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SIMULTANEOUS BROADCASTING.

SHORTLY after 11 p.m. on Sept. 18, anyone who chanced to be listening-in must have been puzzled at the strange noises they heard emanating from the various broadcasting stations throughout the country. No, there was nothing wrong with your set, although you are very wise to always suspect that first; it was only the B.B.C. engineers carrying out a test from Liverpool to all stations. Actually, it was, I believe, the first attempt to broadcast a speech from a public hall to every corner of the United Kingdom. When one considers that approximately 1,063 miles of copper wire in the form of trunk lines and no less than 11 amplifiers were used, it is not surprising that at the onset there was a good deal of roaring and rushing going on. After a few minutes the fault was discovered and rectified, the result being clear, but very weak speech—another pause, and the aerials gave forth really good, strong and at the same time, humorous speech. This speech took the form of a plaintive monologue by an engineer, who was speaking to a microphone on the platform of the empty St. George's Hall, Liverpool. The engineer in question seemed to be bewailing his fate and wondering when that telephone would ring and either stop him, tell him to do more, or sack him altogether. He got his wish for he was soon told to "shut-up" for the night and all was peace.

The next evening was the "grand effort," and when Sir Ernest Rutherford delivered his presidential address to the British Association from the platform of the St. George's Hall, Liverpool, he not only addressed the audience he could see in front of him, but, in addition, his words were heard by a much larger audience spread over the length and breadth of the British Isles.

The words uttered by Sir Ernest Rutherford were picked up by a microphone, passed through an amplifier, and then along trunk lines to London, *via* Manchester. The B.B.C. station at Manchester tapped the lines as they passed through and radiated the speech from his own aerial. That accounts for Manchester. On arrival in London, however, the speech was distributed through five different amplifiers to more trunk lines, *i.e.*, those running to Glasgow, Newcastle, Cardiff, Birmingham, and last, but not least, 2LO.

Think of it! Every word spoken by this great scientist was being scattered to every corner of our country, aye, and further still, for aught we know. The listener in Scotland would actually hear the utterances of Sir Ernest Rutherford before the man at the back of the hall in which the address was being given. Compare, if you will, the different speed of electricity and sound, and you will see the reason for that apparently "tall" statement.

You will gather, from what I have previously said, that London appears to be a sort of exchange. Well, so it is. By means of a system of plugs and jacks and sundry other "gadgets," "juggling" with trunk lines has been brought to a fine art at 2, Savoy Hill, the headquarters of the B.B.C.

On one occasion, for instance, Newcastle programme was relayed to Glasgow, Manchester programme to Cardiff, and London programme to Birmingham, all at the same moment, and the first-named station in each case continued to radiate from his own aerial.

In conclusion, I would like to say that it is owing largely to the wholehearted and courteous co-operation of the P.O. engineering and traffic staffs that these experiments have been carried out with a minimum of delay or inconvenience.

H. W. LITT.

A STUDY OF THE BAUDOT REGULATOR.

BY F. W. COOK (*Cable Room*).

THE principles on which this piece of mechanism works are dynamical, and to analyse its action it is necessary to commence with the fundamental law of dynamics—viz. :—Force=mass × acceleration (given suitable units)—and that mass being constant any change in Force will produce a corresponding change in acceleration. Therefore, F. varies as a. This is a corollary of Newton's second law which states that "the change of motion is proportional to the impressed force." It is to be observed that nothing is said as to the body acted on being previously at rest or in motion. From the second part of the same law, "that the change of motion takes place in the direction of the straight line in which the force acts," we observe that not only must acceleration be considered positive or negative according to its effect in augmenting or retarding the original motion, but change of direction must also be considered as acceleration. $F=m.a.$ is therefore the fundamental equation of dynamics, and it is required to consider this particularly with reference to force spent in maintaining rotation of mass.

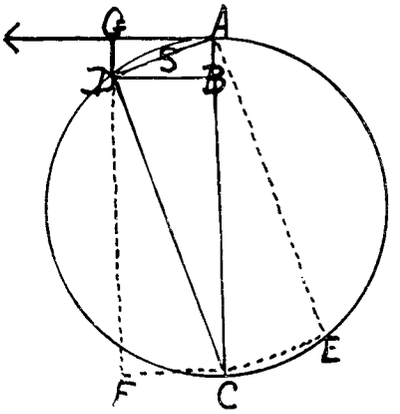

FIG 1.

The inscribed triangle ACD (Fig. 1) is equal to half the area of each of rectangles AECD and ACFG.

$\therefore$ AD.CD=BD (AB+BC)

$\frac{CD}{BD}$.AD=AB+BC

and as $\frac{CD}{BD}=\frac{AD}{AB}$

$\therefore$ AD^2=AB (AB+BC)

But AD=distance the mass has travelled=S and AB+BC=diameter=2r

$\therefore$ $AD^2=S^2=AB.2r$, but $S=vt$

$\therefore$ $S^2=v^2t^2$, and $AB=\frac{1}{2}\ at^2$

$\therefore$ $\frac{1}{2}\ at^2.2r=v^2t^2$

Notation will be as follows :—

a=acceleration.
m=mass.
v=linear velocity.
t=time.
ω=angular velocity.
s=linear distance.
r=radius (or amplitude in the case of regulator).

Terminal valocity=$at=v$.
Average velocity=$\frac{1}{2}v=\frac{1}{2}at$.
Distance=S=vt

AB represents the distance the deflecting force has carried the mass out of its path—*i.e.*, the tangent, and is equal to average velocity×time.

$\therefore$ $AB=\frac{1}{2}\ at.t=\frac{1}{2}\ at^2$.

from which $a=\frac{v^2}{r}$, but linear velocity=radius×angular velocity.

Hence $v=\omega r$, and $\frac{v^2}{r}=\omega^2 r=a$.

From fundamental equation $F.=ma$, we have $F.=m\omega^2 r$.

This quantity represents the entire force spent in maintaining the uniform rotation of the mass m, and is wholly operative along the radius, acting from the centre to the circumference. This was at one time known as centrifugal force, a term now obsolescent—as it does not in itself constitute a force, but is merely the outcome of inertia of matter, and exerts pressure by the tendency of a moving body to maintain motion in a straight line (Newton I), when constrained to move in a circle.

In the case of the Baudot regulator we may consider F_1 to be the total force originated by the driving weight, and F to be the force which is actually delivered at the regulator. F is slightly less than F_1 and subject to small variations. The function of the regulator is to fix the angular velocity and to maintain it as nearly uniform as possible. In other words ω must be constant. By inspection of the relation $F=m\omega^2 r$ or $\omega^2=\frac{1}{m}\cdot\frac{F}{r}$ we see that if ω^2 is to remain constant when F varies, either m or r must vary in the same proportion. The mass is constant, therefore r must vary, and if by the use of springs of suitable tension r can be made to vary as F the stability of ω is secured—*i.e.*, the speed is constant. We will suppose springs are produced capable of extending in exact proportion to impressed force. Let F now slightly change say to Fx, where x may be greater or less than 1. We have $Fx=m.\omega^2.r.x.$ $\omega^2=\frac{1}{m}\cdot\frac{Fx}{r}$ If r now becomes rx, ω^2 is steady, and variations of speed are not possible so long as the same mass and springs are used, for if we increase or diminish the initial tension of the springs, no effect is produced on the regulating function—r merely becomes larger or smaller as the case may be, and the speed of the regulator changes inversely with it. The speed whatever it is remains steady when F varies. (The expression "change of speed" must be understood to indicate changes due to alteration of regulator adjustment, and "variation" to indicate incidental variation when running.)

In a theoretical regulator constructed as above, therefore, changes of speed can be effected, but variations are not possible unless entirely beyond the range of the springs. Unfortunately such a regulator cannot be constructed.

The rule of thumb for regulator adjustment in case of variation runs in effect thus :—

"If the speed varies directly as the amplitude the tension of the springs is too weak. If the speed varies inversely as the amplitude the tension of the springs is too strong." This state of affairs should not occur as we have seen. Let us suppose a case. We add a driving weight thereby increasing F, and observe an increased amplitude and a rise of speed. Applying the rule, the springs would appear to be too slack. Here we are met with a difficulty. F is increased and as ω^2 has also risen r cannot have become sufficiently large. The amplitude is therefore too small or ω^2 could not have risen seeing that m is unchanged. This leads to the paradoxical result that the amplitude is too small on account of slack springs. Similarly with reversed conditions. If we increase F and observe a rise of amplitude and fall of speed, ω^2 is now too small and r therefore too great—tight springs apparently causing too large an amplitude.

As these variations actually occur in practice it is obvious that $F=m\omega^2 r$ is insufficient to cover the facts, and that some term has been omitted in the equation of the theoretical regulator. This new factor must comprise parts previously ignored—the guides, potence bar and screws, the brake drum and axle, and to some extent the springs themselves. These fixed masses virtually constitute a flywheel on the same axle, and evidently must be considered as force is utilised in maintaining them in rotation.

Assume the total fixed mass to be m_2 and the average radius of rotation to be r_2. Also m_1 and r_1 to be the mobile mass and amplitude. The same law of acceleration holds although the force $\frac{v^2}{r}$ is not acting in opposition to spring tension.

F therefore must equal the sum of forces expended in rotating both parts of the regulator.

$\therefore F = m_1\omega_1^2 r_1 + m_2\omega_2^2 r_2$ and as all parts of the mechanism are connected together and revolve at the same angular velocity we have $\omega_1^2 = \omega_2^2$.

$\therefore \frac{F}{\omega^2} = m_1 r_1 + m_2 r_2$ and $\omega^2 = \frac{F}{m_1 r_1 + m_2 r_2}$. This represents the angular velocity of the combined flywheel and regulator.

Let F now be increased to $F+x$, say,

then $\omega_x^2 = \frac{F+x}{m_1(r_1+y)+m_2 r_2}$ assuming r_1 increases by y.

The proportion between the two cases is :—

$$\frac{\omega^2}{\omega_x^2} = \frac{\frac{F}{m_1 r_1 + m_2 r_2}}{\frac{F+x}{m_1(r_1+y)+m_2 r_2}}$$

If the regulator is functioning correctly, we have $\omega^2 = \omega_x^2$ as the speed should not have varied $\therefore \omega^2 - \omega_x^2 = o$, or $\frac{\omega^2}{\omega_x^2} = 1$.

$$\therefore \frac{F}{m_1 r_1 + m_2 r_2} = \frac{F+x}{m_1(r_1+y)+m_2 r_2}$$

Hence :—

$$(F+x)\ (m_1 r_1 + m_2 r_2) = F\ [m_1(r_1+y)+m_2 r_2]$$
$$F m_1 y = x m_1 r_1 + x m_2 r_2$$

This equation shows the relation which must exist between the different quantities if the speed is not to vary with increase of driving force. This is the condition we require. If we had postulated $F-x$ instead of $F+x$ the result would have been $-F m_1 y = -x m_1 r_1 - x m_2 r_2$ which is the same as before. It is evident, therefore, that increase or decrease of F does not affect the relation.

From the above we have :—

$$\frac{y}{x}F - r_1 = \frac{m_2}{m_1}.r_2 \qquad \text{Multiplying by } \frac{x}{y}$$
$$F - \frac{x}{y r_1} = \frac{x}{y}\cdot\frac{m_2}{m_1}.r_2$$

The factor $\frac{x}{y}$ is the ratio existing between an increment of F and the commensurate increase of r_1, and for any given initial spring tension will be a constant.

If we increase the initial tension y becomes proportionally smaller, and $\frac{x}{y}$ greater. Therefore, $\frac{x}{y}$ may be regarded as a measure of initial tension. Calling this quantity β we have $\frac{x}{y} = \beta$ and

$$F - \beta r_1 = \beta.\frac{m_2}{m_1}.r_2$$

$\therefore \beta = F.\ \frac{m_1}{m_1 r_1 + m_2 r_2}$ *i.e.*,— a definite proportion of the driving force.

The factor βr_1 is the product of the initial tension and linear extension of the springs and consequently is equal to the force holding them in extension, and $F - \beta r_1 = \beta.\frac{m_2}{m_1}.r_2$ is evidently the remainder of the force not utilised in maintaining the amplitude, and therefore expended in rotation of the flywheel component. For any given adjustment of the regulator β is constant, and therefore the term $\beta.\frac{m_2}{m_1}.r_2$ is constant, and is equal to the difference between the whole force F delivered at the regulator and the part utilised in maintaining the springs extended to r_1. Suppose β equal to unity by construction, then—

$$F - r_1 = \frac{m_2}{m_1} r_2.$$

(This equation can also be arrived at as follows :—

From above, $\omega^2 = \frac{F}{m_1 r_1 + m_2 r_2}$

Taking partial differentials, ω being a constant

$$\frac{\delta(\omega^2)}{\delta F} + \frac{\delta(\omega^2)}{\delta r_1} = \frac{1}{m_1 r_1 + m_2 r_2} - \frac{F m_1}{(m_1 r_1 + m_2 r_2)^2} = o$$
$$\therefore F m_1 = m_1 r_1 + m_2 r_2$$
$$\text{Hence } F - r_1 = \frac{m_2}{m_1 r_2}$$

Here the Force and the amplitude (r_1) have been considered as varying while the angular velocity remains constant.)

This is a definite relation between the various factors, and a regulator so balanced will give a practically uniform speed. If m_2 or r_2 is zero stable speed can be maintained if r_1 varies as F. This is the theoretical regulator without the flywheel component which is not practically possible, for the mass m_1 cannot be made the whole mass of the regulator. With a fixed mass therefore regular speed is only possible if the difference between F and r_1 is constant and equal to $\frac{m_2}{m_1} r_2$. It will be observed that ω does not appear in this equation, and therefore no indication is given of the actual angular velocity, but only the conditions under which the speed will remain steady when F and r_1 vary. Therefore, $\frac{m_2}{m_1} r_2$ represents a constant quantity by which F and r_1 should differ. Suppose we make r_2 become $r_2 + x$ the value of $\frac{m_2}{m_1}(r_2 + x)$ is greater and the difference between F and r_1 rises. Changes of F are therefore over-registered or over-compensated by the regulator and give a falling speed with a rising amplitude, and a rising speed with a falling amplitude. The springs are not too tight, but r_2 is too large—*i.e.*, the radius of the flywheel component is too large because the potence bar and screws are too high. Similarly if r_2 becomes $r_2 - x$ changes of F are under-compensated, and the speed rises with increase of amplitude and falls with decrease of amplitude. The potence is therefore too low.

It will be observed that alterations of the potence height have a double effect on the regulator, as the initial tension of the springs is automatically changed thereby. To raise the potence bar tends to slow down the speed while the tightening of the springs by the same action tends to raise the speed, and the resultant is the difference of the two.

From the constant $\frac{m_2}{m_1} r_2$ we are also able to deduce that if r_2 be slightly increased and m_1 (the mobile mass) also increased proportionately the functioning of the regulator will be undisturbed. The actual angular velocity will be less, if the same spring tension is maintained, but we are not here concerned with the speed, but with the stability.

We see that to increase m_2 will produce the same result as increasing r_2, and it is therefore not desirable normally to add masses to the potence bar in order to reduce speed as this produces the same variations as too high a potence.

With regard to small changes of speed required to meet ordinary conditions, we have from above :—

$$\omega^2 = \frac{F}{m_1 r_1 + m_2 r_2} \text{ and } F - r_1 = \frac{m_2}{m_1}.r_2$$
$$F = r_1 + \frac{m_2}{m_1} r_2$$

$$\omega^2 = \frac{\frac{F}{m_1}}{r_1 + \frac{m_2}{m_1} r_2}$$ by dividing numerator and denominator by m_1.

$$\text{Hence } \omega^2 = \frac{\frac{F}{m_1}}{F} = \frac{1}{m_1} \text{ and } \omega = \frac{1}{\sqrt{m_1}}$$

From this we see that the speed in a well-balanced regulator varies inversely as the square root of the mobile mass, and by the absence of the other factors in this equation the balance will

evidently not be affected by modifying m_1 to obtain the correct speed.

From the foregoing it will be seen that the quantities $F.m_1 m_2 r_1 r_2 \beta$ are all related and balanced, and in the Baudot regulator designed that the stable speed shall be that which gives an approximate speed of 180 r.p.m. to the brush carrier, and that if one of these factors is far removed from the correct magnitude the balance of the whole is disturbed. It is possible by adjustment of the remaining factors to obtain the same speed of revolution but the regulating function is more or less destroyed. Beyond reasonable limits even adding masses to the mobile mass will destroy this fine balance, and it should not be necessary to add screws and heavy parts, for if the speed is so disproportionately large it indicates that some other factor has been thrown out of balance. The increase or decrease of F_1 beyond reasonable limits throws m_1 out of the centre of its normal range of movement, at which point it is designed to operate, and too large or two small amplitudes should equally be avoided.

From the conditions of equilibration described above it is evident that all the parts of the regulator should be standardised—even the drum on which the brake acts, for if this does not obtain, the exchange of regulators between sets becomes a doubtful proceeding.*

Connection between a theoretical regulator and a simple pendulum.

A simple pendulum oscillates from side to side with simple harmonic motion in the same time as it would swing in a circle with uniform velocity.

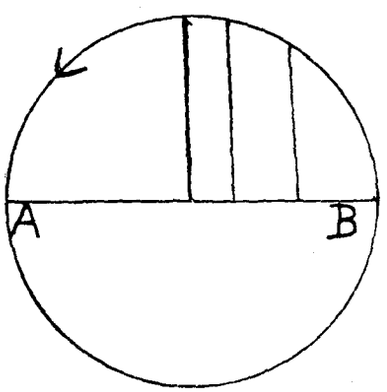

FIG. 2.

If we plot on the diameter of a circle the position at any time of the pendulum bob moving round the circumference, we have simple harmonic motion, and the acceleration of the oscillating point on the diameter at any time is proportional to its distance from the centre. At the turning points A and B velocity is zero and acceleration a maximum. At the centre acceleration is zero and velocity a maximum.

As before, acceleration $=\frac{v^2}{r}$, $v=\frac{2\pi r}{t}$

$$\frac{v^2}{r} = \frac{\frac{4\pi^2 r^2}{t^2}}{r} = a = \frac{4\pi^2 r}{t^2} \text{ and } t_2 = \frac{4\pi^2 r}{a}$$

$t=2\pi\sqrt{\frac{r}{a}}$ = time of oscillation (or revolution).

In the case of a pendulum, r=length (l) and a=gravity (g).

Time of simple pendulum $t=2\pi\sqrt{\frac{l}{g}}$

* Friction on the collar has been omitted to simplify the analysis. This represents the product of the preponderating mass of $m_1 \times \frac{v^2}{r} \times$ the projecting length of the axis, and should not influence the regulator greatly with normal amplitudes.

A GERMAN VIEW OF THE PARIS CONFERENCE ON AN INTERNATIONAL TRUNK SYSTEM.

A GERMAN publication, *Das Fernkabel*, makes some interesting comments on the preliminary conference respecting long distance telephony in Europe which took place at Paris in the spring. With regard to the proposal to form a standing committee with a Secretariat in Paris, it is remarked that this represents a considerable departure from the proposals put forward in Mr. Gill's presidential address to the British I.E.E. These proposals contemplated the creation of a private company on the American pattern, which should construct and work the inter-State European trunk lines in the same manner as in the United States. The political situation in Europe would introduce difficulties fatal to such procedure. The European State Administrations would never agree to place so important a part of their functions in the hands of a private company. Moreover, a separation of the inter-State and internal traffic under existing European conditions is, as every expert knows, technically and economically impracticable. The United States have indeed practically the same superficial area as Europe, but form a political whole for which a single telephone administration is a natural thing. What can and should be agreed upon in Europe is standardized construction and the working of the inter-State lines with due regard to all technical progress. In this direction the Paris conference doubtless indicates a beginning, and one can only hope that the circle of participating Administrations will soon be widened and assume a form appropriate to the importance of the subject of inter-State communication.

For this, above all, the article continues, the co-operation of Germany is necessary. Her trunk system in extent and density is the principal one on the Continent, and her position in the middle of Europe renders it a matter of of necessity that many through routes must cross her territory. Germany has a highly-developed telephone industry, and if progress is to be made, all forces must be harnessed to the task. The same considerations apply to Holland and Scandinavia, whose experiences at this preliminary conference would have been of the greatest utility.

