, and at the same time helps to inspire these men to strive for higher spheres of work by showing their position in a more favourable light, and as a stepping stone to higher grades in the service, my purpose in writing it is amply served.

"I CAN'T AFFORD IT."

By A. H. BOOKER, *Contract Officer, Sheffield.*

SUBURBAN BUSINESS DISTRICT.

"You want to expand your trade, do you not? The best way of doing this is to lessen as much as possible the trouble which present and prospective customers have in doing business with you.

"You cannot do better than adopt such a rapid and convenient means of communication as the telephone service has proved to be.

"Your shop is in a district where residence telephones are plentiful and increasing and you have no doubt found, nowadays, that, other things being equal, orders take that channel which gives least trouble to the customer. In such cases people are apt to forget past services in favour of up-to-date methods. You say you send your boy round or call yourself upon your customers twice a day? How much quicker and easier to receive their commands per telephone, which is *always* available. No waiting to do, so easy to remedy any omission due to forgetfulness.

"I agree with you that *new* business is best obtained by a personal interview. I am demonstrating that now; but you would find it a powerful argument if you could say that you are always at your customers' service by telephone. The time saved from a round of calls would almost represent the cost of telephone service, besides leaving you at liberty to open up new ground.

"You think the number of calls is too small. Well you would find that your service was mostly inwards, which is free, and your outward calls, at about $\frac{3}{4}$ d. each, represent a cheaper way of sending messages than any other means of communication you can suggest. The postcard is usually too slow and is only a one-way message. The telephone is instantaneous and gives message and reply together. Suppose you are asked for something you don't stock? You can have it at once from your wholesaler. The market is always at your command enabling you to take full advantage of a change of prices.

Finally, you know how important it is to keep in line with competitors—ahead, if possible. The telephone service will place you in the front rank, and shortly you will say "I cannot afford to do without it."

By BRIAN GIFFORD, *Contract Officer, Hastings.*

BUSINESS.

"THAT very excuse is in itself sufficient to prove that 'you can't afford to be without it,'" for if translated into plainer English

it simply means that you are not making sufficient money. The obvious reply is, open the doors of commerce to admit the increase, seize every opportunity, and as a line of a very old song says, "Don't let your chances like sunbeams pass you by." There is no easier, quicker, more direct or impressive method of introducing your business or wares to the public, whether customers or not, than by a call through the telephone; it at once makes known that you are within call at any moment, which is of considerable importance nowadays. No printed matter can possibly compare with a verbal communication, for in the latter you can directly allude to the particular articles that appeal to the individual, thereby often effecting a quick sale, or failing that, you may prevail upon them to give you a call to inspect a certain line that is of interest to them. And a thousand and one other ways occur in which business may be increased by its use, and so create the means to "afford" it and show a handsome profit.

There is another excuse commonly made which is just as shallow and devoid of truth or reason, viz., "I have no use for it." This excuse is sheer trifling; a man may just as well tell me he has no use for the tongue in his mouth. Every man (and I was going to say woman, but sometimes second thoughts are best) that has a tongue and the power of speech has a use for the telephone. It is simply a matter of whether he will make the best of the power he has. It is our privilege as men with this power, combined with the knowledge and conviction, to educate everyone that is not yet convinced of its value, and consequently not aware of what they are daily losing; it is a money-making device in the hands of up-to-date men.

What a field we have before us!

One more word. It is not enough when we have prevailed upon a man to sign a contract; we should follow him up by an occasional reminder that he has a mighty lever for business within his walls. We should see that he does not let it rust out, but gets all he can out of it. I have always made a practice of giving a new subscriber one or two friendly calls just to encourage him to "*use it now he's got it.*" The adoption of this course serves a double purpose; the subscriber recognises your interest in his telephonic welfare and the Company recognise the calls, and I am convinced that if this idea were more generally adopted we should find notices-to-cess would visibly diminish, the service would greatly increase, and such excuses as "Can't afford it," "No use for it," etc., would rarely if ever be heard.

LEEDS TELEPHONE SOCIETY.

DEBATE ON THE JOURNAL.

THE third paper of the session was read on Nov. 20 by Mr. C. H. Crawshaw, on "THE TELEPHONE JOURNAL, Current Number." Mr. W. R. Senior, the Contractor Manager, was in the chair.

Mr. Crawshaw gave a very interesting paper, and in the subsequent discussion there was made evident a general feeling that whilst the paper, printing and illustrations were all that could be desired, the JOURNAL could be made more interesting and useful by the introduction of columns devoted to

- (1) Exchange and Mart.
- (2) Answers to Correspondents.
- (3) Latest Telephone Patents.
- (4) Games, such as Chess, Draughts, etc.
- (5) Hobbies.
- (6) Ladies' Column.

Further it was considered that the size of the JOURNAL was inconvenient, and could be advantageously altered to magazine size, say, 9½ inches by 6½ inches.

It was also noted with regret that in the Leeds district the circulation had considerably decreased, and it was felt that if some of the foregoing suggestions were introduced the attractions of the JOURNAL would be enhanced and the sale augmented. There were 38 members present, and ten entered into the discussion.

THE HOTEL TELEPHONE.

TRAVELLERS in comparatively small cities often wonder how the local hotel can afford to install a telephone system with a station in each room.

"It is really a profitable matter," said a well-known hotel man. "The telephone system saves the landlord money. It not only reduces the number of bell boys, but in a small hotel it makes operators unnecessary, since the clerks are able to operate the switchboard besides attending to their own duties."

The hotel boy no longer climbs the stairs nor ascends in the elevator to pound on the door of the guest who wishes to take an early train. The telephone answers the purpose and does it more successfully, for the average man is so imbued with the importance of the telephone as a business agent that its ringing brings him out of bed promptly.—*Telephony.*

THE FACTS AND FIGURES OF DUNDEE.

(*Air: Bonnie Dundee.*)

The Dundee Chamber of Commerce has been bombarding the other Chambers of Commerce and the Press with extraordinary statements of the telephone tariffs in foreign countries obtained from Heaven knows what source—possibly from some statistician with a misdirected sense of humour. (See pp. 188, 193 and 209 of the JOURNAL.)

IN the Chamber of Commerce Dundee-wards they spoke
 "The new measured service—hech, Sirs!—is nae joke
 And we've gleaned information from over the sea
 That the puir heathen bodies get telephones free.
Chor.—So get up your figures and get up your facts
 And deluge the country with pamphlets and tracts
 Oh, expansive, elastic, and fanciful-free
 Are the facts and the figures o' bonnie Dundee."
 "The thrice happy German who pays his five pounds
 Can fill his transmitter with guttural sounds,
 And the Frenchman, for less than six pounds—the disgrace!
 Can bellow 'Allô' till he's black in the face.
Chor.—So get up your figures, etc."
 "And the shivering Russ on the Nevsky Prospekt
 For a handful of roubles, Exchange will connect;
 And on India's coral—unlike our own—Strand,
 For some annas and pice you've the service at hand.
Chor.—So get up your figures, etc."
 "If the Swede and the Magyar, the Finn and the Turk
 And the Czech and the Switzer make telephones work
 For diminutive sums such as Two pounds or three,
 Why canna the canny auld toon o' Dundee?
Chor.—So get up your figures, etc."
 "But supposing they don't?" says the cold voice of Fact,
 "But pay ten to sixteen pounds—to be more exact?"
 "Well, who's to know better; our Press is quite free,
 And sucks in its wisdom from bonnie Dundee.
Chor.—So get up your figures, etc." W. H. G.

THE PRIVATE BRANCH EXCHANGE.

BY E. E. STOCKENS, *District Manager, Aberdeen.*

WHEN one gets to close grips with this system and realises what the advantages to large users really are, the introduction in every large business centre throughout the country should be very rapid, so rapid, in fact, that in many large industrial towns a limit to the extension of the private branch exchange system cannot be gauged with any degree of certainty.

At present we are only commencing this work. The results being satisfactory so far, will bring others to see the advantages to be gained and will lead to a continuous expansion. As to the private branch exchange being a success, the thoroughly practical equipment and the very effective method of working place this beyond question, and this important development in telephony requires no apologist.

In looking at it from a subscriber's point of view, what are the advantages? Each private branch exchange equipment supplied is specially designed to meet the requirements of the individual subscriber's business. The system is elastic in every sense of the word. The number of junctions from the Company's exchange to the subscriber's switchboard being determined by the number of calls passing over the junctions and the number of stations that may require to speak over the junctions at the same time, the subscriber can be certain of receiving all inward calls. The importance of this is not always seen by large users; hardly ever when first pointed out. The busy subscriber thinks that so long as he is able to get his calls through, there is no more to be said. How would these subscribers view the matter if they only knew that important business was going past them? That much important business is lost through blocked lines and lost calls is undeniable.

Another great feature is that the inward calls are put through to the subscriber's particular department or office dealing with the particular business. Here you have a great time-saver. The

people with whom the business is being done get the advantage, and the smoothness and celerity of handling calls in this way reflect much credit on the business methods of the firm adopting such a system.

Then there is the first-class intercommunication between the various departments, a most valuable by-product of the well-designed private branch exchange.

In order to judge the possibilities of this class of business it is as well to look at the various commercial undertakings which have recently adopted it here. The list includes:

- | | |
|-------------------------|------------------------------------|
| Hotels. | Grain merchants. |
| Hydropathics. | Fish merchants. |
| Wholesale druggists. | Coal merchants. |
| Drapers. | Agricultural supply manufacturers. |
| Banks. | Parish councils. |
| Newspapers. | Engineers and shipbuilders. |
| Chemical manufacturers. | Wine and spirit merchants. |
| Warehousemen. | Wholesale grocers. |
| Iron merchants. | Shipping companies. |
| Cab proprietors. | Jam manufacturers. |

This covers a wide range of trade and business, and there are many that will add to this list directly the facts are brought before them.

Just now there appears to be some agitation against the measured rates, which, of course, includes private branch exchange service, but it is to be noted that a large proportion of the speakers who have dealt with the subject admit that the principle is sound and is the fair way to charge for such a service as the telephone. Their chief difficulty is that they object to losing a bargain, and the flat rate for large users is a great bargain.

The weight of the evidence on the question of rates is against the continuance of the flat rate system, the private branch exchange measured service giving a much improved service of far greater all-round efficiency; it is of far greater value to the subscriber and therefore cannot be compared with a flat rate service as regards cost.

MEASURED RATE COMMENT.

RECENTLY both the General Post Office and the National Telephone Company have issued documents in defence of the measured service method of charging telephone subscribers. The Chambers of Commerce are hard to convince because they don't want to be convinced. If they were reasonable they would have abandoned their indictment of the measured service principle early in September, for in our first issue of that month we showed them quite clearly where they were wrong. It is not ignorance, therefore, but selfishness which prompts them to persist in demanding the continuance of the unlimited service tariff on the old scale. Their members are nearly all big users of the telephone, and the present agitation is a campaign in favour of the big user at the expense of the small. It seems to us that the Chambers of Commerce have gone the wrong way to work. They would have done better to accept the measured service principle, and to concentrate their guns on the actual tariff proposed. They can never hope to prove that the unlimited service system is right and the other wrong, and each time they make the attempt they simply court defeat. But if they want to beat prices down it is open to them to argue that the tariffs promulgated under the admittedly equitable measured service system are too high, either in initial fixed charge or in the running charge for calls.

The National Telephone Company in its reply to the memorial of the Associated Chambers of Commerce points out that, if its present unlimited service subscribers were charged the new measured rates, the majority would save on their telephone bills, and only a minority would be paying more. One can quite understand this, but it does not follow that the Company would not be getting a bigger profit on the new basis from their old subscribers. Indeed, we may hazard a guess that the Company has erred on the safe side in framing the new tariff, for it remarks that "the charges for measured service are readily capable of a reduction if experience should justify such a course." As for the General Post Office, it is fairly certain that their rates are fixed on a basis that precludes the possibility of working at a loss. That is only to be expected, commercial prudence dictates it.—*The Electrical Times.*



BRISTOL OPERATORS' TELEPHONE SOCIETY.

CORRESPONDENCE.

TEST SETS.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

With reference to my recent article on "Test Sets" I regret that a slight error has crept in which needs correction. No. 5 test box is designed for showing up *disconnections only*. Short circuits and earths will be shown up in the ordinary working of the exchange.

Dec. 12, 1907.

P. T. WOOD.

CORRESPONDENCE CLASSES.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

I beg to suggest that the marks allotted to the questions in the current "N" (Advanced Mathematics) Course, be increased, or, what would be better still, assigned in proportion to the value of the question. Take Paper 4 for instance, it seems absurd to my mind, to give 2 marks to Question 1, which question can be done mentally, and to give 2 marks each to Questions 8, 9 and 10 which are rather difficult problems. If question 1 is worth 2 marks, surely Nos. 8, 9 and 10 are worth more! There are no doubt many members of this course who will agree with me.

Gloster 14 Dec. 1907

E. W. SMART.

A LIMERICK SURPRISE.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

It may be of interest to other districts to hear of a surprise that was given to a defaulting subscriber whose outstanding had been considered hopeless, and had, in fact, been written off about two years. One of the district office staff observed the subscriber's name published as receiving a large sum as the winner of a "limerick competition" in one of the weekly papers, and the collector was instructed to wait upon him. He was naturally surprised, stating that he expected the Company had forgotten all about the matter long ago, but cleared the account.

Hull, Dec. 18.

GEO. W. CAMPBELL.

DICTATING AND TYPING.

TO THE EDITOR OF THE NATIONAL TELEPHONE JOURNAL.

With reference to Mr. Crowther's letter in the December issue, I beg to say that circumstances changed considerably between the months of February and October of this year, but this is a matter into which I do not wish to enter now.

My purpose in writing to the JOURNAL was to show that it was possible to type direct from dictation without any appreciable delay to the dictator, and in actual practice this system has been found highly satisfactory and is still in use here.

Glasgow, Dec. 18, 1907.

J. R. THYNE.

WHAT THE COMPANY IS DOING.

DURING December exchanges have been opened by the National Telephone Company at Moore (Warrington district), Kely (Fife), Iver and Markyate (Herts and Beds), Earl Shilton (Leicester), Selling (Canterbury), Torpoint (Plymouth), Coed Talon Trefnant and Llanwnda (Chester and North Wales), Cropthorne (Gloucester), Buncrana (Belfast), Hook and Odiham (Hants and Dorset), Portsoy (Aberdeen), Mottram (Oldham), Downham Market (Norwich), Fahan (Belfast), Amble (Newcastle), and Horncean (Portsmouth), bringing the total number now open up to 1,415; 2,885 stations were added during November, making a grand total of 443,348.

LONDON.—Private branch exchanges have been arranged for on the latest principle at the following:—Beaufort Club, Soho Square; Union Club, Trafalgar Square; Illustrated London News and Sketch, Ltd., Strand; and at Buckingham Gate Residential Flats (four junctions, 34 stations). Two additional junctions and 28 stations have also been ordered in connection with the Earles Hotel, Grosvenor Street.

ABINGDON.—A lead-covered aerial cable has been run on poles from the exchange to the railway station.

EGHAM.—One mile of composite underground cable has been drawn in at Englefield Green.

SLOUGH.—*Underground Work*—One and a half miles of composite cable have been drawn in.

LIVERPOOL.—The following orders have been obtained during the month for private branch exchanges:—Nine orders, 44 junctions, 68 extensions, 136,250 calls.

Corn Exchange Removal. In connection with a compulsory removal of a standard at the Corn Exchange, Liverpool, six Western Electric distribution boxes have been fixed to various buildings in the neighbourhood of the Corn Exchange. This method of distribution has been tried on other buildings in Liverpool and is proving to be both an economical and satisfactory way of wiring without the aid of standards.

In connection with the transfer of subscribers in the neighbourhood of Keizers and Manesty's Lane from the Central into the Royal Exchange, 1,052 yards of 50-pair cable and 802 yards of 600-pair cable were drawn in during last month.

BARRY.—Permission has been received from the Engineer-in-Chief for the fitting of an additional 200-line switchboard section at the Barry Dock Exchange, and the work will be proceeded with at once.

Seven new underground junctions have been completed between Barry Dock and Cardiff; also nine underground junctions between Penarth and Cardiff. These include one direct junction in each case from the respective towns to the Cardiff Post Office.

IPSWICH.—Sanction has been given to extend the present underground system, involving the laying of 1 mile 532 yards of duct and 2 miles 37 yards of cable of various sizes.

PAISLEY.—The work in connection with the transferring from the overhead earth circuit system to underground metallic circuit system was completed on Nov. 30. There were 11 miles 831 yards of underground cable drawn in, 1,013 yards overhead cable erected, and 196 miles 488 yards overhead open wire run. There were 55 distributing poles, 39 manholes and 43 brick chambers. In connection with this work a new 2,000 line test frame has been fitted in the test room, and a new party line section equipped in three positions, each for 90 subscribers, has been fitted in the switchroom. An estimate has been passed and approved for providing a new local section, equipped in three positions, each for 90 subscribers, and this it is expected to have to hand about the beginning of February.

NOTTINGHAM.—A large number of outstanding underground jobs have been completed during the last few weeks, and approximately some 2,000 miles of wire have been added to the Company's books. Several other very large jobs in connection with junction work, etc., are also approaching completion. The builders are now putting the roof on the extension building in Nottingham.

CORK.—A 200-pair armoured cable has been laid across the south channel of the River Lee, connecting about 1½ miles of 100-pair cable with the exchange.

Estimates have been sanctioned, and the work in connection with the opening of the following exchanges is being pushed on:—Cloyne and Glanmire (co. Cork), Ennis (co. Clare) and Carrick-on-Suir (co. Tipperary).

TORQUAY.—The contractors have completed their portion of the underground extension; the drawing in of cables is now proceeding.

EXETER.—*Underground Work.*—Additional cables, 585 yards in length, have been drawn in during the month.

GREENOCK.—Since the beginning of November 1 mile 1,037 yards of underground cable has been drawn in to existing duct in the west end of Greenock. The cables vary in size from 15-pair to 600-pair.

NEWS OF THE STAFF.

Miss M. E. CAMPBELL, Senior Supervisor, Swansea Exchange, has been appointed Clerk-in-Charge.

Mr. C. S. WESTON, Cash Clerk, Swansea, who has been transferred to Bristol in a similar capacity, was, prior to leaving, presented with a handsome Chippendale cabinet and lamp as a mark of the esteem in which he is held by the members of the staff. The presentation was made by the District Manager.

Mr. R. A. SKINNER has been made Cost Clerk, Swansea, vice Mr. C. S. Weston.