The consequence of the exclusion of experts from all these countries is, continues the writer, that decisions of the utmost importance for the development of European long-distance communication rest, as the position reached significantly shows, not so much on the experience of the bulk of the countries represented at the Conference as on the practice of the American Telephone & Telegraph Co., which has been so favourably regarded in England and other countries where the Western Electric Co. and its associated undertakings have been encouraged to take root. It is comprehensible that American experiences should be utilised at the deliberations of the conference, but has anyone considered the extent to which the value of American experience is discounted by the fact that a single company could thus attain, through its patents, &c., a very powerful position over the national industries of the countries concerned ?

While acknowledging American progress, the writer maintains that in Europe the whole terrain of telephony has been successfully worked over and that it is neither economically nor technically good to cripple competition by standardisation based so largely on American practices. The Administrations represented at the conference can scarcely expect decisions which affect other European countries to be accepted without their technical experts being heard. This applies especially to the question of extending the long-distance cable systems, which are, naturally, the principal subjects of study, for no especial difficulties exist in connexion with open wires.

It cannot be said that the conference concerned itself only with the affairs of the West European countries represented there, and that, therefore, other countries are not concerned. Such a limitation was not intended by the Administration summoning the convention,

and would in any case have been impracticable, because the agreement arrived at by these countries must affect all other European countries in communication with them. Only a common agreement of all the countries interested in inter-State telephone traffic will be able to regulate the technical basis for this traffic. In the opinion of the writer of the article the Paris conference must be regarded as a non-binding preliminary meeting. Its conclusions offer valuable material for the general conference of telephone experts of all European countries which it is hoped will soon take place.

[NOTE.—Our only comment, for the present, upon this expression of opinion, is that although England has admittedly been greatly influenced by the experience and practice of the American Bell Telephone companies, the result has been very far removed from the setting up of any form of monopoly in the manufacture and supply of telephone plant in this country.—EDS., T. & T. J.]

TELEGRAPHIC MEMORABILIA.

THE matter which looms largest in one's mind at the time of writing is the Japanese cataclysm, concerning which every leader-writer and every newspaper correspondent has exhausted his vocabulary in attempts to reproduce a correct picture of the horror.

The telegraph world has a particular tie with Japan for the simple reason that our craft, very specially, is in more or less direct daily touch with this Eastern Empire.

Coming closer home, the C.T.O., London, has been one of the principal centres towards which Japanese telegraph engineers have gravitated for many years past in their successful endeavours to select the type of apparatus best suited to Japanese traffic needs. Those of us who have had the privilege of close contact with these visitors during their stay in this country have been struck by the patience, the painstaking and the meticulousness of their studies and enquiries. We do not doubt that this same patience added to that courage and determination which form so conspicuous a feature of the Japanese national character will all speedily come to their aid in helping them to bring order out of the present material chaos, and among other forms of communication will enable them to re-organise their telegraph and telephone systems. Such re-organisation will surely prove to be a re-construction scheme plus the application of all that is most efficient in modern ideas of the twin crafts of telegraphy and telephony.

Reverently, the telegraph and telephone staffs of our island uncover their heads to the memory of their Japanese comrades who perished while on duty during the late disaster!

All my London wireless friends were loud in praise of the achievement of the British Broadcasting Coy. on the evening of the 12th ult., when listeners-in of the Metropolis were privileged to listen to the deeply interesting, if lengthy, address of Sir Ernest Rutherford, the president of the British Association, given by him before the members in the Philharmonic Hall, Liverpool. Every word of the 80 minutes' lecture was heard as distinctly in London as though one had been at the very side of the speaker.

Writing of this RELAY TRANSMISSION, the *Electrical Review* had just previously described the arrangements which had then been completed between the London and Birmingham broadcasting stations in connexion with the making of a description of broadcasting exchange of the London station.

An abbreviated account of the Birmingham arrangements will enable readers to appreciate the conditions which obtained on the occasion of the successful Liverpool event.

The apparatus at Birmingham was installed by Post Office engineers, under the supervision of Mr. J. A. Cooper, the senior maintenance engineer at the station. It provided for the speedy changing over from Birmingham's transmission to that of London, and additional switches permit the radiation of music from a local picture theatre, near the orchestra of which a microphone panel has been permanently installed. The switching arrangements are so simple that within two seconds the transmission from the station studio can be cut off and that of London, or of the picture theatre, can be substituted. Eventually, when all the stations have been connected to London, the operator at any one of them will have at his command the whole range of programmes transmitted from the company's stations. He may choose one that is desired, switch in the trunk-line on which it is conveyed to his own amplifying panels, and re-radiate it from the aerial at its original strength. The amplifier in use at Birmingham is remote from the transmitting gear, and is contained in the modulating room of the studio. Use is made of three valves in cascade, into which the "speech current" from the land-line is passed. The valves are given a plate voltage of 130, and the current flowing in the plate or "output" circuit varies from .5 milliamp. in the first two, to 6 milliamps. in the third, so that the original current is amplified greatly before it passes to the transmitting gear. The use of many miles of land-line introduces a slight amount of distortion into the transmission, and to overcome it the company's engineers are experimenting with filter circuits. The filtering was pre-eminently successful on the night in question.

RUSSIA.—The Russian Government is about to erect a new radio-telegraphic station on the island of Nova Zembla in order to provide communication with the northern territories of Russia and Siberia.

It is also stated that the People's Commissioners have confirmed a contract of five years concluded between the Soviet Trust and the General Radio Telegraph Co. of Paris, which latter is to supply apparatus for the erection of radio stations in Russia.

BULGARIA.—The London *Times* states that the Ministry of Railways, Posts and Telegraphs is considering a scheme for the erection of a wireless telegraph station in each of the twelve principal Bulgarian towns.

The same authority points out that nearly 46 per cent. of the broadcasting stations which have been licensed in the United States—826 in all—have either been discontinued or are now inactive. Financial reasons are given for the closing of 25 per cent. of the discontinued stations; about 16 per cent. were apparently never placed in service; 15 per cent. were discontinued because of the competition of better stations in the same territory; and 14 per cent. because the results, from the public point of view, were unsatisfactory. The radio and electrical companies, which have been most active in assembling broadcasting equipment from miscellaneous parts, have discontinued 121 of their 339 stations. The various interests maintaining broadcasting stations, according to the Government returns, were :—

	Active.	Discontinued.
Radio and electrical companies	218	121
Educational institutions	88	13
Newspapers and publishers	68	26
Department stores	36	2
Business unknown	31	26
Automobiles, batteries, cycles	26	2
Churches and Y.M.C.A.	20	4
Private	12	6
Hardware	11	3
Musical instruments, jewellery	10	9
Police, fire, municipal	7	2
Clubs and societies	7	5
Railroads and power companies	7	4
Telegraph and telephone companies ...	6	0
State bureaus	5	1
Banks and brokers	5	1
Dental, medical, drugs	5	1
Parks and amusements	4	3
Stock, poultry, and grain companies... ...	4	1
Theatres	4	1
Mining, marble, and oil companies	3	3
Real estate	2	1
Laundries	1	0
Playing card manufacturing	1	0

A study of the above analysis will doubtless prove interesting, if not particularly useful. The list, of course, only refers to actual transmitting stations, and gives no hint as to whether there is a decrease or increase of listeners-in. The variety of interests which were at one time, and probably sometimes simultaneously torturing the ether with their jargons, gives just a slight idea of the babel of which complaints were aforetime made by our American friends and which were duly recorded at the time in these columns. Fortunately, we have so far been saved from any such misuse of this scientific privilege.

CHINA.—The *Financial Times* authorises the statement that the wireless station at Peking was erected at a cost of £500,000. It was contracted for by the Japanese Missui Co., and was in touch with Bordeaux about the end of July.

TRINIDAD.—Wireless telephone apparatus is to be installed by the Government of Trinidad at the Port of Spain Wireless station to link up with stations in the Orinoco delta, Venezuela. This is just one of those geographical conditions where the wireless system has distinct advantages over *wire* telegraphy, the swampy nature of much of the territory near the estuary of the great river rendering pole or underground line work extremely difficult.

LITHUANIA.—The Kovno press report that a huge radio station is to be erected to the order of the Minister of Communications, and that negotiations with the Marconi Co. are proceeding.

AUSTRIA.—This country, despite its straitened circumstances, has apparently fully realised the unwisdom of giving undue power to private interests with regard to wireless, for the Government announces that both radio telephony and radio telegraphy are to be retained as State monopolies. The right to develop services between Austria and other countries has been leased to the Marconi Co. Negotiations, however, are pending with regard to an inland service, particularly as to broadcasting and ordinary radio telephony, which have so far remained entirely neglected in Austria.

The concession in this case will only be granted to an Austrian firm or an amalgamation of such firms under the condition that exclusively Austrian machinery and appliances are installed. A number of applications for concessions have been received. The concessionaires will be entitled to fix their own tolls and rentals, in which the Government will participate on a percentage basis.

The differing methods adopted by the various Governments as regards the treatment of broadcasting, broadcasters and listeners-in is interesting in the extreme, as will doubtless be agreed when the following press statement regarding the anticipated Australian regulations is perused and is compared with the conditions imposed in other countries from time to time. The

Australian press understands that the regulations will authorise the establishment of radio broadcasting companies, each operating on a fixed wave length. The sole source of revenue of these companies is to be the fees collected by them from those wishing to listen. It is proposed to restrict the sale of receiving apparatus to sealed sets, which will respond to only one distributing station. Before obtaining such a set, the intending purchaser must pay a Government licence fee, and, in addition, the subscription to the broadcasting company, which may be anything from £5 to £20 per annum. It is stated that the service will be established on a competitive basis ; and that provision has been made for different services for those who desire them. In the city there will be a high-grade service by a large company, while in rural districts smaller local companies, municipalities, or co-operative concerns will provide a service in conformity with the needs of the particular district.

The listener will be required to pay an additional fee to every additional broadcasting company if he desires to listen to other announcements and entertainments. It has been suggested as an alternative that dealers in Melbourne should erect and operate broadcasting stations, charging no fees to those availing themselves of the programmes, and paying for the upkeep of the stations from the profits on the sales of adaptable receivers.

It is hoped that the presence of Col. Gibbs and Col. Griffin, both of the United States War Office, in this country at the very early part of last month was a sure token that an English firm will by this time have secured the contract for the manufacture and laying of the new submarine telegraph cable between Seattle and Alaska. The contract, it is understood, is for nearly two thousand miles of submarine cable, and the price fixed about £300,000.

From time to time appreciative notes from representatives of both foreign and colonial administrations are received by the Editorial Committee of the T. and T. JOURNAL. One such letter, received some short time from a kindly official of the Dutch telegraph and telephone service, wrote thus on the occasion of our JOURNAL reaching its hundredth number :—

> "I heartily congratulate you on the occasion of the apparition of the hundredth number of the T. AND T. JOURNAL. I always read it carefully and enjoy the contents with great pleasure. All numbers are interesting and instructive. The leading article commemorating the centenary struck me by the unselfish thoughts upon which it is based."

An unsolicited appreciation of this kind always comes as a help and an inspiration to the Editorial Committee, and gives them fresh courage to continue with their labours.

I have recently had an opportunity of watching and examining one of the Morkrum type-page printing telegraph instruments, and was particularly struck by the sturdiness of its working parts and also with the smooth manner of its functioning. I think it was Donald Murray who said or wrote to the effect that the ideal printing telegraph instrument would be that which most closely approached to the modern sewing machine. The Morkrum, I esteem, is very near that desideratum.

It is deeply interesting to note how, in un-looked-for departments of industry, signalling in some form or other is in daily use. These side lines of telegraphy are principally automatic, and for the most part electrical. Some accounts which have come to hand of the Shipping, Engineering and Machinery Exhibition strongly accentuate this growing factor in our already highly complicated civilisation. Here are shown how the engine room of the modern vessel telegraphs to and fro to the bridge by means of its own batteries. Another device denotes to the captain the actual movements of each engine as well as the speed, an ingenious arrangement diverting the current—itself generated by the propeller shaft—either through the "ahead" or "astern" portions of the visual indicator under the captain's eye. Similarly, a small magneto generator chain-driven from the shafting, by means of a moving coil voltmeter with a central zero, indicates the r.p.m.

One simple dry cell is sufficient to operate the helm indicator which indicates to the man on the bridge the exact angle taken of the ship's rudder at any moment.

Another instrument, or equipment, says the *Electrical Review* shown is a "look-out" indicator by means of which the look-out man on a vessel can draw the attention of the navigating officer to any object which he observes. It consists of a transmitter, fixed to the forecastle or in the crow's nest, and a receiver, placed on the bridge or in any other convenient position. The transmitter has a pointer which is brought round to the direction of the observed object and a switch is pressed to transmit the direction to the receiver, and at the same time a bell or buzzer is sounded. When the officer on the bridge has received the warning he presses a switch and thus notifies the watcher that he has received the message. A large number of other instruments and apparatus are shown, among which may be mentioned a navigation light indicator ; loud-speaking telephones ; a torsion meter for ascertaining the power transmitted to a propeller, and, of course, the usual wireless impedimenta now carried by every vessel possessing a modicum of self-respect !

There are the usual electric bells, ordinary telephones, and that very useful modern development of the thermometer, by means of which the temperatures of the various holds of a vessel are automatically registered to that same centre of information throughout the entire voyage.

The program of the P.O. Telephone and Telegraph Society of London for the Session 1923-24, commencing on Oct. 15, at the Institution of Electrical Engineers, Victoria Embankment, as shown in detail in another column of the present issue of this journal, bids fair to be one of the best which that Society has produced. Opening with an address by that old and staunch friend of all Post Office organisations, Sir Andrew Ogilvie, K.B.E., C.B., closing with a paper on "The Administration and Control of Telegraphs and Telephones," from a Surveyor's point of view, by T. Kelly, Esq., C.M.G., and honoured by two outstanding personalities of the public in the persons of H. Gordon Selfridge, Esq., on the purely business organisation side, and Sir John Snell, K.B.E., on the strictly technical and scientific, the session should prove a distinct advance upon its predecessors, especially in the direction of the attendance of enthusiastic listeners.

M. Albertini, of the Engineering Department of the Italian Telegraphs, visited the C.T.O., London, last month, as did also M. Deldime, Director of the Belgian Telegraphs. It was the first visit of our Italian colleague who was evidently deeply interested in much that he saw. Our Belgian colleague is by no means a stranger to the Metropolis, and probably knows his London as well as most of us.

The two following paragraphs culled from authoritative sources, have given rise to some thought among those more closely acquainted with the condition of the French telegraphs and telephones. It somehow strikes the onlooker as strange, too, that Italy, the home of Marconi, should go to a foreign country for the exploitation of its wireless services, as it is stated in the French newspapers "that an Italian branch of the Compagnie Gênêrale de Télégraphie sans Fil, a French enterprise, has just obtained from the Italian Government a concession for the whole of the public services in wireless telegraphy in Italy. This branch has been formed under the title of the Radio-Italie with a share capital of 1,000,000 lire, which is now to be increased to 50,000,000 lire. The Company will receive from the Italian Government all the stations which the latter has already established and will also erect new stations. The Italian Government will participate in the profits of the Radio-Italie."

France comes ninth in other electrical directions, as in the use of telephones, with one station for every 82 persons, which is ten times less than the United States and less than Luxemburg, Cuba and Finland, and in the matter of telephone traffic and modernity of plant she is 20 years behind the United States, Sweden, Denmark and Canada. However, the Chamber has authorised a big program to be completed in ten years and cost over two milliards of francs ; and a thorough-going financial and administrative recasting of the post, telegraph and telephone services. In detail some of the works contemplated are : new telephone offices, 125,000,000 fr. ; new postal or mixed offices, 177,000,000 ; furniture and apparatus, 30,000,000 ; rolling stock, 22,000,000 ; telegraphic material, 68,000,000 ; and telephone material, 1,719,000,000 fr. Several new telephone trunk lines are to be erected, including additional ones to London, while automatic exchanges are to be widely installed.

France is *apparently* about to take a leap forward in matters telegraphic and telephonic. More strength to her elbow !

Over 60 Cable Room candidates sat for higher appointments during a three-days' examination last month, and although naturally a very considerable number must necessarily be worsted in the struggle, it is with very mixed feelings that one views this repeated drain upon the efficiency of the Anglo-Continental and Colonial Telegraph Service.

It is doubtless an excellent policy to stir men's ambitions and to give a staff ample opportunities to get out of the rut, and the present generation is fortunate indeed to have these facilities. Those of us to whom doors of progress in this direction were banged-to, bolted and barred in the past, have no feeling of regret that those days are now gone for ever, but the problem of how to maintain the standard of high efficiency is an administrative one of the greatest difficulty if the public is to be served as well in the future as it has been in the past, not to speak of improvements which are overdue. The matter is no doubt engaging attention in higher quarters, the officials of which themselves are handicapped by the general condition of Europe, and all that it brings in its trail.

What is Electricity ?—By researches of which the brilliancy and resourcefulness are excelled only by the superhuman processes of deductive reasoning that the investigators have brought to bear upon the results of their observations, the ultramicroscopic atom has been dissected and analysed, and its constituents have been identified as of but two kinds—positive and negative particles of electricity ; of the latter, thanks very largely to the genius of the President of the British Association, Professor Sir Ernest Rutherford, F.R.S., we know a great deal—though it may well be that there remains a vastly greater deal yet to learn—but of the former we know comparatively little. The fundamental unit of electric charge, indivisible and eternal (so far as we know) is that of the electron or negative particle, and it has been measured to an accuracy of one part in a thousand, although the mass of the electron is less by 1,840 times than that of the particle of matter of the smallest mass known to us—the hydrogen atom. But the positive particle, if there be such, eludes detection ; it is never met with alone, and, as Sir Ernest says, not the slightest evidence has been found even of the existence of a positive particle like the electron. In fact, he concludes that the positively charged hydrogen atom, or "nucleus," *is itself the atom of positive electricity*. Apparently its greater mass, contrasted with that of the electron, is to be attributed to its greater concentration—"the greater mass of the hydrogen nucleus would be accounted for if its size were much smaller than that of the electron"—a seeming paradox, which, however, is in accordance with electrical theory.

Thus we arrive at the view that all matter is built up of these two electrical units, negative and positive respectively—the electron and the hydrogen nucleus or proton—but we are still left wondering *what* is electricity ?—*The Electrical Review*. J. J. T.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

TELEPHONES.

THE new business in July maintained the high average of recent months, the gross new stations totalling to 16,792 and the net additions to 7,358. The quarterly payment system necessarily produces an uneven flow in the rate of cessations, as, with notices of termination of agreements expiring at the end of a quarter, the number of circuits recovered in the month immediately following is invariably higher than in the succeeding months, and consequently the net growth is lower. The net increase for July, however, is the best so far recorded under these conditions, comparing with 7,006 in April last, 5,239 in January, and 3,362 in July 1922.

The total number of stations in use at the end of July was 1,082,147, of which 387,704 were connected with London exchanges and 694,443 with Provincial exchanges.

During July the number of residence rate subscribers was increased by 2,279, making the total at the end of the month 163,408 as compared with 139,382 a year ago.

The net addition to the number of public call offices during July was 83, including 18 installed in street kiosks.

At the end of July 417 rural exchanges had been authorised under the revised conditions announced last year, and of these 186 were working, 20 being opened during the month. At that time the engineering work in connexion with a number of prospective exchanges was approaching completion and with increased supplies of suitable switchboards becoming available, it is anticipated that the returns for August and subsequent months will show an improved rate of progress.

Some statistics showing the general development of the service to date in the current financial year are given below :—

	At April 30.	At May 31.	At June 30.	At July 31.
EXCHANGES :—				
London	99	100	100	100
Provinces ...	3,107	3,140	3,166	3,187
Total	3,206	3,240	3,266	3,287
STATIONS :—				
(1) Exchange—				
London	367,403	370,576	373,845	375,679
Provinces ...	657,734	664,527	670,068	675,992
Total	1,025,137	1,035,103	1,043,913	1,051,671
(2) Private—				
London	12,149	12,216	12,303	12,025
Provinces ...	18,753	18,632	18,573	18,451
Total	30,902	30,848	30,876	30,476
(3) Total Exchange and Private—				
London	379,552	382,792	386,148	387,704
Provinces ...	676,487	683,159	688,641	694,443
Total	1,056,039	1,065,951	1,074,789	1,082,147
PUBLIC CALL OFFICES :—				
London	3,808	3,817	3,838	3,836
Provinces ...	12,766	12,915	13,000	13,085
Total	16,574	16,732	16,838	16,921
PUBLIC CALL OFFICES IN STREET KIOSKS	432	451	474	492
RURAL PARTY LINES	7,038	7,221	7,379	7,537

Further progress was made during the month of August with the development of the local exchange systems. Among the more important exchanges extended were :—

LONDON.—Kensington.
Ealing.