Mr. J. A. THOMAS, Cash Book Clerk, Cardiff, has been promoted to be Outstandings Clerk at Swansea. He has been presented by the Cardiff district office with a silver-mounted ebony walking stick engraved with his monogram.

Miss ALICE WELSH, Senior Operator, Cardiff, has resigned from the Company's service. Prior to leaving she was presented by the operating staff with an electro-plated hot water jug and an electro-plated marmalade jar, with best wishes for her future welfare.

Mr. WICKER, Contract Officer, Cardiff, was the recipient of a pig-skin catalogue case, suitably inscribed, on the occasion of his leaving the Company's service to take up another post.

Miss B. BENTLEY, Senior Operator, at Leeds Central Exchange, has been obliged to resign her position, after a service of eight years, on account of ill-health. The operating and switchroom inspecting staff presented her with a dressing case.

Mr. J. AKED, Darlington, has been promoted from Inspector-in-Charge to be Local Manager. Darlington centre now includes the Darlington, Bishop Auckland and Durham areas.

Mr. W. J. BLACOW, Inspector, Lancaster, has been transferred to Manchester as Instrument Inspector. Prior to leaving Lancaster he was presented with a silver cigarette case and pipe and case by the the members of the Lancaster staff.

Mr. W. J. SMITH, Wayleave Officer, Brighton, is being transferred to Guildford in a similar capacity.

Miss A. ROACH, Hull, has been transferred from Senior Operator to Supervisor.

Mr. H. W. DIDDLE was presented with a smoking cabinet as a mark of esteem by the members of the Nottingham local and district office staffs on the occasion of his leaving to take up an important post in Birmingham.

Mr. CHARLES M. CARTER, Wages Analysis Clerk in the Glasgow district office has been appointed Assistant Switchroom Manager.

The girl clerks on the Glasgow district office staff have now been transferred to their spacious new office in the Anchor Line Building, under the charge of Miss JAMIESON.

Mr. S. C. SMITH, late District Manager of Ipswich, was presented with a handsome barometer by the whole staff prior to his transfer to the District Managership of Maidstone. The presentation was made by the Chief Clerk, Mr. W. J. Sawyer.

Miss M. DAY, who has been on the staff of the Brighton Central Exchange for some years, has resigned, owing to indifferent health, and the central staff have presented her with a gold brooch.

Miss S. BAIRD, Junior Operator at the Royal Exchange, Liverpool, resigned on Dec. 6, owing to ill-health, and her colleagues presented her with a gold brooch.

Mr. R. G. REYNOLDS, Contract Officer, Hull, has been appointed to a similar position at Grimsby.

London Traffic Department—Promotions and Transfers:

Miss C. GREGORY, Supervisor, London Wall, has been promoted to be Senior Supervisor-in-Charge, Streatham. On leaving London Wall she was presented with a gold bangle by the staff.

Miss L. CLEAVE, Operator, Hoop, has been promoted to be Supervisor, London Wall.

Miss A. BUCKWELL, on leaving Gerrard Exchange to take up her position as Clerk-in-Charge, Westminster, was presented by the Gerrard staff with a handsome silver-backed mirror and silver and tortoise-shell comb as a token of regard.

MARRIAGES.

Miss M. K. SCRIVENS, operator, Cheltenham, has resigned the service in view of her marriage.

Mr. J. W. CHEETHAM, Cost Clerk, Sheffield, was presented with a handsome clock and the good wishes of the staff on the occasion of his marriage on Oct. 29 last.

Miss M. E. PALLANT, Senior Operator, Colchester Exchange, who recently left the Company to be married, after seven years' service, was presented by the local staff with a handsome table lamp.

Mr. A. T. PAICE, of the Western contract office, London, was presented by his colleagues with an inkstand and clock combined on the occasion of his marriage on Dec. 1.

London Traffic Department.—Resigning to be married:

Miss A. McCOMBE, Senior Supervisor-in-Charge, Streatham, on leaving the service on Dec. 19 on account of her approaching marriage, was presented with a silver-mounted salad bowl by friends among the staff.

Miss E. BODGENOR, Operator, Richmond, on leaving to be married on Dec. 12, was presented by the staff with a handsome dinner service.

Miss B. EATTEN, Operator at the Hop Exchange, on leaving to be married, was presented with an electro-plated cruet and pair of specimen glasses by her colleagues.

Miss B. BOVEY, an Operator at the same exchange, was presented with a dinner service, cheese dish and salad bowl.

Miss BERTHA JACOBS, Supervisor, Hop Exchange, who left to be married in September, was presented by the staff with a Japanese tea service and bread boat, besides which she received a number of other presents from individual members.

OBITUARY.

It is with very much regret that we have to announce the death of Foreman JOHN KINLAN, of Dublin, on Nov. 14, as the result of being run over by a cyclist on the country road near Bray. The Countess of Aberdeen, who was passing in a motor at the time, rendered timely assistance, and was the means of having the cyclists arrested. Some sensation was caused by the fact that two police constables of the Dublin Metropolitan Force were shortly after the inquest taken into custody and charged in connection with the affair. Very much sympathy is extended to the widow who is left with two children. Poor Kinlan was laid to rest on Sunday at Glasnevin Cemetery, and a large number of the staff attended and placed a beautiful wreath on the grave as a token of regret.

We regret to report that Miss RUTH SELBY, of the Coil Winding Department, Nottingham Factory, died of typhoid fever on Dec. 9. Her fellow employees sent a wreath as a token of sympathy.

STAFF GATHERINGS AND SPORTS.

Accrington.—The Accrington staff held their fifth annual dance at the Liberal Club Assembly Rooms on Wednesday, Dec. 11. About 130 guests were present including members from the Blackburn and Oldham staffs. Everyone was delighted with the proceedings, which were of an enjoyable nature.

Ashton-under-Lyne.—The staff held their first annual whist drive and dance at the Warrington Club on Nov. 30. There were about 120 present, and amongst the number were contingents from the Oldham and Stockport staffs. Twenty-three tables were under requisition for whist. Dancing commenced at 9.30 p.m. and was conducted until 11.30 p.m., Mr. W. T. Leeming acting as M.C. Mr. A. Pugh, District Manager, was present, and at the close distributed the prizes to those successful in the whist drive. The gentlemen's first prize fell to Mr. Blackburn of the Oldham staff, and the ladies' first prize to Mrs. Newton.

Birmingham.—At a general meeting of the staff it was arranged that the annual staff ball should take place at the Grand Hotel, Birmingham, on Saturday, Feb. 22, 1908. Members of the staff from adjoining districts are specially invited. Tickets (including refreshments, gentlemen 5s., ladies 4s.) may be obtained from the secretary, Mr. H. G. Savage, district office, Newhall Street, Birmingham.

The first whist drive organised by the Birmingham operating staff took place on Nov. 26. Over 200 members and friends took part in what was really a most enjoyable evening. Among those present were Mr. A. E. Cotterell, Mr. E. Williamson, Mr. and Mrs. H. Julius Maclure, Mr. and Mrs. Baldwin. The stewards (Miss Adams, Miss Williams, Miss Poole, Miss Barnett, Miss Hadley, Miss Eades, Miss Borg, Miss Lambert, Miss Hart) were ably assisted by Mr. Piggott as M.C., and Messrs. Allan and Crecroft are to be congratulated on the success of the arrangements. Prizes, eight in number, were awarded to the successful players.

Burnley.—A very successful whist drive and dance was held at Burnley on Dec. 6, over 80 being present. The first part of the evening was devoted to whist, Mrs. Moon and Mr. Callis (Burnley Local Manager) capturing the first prizes. Dancing went on until the breaking up at 2 a.m. Credit is due to Mr. R. Chambers, who made all the necessary arrangements.

Coventry.—Under the auspices of the South Midland telephony society, a very successful whist drive and soiree was held in All Saints Assembly Hall on Nov. 28. There were 40 tables. The M.C.'s were Messrs. W. H. Oliver and E. Hillier. There were four prizes, the winners being Mrs. Pearson (silver back mirror); Miss Westley (lady's belt); Mr. Kirby (silver match box); Mr. Johns (brass inkstand). Dancing was indulged in until 2 a.m.

Edinburgh.—The second whist drive for the season was held on Dec. 11. Mrs. J. L. Magrath presented the prizes to the winners—Miss A. Ferguson, Miss McLauchlan and Mr. W. Chandler. A very enjoyable evening was spent.

The first annual meeting of the recently inaugurated thrift club was held on Dec. 12; 154 members are now enrolled, and the treasurer reported that at Nov. 28 there stood at the credit of members a total sum of £50. The receipts from pass books and the interest which had accrued are being applied towards liquidating the initial stationery debt. The annual dance has been arranged for Wednesday, Jan. 22, to be held in the North British Station Hotel.

Glasgow.—*Staff Dinner.*—It has been arranged that the staff dinner will be held in Messrs. Ferguson & Forrester's rooms, 36, Buchanan Street, on Friday, Feb. 7, 1908, at 7 p.m., when Mr. D. Johnstone Smith, the Local Director, will occupy the chair. The tickets are 4s. 6d. each, and members of the staff wishing to be present should communicate with Mr. J. M. Stewart, Contract Department, Glasgow, who is acting as secretary.

The Annual Staff Dance was held in the Trades' Hall on Dec. 5, when nearly 80 couples were present. A most enjoyable evening was spent.

Leeds.—A successful whist drive in connection with the Leeds athletic club was held on Dec. 11 in the Tennant Hall, Leeds. About 100 members and friends were present. Prizes were won by the following:—Ladies: 1st, Miss Kelsey; 2nd, Miss Kitchen; 3rd, Miss Throup. Gentlemen: 1st, H. W. Walker; 2nd, A. Sanderson; 3rd, A. Sanders. The following artistes kindly contributed to the evening's enjoyment:—Miss Steward (elocutionist), Mr. Holloway (tenor), Mr. Reed (baritone) and Mr. Nicoll (clarinet). Miss K. Fotherby (Clerk-in-Charge, Leeds) presented the prizes to the successful competitors.

London (Eastern).—The first of a series of entertainments organised by the Traffic, Engineer's, Maintenance and Contract Departments of the Eastern division took place at the East Exchange on Dec. 10. The Divisional Engineer, Mr. C. E. Tattersall, presided, supported by Mr. C. Elliott, Metropolitan Engineer, and Mr. J. F. Edmonds, Traffic Manager. An excellent programme of vocal and instrumental music was provided by the concert committee, the items worthy of special mention being the violin solos by Mr. Gadsby and Mr. Penson's always popular comic songs. The contributions of Mesdames Brotherwood, Benson, Enefer, Dudman, Rhetlaw, Mustoe and Knowles, and Messrs. Taylor, McGregor, Rhetlaw and Riches are also worthy of note. Mr. Prescott's recitation of W. W. Jacobs' well-known story, entitled "A Tiger's Skin," was much appreciated. Over 100 members of the staff and friends were present, and it is hoped to arrange for another similar gathering early in the present year.

London (Western).—The western contract office held their second social gathering on Dec. 9. Owing to the sudden change of plans on the part of the London telephone society which necessitated altering the date of several meetings which had been already arranged there was no time for the preparation of the usual paper. The Divisional Contract Agent, however, read and explained to the staff Mr. Franklin's recent reply to the Association of Chambers of Commerce on the subject of "Measured Rates," this being followed by an interesting discussion on tariff rates in general.

Business over, the proceedings were adjourned to the Eustace Miles Restaurant, Chandos Street, where the remainder of the evening was spent in a whist drive, followed by a small dance. Miss Young carried off the ladies' prize, while Mr. Hudspith gained the gentlemen's prize. The gathering was largely attended by the members of various departments.

Middlesbrough.—The members of the staff recreation club held a smoking concert at the "Star & Garter Hotel" on Dec. 13, when the prizes won in connection with the quoit competition were presented to Messrs. C. W. Bloomfield (1st), J. S. Richardson (2nd), G. Kirk (3rd) and T. Hann (4th). An excellent programme of music, recitations, etc., was given, and an enjoyable evening was spent.

Norwich.—On Nov. 26 the members and friends of the Norwich telephone association held a whist drive at the Café Central, the party numbering 46. Eleven tables were set. Eight prizes were offered, five being won by members of the association.

On Dec. 10 the first combined ladies' and gentlemen's whist drive under the auspices of the telephone association took place at the Criterion Restaurant, with pronounced success. Sixty-two members and friends assembled, and fifteen tables were set. Twelve prizes were played for. Amongst the company were members of the Post Office and Norwich Corporation and City Electrical staffs.

South Shields.—A most successful whist drive and dance was held in the Ingham Street Hall, South Shields, on Friday, Nov. 22, 1907. It was attended by the local staff together with a number from Sunderland and some of the staff of the local Post Offices. The ladies' and gentlemen's first prizes were won respectively by Miss Briggs and Mr. Brown, while the second prizes were carried off by Miss Coats and the Local Manager, Mr. W. J. Douglass. After an excellent supper dancing was indulged in until 2 a.m.

Telephone House Swimming Club.—The above club, with Mr. H. C. Gray in the chair, gave their first annual dinner and smoking concert on Saturday, Nov. 23, at "The Horseshoe Hotel," Tottenham Court Road. Between 60 and 70 members and friends were present and spent a most pleasant evening. The dinner was well served and gave every satisfaction, and the concert which followed came as a surprise, for a number of excellent London professionals contributed to the programme and their performances were greatly appreciated. The event proved in all ways an unqualified success.

NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY.

At the special and ordinary monthly meetings of the committee held since our last issue the following grants were made:—

Engineer's Staff—

(a)	..	..	..	..	..	..	..	..	..	£2	10	0
(b)	..	..	..	..	..	..	..	..	..	5	0	0
(c)	..	..	..	..	..	..	..	..	..	3	10	0
(d)	..	..	..	..	..	..	..	..	..	5	0	0
(e)	..	..	..	..	..	..	..	..	..	1	10	0
(f)	Not a case which could be dealt with.											
(g)	..	..	..	..	..	..	..	..	..	5	0	0
(h)	10s. per week for four weeks and 3 0 6											

Traffic Staff—

(a) 15s. per week for four weeks.

Maintenance Staff—

(a) Not considered a case where help was necessary.

Clerical Staff—

(a) £1 12 6

Head Office Stores Staff—

(a) 10s. per week for four weeks and £2 0 0

Donations received—

Mr. W. E. Hart 10 6

LOCAL TELEPHONE SOCIETIES.

Blackburn.—The second meeting of this society was held on Nov. 22, when a paper was read by Mr. Etherington, Chief Electrician, Blackburn, on "Telephone Traffic." The main features dealt with by the author were: Wastage due to Ineffective Calls; Junction Circuits and Junction Operating; Operating of Message and Measured Rate Lines; Recording of Calls; Overloading of Subscribers' Lines, etc. The various points of the lecture was made clear by the aid of some excellent drawings, especially one which showed the wastage of operating labour, etc., due to ineffective calls. The paper was ably criticised by Inspector Hargreaves, and a very fruitful discussion by the members followed. One interesting feature of this meeting was the presence by invitation of 23 of the operators from Blackburn, Burnley, Accrington, Great Harwood and Darwen, who showed very keen interest in the paper and the discussion.

Bolton.—At a meeting of the district staff held on Oct. 29 it was decided to form a telephone society and elect Mr. A. C. Haley, District Manager, as president and Mr. W. Higson as hon. secretary. The committee have arranged the following syllabus for the session:—1907.—Nov. 28: "Standards for Construction of Plant," Mr. A. C. Haley; Dec. 19: "Magnetism," Mr. R. W. Bell. "Call Office and Post Office Fees," Mr. T. I. Fowler. 1908.—Jan. 16: "Induction," Mr. F. Ratcliffe, "Contract Department Working," Mr. H. Higgins; Feb. 20: "Telephone Receivers," Mr. J. T. Hart, "Telephone Transmitters," Mr. W. Higson; March 19: "Measured Rate Fees," Mr. J. Wilson; "The Power Plant," Mr. W. Boccock; April: General meeting.

The first meeting of the society was most successful, 54 members being present, and an enthusiasm evidenced which augurs well for the future. Mr. A. C. Haley gave a short presidential address followed by a greatly appreciated lecture on "Standards for Construction of Plant." A most interesting exposition of the transmission limits as specified by the Post Office agreement was given. By means of a large scale diagram representing local conditions the table of equivalents as applied to the Bolton area was clearly shown. Great interest was taken in the lecture, which was discussed both from an economic and a transmission standpoint.

Birmingham.—The usual monthly meeting took place on Dec. 3, when Mr. F. C. Baldwin (Engineer) read a paper on "Transmission Studies," in which he dealt with various phases of conductivity in aerial wires and underground cable, etc. The paper, which excited much interest, was illustrated by limelight views. Among those present were Mr. E. Williamson, Mr. Young (Derby), Mr. Redhead (Wolverhampton), Mr. Piggott, Mr. Tucker and Mr. Firth.

Birmingham (Operators).—The third meeting of the session was held on Dec. 12, when a paper was given by Mr. L. Creecraft (Observation Officer) on "Observations," the chair being taken by Mr. C. W. Piggott, Traffic Manager. The paper was of a most interesting character and gave the members an opportunity of seeing the results of their own work from an onlooker's point of view, and an insight into how the results were obtained. Various calls, both on magneto and common battery working, were analysed and explained. The paper called forth a good deal of discussion, and several points raised were afterwards explained by the chairman. The meeting closed with a few remarks on "The Necessity of Sampling the Service" by the District Manager, Mr. E. Williamson, who also called for a vote of thanks to the writer of the paper for the trouble he had taken in preparing it. The attendance was very good.

Brighton.—On Dec. 3 Mr. H. Laws Webb lectured to the Brighton Telephone Society at the Hanover Lecture Hall, North Road, on "Publicity and Promotion," the gist of the lecture consisting of illustrations of the best means of advertising, particularly those adopted in America, and the best means of promoting telephone interests generally. The lecture was illustrated by lantern slides.

On Dec. 18 the subject of common battery faults was dealt with by Messrs. Davidson and Jenkins, who in a very illuminating way exemplified their facts with various drawings. They also gave a practical demonstration of various tests.

Cardiff.—The third meeting was held on Dec. 5, 1907, and there was a good attendance. Mr. James, the vice-president, was in the chair. A very interesting paper was read by Mr. Kirk, Chief Clerk, entitled "The Works Order," and in dealing with his paper he clearly showed that he was an authority on this particular subject. He explained the important part the works order played in the Company's business, and how it served to unite all the different departments, and formed the basis of the Company's bookkeeping. He impressed the necessity of care, promptitude and exactness in the making up of and dealing with works orders, and pointed out that now the new measured rates are in force every little delay meant loss of revenue to the Company. In concluding his paper, Mr. Kirk briefly touched on estimating and expenditure, and laid special stress on the importance of combining efficiency with economy. A very lively and interesting discussion followed, in which a large number took part.

Cardiff (Operators).—The monthly meeting was held on Dec. 9, 1907, Mr. W. J. Marsh, Exchange Manager, being in the chair. There were 29 operators present, being 63 per cent. of the available staff, as well as the vice-presidents. A very interesting paper on "Measured Rate and Recording of Calls" was given by the president, Mr. Waite. He explained fully what the measured rate is and how it affects the Company and the subscriber. He invited suggestions on the recording of calls and emphasised the importance of making calls effective and of doing everything possible to make the subscriber realise the value of the telephone.

Cork.—A telephone society has recently been formed here. The opening meeting was held on Nov. 25, when the District Manager, Mr. A. M. Kidd, gave an interesting lecture on "Outside Construction: both Overhead and Underground." There was a large attendance. The next meeting takes place on Dec. 17, when the Chief Inspector, Mr. Roy, will give a paper on "Exchange Construction."

Coventry.—A meeting of the above was held at Priory Row Assembly Rooms on Monday Nov. 18, when Mr. F. Alcock gave a paper on "Line Construction," which evoked a considerable amount of discussion, the following

points being brought out:—Staying and strutting of poles, the use of eave and rafter brackets and wall plates on buildings, and how to get over the difficulty of disfigurement of subscribers' premises, etc. The attendance of members was 24.

Dover.—A telephone society has just been formed here, and has been well taken up by the staff. The first meeting for the season took place in the district office on Dec. 16, a paper being contributed by the District Manager (Mr. C. F. Ashby), who took for his subject "The Telephone and Efficiency." About 95 per cent. of the members attended, and there is every prospect that the society will prove very successful. The chair was taken by Mr. Duerth (Dover Local Manager).

Dublin.—The president, Mr. Percy F. Curral, in opening the session impressed on the members present the necessity for punctuality, good attendance, and the maintenance of interest in the society. The initial paper on "Contracts and Measured Rate" was read by the Contract Manager, Mr. R. J. Bartley, who gave some up-to-date arguments used for securing subscribers. The second meeting, held on Dec. 11, was devoted to a paper on "Instrument Faults," by Mr. F. Gardner, instrument inspector. The paper was very interesting and dealt with the numerous troubles experienced by the inspector. Mr. Gardner was very enthusiastic and quite at home in the subject.

Glasgow.—The opening meeting for the session was held in Professor McLean's Lecture Hall, Technical College, on Oct. 6. After the usual preliminaries had been gone through the chairman called on Mr. F. Douglas Watson, Superintendent for Scotland, who had kindly consented to deliver the opening address. He spoke of the work of the society, and the many advantages which it afforded to the members, passing on from this to deal with the service which the staff renders to the public—a public which is increasing every day—and brought his remarks to a close with words of advice and encouragement to the younger members of the staff. It was evident that Mr. Watson's address was thoroughly appreciated by the members present.

The second meeting of the session was held in the Technical College on Wednesday, Nov. 20. Mr. A. B. Gilbert delivered a paper on "The Value and Application of the Scientific Spirit" in the course of which he pointed out that "rule-of-thumb" methods were now obsolete and that the days of arriving at important conclusions by haphazard, imagination, or guesswork were now past. Illustrations of the gain effected by the application of scientific methods in building construction, etc., were given, being followed up by descriptions of similar methods now employed in laying out telephone line, plant, etc., etc. Reference was made to the saving in hard cash now resulting from scientific investigation, not only in the engineering, but in other branches of the Company's work, electrical, traffic and clerical, and the paper closed with an exhortation to every member of the staff to be "truthseekers" and to be ever on the search for the most efficient and economical methods of carrying out their various duties.

The third meeting was held on Dec. 4, when two papers were submitted. The first, "Some Further Notes on Technical Terms," by Mr. Thos. Pettigrew, dealt with and explained the terms used in telephone and other electrical work, such as electro-magnetic field, frequency, capacity, etc. The apparatus in a complete telephone circuit from the calling to the called subscriber through two exchanges was described. The second, by Mr. J. W. Macdonald, Rental Register Clerk, dealt with "Telephone Accounting," special mention being made of the Cash and Store Departments. The method of bookkeeping in connection with the large number of transactions in both departments was interestingly described. Both papers seemed to be thoroughly appreciated by the members present.

Glasgow (Operators).—The second meeting of the society was held on Nov. 25, when a paper illustrative of the evolution of an operator "From Applicant to Clerk-in-Charge" was read by Mrs. B. M. Peters, Matron of the Glasgow district. There was a large and appreciative audience, and, after the discussion had been closed and questions answered, Mrs. Peters was awarded a cordial vote of thanks. Thereafter the second meeting of the Club was opened and the prizes in the first limerick competition were distributed to the winners. Games were subsequently taken part in, and a vocal and instrumental programme of music, contributed by members of the Club was much enjoyed.

Greenock.—The third meeting of this society was held on Nov. 28, when about 30 members were present. Mr. A. Ramsay Lamb, president, occupied the chair. Mr. J. E. Duncan, Contract Manager, read a paper on "Contract Department Working," and Contract Officers Smith and Grant contributed some notes on their experiences.

Hull.—On Dec. 16 the third meeting of this society took place, with the Chief Clerk (Mr. Robson) in the chair. The paper on the syllabus for this date was one by the Local Manager (Mr. J. T. Tattersall) on "Underground Work Past and Present," but owing to Mr. Tattersall's unavoidable absence this had to be postponed. The Contract Manager (Mr. A. K. Murray) however kindly consented to fill the breach with a paper on "Contract Department Working." This paper proved full of detail, which was followed by a keenly interested audience, several charts being brought into use showing the different duties of the several members of the department and their relations one to the other. Tables showing the relative positions of the various Contract Departments for the last six months (culled from the official returns) caused a feeling of exultation among the staff, showing as they do the district's very favourable position. The card system was also dealt with very minutely, the paper closing with a call to all members of the staff to further the Company's interests—which would incidentally be their own—on every possible occasion. The discussion which followed was very animated, over a dozen members of the society taking part, and the various critics were very effectively answered by the essayist, who received an enthusiastic ovation at the close of the meeting. The tone of this meeting augurs well for the future prosperity of this society.

Isle of Man.—The session was opened on Nov. 1. The District Manager offers a prize for the best paper or lecture. The following is a list of subjects to be taken up during the session:—J. Thompson, "Instrument Faults"; J. Martin,

"Batteries"; A. Smith, "Metallic Circuit Twisting and the Use of Slings, etc."; District Manager, "Sound Waves" (illustrated by phonograph and gramophone); R. Gawne, "Conductivity and Resistance"; E. Cowley, "Office Work and Works Orders"; E. Vick, "Fault Locating"; J. Thompson, "Testing"; District Manager, "Prevention of Faults"; P. Griffiths, "Instrument Inspection"; J. King, "Line Work, Connections, etc."; Chief Clerk, "How the Outside Staff can Help the Office."

Leeds.—Mr. W. D. Scutt gave a very instructive and interesting paper on "Common Battery Working" before this society at its meeting held on Dec. 4. The paper was illustrated by diagrams which were very skillfully explained. Mr. Morten, the president, occupied the chair. A few questions that were asked were answered satisfactorily by Mr. Scutt. The attendance numbered between 50 and 60.

On Dec. 18 a very successful meeting was held, Mr. W. R. Senior, in the absence of the president (Mr. W. V. Morten), occupying the chair. The Chairman referred to the death of Lord Kelvin, and gave a brief synopsis of his career. Seven papers were read, and whilst each was complete in itself, the series practically told the whole story of the inception to completion of telephone service. They were: "How Letters are Dealt With" (Miss Waddington), "How Orders are Obtained" (Mr. J. H. Corlett), "How the Line is Run" (Mr. Fitton), "How the Instrument is Fixed" (Mr. C. W. Halliday), "How Connected to Switchboard" (Mr. Nieman), "How Operating is Done" (Miss Roberts), "How Calls are Booked and Charged" (Mr. Burdett). The readers of the papers were limited to ten minutes each, and all showed exceptional aptitude in their individual efforts. The number present was 53.

Liverpool and Birkenhead.—The second meeting was held on Nov. 21, the president (Mr. T. A. Prout) in the chair. Mr. J. G. Whittle, of the Birkenhead electrical staff read a paper entitled "A visit to Christiania Exchange." Although the lecturer explained he was at the time on holiday and had no idea then that his notes would form the subject of a paper, he had evidently obtained a good deal of accurate and interesting information. He briefly described the plan of the building and showed by lantern slides its general arrangement, also the cord and key and line circuits, illustrating the difference in certain detail from those in use by the Company in this country. The power plant was also described, switchboard cords were specially dealt with; and the exchange equipment of the Wilson liners was noted, these steamships being connected to the Christiania Exchange immediately on arrival there. The discussion was interesting and well maintained.

London.—The second meeting of the session was held on Nov. 25, 120 members being present, representing about 32 per cent. of the total membership. Mr. H. Davis was in the chair. The Chairman having apologised for the absence of the president, called on Mr. P. J. Skinner to read his paper entitled "Hotel Installations and Wiring of Large Buildings." Mr. Skinner had prepared about 30 lantern slides showing the large hotels where telephone installations or private branch exchanges have been fitted. In the discussion which followed Mr. Laws Webb congratulated Mr. Skinner on the able manner in which he had dealt with his subject, at the same time asking a question as to cost. The following gentlemen also took part in the discussion:—Mr. J. R. Gall, Mr. C. Elliott, Mr. W. Pegden, Mr. P. Wood, Mr. Howe, Mr. Dowdall, Mr. Macfarlane and Mr. Newitt.

The third meeting of the session was held on Dec. 2. There were 150 members present, representing about 38 per cent. of the total membership. Mr. L. Harvey Lowe was in the chair. Mr. Herbert Laws Webb gave a most interesting lecture entitled "Publicity and Promotion," showing some 30 to 40 lantern slides, depicting various methods of advertising as adopted in America. A discussion followed in which the following gentlemen took part:—Messrs. W. H. Taylor, W. Bigland, L. Cohen, H. Corner, J. Edmonds, C. B. Clay, W. Dowdall, C. Elliott, and W. V. Pegden. In conclusion a resolution was passed to the effect that the society desired to express their sense of the great loss which they had sustained by the death of their late vice-president, Mr. C. M. Bailey, and also to convey to Mrs. Bailey an expression of their sincere sympathy with her and her family on their bereavement.

London (Southern).—The monthly meeting of the society was held on Nov. 22, the paper being given by Mr. B. B. Johnson on "Notes on Common Battery Power Plant," illustrated by lantern. An interesting discussion followed the reading of the paper, in which several of the members took part. It was again necessary to postpone the general meeting, the attendance at the meeting being affected by the fog which unfortunately prevailed.

London (Western).—A meeting of this society was held on Oct. 31, when Mr. J. H. Stewart read a paper on "Central Battery Instruments." With the aid of some very clear diagrams which the lecturer had prepared, the various working parts of the instruments were fully described and the paper proved most interesting. A discussion followed the reading.

Manchester.—The society decided to begin on new lines this year, and had an opening social evening on Oct. 19 in order to advertise the coming session and also to welcome about 40 members of the Liverpool staff, who paid a visit to Manchester on that date. The function, which was held at the Grotto Cafe, Princess Street, was a great success, notwithstanding that the Liverpoolians beat the Mancunians at football in the afternoon. About 240 sat down to tea, which was well set out and thoroughly enjoyed. Afterwards a variety of entertainments were open in the various rooms, including a photographic exhibition, thanks being due to a number of large photographic firms and amateurs who sent exhibits, a whist drive, concert (where owing to the amount of talent it was hard to select items), and a lantern exhibition at which Mr. Hesketh, manager of the Thornton Pickard Company, Altrincham, and Mr. Hayward, a member of our own staff, kindly showed splendid sets of photographs. Short speeches were delivered in the different rooms by Mr. A. Magnall (president) and Mr. J. Scott (past president) in which they welcomed the visitors. Altogether the evening was an immense success, a striking point being the sociability, which was typically Lancashire. The opening meeting of the session was held on Friday, Oct. 25, when Mr. A. Magnall read a paper entitled "Pages from a Notebook." This was illustrated by a splendid series of lantern slides. The

principal points of the paper were open wire and cable faults, McIntire sleeves and the new earth clip. Mr. Magnall showed that the majority of faults were caused through carelessness and bad workmanship. A practical demonstration of the McIntire sleeve followed and provoked a good discussion, as also did the earth clip.

On Nov. 8 the second paper of the session was read by Mr. C. Spiegelhalter on "Rubber as Applied to Cables." Mr. Spiegelhalter gave a most interesting paper, beginning with the history and cultivation of rubber. He then described the treatment which takes place after the tapping of the trees. From this he went on to the cables, showing why the different layers are put on, and also gave us a series of specimen mixtures showing the constituents of the various compounds. The vulcanising process and the adulterations were explained, and faulty cables were also dealt with, as were the precautions to be taken in laying. Mr. Spiegelhalter brought with him a number of specimens.

On Nov. 22 a paper was read by Mr. John Scott on "Telephony as a Career: its Present and Future Prospects." Such a subject naturally appealing to telephone employees, the paper undoubtedly commanded the interest and attention of those present. Stress was laid upon the extended field of knowledge covered by the subject of telephony and the infectious enthusiasm which is characteristic of telephone workers. Attention was directed to the phenomenal development and application of telephony and the immense strides in technical equipment made during a period of very limited compass; hence the necessity for all who aspire to high positions in the telephone world to apply themselves unceasingly to the study of all that is connected with the subject and its ever-changing phases. A quotation from Major O'Meara's presidential address to the Post Office Institution of Electrical Engineers on Oct. 14 last was especially interesting. Attention was also drawn to the exceedingly able and thoughtful article on "The Human Side of the Engineering Profession," by V. Karapetoff, which was reprinted in the September issue of the JOURNAL. Charts were exhibited showing past development and indicating the estimated staff and other requirements as at given periods in the future.

A paper was read on Dec. 5 by Mr. W. Wilson, B.Sc., on "Sound." The paper was illustrated by the aid of apparatus kindly loaned by the Manchester University authorities. The lecture was very interesting, and a number of questions were asked and discussed.

Newcastle.—The first general meeting of the above was held on Nov. 21 at 7.45 p.m. with Mr. Jackson, Local Manager, in the chair. Mr. A. McEwan read a paper on "The Cashiers Department" dealing with payments and the allocation of accounts in the No. 5 Return, the receipt of cash over the counter, by money order, cheques, etc. A discussion followed in which Mr. E. T. Payne (Chief Clerk), Mr. H. Dent and Mr. Drummond (District Manager) took part. As there was still some time to spare Mr. W. H. Abbott, by request, read a short paper on "the Measured Rate Service."

Norwich.—On Dec. 6 a very interesting illustrated lecture entitled "Publicity and Promotion" was given by Mr. Herbert Laws Webb. Alderman R. G. Bagshaw, Chairman of the Local Board of Directors, was in the chair. A well sustained discussion followed the lecture. Refreshments were kindly provided by the chairman, and the evening closed with vocal and instrumental music.

On Dec. 10 some of the members met at the Café Central for the purpose of hearing the first section of the following subject, which has been arranged in two parts, "The Birth and Life of a Telephone Subscriber." Part I.: The Birth. Part II.: The Life. Short papers on the following subjects were read:—"Getting the Contract" (Contract Officer Bell), "Issuing the Works Order" (J. W. Fairhead, Chief Clerk), "Wayleaving the Route" (H. H. Wigg, Local Manager), "Running the Line" (Foreman W. H. Sampson), "Fitting the Instrument" (Fitter V. J. Holloway), "Connecting the Exchange" (A. J. Stroulger, Test Clerk). An interesting discussion followed the reading of the papers, and a good deal of information was imparted to the various branches of the staff.

Nottingham.—The society is now in thorough working order. On Nov. 8 the president, Mr. A. Coleman, very kindly attended and inaugurated the session with a most interesting speech, which contained a number of useful hints to all members and grades of the staff. The attendance at this meeting was highly satisfactory, reaching over 90 per cent., in addition to which there were several visitors from the Nottingham Factory staff.

Sheffield.—The first meeting of the session was held on Nov. 1, when a paper was given by Mr. E. S. Byng on "Wireless Telegraphy and Telephony," with experiments and lantern slides. There were a large number of members present and the paper was much appreciated, the experiments being very successful.

The second meeting of the present session was held on Nov. 29 last. A paper on "Measured Rate Traffic" was read by Mr. E. J. Johnson, which was illustrated with lantern slides. There were 75 members present.

Swansea.—The third sessional meeting took place on Dec. 16, when an interesting and instructive paper was given by Mr. H. M. Kenworthy on "Maintenance." The subject was dealt with in a most complete manner and a keen discussion ensued. Mr. W. E. Gauntlett (District Manager) occupied the chair.

Swansea (Operators).—The third sessional meeting was held on Dec. 4 when a paper was given by Mr. R. A. Dalzell, the subject being: "Operating: How it should be Taught, and How the Operator's Interest in it should be Maintained." The question of the training of operators was dealt with in a most able and interesting manner by the lecturer, to whom was accorded at the close of the meeting a hearty vote of thanks. The District Manager occupied the chair.

Western (Metropolitan).—A paper on "Outside Wiring" was read by Mr. E. Gallard before this society on Nov. 28. The lecturer dealt with the methods of erecting poles, overhead lines, cables, etc., and showed various diagrams in connection therewith. The paper proved most interesting and a discussion followed the reading of it.

[A few reports are unavoidably held over.]

THE National Telephone Journal

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TELEPHONE MEN.

XXI.—EUSTACE HARE.

EUSTACE HARE was born on Jan. 24, 1866, at Plumstead, Kent, noted chiefly in those days as possessing an ancient church and extensive marshes, within sight and sound of the smoke and roar continually issuing from the great guns of the Arsenal at Woolwich, which were tested within two miles of his home. Educated at a private school, which involved in all a daily walk of eight miles during six years, Mr. HARE began business life in the office of a relative, spending much of his time in the Long Room of the Custom House and in the galleries of the Coal Exchange, occasionally piloting to the Bank and back skippers of brigs, who had thrilling tales to tell of fearful dangers encountered and overcome between the Tyne and the Thames. But even then the telephone cast its shadow before. From his stool Mr. HARE commanded a view of old Monument Yard, and in slack moments would become deeply interested in a certain pole to which men were continually attaching wires, which from a solitary wire grew to a mighty bed. In those days he knew nothing of wayleave difficulties, but wonders now what that bed of wires is like, if it still exists.