The following new main underground trunks were brought into use :—

London—Uxbridge—High Wycombe.
Manchester—Preston.
Preston—Lancaster.
Pontypool—Abergavenny.

In addition, 19 new overhead trunk circuits were completed and brought into use, and 68 additional circuits were provided by means of spare wires in underground cables.

TELEGRAPHS.

The following new Baudot circuits have been opened :—

Glasgow—Leeds.
Liverpool—Manchester—Grimsby.
London—Cambridge.
Birmingham—Leeds.

"NO PROGRESS WITH THE TELEPHONE."

THE article in the *Morning Post* of Aug. 31 called forth the following letter to the Postmaster-General from Mr. F. H. Bethell, a former president of various American Telephone Companies :—

DEAR SIR,—My attention has just been directed to an article appearing in to-day's issue of the *Morning Post* dealing with telephone matters and making some comparisons between conditions here and in America. For many years I was the President of a number of the important companies in the Bell System, including the Bell Tel. Co. of Penna., and the Chesapeake and Potomac Companies. I was at the same time the First Vice-President of the New York Telephone Co. In all things except area my companies embraced just about one-third of the Bell System. Though I have been out of the industry for over two years, I can speak with knowledge of telephone conditions in America. In the first place there is, and has been, an embargo on new installations in many parts of the country. The *Morning Post* writer is in error on this point. He is in error also in his statement with respect to the method employed in billing for service rendered, and the fact that he advocates the introduction of the so-called "appointment call," is evidence that he is without experience in telephone management.

My experience with your service, both local and toll, has been very satisfactory.—Very truly yours,

F. H. BETHELL.

Hotel Russell, *Aug.* 31, 1923.

The writer in the *Morning Post* had said : In a small suburban town in America it is sufficient to ring up the exchange, no charge being made, and state when the installation is desired. In a very short time the company's representative will call with a contract form drawn up in simple language. The installation is complete and working a few days later.

THE G.P.O. ARTS CLUB.

THE Postmaster-General has kindly consented to open the Annual Exhibition of the G.P.O. Arts Club, on Oct. 8, at 3 p.m. He will be accompanied by Lady Worthington-Evans, who will distribute the medals and certificates. The Exhibition will be held at Mount Pleasant, in the same rooms as last year, and will remain open to the public free of charge, from 12 noon to 9 p.m. each day until Oct. 20.

The
Telegraph and Telephone Journal.

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

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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TELEPHONE PROGRESS.

THE expansion of the telephone system in Europe despite the disturbed condition of so many countries continues to persist steadily. It is yet too early to give a definite statement of the increase in the number of telephones which took place in the year 1922 but from the figures which have so far come to hand we can estimate that there were about 5,854,000 telephones in Europe at the end of last December, an increase of nearly 300,000 on the previous year. The increases in the five chief telephone-using countries will be seen from the following table, in which the telephones in the Irish Free State are included with those of Great Britain for the sake of a fair comparison with 1921.

	1922.	1921.
Denmark	264,413	257,652
France	524,662	488,818
Germany	2,073,612	1,915,717
Great Britain and Ireland	1,065,005	997,805
Sweden	394,535	387,337

The increase for the year is thus 266,015 for these five countries alone.

The progress made in this country during 1923 has been extremely satisfactory. Although the increase of 67,000 in 1922 was a "record" figure, this year's increase bids fair to exceed it. In the seven months to the end of July 53,889 new telephones were added to the system, so that if the present rate of increase is maintained—which we see no reason to doubt—90,000 telephones will have been joined up during the year. In the same seven months no less than 147 new exchanges were opened, or about 5 every week. The number of exchanges in a country is, of course, no indication of the density of telephone development. An exchange may serve 5 subscribers or 10,000, and France, for instance, has 14,598 exchanges to our 3,287, the one country having an average of about 36 stations per exchange and the other of about 320, but a large number of exchanges does indicate that the system is widely spread over the country and that the smaller and less profitable districts are not neglected. A consistent extension of the service to rural districts such as is going on is a matter for unqualified satisfaction.

HIC ET UBIQUE.

BY the time these lines are in print, it is expected that three additional telephone circuits will be working between England and Belgium. These will afford a much-needed relief to the telephone traffic to Belgium.

READERS of the JOURNAL and Post Office men generally will have a welcome opportunity of hearing Sir Andrew Ogilvie again on Monday, Oct. 15, when he reads the first paper of the forthcoming session of the London Telephone and Telegraph Society. The subject, "Relations of the Post Office and the Public," is one, of course, on which Sir Andrew is especially qualified to speak.

THOSE who read the monthly column on Telephone Progress may have occasionally noticed what a large number of ceasing subscribers have to be deducted from the new orders to obtain the net total increase. In the three months ending June, for instance, there were 51,023 new orders, 25,267 ceased, net gain 25,756. This drawback to telephone progress is not of course confined to this country. We observe from an American paper that in 1922 the New York Telephone Company obtained 335,184 new subscribers, whilst 202,227 discontinued, leaving a net gain of 152,957 or about three-quarters of the number of ceasing stations.

It was recorded the other day, says the *Yorkshire Observer*, that Mr. Cutcliffe Hyne, the eminent author, who hails from Bradford, had found time to invent a mechanical device for aerating water, which he had patented in this country and America.

Now Mr. Hyne has turned his attention to the telephone. The instrument at present in his home is of the old-fashioned type with both receiver and transmitter in one piece. This the Post Office is going to take away and substitute "a clumsy candlestick instrument which, as regards convenience and comfort, compares with the other much as a reindeer sledge compares with a Pullman car."

The official reason given for this change is that the present instrument will not work with the central battery system. Mr. Hyne says he agrees that the Post Office engineers cannot, or at any rate, will not, make it so work. But he is perfectly certain that somebody else could make it work.

Here, Mr. Hyne says, is a chance for the inventor, but apparently he is content himself with pointing out to others the opportunity, and to refrain from seizing it himself.

De gustibus non est disputandum. We remember distinctly the time some 15 years ago when up-to-date Americans visiting this country heaped ridicule on the "trombone arrangement"

preferred by Mr. Cutcliffe Hyne (thus they stigmatised the combined receiver and transmitter) which was then in general use. Now we find the instrument most in favour with modern American and British engineers, slightingly termed a "candlestick." The whirligig of time brings its revenges.

THE following extract from a recent issue of *Telephony*, Chicago, is on the subject of newspaper humorists—who are hard up for "copy"—and make cheap jokes on telephone service :—

A fair sample is the following from the editorial page of Hearst's Chicago morning paper, which is constantly demanding government ownership of telephones, railroads, street cars and everything but what Hearst owns :

"No gentleman will swear at a lady, no matter what the provocation. That is why the telephone company employs girl operators.

"When you pick up a telephone, hold it vainly for two minutes, wag the buzzer, hold it another minute, wag the buzzer again, hear the plaintive cry : 'What number did you call, please ?' wait another minute, wag the buzzer, wait, wag, wait and turn purple : don't swear into the telephone. The girl may be listening. It is not likely, but she may be. Hang the telephone up, draw a long breath, count up to a thousand, and then try again.

"Statistics of the telephone company show that the average call is completed in 17 seconds, or maybe 13. We quote from memory. They show also that 81 per cent. of those who use profane language never get to heaven.

"Remember these things. Reflect that yours is probably not an average call, or that to make up for your habitual experience somebody is getting his party even before he calls up.

"And also, you want to go to heaven. There are no telephones there. That is why it is heaven."

Of course, no sensible person will attach any weight to such a silly fling at the value of telephone service. The remarkable efficiency of telephone operators—the real service they give the public—has come to be universally recognised, and those possessed of even the most casual knowledge of their work, with its surprising freedom from errors, are always ready to defend them from such thoughtless, unfair criticism.

Without telephone service and its faithful operators, the newspaper particularly would be seriously handicapped, for most of their local news reaches the office over the telephone wires. For late news the telephone is indispensable.

Yes, we want to go to heaven, and there may be no telephones there, but the reason we want to go is because we are dead sure Hearst will not have a newspaper there.

We have much sympathy with the comments of *Telephony*. We also have our humorists and colourable imitation of the Hearstian press. Only they do not constantly demand government ownership of everything. On the contrary.

THE following story is from the New Zealand postal officers' journal, *The Katipoo* :—

The woman called up the grocer by telephone, and gave him a long piece of her mind—one of those 300-words-a-minute speeches that leave no spaces for replies—and concluded by saying, enigmatically : "And the next order I give you will be the last I'll ever give you." To which direful statement came the cold reply : "It probably will be, madam, for you're on the wrong number. I'm the undertaker !"

THE Illinois Commerce Commission has ordered a reduction of the telephone rates in Chicago, which comes into force on Oct. 1. For individual lines the charge will be £13 10*s*. per annum, instead of £15, including, in effect, 1,296 calls. The rates, however, are not expressed as simply as this. The subscriber pays a monthly guarantee of $5.40 instead of $6 as heretofore. He guarantees to make 3.6 calls daily (or pay 18 cents) instead of 4 (20 cents). For calls in excess of 108 per month he pays 4 cents each. Then the Four-party residence rate is reduced from $2.70 to $2.25, the Two-party residence rate from $3.75 to $3.30, and the Two-party business rate from $4.50 to $3.90 per month. These subscribers all guarantee from 1.5 calls to 2.6 calls per day.

A NEW ATLANTIC CABLE.

(*Reprinted from the* MORNING POST.)

DEPARTURE FROM TYPE.

HIGH SPEED TRANSMISSION EXPECTED.

WESTON-SUPER-MARE, *Sept.* 1.

The landing on Saturday of the shore end of the new transatlantic cable, which is being laid by the Commercial Cable Company, provided an interest for the inhabitants and holiday population of Weston-super-Mare that completely eclipsed all other forms of entertainment, and the crowd that assembled to watch the operations was so large that the aid of the local constabulary had to be invoked in order to prevent interference with the work.

It had been planned to land the cable on Friday, but the severe weather conditions prevented the work. On Saturday morning, however, the conditions were ideal, and a task of considerable magnitude was completed successfully with remarkable speed and without a hitch.

The cable ship, *John W. Mackey*, had to anchor about three miles from the shore owing to the shallow water, and the shore end of the cable had to be brought as close as possible in a lighter, which was manoeuvred into position a few hundred yards from the beach by a skilfully handled tug. The problem now remained of getting the cable from the lighter to the shore in order to join up with the cable from the Commercial Company's office, which had been laid as far as the beach about two years ago in anticipation.

Cables laid in shallow water are very heavy, for they must be well armoured in order to protect their nerve centres from injury by ships' anchors and many other sources. The shore-end is therefore about three times thicker than the deep-sea portion, which is safe from such molestations. In the case of the new cable it is about three-and-a-half inches in diameter, and covered with steel wire armour, and, as it weighs 20 or more tons to the mile, the manipulation of even a few hundred yards calls for engineering foresight and skill.

A shallow trench was quickly dug from the esplanade to the water, and a large traction engine with a powerful winch backed into position with its wheels securely blocked. A stout steel wire rope from the winch was conveyed to the lighter by a boat of cork-like buoyancy, and there made fast to the cable under the directions of Commander Larnder. All being ready, the crowd was pressed back from the trench, and the engine started. As soon as the slack had been taken up it was possible to see the cable, looking like a great grey snake, crawling out of the lighter into the sea, and in a surprisingly short time the head was in position on shore, where it was at once attacked by experts from the ship, who rapidly joined the ship and shore ends. The tug then steamed back to the *John W. Mackey*, with the lighter in tow paying out the cable, and a similar union with the deep sea end was effected.

The cable ship will now proceed to Waterville, on the coast line of County Kerry, adding as it goes a link in the new chain, now almost complete, between the two great English-speaking nations. The route of the cable after it leaves Waterville is *via* the Azores, and thence through Canso and Nova Scotia to New York. Work is so far advanced that the Commercial Cable Company are hopeful that communication may be established by Oct. 1.

The cable itself is of interest not only because it is the first transatlantic cable that has been laid for over ten years, but because of its new design. The conducting power of any electric wire is related to the amount of copper composing it, and more copper has been put into the core of the new cable than in any other of similar length. For example, the conductor of the main section weighs half a ton per sea mile as against 700 pounds as previously used in the largest cables.

It is confidently expected by the company's engineers that the increased conductivity will enable a much higher speed of working to be attained, and that at least 120 words per minute simultaneously in both directions will be possible, and this is greatly in excess of what has been accomplished over long submarine cables up to the present. A vast amount of research and experimental work has been done in search of suitable methods, and instruments with this aim in view.

Cables in very deep water have but small chance of accident, but in shallow water they have many enemies. The chief source of danger is the modern steam trawler, which is capable of working at a depth of 1,200 feet as far out as 200 miles from the coast. The trawls, which weigh over half a ton, are dragged, slowly along the sea bed, and though they may not always break the cable they encounter, sufficient damage is frequently caused to stop communication. This question affects all cable companies, and a special investigation into the matter is now being made.

When such an accident occurs the engineers on shore are able to determine the precise position of the fault, and this is given to the repair ship in exact terms of latitude and longitude. On reaching the point designated the ship steams slowly across the line of the cable with the grapnels lowered until the cable is found. This in itself sounds simple, but a technical expert of the Commercial Company informed a representative of the *Morning Post*

that at a depth of about two miles the time required to lower the grapnels exceeds two hours, and from nine to ten hours is necessary to bring the cable to the surface. The strain on the cable, thus dragged from its peaceful bed, is naturally very great, and has to be kept in mind in designing the armour of a deep-sea cable, and the steel wires used for the purpose, although small, are of great tensile strength. The size of a cable tapers off as it leaves the shore, and, although the end landed on Saturday is over three inches in diameter, the deep-sea section will not be much thicker than an ordinary candle.

The new cable is of British manufacture, and is the work of Messrs. Siemens and the Telegraph Construction and Maintenance Company. As it is a departure from any other type of cable previously laid, its performance will be watched with great interest by all telegraph and cable engineers.

OUR "HALLO" GIRLS.

BY LAURIE SMITH.

[It is of interest to note that this paper was contributed, not by a writer in the Service, but by an outside journalist.]

IT is a recognised fact that of all the present-day public services, the one which comes in for the greatest amount of criticism, is the Telephone Service. Well may such an institution be described as famous, for we have only to think of the vast organisation and complicated machinery which it controls, to realise how much we, especially those engaged in business, owe to such a great undertaking.

On account of the severe criticisms which have of late been made of this great Public Firm, it is quite time the cudgels were taken up on behalf of those hard-working mortals, commonly known in the service as "Telephonists," and who undoubtedly form the nucleus of the system.

Ah! I can hear some one saying, what about our coming automatic exchanges? I would ask them to remember that like a great number of other improvements, these are still on the way, and until such day as every exchange in the United Kingdom is so fitted, these girls will have to remain at their task, and submit to the annoying and sometimes even insulting remarks of the unsatisfied subscriber.

We are all well acquainted with this type of subscriber, and it is a crying shame that our girls, some of whom did most excellent work on the "boards" during the Great War, including Air-Raid duty, should be subjected to their insults. Granted that quite a number of these cases are taken up by the supervisor, but for every such case I venture to state there must of necessity, be hundreds of others of which no notice is taken. Needless to say these remarks, especially if continuous, react on the girls' nervous system.

Little need be said here of the conditions under which our all important "Hallo" girls work at the present time; and it is sufficient to state that the discipline errs on the side of strictness, and well might be likened to the life of a soldier, as the girls whilst on duty are under the ever-watchful eye of their own particular supervisor.

No little amount of credit, maybe gratitude, is due to these girls, not only because of the monotony of their duty, but on account of the silence conditions. Just imagine a young girl having to sit continually at her work without daring to enter into conversation with her fellow-workers, even in the slack hours.

Let us then, one and all, business men as well as casual users of the telephone, remember these points, especially when face to face with what might appear slackness or want of attention on the part of the telephonist. A little thought and consideration will in all probability reveal the fact that the fault lies, not with the girl at the other end of the line, but with ourselves. This little consideration alone will tend to improve the Service, and more often than not teach us that there are always two sides to every question.

The question now before us resolves itself into this—are our Telephonists themselves entirely responsible for the inefficient working, delay and bad connexions, of which we are all continually complaining? The answer, from the point of view of one who claims to know a little of the inside working of the exchanges, is without the slightest hesitation—No, not by a long chalk. It has in the past been the ordeal of the writer to sit in a very large business house, and hear men insult the operator in such an unmanly manner, by way of what they themselves would term "telling her off" or "waking her up," that my blood has boiled, and I have felt absolutely ashamed of my sex. Why should our girls, maybe your own daughter, sister or fiancée, be subjected to such behaviour?

Apart from the fact of causing unemployment among their ranks, it would no doubt be a great blessing and eye-opener if all our exchanges were staffed with men; if so, heaven help the irritable and impertinent subscriber, whether office-boy, manager or director, for he would probably be delayed some minutes whilst the operator gave vent to his feelings!

Further, let us ask, are we ourselves always alert and strictly attentive to our immediate business needs? Do we, for example, whenever any one comes into the office, perhaps a traveller, always jump up and enquire his business, or do we wait for some other clerk to attend to him? I am afraid even two such simple questions as these would baffle even the smartest man or woman of to-day. On the other hand, how many of us, on hearing the unmistakable ring of our telephone bell, make a grab for the receiver? Very few except the most conscientious.

Well, then, if we ourselves are slack in this and many other respects, how can we expect the operators to give us their best attention, which after all is what we claim, and what we have a right to.

The most vital question, without the slightest doubt, is all one of manners and goodwill, without which our present Telephone Service will never become the success we all desire.

Let us, when next faced with what we consider unnecessary delay, or other kindred annoyances, say to ourselves:—"I'll keep my temper more and more every day, and so help the Service to improve."

A visit, by permission, during the busy hours of the day, to any of the numerous exchanges, will not only prove to the visitor the justice of the foregoing remarks, but will show him how selfish and unbusiness-like it is to blame these girls for delays, &c., which are often entirely beyond their control.

NORTHAMPTON POLYTECHNIC INSTITUTE, CLERKENWELL.

WE have received a copy of the recently issued "Educational Announcements" of this Institute for the session 1923-24, which deals with the *evening* work only. The well-known work dealt with in the day section of the "Announcements" will be practically the same as last session, there being only small changes in details of syllabuses which can be made as the work developes.

The whole of the work includes day and evening courses in Engineering (Civil, Mechanical and Electrical), in Optical Engineering and Applied Optics and in Horology. The Engineering courses include sub-sections in Automobile work, Aeronautics and Radio-Telegraphy. In addition there are evening courses in Electro-Chemistry, Metallurgy and Domestic Economy and Women's Trades. The classes for the day courses commence on Monday, Oct. 1, and those for the evening courses on Monday, Sept. 24. Enrolments for the latter commenced on Monday, Sept. 17.

THE NEW PHONOGRAM ROOM AT THE CENTRAL TELEGRAPH OFFICE.

FOR some time the phonogram facilities in the Central Telegraph Office have been inadequate to meet the rapidly-increasing public demands for this service, and the old equipment on the ground floor has accordingly been replaced by a larger installation situated in a more spacious room on the first floor. This new installation was brought into use on Sept. 17. The size of the equipment is considered to be beyond the economic limit of the ancillary system, now being fitted in provincial offices, and accordingly a four-position concentrator has been installed, serving 126 incoming positions, while in addition 42 outgoing positions have been provided, making 168 working positions in all. Outgoing traffic can in addition be handled at any incoming position. The phonogram room is connected with the London telephone system by 68 outgoing and nearly 300 incoming circuits.