On March 19, 1883, he entered the telephone service as Assistant to Mr. ALBERT ANNS, the Accountant of the United Telephone Company at 36, Coleman Street; so that this year he completes 25 years of telephone work. It was under Mr. ANNS' tuition he learnt the rules of bookkeeping and Mr. HARE is of opinion that the careful and thorough training he then received has been of the utmost value to him in later years. At that time the United Telephone Company embraced London and what are now the Southern and Western Provinces, and there can perhaps be no more striking testimony to the growth of the telephone mission than in the fact that, among other duties, Mr. HARE kept the whole of the subscribers' accounts for those provinces: first, second and third notices, new lines, recoveries and removals for all telephoned towns from Norwich to Plymouth. In the year 1890 Mr. ANNS

became Secretary to the National Telephone Company, when it became necessary for him to relinquish the close control over the bookkeeping and district returns he had hitherto exercised; and Mr. HARE was then appointed Chief Clerk of the Accountant's Department, in which post he remained till May, 1893. In September, 1892, was inaugurated the travelling audit under the control of the Secretary which has done so much to unify the methods and bookkeeping arrangements in every centre throughout the country. This work was first entrusted to Mr. S. J. GODDARD, who thus became the pioneer of the travelling audit, and to whom is due the credit of having laid down a sound basis for carrying on the work.

Owing, however, to the rapid growth of the business under Mr. GAINES' new rule it became necessary to strengthen the Head Office management, and in May, 1893, Mr. GODDARD was appointed to assist the General Manager, while Mr. HARE took up the audit reins.

Up to that time he knew nothing of the country north of the Thames, nor what is more to the purpose of the working of a district office, save what could be gleaned from monthly returns, and he learnt two things—the first was that wonderful scenery is to be found above and below the Tweed, and the second, how badly (speaking of fifteen years ago) books could be kept: the more wild the landscape the more rugged seemed the penmanship. At that time Service Instructions were a new thing and conservatism was strong in the land, while the audit was naturally looked upon with suspicion. But so long as the auditor is reasonable and courteous, and fair in his reports, he overcomes every difficulty in the end, and Mr. HARE has the

satisfaction of knowing that he made many friends during his three years' travels, and in addition gained invaluable experience. Soon after his appointment travelling stocktakers were added to his staff, but the work soon proved too heavy for this method, and it was afterwards abandoned.



In May, 1896, the ever-increasing work of the management demanded extra help at Head Office, and Mr. HARE was called upon to relieve Mr. GODDARD of the watch that it is so necessary to keep in a large concern like the National Telephone Company over current expenditure, and a new department was formed called the Statistical Department, composed at first of himself and an assistant. By degrees the scope of the department widened, new rules were originated for controlling expenditure, and the present system gradually evolved, and, while all this has involved considerable work on the district offices, Mr. HARE has continually striven to reduce the office work, the chief example of which, perhaps, has been the recommendation some years ago of the grouping of works orders under various classes of work in place of the more laborious methods of a separate works order for each job. The saving of work in this respect in the Stores Department alone will never be known. As an example also of the varied activities of the Statistical Department, it may not be generally known that in May, 1900, Mr. HARE read the first paper on "Operating" that had up till then been presented at the yearly meetings of the Company's officers; while another favourite subject of his is the training and the welfare of the clerical staffs.

On Dec. 31, 1907, the staff of the Statistical Department numbered ten, and at that date Mr. HARE left its immediate supervision to fill the newly created position of Assistant General Superintendent.

Mr. HARE is a universal favourite, and has earned the warm regard and admiration of his *confrères* by his tact and courtesy. His task during the past few years has been a very difficult one, in having to meet the constant demand from all parts of the United Kingdom for increased expenditure and to determine how to allocate the money to secure to the Company the best possible return from its capital outlay. In this, as in many other matters, he has well deserved the success which has attended his efforts, and it is impossible to overestimate the value to the Company of his loyal and strenuous services.

Mr. HARE says he is no sportsman, inasmuch as, unlike the Englishman generally, if he gets a ball into his hand he does not know what to do with it, and he is reputed not to know the name of a single footballer. He has been nearly drowned three times and to this day he cannot swim; but he is handy with the spade and is devoted to books, while a game of chess is his favourite recreation. He is also an amateur musician, and had the privilege of making one of about 500 voices which took part in the *Te Deum* sung on the steps of St. Paul's Cathedral on the occasion of Her late Majesty's Diamond Jubilee.

NEW EXCHANGE IN JOHANNESBURG.

THE interesting reprint from the *Transvaal Weekly Illustrated* which we give below, records the adoption of the only equitable rate—viz., the measured rate—in yet another part of the globe. It will be remarked from the COLONIAL TREASURER'S speech that subscribers "squeal" because they cannot use the telephone all day for £20 a year; in this country where they have that privilege for £10 a year, they squeal at the bare prospect of *others* being denied unlimited use of the telephone for a given sum, even though their own rate is not disturbed.

The formal opening of the new telephone exchange in Von Brandis Square was one of the most interesting functions witnessed in Johannesburg for some time. Not only did it mark the inauguration of a telephonic system second to none in the whole world, but the interest displayed in the ceremony was such as to strongly testify to the appreciation felt by all sections of the community at the provision of such an excellent institution, which is destined to play a very important part in the commercial and political history of the Transvaal.

The Colonial Treasurer (Mr. H. C. Hull), in declaring the exchange open, said he had been asked by the Postmaster-General to perform the purely formal matter of declaring the exchange open to the public, but before he did that he wished on behalf of the administration represented by Mr. Brown and also on behalf of the Government to tender those present a most cordial welcome. He did not propose to trace the history of the telephone system or to dissemble its intricacies and wonderful educative influence on the public for the reason that he was not capable of doing it. He was happy to be able to tell them, however, that they now possessed a telephone system second to nothing of its kind in the world; but although they had a unique system it was a most expensive system from a public point of view that anyone

had ever struck in any part of the world. On behalf of the Government he wanted to tell them what they proposed doing for the public in regard to the telephone service. The present rates of £20 for Johannesburg subscribers, and £17 10s. for subscribers in other parts of the Transvaal, were perfectly preposterous. (Hear, hear.) He could not understand why Johannesburg subscribers should pay more than those elsewhere. What the Government proposed doing, on the advice of the Postmaster-General, was to alter the charge of £20 on the people of Johannesburg to £7 10s., which would entitle subscribers to 600 calls. If a subscriber were greedy, he would be charged 2d. per call over 600 and up to 1,800, 1d. for calls up to 2,400, and 3d. a call up to 4,800, with a maximum in all cases of £50 per annum. Their friends the newspapers were the best supporters the Government had—(applause and laughter)—and they were going to treat them on especially favourable terms by only charging them half rates. That was to show the newspapers how much the Government appreciated their criticisms. (Laughter.) As regards trunk rates, the present charges were 1s. for five miles; from five to 25 miles, 1s. 6d.; 25 to 50 miles, 2s.; with a progressive rate up to 3s. 6d. per call. In future there would be a progressive rate of 6d. for one to 25 miles, 1s. for 25 to 50 miles, 1s. 6d. for 50 to 75 miles, 2s. for 75 to 100 miles, and 3d. for every 25 miles over 100. (Hear, hear.) He knew that certain persons who were large users of the telephone would squeal, because they would find that instead of being able to gossip on the telephone all day for £20 a year, they would have to pay £50 per annum, but the small user would be entitled to use the telephone more than at present, so that the administration as well as the public would benefit. (Hear, hear.) Probably the new tariff would not come into operation before the middle of next year. He was sure they would all join with him in wishing success to Mr. Brown and his staff. (Applause.)

Mr. Hull then proceeded to switch off the old connection to the new. This occupied the short space of 40 seconds, which the Postmaster-General stated to be a record. The announcement was greeted with acclamation.

The Postmaster-General, in thanking the Colonial Treasurer, observed that the trouble experienced in the past in connection with the telephone service had been absolutely unavoidable. No engineer could have been successful under the conditions which had hitherto prevailed. An American newspaper had recently characterised the telephone as the invention of the devil. (Laughter.) The old system had given rise to a lot of strong language. (More laughter.) He was not so optimistic as to believe that all their old troubles were now removed, but they would not exist to the same extent as in the past, and he thought the public had got as good a service as they could get in Africa, if not in the world. He appealed to subscribers not to worry and bully the operators, as some were in the habit of doing. The majority of the subscribers were courteous and polite, but there were about eight or ten "kickers," who were always growling and bullying the girls. Instead of indulging in such a practice, he would like these "kickers" to make their complaints to him personally. (Hear, hear.) In conclusion, Mr. Brown asked the public to exercise a little patience until the new system was in proper working order. (Applause.)

THE YEAR'S WORK.

THE half-yearly list of exchanges and stations shows highly satisfactory progress in the Company's development. The number of exchanges has increased from 1,285 to 1,441, and the total number of telephone stations from 407,736 to 447,102. The London area now contains 101,551 stations, as against 91,619; Glasgow 32,186, as against 29,908; Liverpool and Birkenhead 25,938, as against 24,415; Manchester 20,314, as against 18,795; Birmingham 12,667, as against 11,804; Edinburgh 10,065, as against 8,941; Leeds 8,749, as against 8,348; Bradford 8,583, as against 7,997; and Sheffield 8,280, as against 7,733. There are now 75 telephone areas containing more than 1,000 stations. The number of call offices now available to the public is 7,986.

POST OFFICE INSTITUTION OF ELECTRICAL ENGINEERS.

THROUGH the kindness of the Council of the Institution it has been arranged that those papers which are published can be obtained by the staff of the National Telephone Company; and from time to time notices will appear in the JOURNAL as to the papers which have been published and their prices.

The following is a list of papers published to date and the price of each:—

"The Telegraph Acts," by Mr. R. McIlroy	9d.
"Telephone Transmission," by Mr. J. G. Hill	9d.
"Electric Wave Propagation," by Mr. J. E. Taylor	9d.
"Telephone Trunk System Signalling Arrangements," by Mr. J. S. Brown	9d.
"The Construction of Telephone Lines," by Mr. A. Moir	9d.
"The Bandot Printing Telegraph System," by Mr. A. C. Booth	1s.
"The Construction of Aerial Lines," by Mr. J. H. M. Wakefield	1s.

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

POWER PLANT—COMMON BATTERY EXCHANGES.*

By J. R. MILNES, *Engineer-in-Chief's Department.*

SINCE the adoption of central energy telephone working, the plant used for the generation of energy in connection with the exchange has become of ever-increasing interest and importance, not only to those officials intimately connected with it, but to other departments. In consequence this paper, in keeping with the aims of the telephone society has been written rather with a view to outline briefly the various uses and functions of the machines and apparatus for the information of those not so much in touch with this phase of telephone work, than to go into any very technical details. At the same time an attempt has been made to indicate, as far as possible, the direction of new departures that are being made or are likely to be made in this work.

A brief description of the working of the following apparatus will be given:—

- (1) Accumulators.
- (2) Motor generators.
- (3) Ringing machines and interrupters.
- (4) Circuit breakers, and polarised relays.
- (5) Rectifiers.

Accumulators.—The first form of accumulator consisted of two lead plates immersed in a dilute solution of sulphuric acid. On current being passed from one plate to the other from some external source the water is decomposed and oxygen liberated at the positive plate and hydrogen at the negative plate. The positive plate becomes oxidised on the surface and a brown coating of lead dioxide is formed whilst the negative plate remains bright. On removing the charging current there now remains, to all intents and purposes, a primary cell consisting of lead dioxide for the positive element and lead for the negative in a dilute solution of sulphuric acid. On this cell being connected up to do work, the action that takes place is a reduction of the lead dioxide to lead, and a corrosion of the lead to a mixture of lead oxide and sulphate. In other words the lead plate, taking the place of the zinc of a Daniell cell, is chemically burnt to supply energy; at the same time the oxidised plate is reduced to lead by the current flowing. As the lead dioxide is reduced, the difference of potential between the electro-negative dioxide plate and the electro-positive lead plate is also reduced until current no longer flows and recharging is necessary. This form of cell was first discovered by PLANTÉ. All other forms of lead accumulators are founded on this principle. There are many disadvantages, however, to this simple cell, and all these have to be overcome in a modern accumulator.

Experience has taught that the following important points are essential for an efficient accumulator:—

- (1) To arrange for as large a supply as possible of lead dioxide to be formed to furnish material for long rates of discharge.
- (2) To have a very large negative or lead surface to be acted on.
- (3) To ensure that the active material (lead dioxide) shall adhere firmly to the positive plate.
- (4) To reduce the resistance, not only inside the cell, but also of all external lugs and connectors to a minimum (this is of special importance in telephone work to prevent cross-talk) and simultaneously to distribute the current evenly over the plates.
- (5) To increase the rate of discharge when necessary without injury to the plates (of more importance in electric lighting installations than in telephony).
- (6) To prevent "sulphating," *i.e.*, the formation of an insulating and insoluble sulphate on the surface of the plates, caused chiefly by long periods of inactivity of the cell when not fully charged, and also by acid of too high a specific gravity.
- (7) To prevent internal short circuiting owing to the "buckling" of plates, due to excessively high rates of discharge or constant overcharging. (Wood separators are now

used to enable the plates to be close together and to avoid possibility of contact from any cause.)

(8) To design some form of automatic control to regulate the charging and discharging of the battery.

Without going into any historical detail, it may be said that the observance of these essential rules has led to the form of modern secondary batteries about to be described.

Stiff plane plates covered in various ways with the active material have been universally adopted. Both positive and negative plates in the unformed state consist of grids arranged to hold a paste composed of a mixture of red lead and litharge with dilute sulphuric acid. Other plates are grooved to hold the paste or are composed of strips of lead burnt into solid supports, the grooves or slats being filled with paste, thus exposing the maximum amount of surface.

When the grids are filled with paste the next process is that known as "forming." On current being passed between the prepared grids, oxygen is given off at the positive plate or anode, and the paste converted to chocolate brown lead peroxide, whilst the nascent hydrogen evolved at the negative plate or cathode reduces the litharge to spongy lead having a large surface. At the end of "forming," the active elements consist of a positive grid containing a large amount of active dioxide of lead and a negative grid containing finely divided spongy lead.

Action of Sulphuric Acid.—A point worthy of notice is that, despite the fact that excessive sulphating is most injurious for a cell, nevertheless the part of the sulphuric acid in the paste during forming and in the electrolyte during charge and discharge is of great importance. During discharge insoluble lead sulphate is produced which forms a protective covering to the plates and prevents further corrosion when the potential gets low. When the charging current is passed, the lead sulphate is decomposed into lead dioxide at the positive plate and spongy lead at the negative plate. This during "forming" helps the formation of spongy lead and dioxide.

Voltage.—The voltage of the lead accumulator is from 2 to 1.85 volts during discharge.

Efficiency.—The efficiency of a well-constructed modern battery, when first installed, is as high as 85 per cent. This falls after use to an average of 80 per cent. This 20 per cent. is lost owing to local chemical action between the peroxide coating and the lead positive plate, and is also due to the resistance of the oxide and sulphate giving rise to useless heat in the cell.

Specific Gravity of Electrolyte.—The means used for judging when a cell is fully charged is either by means of taking the voltage of each individual cell or by testing the specific gravity of the electrolyte.

The specific gravity of a cell under ordinary circumstances when fully charged should never exceed 1.210 or fall below 1.180 when discharged.

In accumulators used for telephone exchanges the tanks are designed to accommodate sufficient plates to furnish current for the ultimate capacity of the exchange, whilst only sufficient plates are installed at first to meet requirements for a few years. To obviate the disadvantage of an excessive bulk of acid in these large size tanks, lead boxes, filled with sand, are fitted at the end of the larger tanks, and take the place of the plates eventually to be added.

It is very necessary when taking the specific gravity of a battery to beware of gassing. Hydrometer readings taken whilst gassing is taking place are always fictitious; the specific gravity indicated being lower than is actually the case. It must also be remembered that cell voltages directly after charge are abnormally high, owing to the gas effect. Reliable readings cannot be taken till after half-hour of discharge has been taken. In connection with the hydrometers, if comparative tests are being made it is unsafe to rely on the hydrometers supplied for each cell reading exactly the same. There is undoubtedly some often appreciable variation which will sometimes lead to erroneous results. One hydrometer should be used for taking the specific gravity through the battery, changing from cell to cell. Of course, this method need only be adopted for special tests, or as occasional check to see that everything is in order.

Charging Accumulator.—With regard to telephone cells, it should be noted that the possibility of the danger of repeated small overcharging is rather large for the following reason:—In small common

* Abstracted from a paper read before the London Telephone Society, 1900.

battery exchanges a battery is often installed to last for eight years, a small discharge compared to the size of the cells is taken, and "routine" charging if done without discretion may lead to injurious results. For the welfare of a battery a complete discharge should be taken occasionally. Another point which is not so often observed and which should be carefully avoided, is excessive charging of the whole battery to bring up the potential difference of individual cells which from leakage have become low compared to the rest of the battery. Persistent overcharging leads to loss of acid and low specific gravity. Overcharging affects both plates; undercharging the negative only, giving rise to sulphating. Too high a specific gravity leads to increase of local action and consequent deterioration.

Cadmium Test.—It may be of interest to give a brief description of the method adopted for finding a faulty plate. This is known as the Cadmium test.

The test is taken as follows:—When the voltage of the battery is down to 1.8 volts and a discharge is still being taken an electrode of cadmium is inserted in the electrolyte and the voltage is taken between the cadmium and the suspected plate. When discharging the cadmium is negative to both positive and negative elements. When charging it is negative to the positive element and positive to the negative. Consequently, in the first case, if the negative cadmium reading be subtracted from the positive cadmium reading the potential difference of the cell is obtained. In the second case the sum of the two readings will give the potential difference of the cell.

To obtain accuracy, a series of readings should be taken for each plate, the mean being taken as the potential difference.

General.—The following points are worthy of note:—

A very warm room is bad for accumulators. The tendency of heat is to shorten the life of the cell, though temporarily increased efficiency appears to be obtained at first. The maximum temperature allowable is 90° Fahr.

Rooms with unprotected plaster ceilings should be avoided. The gassing is likely to loosen the plaster, which will fall into the cells and lead to trouble; lime being very bad for cells. Electric lighting fittings should *not* be placed over the cells permanently unless all metal work is well painted or porcelain holders are used, otherwise corrosion will set in and trouble may be caused.

Motor Generators.—Charging the battery of accumulators in all standard installations is carried out by means of a shunt-wound dynamo driven by a motor taking current from the street supply.

The shunt-wound dynamo or generator is adopted in a telephone exchange in place of either series or compound-wound machines for the following reasons:—

Series Dynamos.—In a series dynamo the whole of the current generated in the armature of the machine passes through the field coils or windings. The result is that the voltage is regulated by the speed and load of the machine. Should this speed drop with a heavy load or from other causes, or should the voltage of the accumulators be allowed to rise above that of the generator, it often ensues that the poles of the dynamo become reversed and the current from the battery starts driving the dynamo as a motor without warning. This is so liable to happen and leads to the necessity for so much attention that series-wound machines are rarely, if ever, used for charging accumulators.

On the other hand the shunt dynamo is wound with comparatively high resistance fields shunting the armature coils. Only a small percentage of the total current passes through the fields, so that fluctuations in the current produce relatively less difference in the potential difference at the ends of the armature coils and so do not affect the electro-motive force sufficiently to change the polarity of the machine and cause reversal of current. As the voltage of the accumulators being charged increases the current in the shunt field increases, the magnetic field become more intense, and more current is supplied to meet the demands of the circuit.

Adjustment of Voltage. For the purpose of regulating the electro-motive force a variable resistance (in the Company's exchanges the Ward Leonard rhesostat) is introduced into the shunt circuit. By altering the current in the field in this manner, the speed being constant, the intensity of the magnetic field is varied and the electro-motive force either raised or lowered as desired. The type of

machine used by the Company has a range of adjustment from 28 to 40 volts at all loads.

Continuous Current Motors.—The motor used for driving the dynamo which supplies current for charging the battery is direct coupled to the dynamo by means of flexible connectors. These connectors consist of compressed leather discs in which holes are bored and into which stops from the driving pulleys of both motor and generator project. Belt driving is not adopted on account of the large amount of space required for an efficient drive.

Both alternate and continuous current machines are used. I have refrained from any mention of alternate current machines as they have been dealt with most ably in another paper.

The continuous current motor used in telephone exchanges is usually of the multipolar type, shunt wound. The description of the dynamo given beforehand will apply equally well to the motor so far as principle goes, with the difference that instead of furnishing current current is supplied from an outside source (the street lighting mains) to the motor. Magnetic fields are produced in the field and armature lagging behind one another through the position of brushes and the winding, and the armature is rotated by the twist or "torque" thus produced. Whilst running up to speed a counter electro-motive force is being gradually built up in the windings of the armature. The simplest way of explaining this electro-motive force I think is by stating that it is the same electro-motive force that would be generated by the motor if used as a dynamo and driven mechanically at the same speed. When the counter electro-motive force arrives at the same voltage as the supply no more current can be taken by the motor and the full speed has been reached. Very little current is required to keep the motor running on no load on this account, in fact merely enough to supply energy for friction losses, hysteresis and the like.

As soon as a load comes on, however (through the drag of the coupled armature of the dynamo or generator when the accumulators are switched on), the current increases in proportion to the load. The slight "lag" in speed between the highest or "wattless" speed of the motor and the loaded motor is quite sufficient to increase the current in the armature and produce a very large "torque."

Hysteresis and Eddy Currents.—To avoid undue heating in armatures a variety of methods has been adopted. In the rotating iron core of the armature what is known as magnetic hysteresis is likely to occur; that is to say, a *time lag* occurs between the action of the magnetising force and the magnetisation of the iron, causing the iron to become heated owing to molecular rearrangement of the particles. To overcome this as much as possible the core must be built of the best charcoal iron, soft iron being far more readily responsive to magnetisation than hard or impure iron. Eddy currents are also set up in the core from the hysteresis, and to overcome this the core is made of laminated sheets of iron well lacquered. This prevents a flow of current.

Another cause of heat is due to eddy currents set up in such parts of the copper of the winding as commutator bars and connectors by the stray field from the machine. In properly designed machines these are not of much importance, but all add up to produce a certain percentage of the loss of efficiency of the machine.

Commutation.—In dynamos used for telephone work, owing to the necessity for charging and talking simultaneously, an essential feature of the machine must be a very efficient commutation.

This is obtained by the use of a large number of coils in the armature and a correspondingly large number of commutator bars. The Company's machines have 175. The difference between this and the 75 bars used for a similar machine used for electric lighting is marked.

The result is that the usual inevitable ripple on the potential surface of a direct current machine is reduced from a long audible wave which would interfere with conversation to an almost imperceptible ripple of high enough frequency to approach inaudibility.

Current Density in Windings.—In the windings of both motors and dynamos it is worthy of note that it is quite permissible to have a current density of from 2,000 to 3,000 amperes per square inch. This is perhaps not generally appreciated and may lead to confusion owing to the considerable difference between this figure and the 1,000 amperes per square inch of the Board of Trade regulations

for wiring. (This figure, 2,000 to 3,000, is of course dependent on the specification for rise of temperature.)

Motor Starters.—The type of starter used for the motors is shown in Fig. 1, and is of the no-voltage and overload release type. A

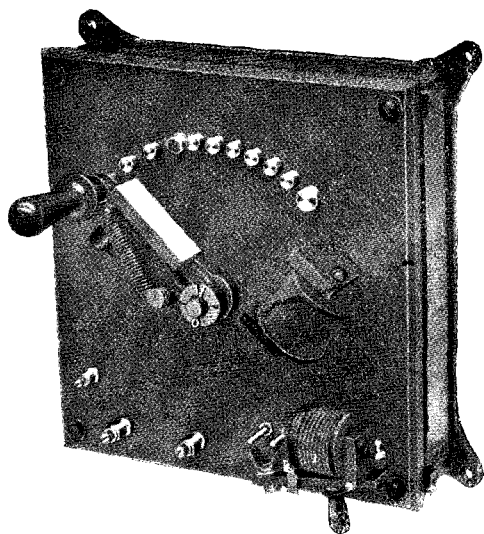


FIG. 1.

diagram of the connections is given in Fig. 2. When the handle is at the third stud the current flows through the overload release coil and through the whole of the starting resistance to the armature winding, also from the third stud directly through the no-voltage release coil to the field and back to the mains. It will be noticed that to start with the field is direct across the mains and the armature through the resistance to the mains. As the arm is moved from stud to stud the resistance is brought automatically into the field circuit and cut out of the armature circuit until at last all the

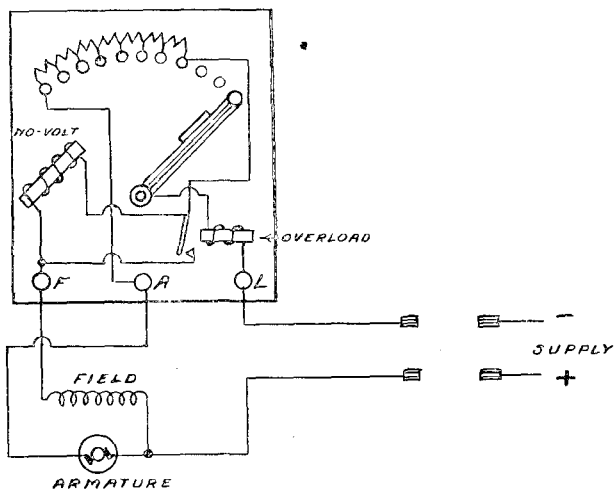


FIG. 2.

resistance is in the field. The introduction of a resistance into the field increases the speed of the motor, owing to the weakening of the field in which the armature revolves and the consequent drop in the back electro-motive force on the armature winding. At the same time the cutting of resistance out of the armature allows more current to flow, also increasing the speed.

- If S = speed = number of lines of force cut per second.
- F = intensity of field.
- V = voltage of supply.
- $V = S \times F$.

As V is constant and F is decreased through introduction of resistance, S must increase owing to increased flow through armature.

F being magnetic pull, if S is reduced mechanically by the load the "torque" is largely increased.

(To be continued.)

NEVER MORE.

With apologies to EDGAR ALLAN POE.

Once upon a day 'twas dreary, while I wandered tired and weary,
In my bag a bunch of contracts, and a pile of printed lore,
I kept ringing, walking, ringing, in the hope a contract bringing
As I stopped with hopeful calling, calling at each office door.
"This gets stale," I muttered, knocking, knocking at each office door,
Only knocking, nothing more.

Ah! distinctly I remember; it was in the bleak November
And my limbs in every member dripped with water on the floor,
Eagerly I wished 5.30; all my clothes were wet and dirty;
I was wet and I was thirsty as I went from door to door,
Always going empty handed, empty handed from each door,
Wet and dripping, nothing more.

Presently I felt much stronger, and resolved I'd wait no longer;
This man here must sign a contract or I'll drop him on the floor.
At that moment I thought boldly, though my limbs felt rather coldly
From the wetting and the dripping, dripping at the office door;
But I felt that I must have it, have it at that very door;
Have a contract, nothing more.

On a stool the man perched lonely; he sat thinking, thinking only,
As I knocked and gently entered, entered by the open door,
Not a word at first was uttered; he looked dazed and somewhat fluttered,
Till I spoke and meekly muttered, "I have often called before,
Called to show you this small booklet, which I've left beneath the door,
Just a booklet, nothing more."

Startled by the stillness broken (in reply no word was spoken),
"Doubtless," said I, "you have never, never heard of this before,
Telephones are what is needed;" but the man he never heeded;
Simply stared as one in passion, finger pointing to the door;
Then he drew a breath, a lengthy breath, still pointing to the door,
Then he yelled out "NEVER MORE."

Startled by the stillness broken, and his words so wildly spoken
Made me think that this poor mortal had an Omnibus* before;
Then methought (without much thinking) maybe this poor man's been drinking,
Maybe he will take a cheap one, take it ere I leave the door;
So I said in softest accents, said it ere I reached the door,
"One Pound-Five* and nothing more."

'Man,' cried he, "your thing of evil made me mad as any devil,
I had one upon that wall there, but it now lies on the floor:
Operators would not listen"—as he spoke his eyes did glisten—
"Through that trumpet oft I shouted, shouted till my throat was sore,
Shouted, did I? Yes, and banged it, banged till my hands were sore."
Quoth this member "Never More."

"On the wall it hung and mocked me, lifeless dummy, till it shocked me,
Whiles I coaxed it, whiles I smashed it, smashed and kicked it on the floor.
On the wall again I put it, drove the nails in deeply rooted,
Still the thing remained as silent, silent as it was before.
Take a 'phone, Sir?—Never More."

"But" I said, "the thing is madness and your words I hear with sadness.
Such a thing as you now tell me never have I heard before.
There's a man who rules our Traffic, and he says in language graphic,
Says his maids are almost perfect; yes, he's said it o'er and o'er;
Said it, yes, when men malign—malign them on that very score.
"Tell him. Tell him 'NEVER MORE.'"

"They don't err, although they're human; man may err, but not a woman."
Then he seized the ruler wildly; in his rage he almost swore.
"Don't tell me there's nothing in it. Leave the place this very minute,
Or I'll drop you with this ruler; yes, I'll drop you on the floor."
And he pointed with his finger, sternly pointed to the door;
"Enter here, Sir, Never More."

"Sir," said I, "I will not grieve you; tell me this before I leave you;
Is't your 'phone, Sir, I see lying, lying broken on the floor?
Small surprise you've botheration; why, Sir, that's a "CORPORATION";
Sign this contract and I'll leave you, never will I come back more.
Thank you, Sir," I say, "Good morning," smiling as I shut the door.
"Sir, good morning, ever more."

* This refers to a cheap omnibus rate, whereby twenty subscribers were connected to the exchange on the same line, introduced by the Company as an experiment in two or three districts.

THE NATIONAL TELEPHONE STAFF BENEVOLENT SOCIETY.

The following donations have been received:—

Balance from a collection at the South-Eastern					
Contract Department	..	..	..	£0	0 8
Mr. C. B. Clay	..	..	..	1	8 6
being share-out from the two provident clubs.					
At the monthly meeting the following grants were made:—					
Engineers—(a)	..	..	..	£3	2 6
(b)	..	..	..	1	0 0
(c)	..	..	..	0	15 0

TELEPHONE WOMEN.

X.—EDITH SMITH.

Miss EDITH SMITH, the present Clerk-in-Charge of Holborn Exchange, entered the service of the United Telephone Company on March 10, 1884, after leaving a private school. She is, therefore, another of our operating staff with 21 years to her credit in the telephone service. She was first an operator at the original "Queen Vic." Exchange, the switchboard at that time being of the old Edison pattern. This was eventually changed over to the first multiple board (with cut-out jacks) in other premises, but the exchange still retained its name. In those days there was apparently no "scale of pay," and increases were conspicuous by their



EDITH SMITH.

absence; consequently the receipt of a "bonus" by each operator on this occasion was hailed with delight.

Miss SMITH's first promotion—although it was only to a small exchange—was as Clerk-in-Charge of Kilburn, in 1888. Two years later she made a much greater advance being appointed Clerk-in-Charge of Edgware Road. This was the original Paddington Exchange, and was then situated over a tobacconist's shop exactly opposite Edgware Road Station.

While at Paddington Miss SMITH witnessed the change over from the transfer to the multiple system, in the premises recently pulled down to extend the present central battery exchange. When one compares the huge building and very complete equipment of the new Paddington Exchange opened this year, one is indeed able to realise the growth of the telephone system.

In October, 1892, Miss SMITH was transferred as Clerk-in-Charge to Westminster, and subsequently she has held the following appointments:—

In February, 1895, she became Clerk-in-Charge at "Heddon Street," removed to Gerrard Street in November of the same year. From April to June, 1896, Miss SMITH was given a little variety in her work, and was employed visiting absentees through illness, a work which in these days, owing to the growth in the number of operators, necessitates the employment of a visiting matron, whose time is occupied in this way. After a severe illness Miss SMITH returned to duty as Clerk-in-Charge at the "Bank" Exchange. In 1899 she was transferred as Clerk-in-Charge to "Avenue." In 1904, when the present Holborn Exchange was transferred from St. Andrew Street to the Birkbeck Bank Buildings and changed from magneto to central battery working Miss SMITH was promoted as its Clerk-in-Charge.

Throughout her service Miss SMITH's integrity of purpose and conscientious work has made her a valued servant of the Company,



JESSIE GRAHAM.

and won her many friends among the staff. A quiet worker, somewhat stern in manner while on duty, and keen to uphold the discipline of her exchange, Miss SMITH is the happy possessor of the saving grace of humour, which enables her to appreciate the lighter side also and to enter into the life of the 120 odd girls of whom she is in charge.

XI.—JESSIE GRAHAM.

Miss GRAHAM joined the service of the Northern District Telephone Company at Tyne Dock Exchange as an operator in 1889. Mr. CLAY was District Manager at the time and Mr. WATTS, Local Manager. Girls were then beginning to take the place of boy operators, and, on first entering the exchange, the new operators were

greeted by a boy, who was sitting in the window sill, with: "You are coming to take our job, so you can learn yourselves." He then left them severely alone until he saw many indicators down, when he rushed to the board, and with much shouting and arguing made the necessary connections. After six months' service Miss GRAHAM was transferred to South Shields, and at the end of another twelve months was transferred in December, 1890, to Newcastle. The district office was at that time in Sunderland, and Newcastle was only a secondary office with less than 300 subscribers, the Post Office being in the ascendant in Newcastle with about 500 subscribers. The Newcastle Exchange was then in the basement of Exchange Buildings on the Quayside. These premises were most unsuitable, and operators not infrequently fainted owing to the badly ventilated atmosphere. In 1893, the exchange was transferred to more commodious premises in Pilgrim Street, and, whilst the locality was not much improved, the switchroom, which is on the ground floor, is still one of the pleasantest in the provinces. The opening of the new exchange was well advertised, and carried out with much ceremony. The public were invited to the opening, and the MAYOR of NEWCASTLE took the chair. The late General Manager, Mr. GAINE, was also present and made a speech. In the evening a dance was held in the switchroom to which subscribers were invited.

The district office was then transferred from Sunderland to Newcastle, and a determined effort made to increase the roll of subscribers. In the achievement of this end, of course, much depended upon the class of service given, and Miss GRAHAM managed her department well. The subscribers' list increased rapidly, and the subscribers under Miss GRAHAM's charge at the Newcastle Central Exchange have increased from 300 to over 3,000. She has a most sympathetic nature, but her staff know that when she deals with any matter concerning them they will be treated with strict but impartial justice. Her energy is never flagging. A subscriber's remark sums up her attitude to the public. Having had trouble with a call, he asked for the clerk-in-charge, and when Miss GRAHAM attended he remarked, "O! I know your voice; now I am all right." He knew he would receive satisfaction.

Miss GRAHAM has served under four District Managers; Mr. CLAY, Mr. BAILEY, Mr. WORMULL and Mr. DRUMMOND; and under the following Local Managers:—Mr. WATTS, Mr. BAILEY, Mr. WIDDICOMBE, Mr. BARR and Mr. JACKSON. Her great popularity is evidenced by the fact that most of the staff who have left the service or have been transferred to other centres, when revisiting Newcastle always pay a visit to her before leaving the town.

CHARLES MACFARLANE BAILEY.

It is with the deepest regret that we have to record the death of Mr. C. M. BAILEY, late Assistant Metropolitan Superintendent, which took place on Dec. 1 last, after a long and painful illness. Although it was known for some time that it was almost hopeless to look forward to a favourable termination of his illness, his death nevertheless came as a great shock to his many friends in the Company's service. It is but two months ago that the JOURNAL published a short account of Mr. BAILEY's career as a "Telephone Man," from which it will be seen that he held several important positions during his long period of service, and his frequent promotions testify to the high appreciation in which his services were held by the late General Manager and the Board of Directors. In addition, he had the gratification of attaching to himself the respect and affection of all grades of the staff in the various districts in which he was placed. He came to London a little over two years ago, and although practically a stranger except to a few, it is not too much to say that during his term of office as Assistant Superintendent in London he had by his charm of manner, his never-failing desire to promote any good cause or to help any individual member of the staff who sought his advice, as well as by his prompt business methods, earned for himself amongst all grades of the Metropolitan staff a high and well-deserved popularity. All those who had the privilege of knowing him had come to regard him as a personal friend, and they sincerely deplore his loss, and it is with the deepest sorrow that this short tribute to his memory is written.

Heartfelt sympathy is extended by all members of the staff to Mrs. BAILEY and her son in their great bereavement. It will be some consolation for them to know that their sorrow is our sorrow.