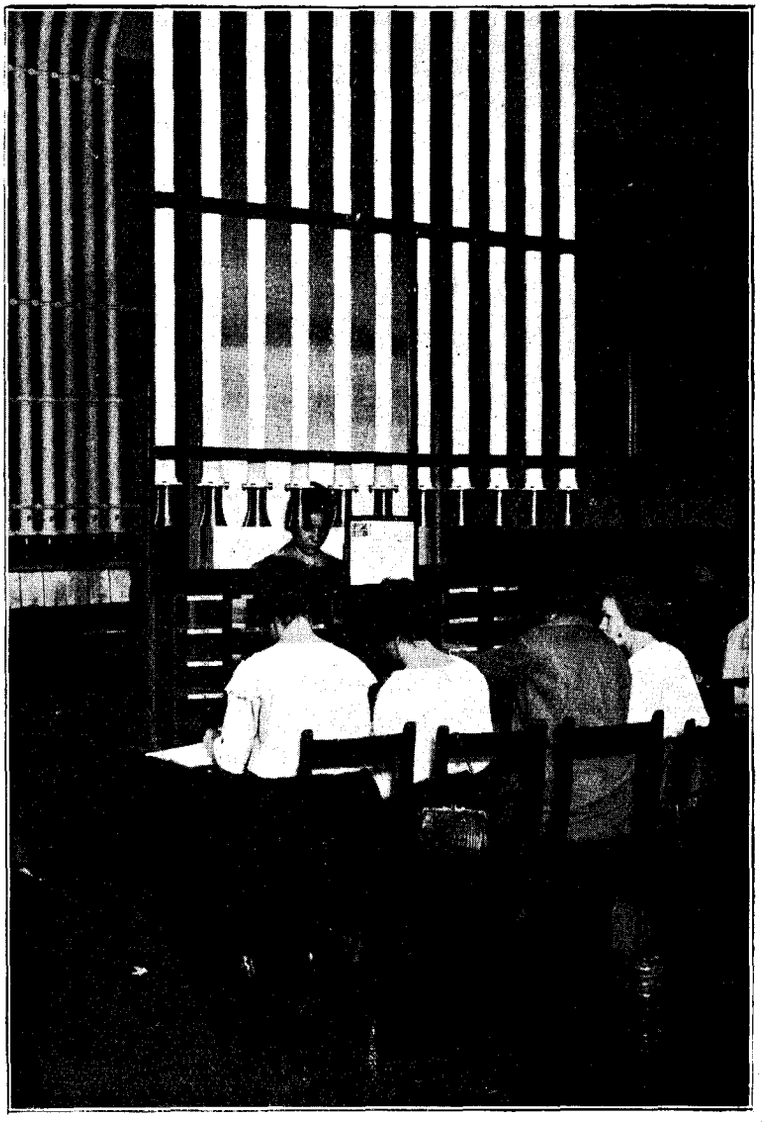
A number of novel features have been incorporated in the design, of which the most notable are as follows:

The equipment has been arranged on 8 tables, each 52 ft. 6 ins. long, and therefore accommodating 21 working positions.

Running bands have been provided for the collection and distribution of the messages on 7 of the 8 tables.

On the incoming tables these bands run underneath the table level, and the received message is "posted" by the telephonist through a slot, similar to a letter box opening, whence the form falls on to the moving belt and is carried to the distribution point. On the outgoing tables messages to be forwarded are placed on the belt travelling on the table level, and the forms are carried along the table and taken by disengaged telephonists.

Arrangements have been made to divide the work originating at and circulating to Post Offices which are delivery offices from work to and from the subscribers and the Post Offices which collect but do not deliver. The object of this segregation is to enable existing connexions to given offices to be readily traced, thereby avoiding the possibility of making a record call to an office which is already connected with another position in the phonogram room.



THE CIRCULATION TABLE.

THE PHONOGRAM ROOM (LOOKING SOUTH).

An Enquiry Bureau has been provided. This will fulfil for the phonogram room the functions normally performed by a monitor's desk in an exchange, *i.e.*, it will deal with all enquiries and difficulties, thus leaving the operating positions available for the purpose for which they are intended, the receipt and dispatch of traffic.

The phonogram forms used in the Central Telegraph Office have a counterfoil attached upon which are recorded the subscribers' particulars and the charge, thereby obviating the provision of a separate ticket.

A machine which date-stamps both the form and the counterfoil, numbers both the form and the counterfoil, detaches the counterfoil, stacks it in numerical order and ejects the form on to the circulation position, has been designed and installed.

Pneumatic tubes have been provided from the circulation position in the phonogram room to and from every other circulation position in the office, and the whole of the circulation arrangements have been designed with a view to keeping the traffic continuously on the move.

Large as the installation is, it is anticipated that an extension will be required at an early date, and indeed had accommodation been available considerably more equipment would have been installed in the first instance.

A general idea of the room is given by the photographs which we reproduce. It is hoped to publish a considerably more detailed description of the room and of the special arrangements, illustrated by further photographs, in a forthcoming issue of the JOURNAL.

W. C. G.

REVIEWS.

"*Automatic Telephone Systems.*" *By William Aitken, M.I.E.E., A.Am.I.E.E. Vol. II. Messrs. Benn Brothers, Ltd., 8, Bouverie Street, London, W.C.4. 35s. nett.*

Vol. I. of this book was reviewed in the T. & T. JOURNAL of October, 1921, and in the preface the author expresses his regret for the delay in issuing Vol. II., and his hope that Vol. III will follow soon. It was apparently the original intention to deal in Vol. II with the items which are being relegated to Vol. III, viz. :—Automatic systems in large multi-office areas, semi-automatic systems, metering, toll working, and power plants. The present volume deals with equipment in subscribers' offices, party line working, branch exchanges of all kinds, village and community systems.

The clear type and larger pages have been repeated in this volume. The diagrams are plentiful, good and easily read, that "bus route" numbering which was such a popular feature of Vol. I. having been retained in Vol. II. We can confidently recommend the treatise as being the most exhaustive work on the subject which has yet been produced—and it cannot but add to the reputation of the author.

"*Press-the-Button-Telegraphy.*" *By Donald Murray, M.A., M.I.E.E.*, has been reprinted with alterations and additions by permission from the T. & T. JOURNAL, 1914 to 1918. On beautifully-toned paper in clearly-defined print, and illustrated in most if not all cases, we should think from new plates, it is a pleasure to handle and read.

From the preface to this second edition it is evident that Mr. Murray's enthusiasms, far from dying down, have renewed their strength like the eagle's as he fearlessly looks into the future at the new fields of activity ripe for conquest. J. J. T.

"*Legal Points for Ramblers.*" *By Andrew Blair.* 1*s. net.* (*Philip & Son, London and Liverpool.*)

It has been remarked this summer that, despite all the lures of other and more rapid means of locomotion, there has been a distinct increase in the number of men and women who have set forth on holiday, both long and short, with knapsack and sturdy walking stick to tramp over hill and dale and unfrequented path. To such and to those many of our readers whose sedentary daily tasks create a natural craving for the open road this little volume should prove well worth the small sum at which it is published.

The information therein has been revised by so high an authority on these matters as Mr. Lawrence W. Chubb, Secretary of the Commons and Footpaths Preservation Society, London, so that the clearly stated counsel given in its pages may be confidently relied upon. It is devoid of legal phrases or where such appear as in the case of *Founderous Footpaths*, for example, the expression is carefully and clearly explained.

Those who cannot resist a dip in the briny upon sight of the sea may be taken back by the dictum of Mr. Justice Cozens-Hardy in 1899 that, "The public are not entitled to cross the shore even for purposes of bathing or amusement. The sands on the seashore are not to be regarded as in the full sense a highway." The author is, however, reassuring as regards the effect in practice of this as yet unchallenged decision!

LONDON ENGINEERING DISTRICT NOTES.

Teletype.

THE Morkrum Teletype apparatus appears to have a future. The third circuit of this type duplexed has been established between the Central Telegraph Office and Margate, and it is understood that many more circuits will be installed in the near future.

Phonogram.

The new Phonogram Room at the Central Telegraph Office has now been opened for traffic. It is situated on the first floor and consists of 126 "stalls" positions for incoming traffic and 42 "stalls" for outgoing work. The Phonogram was introduced for the express purpose of enabling telephone subscribers on the London Exchange System to pass their telegrams or express letters direct to the Central Telegraph Office. The messages are dictated to the C.T.O. for forward transmission by telegraph. Subscribers may also have inward telegrams telephoned direct to them if so desired.

The rapid growth of this class of traffic rendered the late phonogram installation quite inadequate, and it became necessary to lay down new and much larger plant to cope with the present and future development of phonogram work.

A comprehensive description of the new installation will appear in the next issue of the *I.P.O.E.E. Journal.*

Installation of Automatic Telephones for the London County Council at New County Hall.

At 2 p.m. on Saturday, the 8th instant, the existing manual telephone service at the new County Hall was transferred to automatic working.

The new electrical plant which has been installed comprises equipment for 700 extension telephones of which 650 will work automatically and 50 manually together with the necessary power plant and numerous other accessories.

Provision has been made to allow for growth of the system up to 900 extensions.

The installation places at the disposal of the officials and staff the most up-to-date method of telephone communication.

A numbered "dial" is fitted on each telephone, and after first removing the receiver from the hook and hearing the "dialling tone," which is an indication that the apparatus is ready to set up a connexion, the caller proceeds to dial the number of the extension to which he wishes to speak. Almost simultaneously with the return of the dial to its normal position, the bell at the other end commences to ring and continues to do so until the call is answered.

Whilst the bell at the distant end is ringing, the caller hears a distinctive tone signal in his receiver which assures him that his call has reached its destination and only awaits the response of the called party.

If the called party happens to be engaged on another call, the well-known "buzz" or engaged signal is heard.

The whole operation of calling up occupies only a few seconds and after the conversation is finished the automatic apparatus immediately releases in readiness for the next call.

As far as local calls are concerned, therefore, it will be understood that the whole operation is entirely automatic.

In order, however, to effect connexions with the public exchange service manual operators are necessary, and for the purpose of dealing with these calls the lines from the various telephones are also permanently connected to a manual switchboard.

If the caller desires a connexion to the public exchange either for London or Trunk calls, the digit "O" is dialled. This operation lights a small glow lamp on the manual switchboard. The operator plugs in to the line associated with this lamp, ascertains the caller's requirements, and makes the necessary connexion to the lines outgoing to the public exchange by means of plugs and cords.

Similarly, if a caller on the public exchange system desires a connexion with any officer or department of the Council, he calls up his own exchange in the usual manner and asks for "Hop 5000" which is the number allotted to the County Council Exchange.

On receipt of the demand the operator at this latter exchange completes the connexion by plugging in and ringing on the line associated with the telephone of the wanted Department.

It is anticipated that the change over to the new system and its subsequent operation will be much facilitated by the provision of a local telephone directory which has been specially compiled by the Council. This directory contains full instructions on the method of operating the automatic telephones together with alphabetical and departmental lists of the Council's officers and departments.

This exchange, which is the *largest automatic Private Branch Exchange in this country*, has been supplied and installed by the Automatic Telephone Manufacturing Co., Ltd., of Liverpool, in accordance with a specification prepared by the Engineer-in-Chief, and the telephones and wiring for same have been installed by the Department's staff of the London Engineering District.

CONTROLLING THE TRAMS.

Traffic Regulation Direct from Headquarters.

AT the present time when London's traffic problems are receiving so much attention, it is gratifying to find the L.C.C. Tramways Department are actively engaged in minimising the possibilities of congestion. The latest step in this direction is the special system of telephones for the control of traffic which have recently been installed throughout the area north of the Thames.

This area comprises approximately 23 square miles and extending as it does from Hampstead to Poplar, has approximately 53 miles of route.

To run private telephone wires as ordinarily understood from all the various termini, junctions and busy traffic centres in such an area to one central headquarters would be an undertaking equal to the complete telephone installation of a small town, and the number of wires necessary would cost a very considerable amount. The L.C.C. Tramways, however, have adopted a system whereby one pair of wires may be used for a large number of telephones, and which gives the facilities of an ordinary telephone service with the usual switchboard, but has in addition certain distinct advantages.

The scheme in question is based on the Western Electric Company's System of Traffic Control, and this Company have been entrusted with the supply of the necessary apparatus and instruments. The Western Electric System of Traffic Control is already extensively used by many of the large railways in this country and abroad; chiefly for the marshalling of goods traffic, and it has also been used on a small scale on tramways.

As previously mentioned the outstanding feature of the new telephone system is that a number of instruments may be used on one pair of wires running throughout the system. This is accomplished by a "selector" device which enables the Controller to select and ring exclusively any one station out of as many as 78 stations, if necessary, all on the one pair of wires. The number of stations connected to a pair of wires, will, of course, vary according to the particular conditions, and in the case of the London Tramways only about 36 points are so connected.

The Headquarters for the control of the northern area is situated in the Council's Car Depot at Hackney, and apparatus is provided here for four Controllers, although at present the traffic is being handled by one Controller with very occasional assistance.

Along the track at all important junctions, special selective telephones have been fitted in cast-iron boxes mounted on the familiar "Feeder" pillars. At each of these junctions a "Regulator" is stationed. The Regulator is responsible for the regulation and spacing of the cars in the district, and by means of this telephone he is in frequent communication with the Controller at Hackney. As the Controller is continually receiving reports from all the Regulators he is fully advised of all delays, breakdowns, accidents, or other unusual events occurring anywhere over the system.

WAY STATION AT FINSBURY PAVEMENT.

The Controller, by simply turning a particular key out of a number provided on his desk can ring the bell of the telephone at any of the Regulator or control points throughout the area, including various internal stations such as Car Depots, and Power Supply Sub-stations. He is thus able to authorise the necessary action, send the Breakdown Gang or bring assistance from other points; in fact he is in complete control of the situation.

When one considers the large number of minor incidents, such as the breakdown of heavy lorries on the track, which, if not quickly removed cause congestion, not only to trams but to other traffic, it will be realised of what value it is for officials to be concentrated on the scene of a breakdown.

Briefly the method of working the Western Electric Company's Telephone Control System is as follows:—

At intervals of half a mile telephones are situated, and an official, driver or conductor, going to any one of these telephones has only to open the door, lift out the receiver and shout into the mouthpiece "Control." This is conveyed through loud speakers fitted in the Control Room to the Controller, who by means of a telephone jack, plugs on to the circuit from which the

CONTROL ROOM, HACKNEY.

call is being received. The Controller is also able whilst taking the message to ring another point such as a Breakdown Gang, Sub-station or Regulator, to whom it may be necessary to give instructions; even while he is talking it is possible for him to ring a bell on the same circuit calling another man to the line.

The system is divided up into eight circuits, which are at present linked in pair giving four separate keyboards, each of which can be operated by a single Controller or the whole four by one Controller.

Usually the system is worked in this way, but if officials at two different points wish to hold a conversation this line can be isolated from the other seven for the time being, and through the loud speaker the Controller is able to hear when the conversation ceases.

The use of the inter-connecting switches has been much greater on this System than on any of the railway Systems already installed, and it has been found that the system of control of tramways is such that the Western Electric Company's telephone control system is particularly suitable for the work which has to be done.

THE PASSING OF MR. W. G. GOULD.

To many in the London Telegraph Service to-day, even in the C.T.O. itself, the name of Mr. W. G. Gould, of the Cable Room, is but the faintest memory and to many others unknown. Pensioned over fifteen years ago his retirement was marred by years of bodily weakness until outliving his apparently more robust partner he passed away in the early days of last month. Despite his ever-increasing weakness as the months rolled on into years, and gradually deprived him of the power of locomotion, he showed no lack of interest in every-day affairs, the old office with which he had been associated, and current literature and thought, and would still discuss questions with keen interest until the time came when even speech was difficult and would then fail altogether. Yet he continued with his books until one day the end came quietly, gently—and he slept.

Personal recollections of this brave soul centre round his unfailing desire to be just, to which must be added a tenderness hidden beneath a brusqueness which latter at once disappeared when real distress or need became evident before him. Rarely has the Department benefited by a sincerer devotion to duty that that of this late administrator of the Foreign Telegraphs, London. Mr. H. J. Broughton, senior Superintendent, represented T.S.F. at the funeral service at Chingford Cemetery on the 7th ult., Mr. F. P. Didden, a late Assistant Controller, also attending to pay the last tribute to a worthy colleague.

J. J. T.

ORIENTAL TELEPHONE CO.'S FOOTBALL TEAM (Singapore).

The team have several dates vacant Apply to HON. SEC., O.T.F.C., SINGAPORE.

A TALK ON TELEPHONE SERVICE.

SEPT. 18 last is of particular interest to the Post Office, as it was the day upon which advantage was taken for the first time of the facilities for broadcasting by "wireless," information regarding Post Office activities. By the courtesy of the British Broadcasting Company, Mr. W. A. Valentine, Controller of the L.T.S., gave a short talk on "Telephone Service." His address was heard perfectly by "listeners-in," and it no doubt convinced a large number of his hearers of the advantage to be derived from a connexion with the vast system which he explained, and to which we are proud to belong.

Among his large audience there were, no doubt, many who would have liked to have heard more about the actual working of an exchange. This is a very natural desire, but it would obviously be impossible in one short address to go into such details. It is hoped, however, that it will be possible later on to arrange for further talks dealing in greater detail with specific aspects of the telephone system in a way which will be specially interesting to the ever-growing army of wireless enthusiasts. The broadcasting system has rendered the possessors of receiving sets representative of the "man-in-the-street," and it is the public as represented by the "man-in-the-street" who have to be educated in telephone matters and possibilities, if we are to achieve the telephone development reached elsewhere.

CIVIL SERVICE OPINION.

WE learn that the Association of Executive Officers and Other Civil Servants is about to issue a monthly journal entitled *Civil Service Opinion*, the first number appearing on Oct. 15. It will be published on the 15th of each month at 1, Central Buildings, Westminster, price 2*d.* a copy. It will contain Civil Service news and comments, notes on Association activities and on Whitley Council proceedings, and besides dealing generally with the work of the Civil Servant, will include articles and verse in lighter vein, and of a general literary character. Pages will also be devoted to students and to sport. The programme seems very promising and we wish the new venture every success.

THE BEST BED-BOOK.

BY K. R. G. BROWNE.

(*Reprinted from the* DAILY CHRONICLE.)

FROM time to time there arises in one or another of our literary periodicals a discussion as to what constitutes the ideal "bed-book," by which is meant, presumably, that volume which every right-thinker keeps at his bed-side to assist him in the wooing of sleep and the banishing of waking cares. The general opinion seems to be that there is no one published work with an outstanding claim to this somewhat dubious honour, and hitherto I have agreed with this view. But lately I have discovered the bed-book de luxe, the bed-book beside which all other specimens of the breed pale their ineffectual print. I refer to the London Telephone Directory.

The Telephone Directory has all the attributes of the perfect bed-book. It is cheap, inasmuch as a telephone is given away with it; it is readily balanced upon the knee or the chest; and, while a little of it goes a long way, that little is crammed with interest. Which may appear paradoxical, but is true.

The names in the Telephone Directory are alone worth the price of a telephone. My own name is in no way noteworthy, and some of those in the volume under review curdle my blood with envy. Dickens, I think, would have loved this book. Where else could one encounter an Aboaf, a Bullwinkle, a Chonglop, or a Dribble? Who would have suspected that outside the realm of comic fiction there existed a Whereat, a Limebeer, or a Pipkin? The Telephone Directory has all these and more besides.

One may learn, too, much of human nature from this valuable book. Observe that Mr. X *describes himself (no doubt justly) as a "music-hall* artist," while Mr. Y, who, after all, follows the same profession, is content with the label of "comedian." Note that if you earn your living with your lungs you are a "vocalist," and not, as the layman might have supposed, a "singer." Compare the taciturnity of Messrs. A ("Manufacturers") with *the cheery expansiveness of Messrs. B ("Crtage. Road Contrctrs., Builders'* Materials"). And so on indefinitely or until you fall asleep.

The Telephone Directory is a searching examination-paper in general knowledge. What, for example, are the qualifications of a pea salesman? Is he forbidden by some harsh law to purvey so much as a single bean? What is a Mt Slsm? Does a Honey Pckr pick it or pack it? Why are engineers "civil," but entertainers merely "humorous"? What is the difference between a rag and a wholesale rag, for it seems that there are merchants of both? Is a corn merchant the ally or the enemy of a chiropodist? Ask yourself these questions, and then take up night-classes.

But if the Telephone Directory is a pearl, its little brown brother, that buff book wherein one may browse for hours at a time among trades and professions whose very names are Romance, is a jewel beyond price. Who would not sell a farm to become an armature winder, an almond grinder, or an average adjuster? Why was I not equipped for the proper enjoyment of life as a bank-note engraver or a clean towel hirer? If— or, rather, when— the pursuit of letters finally leaves me behind, you may confidently look for me among the dogs' hairdressers, the horse dentists, or the liquorice importers. Unless, of course, I have enlisted under an assumed name in the lingerie (wholesale).

The foregoing examples should serve to show that as a bed-book the Telephone Directory need fear no rival from the classics. When next insomnia has you in its grip, read a page or so of Thompsons or a couple of furlongs of Smiths, and note the result.

SHIPPING, ENGINEERING & MACHINERY EXHIBITION.

The "Relay" Automatic Telephone Company's exhibit at the Shipping, Engineering & Machinery Exhibition, Olympia, consisted of a complete private automatic telephone exchange. This exchange comprises the automatic switchboard, power board, two sets 24 volt batteries, and telephone instruments, all connected up for use.

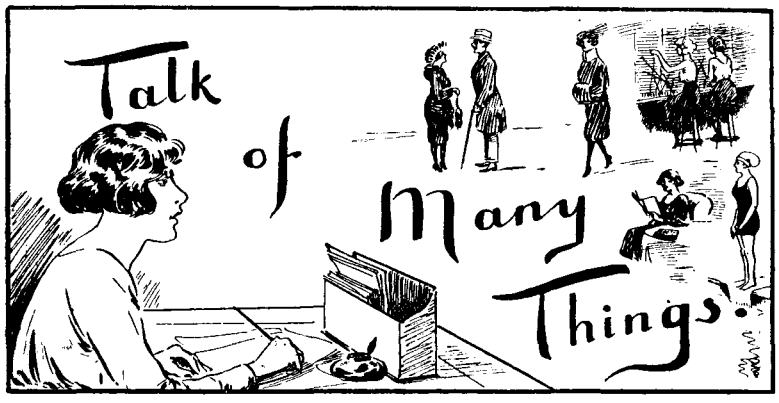
The switchboard consists of an iron frame into which the relay groups are fitted; these groups can be increased as required from time to time without putting the service out of action. The relay takes the place of the human operator, and, by a series of electrical circuits, actuated through the dial on the telephone instrument, the caller becomes his own operator and can automatically get into touch with any connexion required within four seconds.

Power Board and Accumulators.—The functions of these are to store and distribute the electric energy for working the switchboard; the power used for this purpose is supplied from a 24-volt battery of accumulators, which can be charged from the existing electric light system, either direct or through a motor generator.

Instruments.—Instruments of the well-known Post Office pattern are exhibited with a dial attachment, also a convenient form of box type instrument, with combination hand telephone, which is recommended for both desk and wall use. Attention is called to a specially designed type of instrument for use aboard ships.

Wiring System.—An important feature that will be observed with regard to the wiring system is that two wires only are necessary from each telephone to the switchboard, and that the caller can connect himself to any of the other telephones served by the switchboard.

WE TELEPHONISTS



"A Mystery."

"WE read, the other day, that telephone girls ordinarily marry at an earlier age than any other female employees of the State. Why should that be?"—*Extract from Daily Mirror.*

And its Solution:—

"Something Nice."

Apropos of various mildly inflammatory articles of which I must confess myself to be the more-sinned-against-than-sinning author; somebody once said to me in doubtful compliment, "Why don't you write something *nice* about the telephone service?"

The Editress telephoned me to-day and said, "What about it?" or words to that effect; which, being interpreted, meant that positively *nobody* had been energetic enough to write a paragraph for the Telephonists' Column this month, and columns must be filled, so if you do not like this article, it is on your own heads—O ye who have not bothered! Owing to entirely unofficial reasons, a happy mood was upon me, and I straightway thought "I *will* write 'something nice' about the telephone service."

Then I reflected "What *is* nice about the telephone service?" Instantly the answer came to me—the girls! A friend of mine, who confesses to being "rather impatient" on the telephone, came to an exchange dance. When he entered the hall and saw the girls in their party frocks all flushed with excitement and happiness, obviously full of *joie de vivre*, he stood near the door way aghast and said: "Good lord, are *these* the girls I've been swearing at?" The remark leaves much to be desired from the point of view of chivalry; but emphatically pays tribute to the outward appearance of telephonists. Yet it is not of this that I would write. Good looks, ready wit and attractive clothes are there for all to see. It is of the telephonist as she is to another telephonist that I would write. In such a tremendous concern where so many hundreds, or is it *thousands*, of girls are employed, it is a splendid thing to find so much good fellowship, so much kindness, sympathy, such readiness to understand and help. My mind carries me back to those unforgettable days of the War. One had only to say that one's "boy" was on leave and one wanted as much time off as possible, and instantly it was managed somehow. Somebody would offer to take the late duty; somebody would "stay on"; somebody would "come on early." Somehow, between them, in their wonderful kindness, the changes would be arranged to the Department's satisfaction. Then, sometimes, a girl would stay away for a few days and return in a black frock, looking sad and lost. No questions were asked; no blundering words of sympathy given; but in some subtle way the whole exchange would seem to convey a "knowing," a longing to help, a willingness to do anything which could afford the least consolation.

If one sits at one's board with a blinding headache and just slogs on in sheer dislike of "giving way," the next girl is sure to say, "Push your board over. I'll take it."

If there is an earthquake in a remote country or a little child without boots, it is always safe to appeal to telephonists. Their instinct for loving kindness—not "charity"—is spontaneous; they just give.

If a girl becomes engaged, all the other girls get excited and joy with her.

If one leaves to be married and has a lot of presents, all the others say "Isn't it lovely? I feel just as happy as if it were myself."

If one of them should be ill and have to stay away for a lengthy time, the first thought is to send fruit and flowers.

There are so many instances of this fine cameraderie among the girls that it is not possible to speak of them all. Perhaps it is not the "best of all possible" taste to laud the telephonist in the Telephonists' Column; but when I thought of "something nice" about the telephone service, the girls took first place in my mind; and I mean so earnestly the tribute I would pay them that perhaps I may be forgiven if, in sending this article to the Telephonists' Column, I have been guilty of doing that which is vaguely known as "not quite the thing."

DOROTHY TURNER.

Leeds P.O. *v.* Rotherham P.O. (Tennis).

For battles grim of former ages
The student turns to Homer's pages,
Where Greek and Trojan wage their wars,
Helen, the faithless, being the cause.
But even Homeric struggles pale
Beside the subject of my tale.
This stirring tale I now relate
Of Saturday (25th the date),
When Leeds P.O. to Rotherham went,
On Rotherham's tennis laure's bent.
The journey ("standing seats" provided)
Caused railway "heads" to be derided.
The tennis pitch was quickly found,
Three well-kept courts on level ground.
Then soon began this dreadful tourney
(The object of the Leeds' team's journey).
The opening games, though play was keen,
The Leeds' team lost (their score looked lean),
When rain (which loves us like a brother)
Came down and caused a lot of bother.
So all but eight to tea adjourned,
And in a short two hours returned.
Then Leeds played up at the resumption,
P'raps Rotherham suffered from (over) consumption;
For gallant B. and partner fair
Brought victory from the Rotherham pair;
Whilst S. with service ("no delay"),
Helped Leeds in the deadly fray.
R. played with lusty drive and service,
Enough to make the doughtiest nervous;
Miss H. fought like a bear enraged
Miss J. had both her "lines engaged."
The balls were played with terrific pace
(Their Unions taking up the case)!
Such glorious tennis is seldom seen
Outside the Wimbledon's centre green.
The spectators with excitement mad.
The Umpire almost swallowed his pad,
When Leeds first equalled and then surpassed,
And gained a useful lead at last.
Though many good teams to Rotherham roam
This was their first defeat at home;
And in a splendid spirit they took it
(We're sports in Yorkshire, Don't overlook it)!
To lusty chorus they now adjourn
Until 'tis time for Leeds return.
We wish Leeds luck as they steam away,
They'll need it (a week come Saturday)
When Rotherham, whose spirits burn,
Will go to Leeds the tables to turn.
So attend all ye, who love to see
Struggles (as in the Odyssey);
For struggle there'll be beyond human ken,
Worthy of Milton's or Homer's pen
(Of Milton and Homer there are no signs,
So we'll have to accept these doggerel lines).

L. C.

Notice affixed to coils of wire in a London telephone exchange:—

"NOT TO BE USED FOR JUMPERS."

Some girls carry this novelty craze too far!

London Telephonists' Society.

On Friday, Oct. 5 next, the L.T.S. resumes. With "Recollections" as her text, Miss Cox the session booms. So let us come with one intent—to honour our new President. And if each meeting we would make a paramount success, let each one come and undertake to speak (some more, some less)! And when the Competitions start, may each one play a leading part.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.

BOOTH-BAUDOT DUPLEX AWARD.

WE have been informed that the first award of £5 has been gained by Messrs. R. T. King and E. J. Barnes, both members of the Engineering Department, for their arrangement to work long telegraph circuits in underground cables with the ordinary earthed secondary cell equipment instead of using separate unearthed batteries for each circuit. The two wires of the loop are used, but in effect the signalling is done only on the "A" wire, while the "B" wire is used to neutralise the inductive disturbance from the neighbouring circuits in the same cable. The proposal involves the provision of additional windings on the galvanometers and relays, but the cost of this change will be very much less than the cost and maintenance of separate batteries for each loop circuit.

A cheque for £5 was forwarded by the Council of the Institute of Post Office Engineers to Messrs. King and Barnes in March last.

THE POST OFFICE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

PROGRAMME FOR THE SESSION 1923-24.

MEETINGS TO BE HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, VICTORIA EMBANKMENT AT 5.30 P.M.

Monday, Oct. 15, 1923.—Address by Sir Andrew Ogilvie, K.B.E., C.B. (late Second Secretary to the Post Office), on "Relations of the Post Office and the Public."

Monday, Nov. 19, 1923.—"Wireless Telephony," by E. H. Shaughnessy, Esq., O.B.E. (Wireless Section, Engineer-in-Chief's Office, G.P.O.).

Monday, Dec. 17, 1923.—"The significance of State-owned Telephones," by William Day, Esq., M.I.E.E. (Engineer-in-Chief's Office, G.P.O.).

Monday, Jan. 21, 1924.—"What are we here for?" by H. Gordon Selfridge, Esq. (Post Office Advisory Council).

Monday, Feb. 18, 1924.—"Improved methods of production and distribution of electrical energy," by Sir John Snell, K.B.E. (Electricity Commission).

Monday, March 17, 1924.—"Trunk Telephone Development," by H. G. Trayfoot, Esq. (Headquarters, Traffic Section, G.P.O.).

Monday, April 28, 1924.—"Administration and Control of Telegraphs and Telephones from a Surveyor's point of view," by T. Kelly, Esq., C.M.G. (Surveyor, South Eastern District, G.P.O.).

HULL POSTAL, TELEGRAPH AND TELEPHONE SOCIETY.

President: G. N. Merrefield, Esq., Surveyor, North Eastern District.

Vice-Presidents: D. J. Barnes, Esq., District Manager, York and Lincoln Telephone District; J. T. Tattersall, Esq., Sectional Engineer, Hull.

Chairman: C. R. Thomas, Esq., Postmaster, Hull.

SYLLABUS—1923-24.

Sept. 4, 1923.—Lantern Lecture, "Automatic Telephones," by B. O. Anson Esq. (Engineer-in-Chief's Department, G.P.O., London.).

Sept. 18, 1923.—Lantern Lecture, "Travelling Post Offices," by Wm. C. Waller, Esq., (Chief Superintendent, Travelling Post Offices, G.P.O., London).

Oct. 30, 1923.—Address on "The Psychology of Telephony," by John Lee, Esq., C.B.E., M.A., M.Com. (Controller, Central Telegraph Office London).

Nov. 20, 1923.—Lecture, "The Decline of Telegraph Traffic and the Future Outlook," by J. Stuart Jones, Esq., M.B.E., (Inspector of Telegraph and Telephone Traffic, G.P.O., London).

Jan. 15, 1924.—Lecture, "The Development of the 'On Demand' Service," by G. F. Saffrey (Assistant Inspector of Telegraph and Telephone Traffic, G.P.O., London).

Feb. 19, 1924.—Lecture, "Recent Developments in Telegraph and Telephone Engineering," by T. B. Johnson, Esq., M.I.E.E. (Superintending Engineer, North Eastern District).

March 18, 1924.—Lecture, "The Story of the Baudot," by H. W. Pendry, Esq. (Assistant Inspector of Telegraph and Telephone Traffic, G.P.O., London).

April 15, 1924.—Lantern Lecture, subject to be announced, by A. Owen Spafford, Esq., O.B.E. (Assistant Surveyor, North Eastern District).

Postal servants of all grades, in Hull and District, are invited to be present at the meetings, which will be held on the dates announced at 7.30 p.m. at the Hull Post Office.

JOHN C. CRAVEN (*Secretary*).

LONDON TELEPHONE SERVICE NOTES.

The Controller Broadcasts.

ON the evening of Tuesday, Sept. 18, we had the experience of listening at home to the Controller delivering an address from 2 L.O. The fifteen minutes allowed in such occasions is little enough time in which to deal with the subject of "Telephone Service," but Mr. Valentine very successfully sketched the framework on which is built the large organisation known as the London Telephone Service. The listeners had presented to them an idea of the vastness of the system, followed by an impression of the minute detail of a single telephone call out of the many millions of calls which experts lightly dismiss by the one word "traffic." The address ended with an invitation for any who so desired to visit a telephone exchange and examine for themselves its wonders. It is hoped the invitation will be taken advantage of to the fullest possible extent. We are justly proud of our system, and never tire of explaining it to whoever cares to come.

That this event be the forerunner of others of a similar character was the sentiment uttered by Captain Eckersley, the British Broadcasting Company's Chief Engineer, at the close of the address, and it is hoped that it will be so.

* * * *

London Telephonists' Society.

The programme for the 1923-1924 session is now published and should prove attractive. It is interesting to note that this will be the Society's fifteenth year. The arrangements are:—

Oct. 5, 1923.—Presidential address by Miss A. D. Cox. Subject: "Recollections."

Nov. 3, 1923.—Two papers. (1) "The Phonogram Room," by Mr. W. C. Griffith. (2) "The influence of sport on our work," by Mr. E. A. Pounds.

Dec. 7, 1923.—Impromptu Debates. Managed by Mr. Horace Dive. Subject: Subscriber *v.* Information Desk, or Complaints and their Cures.

Dec. 29, 1923.—Annual Dance.

Jan. 29, 1924.—Lantern Lecture, by Miss A. A. Heap, on "Recent Holidays in Italy."

Feb. 1, 1924 *and March* 7, 1924.—Competition Papers. Special Subject: "Wrong Number Trouble."

The meetings will commence at 6.30 p.m. and will be held in the Y.M.C.A. Lecture Hall, 186, Aldersgate Street, E.C.4., quite close to the G.P.O.

* * * *

Night Staff at Play.

Two cricket matches of unusual interest were played, the first on Aug. 31 and the other on Sept. 8.

The former took place at Berrylands, Surbiton, and the opponents were the Pelican C.C., comprised of the staff attached to exchanges in the South and South-West, and the Carmel C.C., representing the exchanges in the Carter Lane building. The event was to decide who should hold the U.P.W. Challenge Cup for a year, and in a close and exciting game Carmel won by the narrow margin of 5 runs. For the winners, Bailey put up the best performance, his 27 runs being the top score, and he followed this up by taking 7 wickets for 35 runs. Curiously enough, the best performance for the Pelicans side was very similar, Smith taking 5 wickets for 42 runs, followed by 26 runs, the best for his side. The complete scores were:—

Carmel.		*Pelicans.*	
Burt, b. Smith	10	Sayer, c. Tomms, b. Crompton	1
Fisher, b. Smith	20	Moss, b. Bailey...	5
Crompton, lbw. Christie ...	9	Dearnley, b. Bailey	14
Tomms, lbw. Christie ...	9	Christie, b. Bailey	1
Bailey, c. Dearnley, b. Smith ...	27	Smith, b. Tomms	26
Lawrence, c. and b. Gordon	9	Gordon, lbw. Bailey	5
Butten, run out	0	Herod, b. Bailey	2
Bird, not out	8	Kent, lbw. Tomms	1
Banner, b. Smith	0	Simpson, not out	11
Buck, lbw. Smith	0	Bater, b. Bailey	4
Extras ...	4	Extras ...	4
	96		91

* * * *

The second match was played at Park Royal, and a selected team from the Night Staff's Cricket league met a team from the Traffic Branch. The scratch team from the Traffic Branch were well beaten, but not to the point of despair, and it is hoped that this match will be an annual fixture.

The Night Staff batting first, declared their innings closed at 213 runs for 7 wickets, and then disposed of the Traffic side for 73 runs.

Contract Branch Notes.

"*Wired Wireless.*"

Listening the other evening in North London to Sir Ernest Rutherford, F.R.S., giving his presidential address before the British Association in St. George's Hall, Liverpool, and marvelling that a little home-made crystal set, costing 3*s.* 6*d.*, less, of course, the telephones, could so reproduce his voice that he might have been in the same room, it struck me that others might like to know how it was done.

Briefly it may be stated that the British Broadcasting Company hire from the Department a trunk line at night from London to each of the 5 broadcasting stations and local ends to the Studios or other points. On the special occasion referred to, they hired an additional trunk circuit to Manchester, and had continuous service thereon for a couple of hours during the speech in order to keep control of transmission.

The series of events was as follows :—

Speaker :— Microphone. St. George's Hall, Liverpool. Amplified at St. George's Hall. Passed through transformer at St. George's Hall over direct circuit to Manchester Studio (amplified on parellel leads at Manchester for Manchester listeners). Joined from Studio through Manchester Trunk Exchange to London Trunk Exchange, thence to Studio, Savoy Hill. Amplified at Studio, Savoy Hill. Passed direct to aerial at Marconi House.

The British Broadcasting Company's engineers say that technically the experiment was a complete success.

These trunk lines are used nightly for the distribution of news and for special events such as that referred to.

The British Broadcasting Company are to be congratulated on their enterprise, and on the success which had been obtained on this form of "wired wireless."

* * * *

A Unique Agreement.

Negotiations have been completed up to the point of signing an agreement in a rather unique case which is probably the first of its kind in this country.

The Halden Estates Company, Ltd., are developing an estate called Nork Park between Banstead and Epsom, and have undertaken to rent a telephone and be responsible for the call fees for one year for every house they build on the estate and to supply the Department, free of charge, with the necessary site for an exchange and Post Office.

The magnitude of this exceptional transaction will be appreciated when it is mentioned that the Company hope to build and dispose of 1,800 houses on the estate within a period of five years.

Interesting possibilities are opened up by this new phase of contracting for telephone service wholesale, and future developments in similar cases throughout the country may be looked for now that the ice is broken.

* * * *

Culled from the Exchanges.

City.

The City Exchange have arranged a series of their popular dances for the coming winter, the first taking place at the Stationers' Hall on Friday, Oct. 26. The others are fixed for Jan. 26, 1924, and March 8.

Tickets can be obtained from either Miss Eastell or Miss Miller at the City Exchange.

The "House Full" notices are usually up well in advance of the night, so intending revellers are advised to get their tickets early.

* * * *

Trunk and Toll Exchanges.

The two swimming clubs, named the Imperial and Renown, combined in their third annual swimming gala which was held at the Holborn Baths, on Sept. 11.

The principal results in a programme of nineteen events were :—

Trunk Championship—

Miss McBirney	1
Miss Porter	2
Miss Harold	3

Toll Championship—

Miss Waspe	1
Miss Orton	2
Miss Wilson	3

Diving—

Trunks.—Miss Hodden	1
Toll.—Miss McKelvie	1

Invitation Team Race—

Regent Exchange (Miss Phipps, E. Williams, Broomsgrove and E. Amos)	1
Gerrard Exchange (Misses Davis, Hayter, Wilson, Burt)	2

Handicap—60 yards—(Open to Post Office Ladies).—

Miss Phipps (Regent Exchange) 3 secs.	1
Miss Oskenden (Money Order Dept.) 3 secs.	2
Miss Grover „ „ „ 12 secs.	3

Team Race. Trunks versus Toll—

Trunks beat Toll.

Graceful Swimming—

Miss Davis (Gerrard)	1
Miss (Regent)	2
Miss McBirney (Western)	3

In addition, there was an exciting water polo match in which the Penguins beat the Amateurs 3 goals to 2.

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Help for Japan.

Members of the staff who contributed will be interested to learn that the sum of £155 was sent to the Lord Mayor in connexion with his Relief Fund to assist sufferers in the recent awful earthquake disaster.

PERSONALIA.

LONDON TRAFFIC STAFF. TELEPHONISTS.