The funeral took place at Sanderstead Parish Church on Dec. 4, and there were present, in addition to the relatives and more intimate friends, the following members of the staff to pay a last tribute of esteem and affection to their late colleague:—Mr. J. Stirling, representing Mr. S. J. Goddard; Mr. C. F. Peacock, representing Mr. F. Gill, Engineer-in-Chief; Messrs. C. B. Clay, L. Harvey Lowe, C. Elliott, G. F. Greenham, W. F. Taylor, J. F. Edmonds, W. J. Gilmour, J. Leslie and Mr. G. F. Preston (General Manager, Post Office telephone service). Amongst the many beautiful floral offerings were wreaths from the Metropolitan Superintendent and staff, the officers and staff of Head Office, and the traffic branch of the Post Office telephone service. Resolutions of sympathy were passed by the London Telephone Society and the National Telephone Staff Benevolent Society.

ABOLITION OF THE UNLIMITED SERVICE RATES IN GERMANY.

PROPOSALS OF THE IMPERIAL POSTAL ADMINISTRATION.

We learn from the *Zeitschrift für Schwachstromtechnik* that a memorandum of the proposed new order for telephone charges in Germany (which will be laid before a Commission called for the purpose of considering them on Jan. 7) has appeared in the official gazette. This important memorandum concerns itself chiefly with local service and is designed to show that in flat rate service the loading of lines with calls has become enormously heavy and tends to increase from year to year. The Postal Administration will in consequence totally abolish this kind of charge. Amongst other alterations in telephone charges which will take place the Administration proposes the following tariff:—

- (1) Flat rates are abolished. Connections will only be supplied for an annual sum plus a charge per conversation.
- (2) The annual charge consists of:

In areas of	1 to 1,000 connections ...	...	£2 10
"	1,001 " 5,000 " ...	...	£3 5
"	5,001 " 20,000 " ...	...	£4 0
"	20,001 " 70,000 " ...	...	£4 10
"	more than 70,000, for every additional 50,000 connections or part thereof		10s. more.
- (3) For every call inaugurated a single conversation charge of 5 pfennig (05 of a shilling) will be made. If during a financial year more than 2,000 calls are made by one subscriber, calls from 2,001 up to 6,000 will be charged at 4½ pfennig (045 of a shilling), and calls beyond that at 4 pfennig each (04 of a shilling).

It will be seen from this that a subscriber in Berlin who makes 2,000 calls will pay £10 for his telephone (*i.e.*, £5 annual charge and £5 for 2,000 calls), and one who makes 6,000 calls will pay £19. In Hamburg and other large cities with telephone systems of between 20,000 and 70,000 lines the charge would be £9 10s. (*i.e.*, £4 10s. annual charge and £5 for 2,000 calls) and £18 10s. respectively. Under the present rates the subscriber pays £9 for an unlimited service in Berlin and £8 10s. in the systems with more than 5,000 subscribers.

[From a subsequent issue of the *Zeitschrift* we learn that a meeting of 50 members of various industrial, commercial and agricultural chambers and of officials of the Imperial Post Office and Bavarian Ministry of Trade considered the above-mentioned memorandum, and whilst some widely divergent opinions were expressed, the majority were in favour of the total abolition of the flat rate and its replacement by a measured rate, but it was suggested that the proposed tariff be supplemented by a rate of 40 marks (£2), with a charge per message, for small places with under 500 subscribers, and that there be a uniform charge per call, whether used in large or small quantities, of 4 pfennig (04 of a shilling).]

THE DEVELOPMENT OF THE TELEPHONE IN THE ENGLISH COUNTIES SINCE 1892 GEOGRAPHICALLY CONSIDERED.

By W. H. GUNSTON.

(Continued from page 185.)

VII.—NORTH-WESTERN COUNTIES.

LANCASHIRE suggests to the mind the densely populated districts of Manchester, Liverpool, Oldham and Blackburn, collieries, mills, factories, works, etc.; but it must not be overlooked that there is a large rural area between Liverpool and Preston, and that the Lake District extends over the northern portion of the county. The purpose of these papers therefore, which is to deal chiefly with the development of counties outside the great centres of population, will find some scope even in Lancashire. Similarly in Yorkshire, the busy district bounded by Sheffield, Wakefield, Leeds, Bradford, Huddersfield and Halifax comprises but a small portion of that extensive shire, whilst, of the remainder, the Yorkshire dales, wolds and moors, and the Richmond, Thirsk and Ripon districts are either picturesque or agricultural.

Lancashire already possessed 71 National exchanges in 1892. There were six at Manchester, nine at Liverpool (besides Bootle, Garston, Gateacre, Waterloo and Huyton), and exchanges at Ashton-under-Lyne, Denton, Bolton, Atherton, Farnworth, Horwich, Leigh, Bury, Radcliffe, Ramsbottom, Oldham, Middleton, Shaw, Rochdale, Heywood, Littleboro', Blackburn, Great Harwood, Wilpshire, Accrington, Darwen, Chorley, Clitheroe, Preston, Ashton, Bamber Bridge, Fulwood, Burnley, Nelson, Padiham, Lancaster, Caton, Morecambe, Blackpool, Fleetwood, St. Anne's, Lytham, Bacup, Haslingden, Barrow, Ulverston, Wigan, Prescott, St. Helens, Newton-le-Willows, Ashton-in-Makerfield, Southport, Ormskirk, Skelmersdale, Warrington and Widnes. Various exchanges in Liverpool proper have been closed and larger ones opened, the existing number now being seven, exclusive of the suburban exchanges above mentioned and those opened at Mossley Hill (1894), Hightown (1906) and Crosby (1907). Manchester now possesses ten exchanges, besides Failsworth (opened 1894), Eccles (1896), Whitefield and Urmston (1899) and Walkden (1906). Exchanges more or less suburban to the large towns were opened at Mossley and Rawtenstall in 1894, South Shore, Blackpool (1895), Pleasington (1896), Waterfoot and Adlington (1898), Eagleley (1899), Whalley (1900), West Houghton (1902), Rainhill (1903) and Birkdale and Longton (1905). The following exchanges have been established in the country districts:—Longridge (1893), Leyland (1895), Colne, Kirkham, Formby (1896), Garstang, Poulton-le-Fylde (1897), Burscough (1898), Dalton-in-Furness, Galgate (1899), Cleveleys (1904), Maghull, Brock, Rainford (1905), Carnforth, Grange-over-Sands, Newby Bridge, Ainsdale, Halsall and Standish (1906), Upholland, Parbold, Croston, Aughton and Brinscall (1907). The Post Office possesses no exchanges in Lancashire, except those for the accommodation of a few trunk wire subscribers in some of the large towns. Such exchanges in this county and elsewhere are left out of consideration in these statistics. Altogether there are 117 exchanges open in Lancashire.

Cheshire.—In 1892 there existed exchanges of the Company at Chester, Runcorn, Northwich, Altrincham, Hyde, Stockport, Macclesfield, Bollington and the Birkenhead group (Birkenhead, Liscard, Bromborough, Rock Ferry and West Kirby—now Hoylake). To the latter Heswall, Hooton, Neston and Ellesmere Port have since been added. The development of Cheshire proceeded as follows:—Sale and Middlewich exchanges were opened in 1893, Crewe in 1894, Alderley, Wilmslow and Winsford in 1895, Frodsham in 1897, Nantwich and Congleton in 1898, Marple, Knutsford, Cheadle Hulme and Lymm in 1899, Disley and Tattenhall in 1906, Whaley Bridge, Gatley, Christleton, Stockton Heath, Moore, Upton, Willaston, Mottram and Aston-by-Sutton in 1907. The Post Office opened at Sandbach in 1903, and have since established exchanges at Farndon, Clutton, Malpas and Sandiway. There are thus 44 now working in the county.

VIII.—YORKSHIRE.

The *West Riding* has been well developed by the Company. Not only has an extensive exchange system been established in the industrial centres, but operations have been extended to Skipton, Settle, Long Preston and Grassington in the north-west and also to old country towns such as Wetherby, Knaresborough, Boroughbridge, Ripon, Tadcaster and Selby. Already in 1892 there existed 50 National exchanges, viz., a Bradford group consisting of Bradford, Manningham, Shipley, Low Moor, Bingley, Dudley Hill, Thornton, Rawdon, Haworth; a Leeds group (Leeds, Headingley, Morley, Stanningley and Chapelton); a Sheffield group (Sheffield, Mexboro', Oughtibridge, Stocksbridge and Wortley); Dewsbury, Batley, Mirfield, Birstall and Ossett; Halifax, Cleckheaton, Lightcliffe, Hebden Bridge, Sowerby Bridge and Todmorden; Huddersfield, Holmfirth, Elland, Milnsbridge and Brighouse; and exchanges also flourished at Ilkley, Otley, Skipton, Keighley, Steeton, Harrogate, Ripon, Wakefield, Castleford, Pontefract, Goole, Rotherham, Penistone, Doncaster and Barnsley. Wortley, Sowerby Bridge and Manningham were afterwards closed and the subscribers' lines run into other exchanges. Idle, Roundhay, Heckmondwike, Luddendenfoot, Skelmanthorpe and Ecclesfield date from 1893, and Garforth from 1894. In 1896 exchanges were opened at Slaithwaite, Marsden, Pool (now Arthington), Horsforth and Thorne; in 1897 at Honley, Rothwell, Tadcaster and Selby; in 1898 at Ripley and Knaresborough; in 1899 at Knottingley and Settle; in 1900 at Guiseley, Meltham and Kirkburton; in 1901 at Woodhouse and Barnoldswick; in 1902 at Owlerton; in 1903 at Wetherby and Boston Spa; in 1904 at Burley-in-Wharfedale, Menston, Horbury and Normanton; in 1905 at Broomhill (Sheffield) and Crosshills; in 1906 at Long Preston, Cullingworth, Hoyland, Silkstone, Thorner and Crossgates, and in 1907 at Sharrow (Sheffield), Boroughbridge, Attercliffe, Ackworth, Whixley, Grassington and Saddleworth.

East Riding.—Hull was the only place at which an exchange existed in 1892. It was followed by Beverley, Cottingham and Bridlington in 1896; Hessle in 1897; Ferriby, Brough and Kirk Ella in 1899; Driffield in 1902; Sutton, near Hull, in 1903; Hedon in 1904, and Filey in 1906. The Post Office opened an exchange at Hornsea during the present year.

The Hull Corporation entered into competition with the Company by opening an exchange in Hull in 1904. They are now operating in addition at Hessle, Beverley, Cottingham, Sutton and Kirk Ella.

In the *North Riding* (including the district known as the Ainstey of York) the Company seems chiefly to have developed the industrial districts and the Post Office the rural. York and Scarborough National exchanges existed in 1892, as did Middlesbro', Saltburn, Redcar and Linthorpe. Southbank was opened in 1896, Whitby in 1899, Guisborough in 1903, Skelton in 1904, Scalby and Escrick in 1905, and Loftus and Normanby in 1906. The Post Office opened at Richmond and Malton in 1903 and Northallerton in 1904, and have since established exchanges at Thirsk, Easingwold, Bransby, Bedale and Great Smeaton. They also possess an exchange at Middlesbro'.

There are thus in Yorkshire 135 exchanges working of which 120 belong to the Company, nine to the Post Office and six to the Hull Corporation.

IX.—NORTHERN COUNTIES.

Northumberland.—In Newcastle and the Tyneside district, after a long period of competition, the Company altogether outdistanced its rival, but in the rest of the county the Post Office to some extent had its compensation; and flourishing exchanges have been established by the State in numerous country towns and villages. In 1892 the Company had six exchanges in Newcastle, one each at Blyth, Morpeth, Hexham, Corbridge (since closed), Alnwick, Alnmouth, Berwick-on-Tweed, North Shields and Tynemouth. In 1893 Whitley and Wallsend were added to the list, in 1898 Benton, and in 1907 Amble. The Post Office possess old-established exchanges at Newcastle, Tynemouth, Northumberland Dock, North Shields, Morpeth and Blyth. Whitley was opened in 1897, Hexham in 1898, Wallsend in 1899, Corbridge and Bedlington in 1901, Alnwick, Benwell, Ashington and Newbiggin in 1902; Wooler in 1903, Ponteland, Whittingham and Seaton Sluice in 1904. Since that year exchanges have been opened at Humshaugh, Wark,

Bellingham, Otterburn, Wylam and Dipton. Newcastle is at present served by three large National exchanges: Central, Gosforth and Jesmond, and by a Post Office exchange with small sub-exchanges at Elswick Road, Clayton Road, Shields Road and Gosforth. Altogether there are 42 in the county.

Durham.—In 1892 the Company's system was in operation at Durham, Sunderland, Gateshead, South Shields, Darlington, Bishop Auckland, Hartlepool, West Hartlepool, Stockton, Jarrow, Chester-le-Street, Blaydon, Hylton, Ryhope, Seaham, Norton, Eaglescliffe, Yarm (since closed), Seaton Carew, Consett, Leadgate and Shotley Bridge (the latter two have since been closed). Houghton-le-Spring was opened in 1893, Boldon and Greatham in 1894; Spennymoor, Hartburn and Middleton-one-Row in 1898; Birtley, Howden-le-Wear and Willington in 1899; Hurworth in 1900, Whitburn in 1902, West Auckland in 1903, Whickham in 1904, and Ryton in 1905. Prior to 1892 the Post Office were established at Sunderland, Stockton, South Shields, Tyne Dock, Jarrow and Blaydon. Gateshead, Durham and Westoe were subsequently added. Bishop Auckland, Dunston, Low Fell and Darlington followed in 1897, Spennymoor in 1898, Ryton and Castle Eden in 1900, Annfield and Wingate in 1901, Chester-le-Street, West Stanley, Shotley Bridge, Stocksfield, Prudhoe, Sedgfield, West Cornforth, Shildon and Gainford in 1902, Barnard Castle, Ebchester, Easington, Haswell and Piercebridge in 1903, and Hebburn and Thornley in 1904. Since then further exchanges have been opened at Ferry Hill, Felling, Lanchester and Staindrop, making a total for the county of 71.

Westmoreland.—Windermere was the only exchange established by the Company prior to 1892. Kendal (1895) was the second, followed by Ambleside (1899), Grasmere (1905), Appleby (1906) and Staveley (1907). The population of the county is only 64,000.

Cumberland.—In 1892 National exchanges existed at Whitehaven, St. Bees, Cleator Moor, Carlisle, Maryport, Workington, Cockermouth, Egremont, Wigton (afterwards closed), Harrington (now merged in Whitehaven), Frizington (now merged in Cleator Moor), Aspatria (now merged in Maryport) and Dalston (since closed). Penrith and Keswick were opened in 1899, Egremont was re-opened in 1905 and Wigton in 1907. The Post Office have small exchanges at Greystoke and Workington, making a total of thirteen for the county.

SUMMARY.

Since the foregoing papers were written the following exchanges have been opened:—

SOUTH MIDLAND.

Middlesex.—City and Hornsey exchanges by the Post Office.
Herts.—Redbourn, Markyate and Stansted by the Company.
Beds.—Arlesey by the Post Office. Leagrave by the Company.
Bucks.—Steeple Claydon and Amersham Common by the Post Office. Iver by the Company.
Northants.—Wollaston by the Company. Thrapston and Brigstock by the Post Office.
Cambs.—Madingley by the Post Office.

EASTERN.

Essex.—Chingford by the Company. Tiptree by the Post Office.
Suffolk.—The Company's exchange at Haverhill has been closed.
Norfolk.—Downham Market by the Company. Long Stratton and Hanworth by the Post Office.

SOUTH EASTERN.

Surrey, (addendum).—Hook exchange was opened in 1905.
Kent.—Longfield and Meopham by the Post Office. Selling by the Company.
Sussex.—Slindon by the Company. Hurst Green and Robertsbridge by the Post Office.
Hants.—Odiham, Hartley Wintney and Horndean by the Company. Hook was opened in 1907 and not in 1905.

SOUTH WESTERN.

Devon.—Starcross by the Company.
Cornwall.—Torpoint by the Company.
Somerset.—North Petherton by the Company.
Wilts.—Wroughton by the Company.

WEST MIDLAND.

Gloster.—Warmley by the Company.
Worcester.—Crophorne by the Company.
Warwick.—Berkswell by the Company.
Staffs.—Codsall by the Company.

NORTH MIDLAND.

Leicester.—Earl Shilton by the Company.
Lincoln.—Healing by the Company.
Notts.—Daybrook by the Company.

The following list shows the number of exchanges open in each English county at the end of 1907. It should be mentioned that neither exchanges containing only one subscriber nor those Post Office exchanges which consist entirely of lines connected to the trunk board for trunk communication purposes are included:—

County.	Company.	Post Office.	Corporation.	Total.
Yorkshire ...	120	9	6	135
Lancashire ...	116	—	—	116
Kent ...	73	14	—	87
Durham ...	33	38	—	71
Hampshire ...	52	4	8	64
Sussex ...	38	19	—	57
Surrey ...	30	18	—	48
Cheshire ...	41	6	—	47
Middlesex ...	28	18	—	46
Gloucestershire ...	38	8	—	46
Northumberland ...	15	29	—	44
Monmouthshire ...	18	23	—	41
Essex ...	26	11	—	37
Hertfordshire ...	21	15	—	36
Staffordshire ...	31	2	—	33
Devonshire ...	31	—	—	31
Somersetshire ...	22	9	—	31
Derbyshire ...	24	4	—	28
Worcestershire ...	25	2	—	27
Lincolnshire ...	9	15	—	24
Warwickshire ...	22	2	—	24
Wiltshire ...	22	1	—	23
Buckinghamshire ...	8	15	—	23
Suffolk ...	12	10	—	22
Norfolk ...	12	10	—	22
Cornwall ...	18	2	—	20
Leicestershire ...	16	4	—	20
Northamptonshire ...	11	8	—	19
Berkshire ...	15	2	—	17
Nottinghamshire ...	15	1	—	16
Shropshire ...	8	7	—	15
Dorsetshire ...	13	—	—	13
Cumberland ...	11	2	—	13
Cambridgeshire ...	8	3	—	11
Bedfordshire ...	4	5	—	9
Oxfordshire ...	6	2	—	8
Herefordshire ...	4	3	—	7
Westmoreland ...	5	—	—	5
Huntingdonshire ...	3	1	—	4
Rutlandshire ...	—	4	—	4
Total ...	1,004	326	14	1,344

The telephonic development of a county cannot be reckoned by the number of exchanges it contains as the exchanges vary from three lines to over 10,000, and it requires no abstruse process of mental arithmetic to demonstrate that a county possessing two or three exchanges of the latter capacity is more highly developed than one containing 30 or 40, with an average of 100 lines each, and in the Company's Newcastle exchange alone there are four times as many lines as in all the Post Office exchanges in Northumberland, and in Sunderland as in all the Post Office exchanges in Durham. To ascertain the number of subscribers situated in each county is not easy—nor would it be particularly profitable—for the inhabitants of one county are often connected to an exchange in another; but it may be laid down that there are, roughly, 100,000 telephone

stations in Middlesex, and about 60,000 each in Lancashire and Yorkshire, the next county, Surrey, being a bad fourth. The purpose of these papers, however, is rather to show how the telephone system has spread during the last fifteen years over the face of the counties, and whilst it would require a large map rather than statistics to show this process, the following figures showing the proportion of exchanges to acreage may not be uninteresting in this connection :—

County.	Acres (thousands).	Exchanges.	Proportion of acres to exchanges.
Middlesex	181	46	3,935
Monmouth	341	41	8,317
Durham	647	71	9,113
Surrey	485	48	10,104
Lancashire	1,207	116	10,403
Kent	995	87	11,436

Yorkshire comes out with 21,333 acres to each exchange and Westmoreland with 100,181.