Resignations on account of marriage :—

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Miss J. SIM, Telegraphist, promoted Assistant Supervisor, Aug. 3, 1923.

are, however, probably 200,000 persons already in possession of unlicensed receiving apparatus, and as the Committee point out these persons are paying nothing towards the cost of the programme because in the past there has been no licence applicable to them. A special interim licence will be issued at a fee of 15*s.* covering their present apparatus, whether made or purchased and wherever made or purchased, which will be granted to them provided that they apply for licences before Oct. 15. No charge will be made for past user and no proceedings will be taken in respect of past user if the licence is taken out before Oct. 15. Constructor's and Interim Licences as above will be placed on sale at all Head and Branch Post Offices and certain sub-offices on and from Oct. 4. Applicants for such licences, as well as for the existing B.B.C. licence, will be required to fill up and sign a simple form. Copies of these application forms may be obtained not only at Head and Branch Offices but at all sub-offices at which Money Orders are issued. This system of licensing will be continued for an interim period expiring on Dec. 31, 1924, after which it will be possible for the single form of licence recommended by the Committee to be introduced, without any condition as to the marking or origin of the licensed apparatus, if it should be then thought desirable. Out of the fees of 15*s.* for the Constructors' Licence and 10*s.* for the B.B.C. licences, the Company will, if the House of Commons agrees, receive 12*s.* 6*d.* and 7*s.* 6*d.* respectively, instead of 5*s.* per licence which they receive under the existing scheme.

The Postmaster-General is not satisfied that, even with the increased contribution from licence fees, the revenue of the Company will, for some time to come, be sufficient to provide adequate programmes without a substantial contribution in the form of royalties on the sale of sets by the manufacturers who form the Company. Hence he has stipulated for the continued payment of such a contribution, but on a reduced scale. The reduction will be approximately 50 per cent., except in the case of crystal receiving sets, where it will be considerably more. This reduction should enable a cut to be made in the cost of receiving sets. The proportion of the licence fees receivable by the Company will, after Dec. 31, 1924, be placed on a sliding scale based on the number of licences on the one hand, and the cost of maintaining an adequate broadcasting service on the other hand. Any surplus profit accruing to the Company over and above 7½ per cent. on its capital and a necessary reserve for depreciation, &c., of plant and machinery will be surrendered to the Post Office: in other words the profits of the Company are limited to 7½ per cent. upon its capital.

The existing experimental licence, at an annual fee of 10*s.* will continue to be issued from the General Post Office to persons who are able to satisfy the Postmaster-General that they desire the licence for *bona fide* experimental purposes and are qualified to conduct experiments, and who sign a declaration to the effect that they will not use the broadcast programmes except for experimental purposes.

Each new licence (as distinct from renewed licences) will cover a period of twelve months from the first day of the month of issue. Renewed licences will cover twelve months exactly from the date of expiration of the old licence.

The basis of membership of the Broadcasting Company will be extended so as to include dealers, with suitable representation on the Board of Directors for the new membership if it becomes at all substantial; and the deposit of £50 now required from members will be abolished. The licence held by the Company will be prolonged, on suitable conditions, to the end of 1926, as recommended by the Committee. If the Company supply a satisfactory service and are willing to erect additional stations where the Postmaster-General may consider them necessary, he will not license any other broadcasting service during the interim period up to Dec. 31, 1924. After that date, if the Postmaster-General should consider it desirable that additional stations should be established in any town or district where the Company's service is not adequate and if the Company are not prepared to provide such stations, the Postmaster-General reserves the right not only to license other organisations to do so, but also to give them an appropriate share of the revenue arising from new receiving licences in the district in question. He also reserves the right to license other services (without regard to geographical area) without withdrawing from the Company any part of the licence fees to which they may be entitled. In either case, he reserves the right to allot suitable wavelengths to the new organisation, while taking all reasonable steps to avoid creating interference with the Company's services.

The Postmaster-General proposes at an early date to appoint an Advisory Board, as recommended by the Committee, to assist him in all important questions relating to broadcasting. He has noted with pleasure the Committee's recommendation of the present broadcasting service; and he trusts that the service will give increasing satisfaction under the new conditions, and that a great impetus will be given to the sale of British-made receiving apparatus.

In the enforcement of the new scheme of licensing, much will depend upon the willing co-operation of the public. So long as there has been no licence to fit the case of the many thousands of "listeners" who are using home-made apparatus, it would have been unreasonable for the Post Office to attempt to enforce the law with any strictness; but now that such a licence is available, there will no longer be any excuse for the use of receiving apparatus without licence. The Postmaster-General believes, however, that the "listening" public will require no pressure in this respect. He is confident that they will be not only willing, but anxious, to put themselves right as regards the law, and at the same time to contribute their quota towards the cost of a service which is affording them so much enjoyment.

Copies of the Broadcasting Committee's Report may be purchased through any bookseller or directly from H.M. Stationery Office at the following addresses:—Imperial House, Kingsway, London, W.C.2, and 28, Abingdon Street, London, S.W.1; York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; and 120, George Street, Edinburgh. Its price is 9*d.*, or, if ordered by post, 1*d.* extra for postage.

* * * *

The provisional scheme, aided by a "good press," "C.Q.'s" from broadcasting stations, and a general desire for fair play to the Broadcasting Company has met with unqualified success. There was a good demand for licences on the first day, Oct. 4, but as the closing date for Interim Licences came nearer and nearer so the demand increased. On Saturday, Oct. 13, the original closing day—applicants formed queues at many Post Offices and police regulation was necessary at least at one office. In the ten days ending on the evening of Oct. 15, approximately 227,000 interim and constructor's licences were issued, raising the total figure to approximately 414,000 licences distributed in round figures in the following proportions:—

Interim and Constructor's Licences ...	227,000
Broadcast Licences	128,000
Experimental Licences	59,000

If we examine the figures in detail some extraordinary anomalies are apparent. For instance, at the Eastern District Office in London 16,138 and at Glasgow 22,800 interim and constructor's licences were issued as compared with 791 and 4,022 broadcast licences respectively for the whole period from Nov. 1, 1922, to Sept. 30, 1923. Into any discussion whether this surprising influx was due to repentant "pirates" or to new devotees we refuse to be drawn. Again, the nearness of a broadcast station has a very decided effect on the number of "broadcatchers," on account no doubt of the limited range of the popular and inexpensive crystal set. But even making considerable allowances for that fact, one wonders whether there are really more wireless enthusiasts in Kingston-on-Thames than in the four cities of Kingston-on-Hull, Leeds, Liverpool and Nottingham combined, and more in Waltham Cross alone than in the populous city of Leeds. Or is there some other explanation? Perchance the smaller number of licensees is due to temperamental differences between North and South? It may even be that Yorkshire, Lancashire and Nottinghamshire do not take kindly to a type of entertainment where a pleased audience is deprived of the opportunity of expressing its approval vociferously and a disgruntled listener must suffer in silence.

One aspect of the scheme has given much satisfaction. There were surprisingly few hitches in the practical working of the new arrangements, and it must be remembered that the printing, distribution and issue of a vast number of forms and licences were carried out at great pressure. At an early stage, there was some misunderstanding as regards the "last day" which was described simultaneously in the "Press" as Oct. 13 and 15, and to meet this difficulty the later date was adopted. Many would-be licensees were loth to part with their bawbees until their conundrums to headquarters had been answered; and in order to avoid any hardship in consequence of the unavoidable delay in answering the thousands of letters received during the 10 days, the period was extended to the end of October.

There was one fly in the ointment. It was originally proposed that applicants for new experimental licences were not only to prove their qualifications to experiment but also to make a declaration that they would not use broadcast programmes except for experimental purposes. They were thus—they urged—on the horns of a dilemma. They would be faced with the alternative of perjuring their immortal souls, or of missing, may be, a "Melba" performance at Covent Garden. The intruding insect was removed by an agreement that a person otherwise qualified for an experimental licence would be authorised to use broadcast programmes for purposes of entertainment on his undertaking to pay an increased fee of 15*s.* per annum. This concession, coupled with a promise

WHERE TO STAY.

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

BRIGHTON.—Rusthall Boarding Establishment, 11-12, Cannon Place. Central. One minute West Pier. From 2 guineas weekly.

GUERNSEY (Channel Islands).—Comfortable Board-Residence. Electric Light, bath, &c. Mrs. G. A. Rabey, 17, Havilland Street, St. Peter Port.

SHANKLIN.—Glenavon Private Hotel. Comfortable Brd.-res. Electric light and gas fires all bedrooms. Free billiards, splendid cuisine (separate tables). Highest recommendations.—T. Geere. 'Phone 37

not to require existing holders of experimental licences to make declarations or to pay increased fees, apparently met the views of all parties.

Time alone will show whether—as some urge—" radio fans " are merely the followers of a passing fancy, or whether broadcasting by wireless telephony will form a permanent part of the world's communications as the Committee and many other unprejudiced thinkers are convinced. There is one fact which has emerged clearly from the controversy of the past few months. During the summer months nothing will excite enthusiasm in the wearing of telephone head sets. No doubt because, like melons, they make the ears so wet !

THE MORKRUM "TELETYPE."

THE installation of printing telegraphs on the main routes in the British telegraph service, principally in the form of multiplex systems, has been proceeding steadily during the past few years, and practically all the larger centres are now so interconnected.

Multiplex systems, by affording 4, 5 and 6 duplex channels on a single wire, are essentially line-saving, and by their use on long-distance circuits appreciable economies in wire costs have been possible. On short routes, however, where maximum loads average between 800 and 1,000 telegrams daily, the advantages of multiplex are not so fully realisable, and the advent of a simpler form of printing telegraph has, for some time, been awaited. Prior to the war a promising instrument was designed by Mr. H. H. Harrison, the well-known authority on machine telegraph mechanisms, but prohibitive manufacturing costs have arrested its development. The appearance in this country two years ago of the " Teletype," manufactured by the Morkrum Company, Chicago, was therefore a matter of interest, and, as its performance and construction were favourably reported upon, the British Post Office took an early opportunity of subjecting the apparatus to a trial on public wires. Promising results were obtained, and the number of circuits being equipped with " Teletype " apparatus is increasing. It may therefore be of interest generally to offer a brief description of the principal features of the instrument.

The " Teletype " belongs to that group of printing telegraphs described somewhat lengthily as " single-channel start-stop " systems. A five unit alphabet is employed, but the mechanism equivalent to the multiplex sending and receiving distributor

FIG. 1.

does not rotate continuously and the transmission of each five-unit combination is preceded by a " start " signal and is followed by a " stop " signal, making virtually, a seven-unit system.

As may be gathered from Fig. 1, the " Teletype " in size and shape resembles the ordinary commercial typewriter, and it may be mentioned that the table space required for duplex working is similar to that provided for Morse duplex working. The instrument consists of a typewriter keyboard in front, a small transmitting mechanism at the right, a motor with a centrifugal flywheel governor to keep the speed reasonably uniform, and a printing unit, in front of which is positioned the typewheel and the tape on which the message is printed.

The keyboard consists of three banks of keys, and, in the Post Office sets, two space bars, " letter space " and " figure space " in place of one shown in the Figure. The keyboard layout follows universal typewriter practice, and arrangements are being made to bring it into conformity with the Post Office standard keyboard as regards the position of " secondaries " or auxiliary characters. The " letter space " bar is used to space before or between words, the " figure space " bar being brought into use to space before or between figures. By this means separate inversion signals are unnecessary, the space-bar signals performing the double function of spacing, and of changing the printer typewheel position from letters to figures, or *vice versa*.

Underneath the keyboard lie five irregularly-notched levers, and depression of a key slides one or more of these levers to the right or left thus forming the desired permutation. The levers moved to the right lock corresponding contact levers of the transmitter unit, leaving the others free. Simultaneously, clutch mechanism brings into operation the drive from the motor, and a series of cams with staggered notches revolve, permitting the unlocked contact levers to close and open the circuit successively like playing successive notes on a piano ; the locked levers being held open throughout. " Start " and " stop " signals transmitted from a sixth contact lever precede and follow the letter permutation. Immediately the " stop " signal is sent the clutch mechanism disengages and the transmitter unit comes to rest until another key is depressed.

The receiving unit is a combination of Hughes reception and Baudot printing. Incoming signals actuate a single electro-magnet and the movements of the armature of this electro-magnet are distributed to a group of five selector levers by an ingenious shuttle roller the action of which merits description. The shuttle roller is keyed to the printer shaft and on receipt of a " start " signal, rolls round the face of a cam-ring. On the face of this ring are five indents with a selector pin projecting at the base of each indent. The shuttle roller, when free, rides into each indent and pushes the pin forward, but it is arranged that when the electro-magnet armature moves upwards, an extension prevents the movement of the roller into the indent over which it may be travelling at the moment. and the pin in that indent remains undisturbed. Thus, as the armature responds to incoming current reversals so the shuttle roller, in completing a revolution pressing against the cam-ring face, is either free to roll into an indent, or is intercepted, according to the position of the armature. When a selector pin is set, the movement is carried mechanically through a selector lever and plunger to a seeker which rests on a combiner wheel as in the Baudot receiver. There are five such seekers similarly operated, and when the permutation, which is set during a revolution of the shuttle roller, finds the appropriate group of notches on the " combiner," the print arm is released and the tape is thrown against the revolving typewheel, thus printing the selected character. On receipt of the " stop " signal, the clutch mechanism is disengaged and the printing shaft carrying typewheel, &c., stops when it has completed one revolution.

From the foregoing brief outline it may be apparent that the transmitter and printer units must rotate at approximately uniform speeds in the interval between the " start " and " stop "

signals. This uniformity of speed is obtained and maintained by means of the centrifugal governor in the flywheel of the continuously running motor. Governor contacts are brought out on a flexible arm. Speeds are verified by watching the movement of alternate black and white bands painted on the periphery of the flywheel through slotted extensions of a vibrating tuning fork. If the bands appear to be stationary, the motor speed is correct, but visual movement of the bands in one direction or the other indicates speed fast or slow, and corresponding adjustments are made simply by turning the governor arm contact screw to the right or left. A comparatively wide variation is permissible, as the start-stop principle affords letter correction.

The "Teletype" is arranged to run normally at 40 words (240 letters) a minute. The keyboard is "free" to be manipulated at any speed up to that figure without consideration having to be given to cadence signals or time intervals, but keys struck quicker than maximum speed resist depression as the previous permutation of selector bars remains locked until transmission of that letter is completed. Higher speeds may appear to be desirable with a type keyboard printing system, but in practice it is found that the number of telegrams which can be signalled at the present speed keeps the receiving operator fully employed gumming and checking, and any increase in load which might be carried with an increased signalling speed would probably necessitate additional staff at the receiving point without commensurate advantage. Working at a steady rate of 40 words a minute, experienced "touch" keyboard operators possess a reserve or margin of skill which expresses itself in rythmic and accurate manipulation with a minimum of effort and in operating the "Teletype" those features have been particularly noticeable.

The first Post Office circuit to be equipped with "Teletype" was that between the Central Telegraph Office and Croydon, a distance of about 13 miles in length. Initially the circuit was worked simplex, batches of five messages being sent in either direction. A "home" record was made as outgoing signals passed out to line through the local printing electro-magnet. Results proved sufficiently promising to warrant a further step being taken and arrangements were made to duplex the instrument by severing the connexion between the transmitter unit and local printer electro-magnet, abolishing the "home" record. Duplex "Teletype" is now worked on seven Post Office circuits, varying from 2 miles to 50 miles in length and carrying from 500 to 1,000 telegrams daily. The best effort so far has been the excellent total of 950 telegrams transmitted over the London—Margate circuit between 9 a.m. and 5 p.m. on the Saturday preceding August Bank Holiday.

It would be unwise at present to express a definite opinion regarding the maintenance of the apparatus. Modern machine telegraph designers aim at producing simple machines with as few electrical contacts as possible, and it can be said that the "Teletype" approaches the ideal in this respect. But the introduction of a machine telegraph, even of comparatively simple construction, at an office where formerly the entire mechanism for telegraphy consisted of Morse keys, sounders, and, perhaps, relays, creates conditions which are not too favourable to first-class maintenance, and time must elapse before manipulative and engineering staffs become acquainted with the new apparatus. Despite this fact most of the Post Office "Teletype" circuits are working with surprisingly few stoppages, and in some cases stability is maintained over long periods of weeks.

Although in the evolution of machine printing telegraphs the extreme simplicity and stability of the Morse sounder have not been attained, a long way has been travelled towards it. The "Teletype" is a notable landmark, and its success leads one to anticipate within the next few years a rapid extension of start-stop telegraph systems in this and other countries.

A. P. O.

TELEGRAPHIC MEMORABILIA.

A VERY interesting and up-to-date volume has recently appeared, by A. S. E. Ackermann and published by the Old Westminster Press, entitled "Popular Fallacies Explained and Corrected." Something over thirteen hundred popular beliefs are exploded by the iconoclastic writer. "Alfred the Great," says the author, "was perhaps too practical a man to let his own supper get burnt on the hearth, and too wary a general to go about masquerading *with a harp in the enemy's* camp!" The Canute story of the King who rebuked the waves on the sea-shore and got his feet wet as an object lesson to over flattering courtiers was not written until a century after the monarch had passed out of this life. The tale of Lady Godiva and "Peeping Tom" is likewise swept aside as a "silly story," and upon the authority of Prof. Freeman, too, while Fuller's anecdote concerning the gallantry of Sir Walter Raleigh and the dragging of his beautiful plush coat in the mire to save the dainty feet of Queen Elizabeth also goes by the board. Then we sigh for the credulity of our ancestors, but are quickly pulled up against modern public ignorance which, shades of the daily press, has fostered the idea that Marconi *invented* wireless telegraphy whereas he only improved the system. Without detracting from the highly valuable services rendered by the Italian scientist to radio telegraphy and telephony it is comforting, however, to find that standard authorities have not forgotten the pioneer mathematical work of Clark Maxwell or the patiently careful scientific experiments of Hertz. Yet the probabilities are very heavy on the side of even this modern legend remaining un-exploded in the minds of the bulk of the population, who naturally have much easier access to the scientific (?) tit-bits of their favourite daily newspaper than to this more reliable and specialised volume at twelve shillings and sixpence.

The good work performed by the Post Office Relief Fund in looking after the welfare of the wives, children and other dependants of men of all grades who had been incapacitated or who had paid the full price of victory, has repeatedly been mentioned in these columns, but no apology is proferred for referring to the subject once more. On this occasion it is simply to mention the matter more particularly as regards the Central Telegraph Office branch of the fund and to assure our C.T.O. readers and subscribers that the monies so generously subscribed by them is carefully, yet liberally donated. Though bound by legal documents and trust deeds to certain limits, which limits themselves have been fixed by actuarial experts, there is nothing approaching hide-bound adherence to the letter, rather does the broad spirit of humanity breathe through every decision. Here is a typical case: Mrs. X., husband killed, leaving five young children. Under trust deed children are to be the special care of the Fund. After several years of heroic struggle the mother has an offer of marriage. War Pension will naturally terminate in event of remarriage, but Mrs. X. enquires of P.O. committee if in this event her children's education will be discontinued as she could not accept offer to the detriment of the children's future, and could not herself afford to continue their education on the same scale, upon her re-marriage. Applicant informed by Executive Committee that she need have no fear on that score, committee will carry out promise to the full. Another case for which no specific rule could be laid down:—Mrs. A. has a daughter whose training at a business college she is struggling to pay for. Committee discover that Mrs. A., owing to illness, has fallen several months in arrears with her rent, and although every effort made she cannot overtake the debt but continues to regularly pay the current amounts. Further enquiries are made and show the genuineness of the case, a grant sufficient to wipe out the entire sum owing is made, and if any proof be needed that such assistance is really appreciated perhaps the recipient's own words to the honorary secretary when she heard of the decision will best convey the measure of the relief, "I shall sleep at night now."

The following notice referring to a Siemens' 3-Valve Wireless Telegraph receiver, was exhibited at the Shipping and Engineering Exhibition at Olympia, and while a distinct tribute to the quality of the receiver is also interesting as regards the two transmitting stations mentioned:—

> "Extract from a report from the wireless telegraph operator on a vessel at Melbourne, Australia:—
>
> "'On the trip from Capetown to Melbourne . . . at no time have conditions been good, but in spite of this, press from Leafield and Bordeaux was received up to the time of entering the above port.'"