TELEPHONES—AND THE BLIND.

By H. JULIUS MACLURE, *Contract Manager, Birmingham.*

PHILANTHROPISTS interested in the welfare of the blind have for years been constantly congratulated on many brilliant successes which they have from time to time achieved in finding for them means of employment. Now a new field, and a remarkable one, appears to have been evolved by those who are responsible for the management and conducting of the General Institution for the Blind, Carpenter Road, Egbaston, Birmingham. Knowing the marvellous sense of hearing and touch generally possessed by the sightless, Mr. H. STAINSBY, the secretary, suggested the possibility of a blind girl or boy's being able to operate a small switchboard in a subscriber's office. The suggestion was made to Messrs. Parker, Winder & Achurch, Limited, of Broad Street, Birmingham, and this firm, with what has proved to be considerable forethought, adopted the suggestion. Their installation consists of a small private branch exchange with five junctions and eight internal stations. This exchange is now, and has been for some fifteen months, operated with marked success by a totally blind operator. The subscribers state that the work is now done far better than it ever was in the past. The operator is quick, intelligent and accurate, and, from the National Telephone Company's point of view, the arrangement is most satisfactory, inasmuch as the attention given at the subscriber's end is beyond reproach. The compliment paid by a National operator to her blind *confrère* when she said, "I wish every operator on a subscriber's premises was blind," testifies eloquently to this, although her wish might have been differently expressed. There would naturally be a limit to the number of lines operated by a blind operator, but for a small installation the services of a properly trained blind operator prove of great value all round. With a view to training boys and girls for this new field of labour, and for the purpose of providing adequate telephone facilities throughout the building the Blind Institution has installed a private branch exchange on its premises consisting of the following apparatus:— A sixteen-line switchboard on which terminate two junctions, ten ordinary internal pedestal extensions and one special extension. The switchboard is equipped with a headgear receiver and breast-plate transmitter which are used by the blind operator. One of the ordinary pedestal extensions is fitted in the same room as the switchboard and is used by one of the officials of the asylum for ordinary business purposes, and as a supervising instrument for the purpose of instructing and assisting the blind operator until she or he is proficient. This extension is also used for answering any calls on the switchboard after office hours, when the blind operator is no longer in attendance, and to save time in bringing the breast-plate transmitter and headgear receiver into operation.

The special extension already referred to is only special in so

far that instead of an ordinary table instrument being used in connection therewith, the extension terminates on a headgear receiver and breast-plate transmitter, so that it can be used as a dictating set by a blind typist. It is provided with an extension bell as a means of calling the typist, and with a hand generator to enable the latter to call the operator at the switchboard. This special extension is fitted in the special typewriting department of the Blind Institution and letters are thus dictated from any of the ordinary extensions direct to the typewriting room.

At the present moment there are five boys and three girls under training at the Blind Institution as telephone operators.

Blind operators can, so quick is their hearing, in a very short time after they have commenced to operate a particular switchboard, tell by the sound which indicator, or which of two or three indicators, has fallen. They can, in any case, by a delicate touch of their finger tips—so light that they rarely "throw" another indicator—at once insert the answering plug into the proper jack of the indicator which has fallen. They are equally expert at clearing.

It may here be stated that the apparatus used by a blind operator is of the ordinary pattern. There are no raised figures, special marks, etc., of any kind. Thus, standing behind an expert blind operator, one sees the latter equipped with headgear receiver and breast-plate transmitter waiting with the answering plug in the right hand ready for a call. An indicator falls and the left hand of the operator goes swiftly forward and the finger tips usually find and replace the indicator without hesitation. With the right hand the plug is simultaneously inserted and the name of the operator's firm given smartly. It is a question whether the casual observer would know that Messrs. Parker, Winder & Achurch's operator, for instance, was sightless, unless previously informed.

To briefly summarise the difference in methods between an operator who is not blind and one who is, it might be said that the former on receiving a call, plugs straight into the proper jack without using the left hand, or withdraws the plugs similarly, whereas the blind operator whenever plugging in, or clearing, stretches the left hand forward to—so to speak—check the operation. This of course refers to operating purely. The only other dissimilarity between the two operators' methods is that the one to make a note uses pencil and pad, and the other a "shorthand typewriter."

A reference has been made to the typewriting department of the Blind Institution and to letters dictated from the extension instruments in the executive departments of the institution.

These letters are taken down on a most ingenious instrument which can only be described as a "shorthand typewriter." One of these shorthand-typewriting instruments is also necessary for each blind telephone operator. A short description of this typewriting instrument is both interesting and necessary, and is given below, but its use in connection with the switchboard operator is simply to record any messages or numbers she or he would, if blessed with sight, note with pencil and pad in the ordinary way. The shorthand-typewriter instrument itself consists of what in appearance looks like a modified form of ordinary typewriter with seven keys. One of these—the centre one—is a shift key, the others being ordinary keys. A speed of 140 words per minute has been attained. The machine is entirely automatic, the operator having absolutely nothing to do but to press the keys. The matter is recorded on a roll of paper which travels along a tray and into a basket, the paper being automatically pulled forward at each depression of the keys. When the dictation or speech is finished, the operator winds the paper back again on to the original spool; it is then ready for transcribing. For reading, the paper is wound off into the basket again by means of a milled knob in front of the machine, the operator reading the matter as it travels along the tray between the embossing die and feed rollers. There is an immense advantage in this arrangement, especially when transcribing notes, inasmuch as the operator can take his fingers off the embossed shorthand, transcribe a sentence on the ordinary typewriter, and instantly replace his fingers on the exact word at which he left off. This cannot be done where the matter is written on a sheet of paper. The roll of paper contains about 200 yards, and for office work will last several days, and when it runs out or becomes broken the operator is instantly notified by the striking of a bell. A new roll of paper can be easily and quickly fixed.

should be observed that the ordinary Braille alphabet is used, and that any number of the six points can be embossed at the same time. The paper then moves forward to the next sign.

A very important feature that has been embodied in the patent is the spacing arrangement. By a simple device, the space between each word is simultaneously made with the last letter of such word or phrase. While it writes the ordinary Braille system, it was designed especially for writing the "Birmingham (Blind Institution) System of Embossed Shorthand." The speed which an ordinary blind typist attains may be taken as 80 to 100 words per minute, although the extraordinary speed of 140 words per minute is attained by Mr. M. MYERS of the Blind Institution.

It may be considered that space has been somewhat encroached upon to describe this "shorthand typewriter." The necessity for this description is evident when it is remembered that without such a machine a blind telephone operator would be practically an impossibility. It is understood that the Blind Institution affords facilities for each blind operator engaged by a firm to have the use of one of their shorthand-typewriting instruments and the blind operator makes her, or his, own arrangements for being brought to, or taken from the subscriber's premises daily. Thus the employer is in no way affected by the fact that his employee is sightless, and only those who have been a victim of the fatal policy of being left to the tender mercies of that most irresponsible of persons, the office boy, fully appreciate the blessing of coming in contact with (either at his own end or the distant end of the wire) a blind operator. The latter of course has nothing to do but telephone operating, and herein probably lies half the secret. Nor must it be overlooked that, as a class, the blind are far more enthusiastic and conscientious in their work than their more fortunate brethren.

Probably it will be wondered how a blind operator can find telephone numbers. A moment's consideration however will show that it is not the operator's duty to turn up telephone numbers, but the duty of the person who wishes to make the call. Still in the case of an operator at a private firm, even when blessed with sight, it is marvellous how telephone numbers of correspondents are remembered, and it is a question if a sightless operator is not even more gifted in regard to memory than one endowed with sight.

“COMPULSORY TELEPHONE ECONOMICS.”

Apropos of our editorial last month in which the attitude of a section of the Press is referred to, *Electrical Industries* takes some of our newspaper and municipal critics to task in the following forcible article entitled "Telephone Twaddle":—

"If the general newspaper and municipal criticism of telephone matters does not rise a little above the present level, Mr. SYDNEY BUXTON will be forced to make telephone economics a compulsory subject in schools. As an example of intelligent Press comment we may quote the *Grimshy Telegraph's* remarks on the dispute between the Cleethorpes District Council and the National Telephone Company as to whether £10 or £4 should be paid for certain wayleaves. The *Grimshy Telegraph* does not agree with the Company that £10 is an excessive charge 'when one considers the amount charged by the Company for the use of their instruments. They, of all people, should be the last to complain of a charge of £10 being "excessive." It does not seem to strike our contemporary that if the Company's charges are really excessive the cause may lie less with the greed of the Company than the obstructive avarice of those who demand extravagant sums for wayleaves. The constant repetition of incidents of this kind should force Mr. Buxton to get the question of wayleaves put upon a proper legal basis. The process of bargaining with ignorant councils and mean landowners is out of date. An equally narrow view of the tariff question is taken by the Westmorland City Council which objects to the new message rate system because the Company in 1894 arranged with the Kendal Chamber of Commerce to provide an unlimited service for £8 10s. a year. The arrangement now suggested is £6 for 500 calls with penny junction fees. Mr. PATTINSON, who moved a resolution of protest, raked up the usual stupid comparisons between rates in Westmorland and in Canada, the United States, France and Germany. He does not seem to be aware that it is the message rate system which has accompanied the greatest development of telephone traffic, but he was not above threatening the Company that the payments for

wayleaves would be increased if the Company did not meet the council on the tariff question. We hope that in time Mr. PATTINSON will come to regard this threat as his soundest argument."

WIRELESS TELEPHONY.

It is announced, says *Electrical Engineering*, that considerable progress in wireless telephony is being made by the Amalgamated Radiotelegraph Company in Berlin, where experiments are being carried out under the direction of Dr. Seibt. Following the successful communication with Weissensee, about five miles from Berlin, conversations were exchanged last week between Berlin and Juterbog, over some 40 miles. It is stated that the company intend next year to establish wireless telephonic communication between Oxford and Cambridge. The *Daily Telegraph* reports that successful trials of a new system of wireless telegraphy and telephony have been made between the Poulsen station at Lyngby and Esbjerg, a distance of about 200 miles. The new system, which is the invention of Herr Aron von Lepel, is said to be much cheaper to instal, as the apparatus is much smaller and lighter than that required for existing systems. Experiments are to be made between Esbjerg or some German station and England.

A subsequent issue of the same journal says: Our Copenhagen correspondent writes that Mr. Valdemar Poulsen succeeded last week in establishing connection between Berlin and Copenhagen by wireless telephony. The receiving station was the same as he has been using for wireless telegraphy at Lyngby, and the other station was at Weissensee, near Berlin. The distance between the stations is about 300 miles. A gramophone played some pieces of music and various songs. As yet no technical details are available, but it is considered that the results are promising, as the station at Weissensee is very primitive. The station at Lyngby, used as a wireless telegraphy station, has been in connection with the west coast of Ireland and with St. Petersburg, with complete success, and it is stated that Poulsen is at present experimenting with apparatus that will take down the messages "in writing," and has also achieved good results.

At a recent meeting of the Association of Naval Architects in Berlin, we learn from the *Electrical Review*, Count Arco, engineer and technical director of the Gesellschaft für Drahtlose Telegraphie ("Telefunken" system), stated that "Telefunken" no longer confined itself to the production of electrical oscillations by the emission of sparks: the company was now in possession of a new and reliable method, by which uninterrupted oscillations were produced by means of arcs. The company adopted this method almost exclusively for telephony. The Telefunken Company has already standardised wireless telephone stations for military and also for ordinary purposes, and its achievements have made rapid strides during the past year. The first demonstration took place in December last year before officials of the German Imperial Post over a distance of 36 kilometres, the messages being received by means of the 100-metre tower at Nauen. The same distance can be bridged to-day by the Telefunken Company, and the messages more clearly received, with masts only 20 metres in height. Last month messages were transmitted from Westend, near Berlin, to Rheinsberg, a distance of 75 kilometres, and were absolutely clear when received: masts about 26 metres in height were used at both stations. The energy used was also only about one-third of that used at the earlier demonstration. In spite of the favourable results of these trials the lecturer considered it improbable that wireless telephony would ever seriously compete with wireless telegraphy. He expressed himself as equally sceptical in regard to the general adoption of oscillations produced by means of arcs for wireless telegraphy. He considered that the spark method would become more widely used, although there was room for improvement—particularly in regard to its tuning capacity and freedom from disturbance. It is now possible to telegraph over a distance of 75 kilometres with a portable military station, using only 200 watts and masts only 12 metres in height.

HOW NOT TO REGULATE TELEPHONE TRAFFIC.

If you have ever had to tell your life story over a telephone to the office boy at the other end of the wire, you will know what humiliation means. The other day I had reason to 'phone to a friend about an appointment and having secured his number I put my usual query, "Is Mr. G— in?" "Who are you?" demanded the voice, evidently that of a new boy who did not know me. I gave my name and heard him scratching it on a sheet of message paper. I waited what seemed half a minute then heard a boyishly pompous "Now, sir, what's your business?" This was distinctly annoying, but remembering he was a new boy I told him I was a personal friend of his employer and my name would be sufficient.

"Very sorry, sir, but I cannot do that. My orders are to put no speaker through to him who refuses to state his business."

I argued that Mr. G— did not want to know my business, that he knew it already. I was now beginning to enjoy the fun.

"But I don't know it," persisted the boy. "Can you tell me something about your work?"

This finished me, but before putting back the receiver I told that boy what I thought of him, and what an anxiety he would ultimately become to his friends. Next day I called upon Mr. G—; but I will say no more as we are not on speaking terms now.

If you have a lot of telephone traffic put a judicious person in charge not a wooden-headed youth who does not know how to act. Much business is to-day done over the wires and there is room for plenty of improvement in telephone despatch. What good is it to have to wait five minutes and spell your name five times to five different persons before you get the right man? Is that you? —*Northern Daily Telegraph*.

The National Telephone Journal.

"BY THE STAFF FOR THE STAFF."

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THE SUBSCRIBER'S PART.

THE part played by subscribers in the efficiency of their own telephone service is much greater than most of them imagine. Indeed it is not too much to say that the quality of the attention given at the subscriber's end of the line can make or mar his telephone service. Who has not within his experience rung up a friend or business client, and been answered by the office boy? So far, so good; to establish instant personal communication with a man is not always feasible, even if we call at his office. Our correspondent may be engaged, and we must wait or call again. But how frequently at the telephone of a large firm the office boy, without declaring himself, encourages or rather exhorts us to relate our business to him with great circumstance and particularity of detail, and at the end of the recital, remarks with cheerful stupidity: "One minute, sir!" and forsakes us for two, ultimately bringing back to the telephone a person even more opaque than himself, to whom we obediently restate our case, only to learn: "Oh, you want Mr. SMITH." Marking the flight of time with drumming fingers, we await the slow approach of Mr. SMITH to whom we relate our thrice-told tale, with the result that he informs us that the matter does not come within his purview, and that our proper interlocutor is out. Such incidents as these—unfortunately far from rare—prejudice the Company very gravely with the unthinking, for of course they reflect unfavourably on the telephone service, and illustrate better than any closely reasoned argument the important part played therein at the subscriber's end.

On the other hand we may call up a large company with many departments, anticipating some difficulty in getting in direct touch with the particular official with whom we wish to speak, and find ourselves answered by an intelligent operator who on learning the name of the person required, connects us to the telephone on his desk, and we at once hear (without the vexatious intervention of

third and fourth parties) our friend's voice replying. Such are the facilities for direct communication afforded by the private branch exchange system. "Look upon this picture and on that," we may well say, "Hyperion to a satyr!"

Between these two extremes there are, of course, many degrees, and a special switchboard attendant is not a necessity to a subscriber with a moderate volume of traffic. But what is a necessity is that the telephone should always be intelligently answered, and that clients who approach a firm through that channel should at least get the courtesy they would get at the counter, or in correspondence. An important feature—and one which the subscriber seldom seems to realise—of this parleying with correspondents at the instrument, and a necessary concomitant of this rushing to and fro, delay, and annoyance, is that the telephone is blocked meanwhile for other inward calls. Customers and clients are wondering (and declining to believe) that this telephone number can be so long "engaged"; business is being lost; and, incidentally, the Telephone Company is not escaping its quota of abuse. The waste of other people's time at the telephone is a vice which the unlimited service rate has fostered, and one which has grown upon people without their perceiving how banefully it reacts on their own business. It is surely not a counsel of perfection that the telephone bell should always be answered promptly, answered courteously, and answered (without more than one intelligent intermediary) by the right person.

RATE REFORM ON TWO CONTINENTS.

Two significant items of news appear in the columns of the JOURNAL this month—namely, the conversion of the Postal Administrations of the Transvaal and, what is still more important, of Germany, which possesses the largest telephone system in Europe, to measured rate principles. Thus do the principal nations gradually come into line, for there is a marvellous similarity between Manchester and Melbourne and Berlin and Johannesburg when it comes to the manners and customs of subscribers and the difficulties of telephone administrators. America has been followed by Great Britain and that in its turn by Austria, Australia, the Transvaal and Germany, whilst the inequalities of the flat rate have also become apparent to the French Government.