A propos of exceptionallygood radio reception, the following experience of a London telegraphist who, being on late evening duty and therefore reaching home somewhere about midnight, listened in on his set to see what, if anything, was doing, will undoubtedly prove interesting to many readers. Here is an extract from the log of our amateur colleague. Log begins:—

"12.35 a.m. (G.M.T.) 24/9/23. Wave-length about 400 metres. Organ recital.

12.48 a.m. Church notices . . . My subject for next Sunday will be, 'The day that never comes.' At 7.30 o'clock there will be an organ recital for 15 minutes. Any who are listening on radio *are invited to send their contributions to the* Pastor, First Baptist Church, New York.

1.0 a.m. Quartette, 'Art Thou the God Israel.' (The soprano was especially clear.)

1.20 a.m. Hymn, 'My faith looks up to Thee,' sung by the congregation." Log ends.

The set used was a valve and crystal dual amplification circuit. (The S.T. 100 circuit 70,000 ohms resistance and the note magnifier.) Signals faded from time to time but reached quite comfortable strength at intervals.

Really our critics are difficult to please. For months and months one has heard cries of "Economy," and appeals for "business management" of Government Departments, and yet quite recently one read in the leading columns of a London daily newspaper these words:—

> "The Imperial view would be that, though the mails and cables might be run without immediate profit in money, the ultimate gain to the British Empire as a whole would be incalculable."

The article went on to say that:—

> "The Treasury view is, as a rule, that postal and telegraphic services must not only pay their way, but yield a profit in aid of revenue, and that all extensions of them must be judged by the immediate financial test alone. No considerations of national policy or sentiment are taken into account."

It is evident that with the Telegraph Service, as with most other services, the protagonists of economy are all out for economy except for that particular service of which at the moment they happen to be sponsor. If the Treasury *qua* Treasury had called upon the British taxpayer to pay for the duplication of the Pacific cable instead of being able to pay for the manufacture and laying of a second cable out of the profits acquired, there would have been very very few of the British press, but what would have joined in the cry of "Wastrels."

The retirement of Mr. E. J. Clarke from the C.T.O. upon reaching the age-limit removes from our midst one of those unostentatious figures who "do good by stealth" out of pure love for a cause. In 1888 he inaugurated a collection of pennies weekly in the office on behalf of Dr. Barnardo's Homes for Waifs and Strays, and has faithfully continued the work throughout these thirty odd years. During this period no less a sum than £4,250 has been collected by this quiet friend of homeless bairns. To say more would be out of place on a work so gracious. It is very satisfactory to learn that Mr. W. M. Plummer has agreed to take over the responsibility of the continuance of this excellent work for the little ones.

Radio notes are rather extensive this month, and priority is given to the following item on the development of broadcasting by means of *wired*-radio over electric lighting and power circuits. These are arranged under the basic patents of Major-General G. O. Squier, the N. American Co. granting an exclusive licence to a subsidiary organisation, Wired Radio Incorporated. A number of power and lighting companies are developing the system in conjunction with the last-named company, says the *Electrical World*. This is a curious reversion to type in the modern scientific world, for, adds our American contemporary:—

No transmitting or receiving aerials are used; instead, the sending apparatus is connected to one phase of the three-phase 'buses at the power house, and the radio waves follow along the wires to the receiver, which is plugged into any electric lamp socket or convenient outlet in the home, just as an electric fan, iron, or toaster is connected.

New types of simplified transmitting and receiving apparatus have been developed. One of the receivers is a combined tuner-amplifier and "loud speaker" in a small cabinet. Current for lighting the filaments is supplied from the 110-volt lighting mains through an ordinary lamp-cord connexion, which also carries the radio waves into the receiver, where they are amplified and converted into voice and music. No antenna, ground connexion, storage battery, or special wiring is required, and any number of receivers may be operated simultaneously in a home or apartment house without interference. An adjustment permits reception of the ordinary space-radio programmes. A wired-radio programme of a comprehensive kind is to be furnished which will be continuous from early morning until late at night. The anticipated developments are even more interesting, if that were possible, for the company expects to offer more than one programme on various wave-lengths, and tuning dials are provided on the receiving sets for this purpose.

In Argentina the practical side of radiography is making remarkable progress. Governmental support is extending in all directions, the very latest arrangement being the equipment of the Chamber of Deputies at Buenos Aires with telephonic communication with the radio station at Palermo (Argentina). The range of this station is about two thousand kilometres, and so that the maximum publicity may be given to the parliamentary debates it is intended to equip motor trucks fitted with receiving apparatus which will perambulate the streets of the capital and other important cities of the republic.

The *Electrical Review* states:—

The improvements effected at the radio station of the Cuban Telephone Co. of Habana now allow of an effective radius of approximately 3,000 miles on a wave-length of 400 metres. Messages sent from Habaña to Prince Albert (Saskatchewan, Canada) have been heard with startling clearness, while other stations at long distances which have reported are Catalina Island, Visalia (California), and Porto Rico.

CUBA.—A new wireless station has recently been erected at Trinidad, in the Province of Santa Clara, located near the port of Casilda. The modern 2 k.w. high-frequency transmitter can change instantaneously from 300 to 1,400 metres wave-length, and, under normal conditions, has an approximate range of 700 nautical miles by day and 1,200 by night. Wireless stations now provide the southern coast of Cuba, which is considered one of the most dangerous for the coasting trade, with almost complete protection.

JUGO-SLOVAKIA.—*L'Electricista* announces that the Serbo-Croat-Slovene Minister of Posts ordered during the past year from the Telefunken Co. in Germany and from the firm of Lorenz six radio stations, which will be set up at Lubiana, Zagabria, Sbalato, Podgoritza, Novidal, and Skoplije. The largest is that of Lubiana, which, with those of Zagabria and Skoplije, will be constructed by the firm of Lorenz. It will be of a power of 40 k.w. and will use wave-lengths of 4,150, 5,350, 7,500 and 12,000 metres. The antennæ supported by a central metallic tower 120 metres high, will be in the shape of an umbrella. Those of the stations of Zagabria and Skoplije will be of arc shape and will use wave-lengths of 3,000 and 8,000 metres. They will also be modifiable for radio telephony with wave-lengths of 3,500 and 4,000 metres. The receiving stations will be located several kilometres from the transmitting stations and furnished with T antennæ. The three remaining stations supplied by the Telefunken Co., will be of 20, 10 and 5 k.w. respectively, and will also be capable of being used for radio telephony.

SOUTH AFRICA.—The power of the new radio station shortly to be erected close to Klipheuval (Malmesbury district) as compared with the present 5 k.w. station at Slangkop in the Cape Peninsula is one hundred and fifty times greater according to the *British S. A. Export Gazette*, and it is, therefore, expected to be possible to communicate with the British Isles, Australia, India, the U.S.A., &c. The station will be completed it is hoped in fifteen months. Sixteen masts are to be erected in a circle 1½ miles in diameter.

The *Scientific American* is responsible for the two following paragraphs. The second paragraph regarding the new Bavarian station is especially interesting, the construction of the station presenting as it does some new and ingenious features.

GERMANY.—In order to facilitate overseas traffic a receiving station has been installed at Geltow, about 30 kilometres in a southerly direction from Nauen. A similar arrangement has been adopted at Eilwese, the receiving station for which is now at Hagen. It is intended to use the new stations for communicating with a distant station from Berlin, using Nauen for transmission and Geltow for reception, land lines connecting each of the latter with Berlin, and for communicating with New York, using the station at Rocky Point for transmission and that at Riverhead for reception.

It is claimed that after the completion of the new station, now under construction in the Upper Bavarian Alps, Germany will have the most powerful and best equipped radio station in the world. At first it will be devoted to experiments on a large scale, but later it will be operated by the C. Lorenz Co. for commercial and governmental purposes. One of the remarkable features of the new station, which is located in a shallow valley between the Herzogstand (1,732 m.) and the Stein, one of the foot-hills which rise above the Kochel Lake to a height of 940 m., is the manner in which the antennæ are placed. From the top of the Stein five aerial cables are stretched in fan fashion to five anchor points at the top of the Herzogstand, at an average height of 300 m. above the station building. The combined length of the five cables is about 2½ km. To prevent excessive strain on the aerials the insulated ends are attached to a single cable, which passes over a pulley at the highest point of the Stein. To the lower end of this cable a heavily weighted car is fastened, which rests on an inclined track on the farther slope of the hill. The ballast in the car is sufficiently heavy to keep the five aerials well stretched under normal conditions and to counterbalance their weight when they are exposed to strong wind or are coated with ice. In this way it is hoped that sagging of the antennæ will at all times be kept within permissible limits. For transmitting, a Poulsen-Lorenz arc of approximately 2,000 k.w. and a high-frequency generator of the Schmidt type of equal capacity will be used. The electrical energy required will be obtained from the Walchen Lake power station nearby. The high-frequency will be obtained either directly from the generator or by a frequency transformer, as at Nauen. The equipment will render it possible to make, for the first time, a comparative test of the two methods of transmitting.

Readers of our JOURNAL have no doubt made a diary note to the effect that the All-British Wireless Exhibition and Convention at the White City Shepherd's Bush, is from Nov. 8 to 21.

RUSSIA.—According to the *Izvestra* of Moscow there are very special regulations regarding the installation of radio stations by Trade Union and Communist party organisations in Russia as well as for educational and scientific purposes.

CHILI.—Owing to the mountainous nature of the country, conditions for radio transmission in Chili are far from ideal, nevertheless, there appears to be sufficient justification for the formation of the Compania Radio Chilena as ordinary telegraphic means of communication are decidedly inefficient. The government has not yet taken any measures so that, except that no spark stations are permitted, everybody is perfectly free to erect radio equipment, using undamped waves. A high-power station is shortly to be erected at Santiago by an American firm, British enterprise apparently being rather weakly represented, although the French are much to the fore.

RUMANIA.—In this country, however, apparatus purchased in England for a new radio station, telegraphic and telephonic, is to be erected in Timisoara. According to *Reuter's Trade Service* (Bucharest) the station was to be opened at the end of September.

CEYLON.—The island has a club of 150 members and efforts are being made to obtain the removal of Government restrictions upon the use of wireless apparatus. These have so far succeeded that an Ordinance will shortly be issued which will permit experimenters to purchase and operate sets.

JUGO-SLAVIA.—A new 100-k.w. radio station is in course of erection at Rakovica near Belgrade, by the French Wireless Telegraph Co. On its

completion the entire installation will be taken over by the State. The operating *personnel* will become employees of the Department of Posts and Telegraphs, the company maintaining one engineer as a technical adviser. The agreement covering the construction of the station provides for its operation on the basis that 12 per cent. of the gross receipts go to the Treasury and the remainder towards the payment of operating expenses. If there should be a net profit from the operation of the station, however, the State is to receive 20 per cent. of the amount. After a period of 30 years the station becomes the property of the Government without any further payment; beginning with the eleventh year, the State has the option of purchase at any time it desires. Should the station fail to function as provided in the contract, the State has the right to purchase it at any time. This particular station will be the first high-power radio installation in the Balkans.

SWEDEN.—The British Legation at Stockholm informs the Department of Overseas Trade that a radio broadcasting company has been established in Sweden under the name "Svenska Rundradioaktiebolaget." The dividend is limited to 7½ per cent. cumulative. It is understood that the company will have exclusive rights for broadcasting in Sweden from 1924 to 1934 with a preferential claim to renewal on the expiry of these rights. Further, licences for the use of receiving apparatus are to be granted freely to the public, *i.e.*, with as few formalities as possible. No restrictions are to be made with respect to the construction of receiving apparatus, except that licences are not to be granted for the use of apparatus likely to cause disturbance to other receivers. Military and commercial secrets are to be protected by other means, such as ciphers. It was originally proposed that Swedish manufacturers should be protected by Customs duties and against home competition by State control, but it is understood that these proposals have been rejected. The latter decision is particularly interesting to those concerned with the future of wireless in this country.

Eastern Engineering states that the Superintendent of the Telegraph Administration has been petitioned to have a separate telegraph line installed between Shameen and Hong-Kong so as to facilitate the transmission of telegraph messages, and to obviate the delay caused by the frequent breakdowns of the line between Canton and Hong-Kong. By restoring the former separate line between Shameen and Hong-Kong all messages, instead of passing through the head office, will pass between Shameen and Hong-Kong direct, and more messages can thereby be handled.

The Direct West India Cable Co., Ltd., announces the result of its working year ended June, 1923. There was an actual decrease in the net result of the year's working of £6,263 but only £2,762 of this is due to a reduction in receipts, which is easily accounted for by bad trade conditions in the West Indies. A dividend of 10 per cent. is declared.

The company's cable was interrupted for a few days near Jamaica, otherwise it worked efficiently throughout the year, but the insulation of the Bermuda-Turks Island section remains very low.

The report of the Halifax and Bermudas Cable Co., Ltd., for the same period is also satisfactory in that the net result is a credit balance of £22,594 shown as against £6,878 for 1922, although the dividend declared is 4 per cent. less than the D.W.I. company.

This company's cable also worked satisfactorily for the twelve months under review with the exception of a few days interruption during August, 1922, at a point near Halifax, N.S.

As quite a material part of these two companies' investments were in American securities they have both felt the imposition of the American income tax in addition to that imposed in Great Britain, and accordingly such funds have now been transferred to British securities. The losses on the transfers in the case of the two companies were respectively £3,931 and £1,344.

The gales of early October worked considerable havoc with certain of the short Anglo-Continental submarine cables, although it is marvellous that the damage was not more extensive considering the phenomenal force of the storm.

Out of these interruptions has emerged the proof of theories enunciated with monotonous persistency by British telegraph officials for years that, given good land lines on the continental side, the cables would carry from 100 to 200 per cent. more traffic and that with comparative ease. Owing to the breakdown it became necessary to ensure at least a couple of stable land lines in order to meet the sole remaining available cable conductors which ran out from the Kentish coast. As a result, traffic which normally occupies half-a-dozen cable conductors, and that frequently by laboured working, was dealt with over one-third of the number and with comparative ease.

There was a splendid attendance at the opening meeting of the T. and T. Society of London to hear the address of Sir Andrew Ogilvie, K.B.E., C.B., upon "The Post Office and the Public."

The historic side was more than tinged by the personal experiences and recollections of Sir Andrew. These were all the more valuable as coming from so trustworthy a source and from one whose fairness and charitable judgment could never be called into question. Sir Andrew has always been a champion of the Post Office, although he has never permitted himself to blind his eye to the real grievances of the public in general or the viewpoints of the business man in particular.

The discussion which followed also provided good fare, Mr. R. A. Dalzell, C.B.E., Mr. A. Moir, O.B.E., Mr. W. Davis, of the L.P.S., and that stalwart attendant at all of the Society's meetings, Mr. Wm. Day, M.I.E.E., and others contributed. Mr. Moir's tribute to the spirit of "Giving Service," which he found in Canada, especially on the C.P.R., was an ideal which we might well take to our hearts.

"More publicity" was the keynote of several speakers, who thought that the Post Office should advertise itself more aggressively. The Chairman, Colonel T. Purves, O.B.E., M.I.E.E., in his concluding remarks, said, amongst other very good things, that the Post Office had not always been happy in its publicity and cited a recent occasion in his own experience where, hoping to give the London public some insight into the way in which the P.O. was extending the telephone underground system he had provided his engineers with bold placards which they were to display over their street excavations. That portion of the British public which happened to be on the top of the same omnibus and were held up for twenty minutes near Ludgate Hill was apparently not impressed by the scheme as it affected them at the moment, and apparently voiced their opinions of Post Office excavations with no uncertain but rather strident note! Fortunately the Engineer-in-Chief was travelling *incog*!

There were many private expressions regarding Sir Andrew's kindness in honouring the Society with his presence and paper to which was added the sincerest hope that the physical strain upon the genial Vice-President would not prove unduly great in view of his impaired health.

Psychology.—Truth was the most splendid and the most dangerous thing in the universe. . . . The tyrants and exploiters of mankind would become ten-fold more dangerous when armed with psychology. Horatio Bottomley was an accomplished psychologist in his own department

> Applied science told us how to make a gun but not when to shoot or what to shoot at. . . .
>
> If we educated at all other points, but failed to educate at the point of responsibility, we should inevitably come to no good end.—DR. L. P. JACKS, editor *The Hibbert Journal*.

J. J. T.

THE CENTRAL TELEGRAPH OFFICE AND THE GREY FRIARS.

As I sat in one of the old oaken pews of Christ Church, Newgate Street, on Oct. 24, looking back at the grand old organ, over the keys of which Mendelssohn's fingers themselves have many a time wandered, then following the severe lines of the Corinthian pillars up to their capitols beyond, to the vaulted roof of this old temple of the City of London and then down again to the paved aisle, two figures dressed in grey hoods and girdled robes of the middle ages moved noiselessly along in the deep, deep shadows underneath the galleries of the ancient structure and watched, with something of pained wonder, the troops of men and women of all ages as they reverently took their seats in the sacred edifice on the occasion of St. Bartholomew's Hospital appeal, when an organ recital, arranged and carried out by C.T.O. officials under the benign guidance of Mr. Daggett, was given in aid.

"Truly, brother Anselm, these be strange unseemly folke. These maidens yonder come unattended! Their eyes unabashed look not down demurely as becometh maidens, but gleam straight out without feare and without shame."

"Yea, brother," replied his companion, "but these be changed times since we walked in the flesh, through those cloisters which once were harde by to this sacred grounde. Yet it seemeth unto me that there lyeth much good in the hearts of these folks though truly their women are all too gaily dressed to my liking and have greate liberty and feare, no hurte, though they be unprotected, for see! their men carry neither sword or rapier at their side. List! ye musick commenceth. T'is sweet harmonie and delighteth me. Master Daggett playeth he not with skill upon the multitude of pipes? And all for charity's sweete sake, they say. Also brother, do many maidens and comely youthes company him: some play on stringed instruments as Mistresse Shaw, with soft and winsom tune; some synge noble songes as Mistresse Elliott and Master Webber, while Master Daggett makeythe ye pipes to dance around and in and out of every tune, and between each note and yet without unpleasante but rather sweeter mingling of sound. Yea, brother, and many more faire women and comelie men do come unto this House of Prayer from the Ye great House of Labour where all ye daye and all ye nighte sweete messages are made to speede through ye air and over and under ye sea, and to East and to West and to North and to South, with a swiftness which knoweth not even ye winge of ye eagle. By what magic t'is done that know I not brother, but 'tis true that ye hearts of these folke of ye greate House of Labour are very tender unto ye needs of ye sicke and ye poore. For their goode do they worke with their own hands many daies, for this ende do they give of their own sustenance, and like unto us also, brother, are they of ye *mendicant* order for they beg of ye riche and of ye princes if ye London citie. To-day synge they together with mighty shouts of joy unto ye Heavens, for with great gladness have they holpen the cause of the Hospital which lieth in the Smooth-fielde near unto ye tilting grounde and ye Golden Spur, whereunto have they given muchen silver for physick and linen raiment. Thus appeareth itte unto me, brother, that lyttle though we comprehend ye ways and ye dresse, and though ye brazen appearance of these strange people pleaseth me not, yet seemeth it unto my hearte that ye spirit of our beloved Saint Francis still dwelleth on this holye grounde and has fallen upon these men and maidens and upon the House of Labour, and upon ye Abbott Hine-Haycock of this place, wherefore let us crye peace and goodwille and our benison upon them and may they continue to stir many heartes to alle good works."

J. J. T.

SOME RANDOM REMINISCENCES.

By ARTHUR E. COTTERELL.

ONE million and ninety-one thousand telephones, 3,323 telephone exchanges and 3,750,000 miles of wire in terms of single wire. These figures are an epitome of 44 years of telephone development in the British Isles excluding such plant as has been transferred to the Irish Free State, the Corporation of Hull and the States of Jersey, to which should be added the little system established by the States of Guernsey.

To one whose privilege it has been to be associated in various capacities with the Telephone Service from the beginning, these results, though but a milestone as it were in the future course, give rise to some thoughts of past years in which one recalls the difficulties which had to be met and the zeal, the energy and enthusiasm of the men and women by whose efforts these things have been brought about in past years, are being carried on, and will be, by successive generations.

One feels tempted to sketch out the characteristics of many of these persons, but the years even from the first of them are too recent to justify such a course.

A million telephones! attained and passed. The pioneers had large ideas as to the future possibilities of the telephone but, in view of the uphill fight that it was and continued to be for many years to secure more than a modest support, I doubt whether their most sanguine hopes ran into such figures.