The COLONIAL TREASURER for the Transvaal, with a freedom of expression denied to Ministers on this side of the equator, fears a tendency of large users to "squeal" if deprived of the right to talk on the telephone all day for a specified moderate sum; and the German official memorandum observes that under the flat rate the load on the subscriber's line is abnormally heavy and, moreover, increases from year to year. The Berliner who now pays £9 for the right of making unlimited calls will in future have to pay £10 if he makes 2,000 during the year, and if he is so greedy as to overload his line to the extent of 6,000 calls a year he will pay £19 for the privilege instead of, as at present, £9. It will be observed that a Commission is to consider these proposed rates, and, no doubt, the objections of the large user will be loud and numerous; but gradually business men of ordinary acumen will come to see the obviously bad policy of overloading their lines and practically closing them to inward calls—as often is the case—at all but rare and haphazard intervals. The ideal service is many telephones at

low annual rates and with light loads, and this is impossible under a fixed rate designed to cover the telephonic excesses of the few.

Meanwhile, with a quotation before us from the official *Reichsanzeiger* proposing to raise the existing rates for large users to anything over £20, the homilies preached to us by sundry Chambers of Commerce on the text of an illusory £5 rate lose something of their force.

A TELEPHONE INFORMATION BUREAU.

THE telephone has been put to a new and interesting use in Cardiff. In the public library of that town an information bureau has been established from which professional and business men can, by means of the telephone, obtain information on all possible subjects with the minimum of delay and trouble. Mr. BALLINGER, the librarian, is to be congratulated on initiating a departure which cannot but be of the greatest public utility, and which is susceptible of many far-reaching developments. The idea was suggested by a telephone message from a scientific man who, unable to find time to make a personal call at the library, rang up to enquire the name of the maker of an instrument of unusual type in order that he might telegraph for one. The information was quickly placed at his disposal, and it then occurred to the librarian that there must be many similar cases in which the unequalled resources of a public library could be rendered of immense service to citizens if they could be made available by the time-saving medium of the telephone. He accordingly placed a scheme before his committee which, after duly weighing objections to the project, instructed him to proceed with it.

It is an unfortunate but undeniable trait in human nature that in the consideration of reforms, new inventions, and other phenomena of social progress their abuse rather than their use, their drawbacks rather than their benefits loom so largely in our view. The private individual solicited to take the telephone service only sees his privacy invaded, and imagines himself at the mercy of all and sundry who are in possession of the price of a telephone call. The invention of X-ray photography caused retiring souls to contemplate with dread the day when the secrets of their anatomy should be the prey of nefarious snap-shooters. In the present case the fear immediately springs up in the mind that an information bureau would be pestered by idiotic and frivolous questions, especially when one remembers how the correspondence columns of newspapers are burdened with enquiries which the most easily available books of reference would answer; but, after all, it will be seen that it should not be difficult to reduce the number of such questions by systematic discouragement, and the frivolous would soon lose a relish for telephoning to the library on a vain quest.

When it is remembered what an array of encyclopædias, dictionaries, lexicons, bibliographies, gazetteers, directories, compendiums, indexes, registers, peerages, handbooks, atlases, guides, and other books of reference a well-equipped library possesses and when in addition these are handled in a systematised method by expert library assistants, it needs little imagination to understand what a boon it would be to the busy commercial and professional man to have these ready references available at the other end of his telephone. Moreover, enquiries of a reconдите nature, or involving elaborate research can be, as at Cardiff, dealt

with by placing at the disposal of the enquirer all books dealing with the subject. These are first collected together by an experienced member of the staff, and a telephone message then intimates to the enquirer that they are ready for him to call and consult them. In fact, the idea has an unbounded scope of usefulness, and we await the development of this new application of the telephone with considerable interest.

STAFF FELLOWSHIP.

THE question has been raised by a correspondent of the desirability, "from a disciplinary point of view," of encouraging, by publishing accounts of their varied functions and sports, social good fellowship amongst the staff.

Our attitude towards a salutary intercourse between grade and grade and district and district has, we think, been consistently shown all along by articles and comments on the subject. The feeling of the directors and higher officials of the Company has been plainly indicated by their patronage of clubs, societies, and athletic associations, and by their active participation in social functions.

The "element of collusion" which is sometimes feared does not necessarily require the atmosphere of a club or social gathering to bring it into being. Nothing will prevent two men on a given staff forming a friendship; and that a senior should be unduly lenient to the faults of a junior whom he personally likes, or that conversely a junior should fail to be a check on a friendly senior, does not need that they should go in to bat together or be emulous rivals at chess. But we imagine that it is the province of a district manager to detect and suppress collusion amongst the staff from whatever cause arising.

On the other hand, the advantage derived from knowing those with whom we have to deal in our daily activities is almost incalculable, and the cultivation of good feeling cannot fail to make the wheels of business run more smoothly. To see, to know, to understand, and to appreciate those with whom we correspond, and with whom we co-labour, this makes for the facilitation of our work; and the spirit of co-operation thereby engendered acts beneficially on the furthering of the Company's interests. The man whose gruff tone or impatience on the telephone did not conduce to willingly lent assistance is now more favourably recalled and attended to; and the chief, perhaps exacting and austere in the office, is known to be kindly and genial in the social circle, and his calls upon his staff are responded to with greater alacrity.

Against this we have the picture of a staff working in tight compartments, jealous of and hostile to other compartments, each consumed with a zeal to trip his fellow-worker, thrust him from his place and supplant him. This active jealousy may conduce to a certain internal efficiency and smartness, but it is obtained at a cost to the Company of harmful inter-departmental friction, and of a tendency to set oneself right at all costs and to hamper rather than aid other districts. It is productive of a narrow-minded stamp of officials who, whilst they are good disciplinarians, are little more, and whose potentialities will never react to the benefit of the Company in the same way as those of officials guided by a broader-minded spirit.

HIC ET UBIQUE.

SAYS the *Springfield (Minn.) Advance*: "There is a telephone rate war on at Butterfield, and, while some of the residents of that village think they are being robbed by the telephone company, Bro. Eb. HUNTINGTON says they are not paying a dodgasted cent too much for the service they receive." Transpose any commercial community for those worthy residents, and any Postmaster-General for Brother Eb. HUNTINGTON and you have in Butterfield the telephonic macrocosm in miniature.

WHAT may be called the hippophone seems to be the latest from America.

"It is well known," says the *Electrical World*, "that the horse is very sensitive to electrical effects, but this condition has not previously been utilised, except by jockeys and gamblers, in horse races. An ingenious device by which the horse is made a part of an electrical circuit has been reported to the War Department by Lieut. A. C. KNOWLES, 13th Infantry, at Fort Leavenworth, who has been making tests intended to permit telegraphic and telephonic communications between mounted operators. This will permit the mounted operator to transmit messages to his base wherever necessary without stopping his horse, and is accomplished by placing a small piece of copper, properly connected to the instrument, against the animal's body, thus completing a ground connection through the horse's hoof. Conversation was carried on without difficulty between two operators separated by five miles, the horses standing in the grass."

The *Electrical World* does not say what happens if anyone pulls the horse's leg.

PARISIAN papers contain a description of a new device which it is rumored is to be introduced into the new common battery installations. This is a "barker," which has nothing of the canine about it, but is an appliance which emits a barking sound when a negligent subscriber fails to hang up his receiver after he has finished within the telephone. The noise is said to be so disagreeable that the subscriber hastens to remedy his omission rather than endure the bark.

Electrical Industries suggests to the POSTMASTER-GENERAL the desirability of making telephone economics a compulsory subject in schools. There is much in the idea, which if carried out would be productive of some matter for instruction and entertainment. Students might be relieved of the illusion, only too prevalent, that all that is necessary to connect a subscriber with the exchange is to run about a shilling's worth of wire to the pole in his neighbour's garden, or solder it in some wondrous manner to a wire passing near his window. It could also be explained that it is impossible for a subscriber to have an operator at the exchange all to himself in his busy hours when he is not willing to pay even half the amount of an operator's wages for his telephone; that if a really princely sum was paid in wayleave rent for every pole, cable or attachment, the service would be an economic impossibility; and that if he has an expensive junction wire many miles long at his exclusive disposal for a period of three minutes for the sum of twopence he is not being robbed.

THE public has a vague idea that these payments are all made on a large scale, and that by spreading them over a large number of subscribers the service is made a commercial possibility. This, of course, in a general way is correct; but when the public undertakes to criticise the various heads of payment and the various rates of charge it becomes necessary that they should have some rudimentary ideas of telephone economics, otherwise they seem likely to fall into the error of the comic paper tradesman who said, "Yes, I lose a farthing on each article—but it's the quantity that pays!"

FOREIGN INTELLIGENCE.

Denmark.—The new directory of the Copenhagen Telephone Company shows that the number of subscribers' stations in Copenhagen and neighbourhood has increased during 1907 from 30,306 to 34,100, and the total for the island of Sealand from 37,846 to 42,800. There are 1,699 officials in the employ of which 1,114 are women, 1,052 being operators and four being classed as workmen and foremen!

Canada.—The Bell Company's system in Manitoba has been purchased by the Government for \$3,300,000. The present number of subscribers is about 14,000.

THE OPERATOR'S POINT OF VIEW.*

BY WINIFRED M. ETHEREDGE, *Traffic Department, London.*

I MAY as well say at the beginning that this makes no pretence of being a technical paper. There are doubtless many present who could set me right at once were I to open my mouth on technical matters, and perhaps I shall make some statements which will rouse your amusement with your wider knowledge of telephony of which I only know the A B C, but you must remember all the time that I am at present trying to put before you exactly the operators' opinions of things, and the operator being only a part of the scheme only sees her own particular part and does not understand how it has to fit in with the whole general plan.

To an audience, such as this, it is unnecessary to point out that the operator is very different from the general outside conception of her. It is quite unnecessary to remark that she has other things to do than pass her time with crochet work, novelettes, or even a sly cigarette. We all know that the telephone operator is the usual business girl of various types. So we will come to our point without any further digressions and consider what the operator thinks about things.

The first points to be mentioned are the three cardinal points of operating as shown by a little pamphlet carefully fixed at the commencement of the operator's rule book. These are politeness, accuracy and speed.

There's a great deal in these three points I've no doubt, but there is also a great deal that isn't in them. Politeness sounds very well in theory, but an experienced operator will tell you that in practice it is tact rather than mere politeness that is needed. Tact is certainly an operator's most valuable asset. A studied civility will speedily degenerate into something soulless and mechanical if not carefully watched. And it is not by any means an easy task when dealing with hundreds of calls to greet each caller with a bright cheerful response as if he were the only one to be considered. There are often emergencies when mere politeness is useless. If a subscriber is somewhat out of temper—not a very rare occurrence among city men—and has been worrying his operator all the morning and making himself a general nuisance—and, what's more, knows it too—a cold mechanical civility only irritates him the more; or if the operator keeps a smooth unruffled temper before all his heckling, and still answers him as politely as if he were the most considerate of subscribers it makes him feel a bit of a cad, or else he thinks she is laughing at him. In either case it does not improve his temper as no man likes to be made to feel that he has been behaving caddishly. Tact and an even temper will do wonders where an ordinary politeness would fail. And there are always difficulties arising which cannot be dealt with by any rule from the book. When an irascible caller tells one in a very forcible tone to go to a certain place, notorious for its hot climate, a polite reply seems somewhat inappropriate, and the remark "Junctions engaged, shall I ring you?" is not calculated to lessen his wrath.

With regard to the other two points, accuracy and speed, the value of these cannot be disputed. Both are extremely essential to good operating and neither of much value without the other or the first and most important quality, tact in dealing with subscribers. Let us take it for granted then, that our operator is fully trained and competent and has the three cardinal virtues, and consider for a few minutes the principal points which go to make or mar her work when taking up her position at the switchboard. To quote an old saying, "The proof of the pudding is in the eating," and it is when they come to be put into practice that many theories prove to be inadequate and many undreamed of obstacles and difficulties arise. From the operator's point of view the three things on which the efficiency of her work depends are firstly, junctions; secondly, maintenance; and thirdly, the subscribers themselves.

To begin with junctions. Sufficient junction communication to all exchanges and thoroughly efficient "B" operators (*i.e.*, incoming junction operators) at the distant end are very necessary. If either is lacking the operator's work is hindered and hampered to a very great extent and speed is absolutely impossible. It is absolutely

* Abridged from a paper read before the London Telephone Society.

essential that all calls should be completed as quickly as possible and off the operator's hands, and directly a hitch in the usual course of operation occurs, calls begin to accumulate and trouble begins. In this way a slow "B" operator or insufficient junctions to one important exchange can hinder, and to a certain extent, disorganise the work of another. An "A" operator (*i.e.*, subscriber's operator) ought to be able to ask for her number on the order wire, obtain a junction immediately, and be sure that the line required is properly connected at the distant end so that the connection may be completed in the fewest possible number of seconds.

Maintenance is the next point. There can be no thoroughly efficient operating without good maintenance. This refers not only to subscribers' lines and instruments, but to switchboard apparatus. In the case of subscribers' lines it is important, from the operator's point of view, that these should be all in order. A line that is perpetually faint or intermittent, or a subscriber who continually complains that his extension bell does not ring and his private wire is out of order, can be a source of continual trouble to an operator. But the importance of good maintenance is even more apparent in the case of the switchboard apparatus; a good instrument is very essential to an operator. Then with regard to cords, keys, buttons, etc. When these are all kept in good repair, so that the operator can avail herself of the fullest capacity of her position, the work goes much more smoothly. Maintenance of exchange apparatus is a point that has improved enormously during the last six or seven years.

As for triggers. Well, I used to repair my own. I refer here to the old-fashioned listening keys at magneto exchanges, which are pulled forward for the operator to go into circuit. We all used to repair our own triggers as far as possible when I first entered the Company. There were various methods of doing this. A penknife was a useful tool, and periodically we used to tighten our screws to keep the triggers firm.

Then sometimes a key would get very stiff, and positively refuse to move without a herculean effort. There was a very good remedy for this, and that was blacklead pencil. Blacklead pencil carefully inserted back and front and worked up and down in the joints would prove an effectual loosener to the most stubborn key, and in this way we used to keep all our triggers easy and well oiled as it were. Then at one time it was not at all unusual if a board went out of order during the busy hours of the morning for the operator to stand out half an hour at a time while the inspector hunted round for his screwdriver or pincers or soldering iron—all for a little job which two minutes would put right. These, however, are things of the past, and the present maintenance can, as a general rule, claim exemption from guilt of any such vagaries.

Then we come to subscribers. There are subscribers and subscribers; they are of many sorts and varieties. But subscribers, too, have improved. Five or six years' education by smart operators has managed to instil some sense into the most erratic of them. The service does depend a great deal on the subscriber, and until we get a perfect lot of subscribers a perfect service will be an impossibility. From an operator's point of view I do not know which are the worst—the men who always grumble and growl, no matter what is done for them, or the men who think unreasonable abuse and faultfinding can be amply compensated for by an offensive familiarity. A subscriber who treats his operator with a businesslike politeness and consideration will get the best possible service from her, while she hasn't much respect for a man who alternately abuses or flatters her. Boys are one of the worst nuisances of the telephone. There is no accounting for the vagaries of the office boy, particularly if there be two of the tribe together. It is quite possible that he is having a quiet game of football, if all attempts to gain his attention for ten minutes prove unavailing. He will come presently and express his surprise and regret at the fact that you have been unable to get him, or else tell you point-blank that the bell hasn't rung. I remember one boy who used to speak in the most confidential tones, and who had a habit of making his own abbreviations in imitation of the "Av" and "Wall" and "Pad" which he heard on the order wires, and many were the weird combinations which resulted. "245 Bat" or "23 Croy" were easy, but when it came to "Mans" for Manchester and "Glasg" for Glasgow it was time to draw the line.

I had a somewhat amusing experience once, when I was quite a

junior operator, with a subscriber on my board, one New Year's Day. He was a Scotsman—I hope that anyone present from the land o' cakes will not take this as anything but a compliment—and no doubt he had been celebrating the New Year somewhat thoroughly with his native spirit. More than saxpence had gone bang when he rang up and asked for a number. It was engaged and from the distant exchange—Dalston it was—came the hum of the busyback. Dalston had a very loud busyback in those days, one with a kind of triumphant note in it. He gave quite a yell when he heard it, and cried out "Take them away, take them away, I won't have them on my line." He thought it was the bagpipes, and would not go away, but remained at the instrument long after the busyback had been disconnected, protesting that he would not have the pipes on his line; and presently he was on the supervisor, telling her all his troubles. That awful operator had been annoying him all day and now she would put the pipes on his line and wouldn't let him have any peace. He wished she'd take the girl away and let him alone. One more subscriber I must mention, and he was a very well-known offender at the time. It was his practice to ring up after seven in the evening, and about five o'clock on Saturday when the operators were slack, and try to draw them into conversation. There was no getting rid of him. He would take no snubbing and, no matter what was said to him, persisted in remaining at the telephone asking silly questions and making senseless remarks. It was impossible to ignore him or silence him with the usual schedule answers. Even the best of operators found it hard to tackle him. The conversation would go something like this:

"Number, please."

"I say. How's your little dog?"

"What number, please."

"I asked how your little dog was."

"Do you want a number, please?"

"No, I want to know about your little dog."

"I haven't got a little dog. If you don't want a number don't keep ringing up."

"Yes, you have got a little dog. You told me it was a bigger dog than mine."

"I don't know anything about the dog. Do you want a number?"

And so forth.

It was no use reporting this particular subscriber for when the matter was taken up with him, he would blame his clerk and be most profuse in his apologies, then ring up half an hour later and repeat his performance. I won't say anything about the best method of dealing with such frivolous calls, but I know what we used to do—and that was connect him on a spare position with the trigger down for a while, so that he might turn the handle until further notice without any effect.

Such frivolous users are, however, fortunately not very numerous and subscribers are certainly nowadays much more intelligent than they used to be, though there is still plenty of room for improvement.

The spread of the private branch exchange system has probably had something to do with this, as there are now so many big firms with an up-to-date switchboard and installation, and a Company's operator well used to exchange methods to attend to them, where in the old days there was a pre-historic kind of apparatus and a small boy who divided his attention between that and his halfpenny "hair raiser." But there is a point here that might be mentioned, and that is that unfortunately Company's operators at private branch exchanges are not always quite the model subscribers they might be; but I suppose in those cases where they display an unreasonableness and lack of consideration that one would not expect from one conversant with exchange methods the blame must be laid on the subscribers who are worrying them. We'll say so, anyway.

One final point I must on no account omit. That is the great improvement in the conditions under which operators work now in the matter of personal comfort. A great many advantages and privileges have been gained since I entered the Company nearly seven years ago, and the girls, as a whole, are very happy over their work, in spite of the worries and little annoyances that often arise, and their health and well-being are so well looked after that no one can have cause to grumble. The conditions under which the