In saying this I am carrying my mind back to days which commenced when only three or four telephone exchanges had been established in these islands; when London comprised about 200 subscribers, Manchester and Liverpool less than a hundred each, and the Birmingham exchange had not yet come into existence.

It is not proposed to enter into details of the course of events from these early days as the writer dealt with these briefly in a series of articles entitled "The Dawn of Telephony in Birmingham" which appeared in the JOURNAL in November and December, 1915, and January, 1916, but a few incidents and circumstances not mentioned therein may be of interest.

The first point which strikes one is how little was known of the thing with which we had to deal.

My own knowledge was a minus quantity, but being at a receptive age and seized with an intense desire to gather all the information I could on a fascinating subject, I eagerly absorbed anything which was told me or said in my presence.

In this connexion it was not a little fortunate that the office in which I sat was merely divided off from the so-called private office by a glass and wooden partition, or perhaps I should better describe it as a screen some 6 feet in height, over the top of which all conversations in the inner sanctum were wafted. Nominally this inner apartment was the Secretary's room, but the Electrician having no separate accommodation also sat there. The latter gentleman, the late Mr. Fred Ormiston, was well known in telegraph circles and knew as much about telephones as was known in those days. He was always ready to impart any knowledge that he had and having very little to do had plenty of time for the exercise of a discursive tendency. As there was little for me to do, except when we were sending out batches of circulars, the Secretary, Mr. Ryder, told me I was at liberty to do any personal writing or such matters as might convey the impression to callers that I was busy in the office. Amongst these I started a note book in which I jotted down any information about the telephone which came my way; the entries in which grew more rapidly when Mr. Ormiston, showing a kindly interest, gave me encouragement and explained many points.

In those early days there were, of course, no text books on the telephone, and, therefore, the only course to adopt was to study electricity and magnetism and browse in Culley's or Preece and Sivewright's Telegraph Handbooks and build up what knowledge you could by your own deductions.

Perhaps there was too little information to afford material for a presentable telephone manual at that time. It must be remembered that during the course of the first year or so the whole thing was so simple as to be little more than glorified bell fitting, but simple as it was there were occasions when faults occurred which taxed the abilities of the staff not a little. To-day, indeed throughout long years, it would inconceivable that a telephone exchange, however small, should be placed completely out of action for any lengthy period, except from some catastrophe.

I remember, however, that some few months after the Birmingham Exchange had been established, a complete breakdown occurred which, in the absence of Mr. Ormiston who was ill at the time and confined to his home in Croydon, baffled the united efforts of the staff. The Secretary knew nothing about electrical matters, neither did I at the time, so the only expert (*sic*) was the instrument man whose knowledge was limited to fixing telephones, joining up the line, earth, and battery wires to lettered terminals, charging batteries and regulating transmitters by turning a screw one way or the other until a person listening at the other end of the circuit declared that the hearing was satisfactory. The foreman of the outside gang proffered still less useful services.

The switchboard and operating table, which were similar to that shown in an illustration which appeared in the first of my articles on "The Dawn of Telephony in Birmingham," were separate pieces though connected of course by wires, and it was obvious at the time of the trouble that the switchboard was in order as the indicators were frequently falling. The difficulty was clearly at the operating table, but though several of us besides the operator could manipulate it no one really understood the connexions. After spending most of the day unsuccessfully the instrument man was seized with the brilliant idea that the service could be re-opened by fixing up an ordinary telephone provided with a cord and plug whereby connexion could be made with the jack of any subscriber. In this way it became possible to answer a caller and also call up the number which he required; the complete connexions being made by means of simple cords with plugs at each end. Supervision of these connexions and the clearing of the same were effected by the simple expedient of tapping the instrument plug on to the plugs or jacks of the lines concerned. Compromise though it was, Jack Seals, the instrument man, went up in our general estimation. After another day of this makeshift and futile efforts to discover the cause of the trouble, the Secretary decided to telegraph to the United Telephone Company in London a request that an electrician should be sent down. In speedy response a young gentleman arrived whose age appeared to be in the early twenties. He was, as I well remember, immaculately dressed, and he proved himself to be all there. Having asked for details of the trouble he repaired to the switchroom, and, having laid aside his silk hat and well-cut overcoat, lay under the switch-table where he very soon discovered a defective connexion and restored the apparatus to normal working. Having convinced himself by a few suitable tests that all was well, he asked for a clothes brush, and for the time of the next train to town.

Not only was telephony in its infancy at this time, but the only other really practical applications of electricity may be said to have been limited to telegraphy, electro-plating and electric bells. Needless to say telegraphy, though efficient and greatly advanced, had a long way to go before reaching the achievements of to-day. The era of electric power, traction, and lighting had yet to come. As to the last-named after the introduction of efficient arc lights and the more attractive incandescent lamps the thing which hindered their adoption was the fact that the estab lishment of central stations for supplying the current hung fire for a considerable time with the result that few people were found willing to incur the cost of having engines and dynamos installed for their own purposes. I think that the first people to adopt it in Birmingham were Messrs. Newbury & Wilson, a firm of drapers in High Street.

(To be continued.)

The
Telegraph and Telephone Journal.

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NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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DIRECTIONS TO SUBSCRIBERS.

THE directions issued by the Post Office for the use of the telephone have attracted considerable attention in the Press—in fact, on the whole, they may be said to have had a "good press" for it is realised by the charitable that the suggested pronunciations of English numerals (together with other hints) are designed to lessen errors on the telephone, and are not part of a sinister scheme to corrupt our mother tongue. Nevertheless, whilst some journals give a grudging benediction to the Postmaster-General and confess somewhat in the spirit of Joe Gargery in "Great Expectations"

> "Whatsume'er the failings on his part
> He were that honest in his hart,"

others are more sceptical or scornful. "Our unfortunate tongue," says one, "is having a hard struggle to maintain itself against the inroads of American. . . . It is somewhat disturbing to think that telephonese has entered the field as a competitor with English." Another protests against "atrocious neologisms" though we doubt whether a slightly perverted pronunciation of a word can be described as a neologism. Northern papers cannot resist a gibe at Cockney pronunciation, whether it is beside the mark or not. A Scottish paper finds considerable humour in the expression "a long x," the classical nature of culture north of the Tweed evidently associating quantity strictly with vowels. Most of the fears of these purists, however, to whom in general we should feel entirely sympathetic, are without foundation. Those people who, taught by the dire effects of confusion between four, five and nine in telephonic speech, adopt the pronunciations "foer" and "fife" will hardly use these words with a frequency sufficient to affect their ordinary pronunciation. Even those who do a good deal of telephoning are not asking for 4's and 5's all day; there are other numbers.

Although in one criticism there is a suggestion that the Post Office was "as usual" trying to put the blame for telephonic shortcomings on the public, there is, we are glad to note, a growing appreciation of the importance of the part played by the public in the smooth working of the service. There is too a growing appreciation of the fact that these directions and suggestions are issued in the best interests of the telephone-using public. Telephone etiquette is a branch of good manners which is still in a transition stage of development. The vast increase in this means of development, the recency of its attainment to a comparative universality have rendered necessary a common understanding of its amenities. As the telephone fills a larger and larger space in his business day, the subscriber appreciates the enormity of wasting his correspondent's time, of the necessity for personal attention to calls, of the discourtesy of "getting Mr. So-and-So to the telephone" and then making him wait the caller's leisure, and of being coy in giving his own name whilst rapping out testily: "Who are you?" He also begins to understand that the longer he occupies his line either in actual conversation or unnecessary preliminaries the longer it is "engaged" and closed to incoming and possibly important calls. He, therefore, in the main, welcomes any propaganda which tends to ensure better service, realising in it, we trust, an earnest of the constant efforts made by the Post Office to improve telephonic communication whether by the agency of its staff and plant or of its users.

WHAT IS TRUTH?

IT used to be contended that parsons in their pulpits were in the happy position of being able to propound any views, however ill-considered, or thunder any invectives, however ill-judged, without fear of contradiction or demur as one of the privileges of their calling. We think that abuse of the privileges of the rostrum is a charge which can more frequently be laid against the political speaker and especially the political lecturer. It is true that he is not immune from interruption or contradiction, but how many amongst his audience are able to criticise the clotted and coagulated statistics which he can hurl at their heads or correct the cunningly-presented travesty of history in which he commonly delights? With an authoritative air which daunts the credulous he imposes his facts and figures on his hearers—but what facts and what figures! Acceptable perhaps to a sympathetic audience who are prepared to believe what they wish to believe, and carefully edited for that purpose, they are difficult for the unprepared doubter to traverse, and they pass unchallenged.

We are moved to these reflections by an address given at a political meeting in Derbyshire by a lady, whose name we charitably suppress, and who apparently was sent down by some central organisation. She is said to have given some striking instances of the adverse effects of nationalisation. We pass over her curious and random remarks on the history of the posts and confine ourselves to giving an example of how she treats the telegraphs. Complaining of the present rates, she says that under a private telegraph service in London in 1878, one could send a telegram sending 12 words and the address for 6*d*. (whether within London only or for any distance she does not indicate). The transfer of the telegraphs to the State, however, had taken place eight years earlier when the high charges of the companies varying *according to distance* from 1*s*. for 20 words to 2*s*. for 20 words in Great Britain, were reduced to a uniform charge for all distances of 1*s*. for 20 words, with the name and address of the sender and addressee sent free. Later, as our readers know, came the introduction by the State of the sixpenny telegram which had to go the way of so many pre-war advantages when the prices of every other service and commodity were raised. Equally fantastic are her statements concerning the dividends paid by the National Telephone Co., and her misleading suggestion that they paid a farthing royalty on every penny call. One cannot help wondering how such statistics are evolved. Are they dreamed, are they extracted in indecent haste from imperfect records by people who do not comprehend their meaning, only to suffer further dislocation in their journey from London to Derbyshire, or whatever place is to be edified by their dissemination ?

We have no quarrel with people for lecturing and writing against principles of which they disapprove, but that must always be a poor cause which can only be furthered by misrepresentations of the other side. Misstatements deceive the unthinking and especially those who have no means of testing their value, but the ultimate detection of their falsity must inevitably conduce to reaction. Even in these brave and booming days truth has its claims, even if upon no higher ground than that of policy.

HIC ET UBIQUE.

AT the beginning of last month a contract was placed for the provision of another telephone cable between England and Holland. It will contain eight physical circuits without taking into account "phantoms," and will provide a much-needed relief to the Anglo-Dutch service on its completion some time during next summer.

A REPORT of the progress and activity of the telephone, issued by the Superintending Engineer in the Manchester district shewing that the number of telephones in that district had risen from 32,496 in 1912 to 56,645 in 1923, obtained very favourable notice in the Press. The *Manchester Guardian* published the following leading article upon it :—

People who make bitter jokes about the troubles which the telephone has inflicted on society had better reconsider their ways. The mind of the majority is evidently against them. From a report on the telephone service within the Manchester area (from which we publish some details to-day) there emerges the assurance not only that the number of telephones in use has increased by 72 per cent. in eleven years, but also that more instruments came into use last year, in a time of great trade depression, than in the "boom years" of 1919 and 1920. In the past twelve months 4,665 more telephones have been installed than in the previous year. It is difficult to see what the enemies of the telephone can say in reply to figures like these. The deeper the financial gloom the greater the necessity for more telephones, is the immediate conclusion ; the telephone seems to be presented as the friend and comforter of the distressed business man. Of course, if the critics of that instrument are exceedingly bitter and determined, it is just possible to work out some rival conclusions on the subject. It might be argued, for instance, that the telephone acts as a counter-irritant. Troubled and perplexed by the outlook for a business which refuses to get busy, the captain of industry may hasten to instal more telephones in order that his attention may be distracted from his real anxieties by more wrong numbers and more unnecessary calls from people who don't matter. Matthew Prior rejoices in the fact that

> while Mankind
> Through Fate's fantastic mazes errs
> It can imagined trouble find
> To combat against real cares,

and perhaps more telephones in times of industrial depression stand for the deliberate application of this theory. Or perhaps, when there is less to do, people have more need to talk. Or, again, the sight of any kind of activity about a stagnant office may be a relief—"It is a dull morning ; let us go out and order a telephone to be installed." But these would all be half-hearted and ineffective arguments. The only sound moral is that the telephone becomes more and more of an hourly necessity, and, as the need grows, so it must be met, good trade or bad.

The increase of 4,665 referred to was the net increase for the past year.

ACCORDING to *The Times* (Engineering Supplement) an interesting indication of the trade slump in India is found in the experience of the Bengal Telephone Corporation, Limited. Eighteen months ago a great number of applications had been received for new lines which could not be provided until the corporation's schemes for development had been completed. In the interval such has been the stagnation of Calcutta's trade that the majority of those who were clamouring for connexions now no longer require them. Consequently the corporation is considering revision of the tariff rates so as to make telephone charges limitable by the subscriber according to the use he makes of his intrument rather than to increase the flat rate now prevailing. The directors have therefore applied to Government for a modification of the terms of their licence to permit the introduction of a message rate of charges calculated to produce the same revenue as at present from present subscribers and to attract small users.

The number of telephones in Canada has increased from 902,090 in 1921 to 944,029 in 1922, or 10.53 per 100 population. The development of Ontario is 13.59 per 100, and that of British Columbia 15.19. The totals in the principal provinces are as follows :—Ontario 405,019 telephones, Quebec 157,993, Saskatchewan 96,195, British Columbia 81,853, Manitoba 67,514, Alberta 66,581, Nova Scotia 36,306, and New Brunswick 27,314.

FROM a report issued by the Federated Malay States we learn that the number of telephones in those states increased by 120 in 1922 and now total 2,941. The mileage of telegraph and telephone wire is 15,062 overhead and 5,196 underground.

"THE PUBLIC AND THE ADMINISTRATION OF THE TELEPHONE SERVICE."*

BY SIR A. M. OGILVIE, K.B.E., C.B. (*late Second Secretary to the Post Office*).

THERE are few Civil Servants whose work brings them into contact or direct communication with the public who do not experience a certain antagonism in the attitude of those with whom they have to do business. This antagonism, of which I would speak to-night, is common to Civil Servants of all departments in their administrative work, and I should like to say a few words as to its origin, its effects and as to the methods by which it may be overcome, as illustrated by some humble experiences of my own in telephone work.

The operation of the telephone service and its staff suffer from a special and most virulent variety of this antagonism. Perhaps some of my hearers may have expected me to speak of this variety to-night, but I do not propose to do so. It presents quite a different problem. It has not the same historical origin. Its cure will be more difficult and more distant in time. It exists not only in this country, but also in countries where Civil Servants as a class are regarded with respect or where the telephone service is purely commercial. It exists even in New York and Stockholm, and probably so long as the human nature of telephone users (and perhaps of operators) remains what it is, it will always continue. Whether the spread of automatic telephones will make any change is an interesting problem for your consideration.

Most of you are probably readers of *Pepys's Diary*, and it is not the least merit of that great work that it illustrates very well the condition of the Civil Service in the 17th Century. In many ways Pepys was one of the best and ablest Civil Servants of his day, and yet even he was open to considerations which would secure the dismissal of a present day Civil Servant. The Government service was then full of men who owed their positions to jobbery of all kinds and even to the bribery of the Mistresses of kings or of influential politicians. It was full of sinecurists, of pluralists, and of men who were so ignorant or so lazy that they were incapable of doing properly even the simplest duties. There seemed to be no private or public conception of the Civil service as an efficient administrative body. It was accepted as a necessary evil.

It is true that to some extent the same conditions affected the other professions and business concerns, But in these the smaller and more definite field of each man's work and the very close connexion between personal efficiency and business or professional success rapidly produced great changes in the standards of work. Unfortunately in the Civil Service evolution proceeded more slowly. Men could not get away from the idea that the Civil Service existed chiefly for the benefit of friends of the party in power, or of those who were rich enough or influential enough to buy their places. The same idea affected the navy and army also, and it is strange to observe how it continued throughout the 18th Century and well on into the 19th. My own father, who entered the Civil Service in 1826, often told me that, even at that date, there were many men in the Government service drawing emoluments of two or three thousand pounds a year who could barely write their own names and whose work was done for them by substitutes, paid two or three pounds a week. At the time of the Crimean War the incompetence of the administrative staff of the War Office was a bye-word, and it was said to be due to the indiscriminate appointment of the friends of constituents even by those who were reckoned to be respectable Ministers of State. It was said also, I believe, with truth, that less scrupulous ministers used to settle their bills by appointing relatives of unfortunate creditors. Similarly in the navy personal influence governed appointments and promotions. You will remember how Smollett and Marryat described the way in which things were done at the Admiralty—though I suppose the stern facts of life at sea even in peace time must have weeded out many incompetents. In the army the purchase of commissions and even of promotion in regimental rank continued till 1870. When I entered the Secretary's Office in 1881, open competition had been in force for 8 or 9 years only. Although an awakened conscience in nominating authorities and a system of limited competition had produced many able men among my seniors, yet there still lingered representatives of the old system. Some of them gave us a good deal of amusement. One I remember who, as Clerk-in-Waiting during the Crimean War, had delayed the delivery to *The Times* of a letter from a Correspondent at the front containing news which he thought the Government had not received. Grave complaint followed, and he was summoned to the presence of Sir Rowland Hill. "Why did you do it?" said Sir Rowland. "I used my discretion," said my friend. "Then never do it again," said Sir Rowland, and "I never have," my friend used to add.

Among the very last appointments filled by political patronage, were those of Sub-Postmaster and Rural Postmen. When I became Private Secretary to the Postmaster-General in 1891, my duties included the sending of reports to the office of the Parliamentary Secretary of the Treasury—who was more generally known as the Patronage Secretary—of vacancies for Sub-Postmasters, Up to about 1860, Head Postmasterships were also filled in this way on the nomination of M.P.'s or other supporters of the party in power. Vacancies for rural postmen were reported by the Postmaster-General's Private Secretary direct to the favoured representative of the Party in each constituency. I did not like the work, and I lost no occasion of calling the attention of my first two Chiefs to the difficulties and anomalies it created. Sir James Ferguson and Mr. Arnold Morley were both high-minded Ministers, who took a serious view of their responsibilities and their representations to their Governments led to the abandonment of the old system and the substitution of the present system of appointment, after full enquiry of the Post Office Surveyors, into the official merits of the Candidates.

Incidentally, I may say that we often received letters from M.P.'s or parliamentary candidates begging us not to consult them because for every candidate they recommended they offended the friends of six others. I rather think this fact had some weight in Downing Street, and I have sometimes wondered how long, if it had been otherwise, the venerable system I have described would have remained a part of the British constitution.

I do not wish to suggest that the millenium began with open competition. Ministers in the 17th Century and since have generally aimed at a certain public efficiency. Especially this was the case from the Revolution of 1688 onwards lost in the Whig Ministries, and it was necessary for them to secure some men of ability to act as their assistants. There was probably never a time since then when there were not some distinguished Civil Servants, though they were much less known outside their Departments than the Civil Servants of to-day. In the Victorian age there were many such within my own earliest recollections, men who owed their positions to patronage, but who were of liberal education, high breeding, wide intellectual outlook. Moreover, in the humbler classes, even the bad system of appointment produced some men of energy and intelligence, just as the most theoretically perfect system gives us some bad bargains. On the whole, however, the good exceptions could not counteract the prejudice created by the more numerous perverse and useless officials. Moreover, the system of government which they administered was often harsh and mischievous, and in all departments probably the number of useless duties was excessive.

It is, therefore, not to be wondered at that a strong tradition grew up and still exists as to the uselessness and incapacity of Civil Servants, and the whole body were put in the same class as the Tapers and Tadpoles of the Red Tape and Sealing Wax Office of which Dickens wrote. This belief that the Civil Servant and the business or professional man represent two distinct types of humanity is still strong in the public mind. You will remember how often it was expressed during the War in speeches and in the newspapers and found a ready acceptance by the public in spite of the splendid work done by professional Civil Servants in all the new departments and the fact that many of the blunders were committed by business men camouflaged as Civil Servants or as warriors. There was an excellent article, in the *Fortnightly Review*, written soon after the War which illustrated this statement, and I am sorry not to have had an opportunity of looking it up so as to give you a more exact reference. It was Sir Robert Peel who said it took 30 years to get a political idea into the mind of the British public. I am afraid that it will take much longer to get rid of the deep-seated instinctive prejudice of which I am speaking. The public departments may go on producing in large numbers men of the type of Sir George Murray, Sir Henry Babington Smith, or Sir Matthew Nathan, if I may name only three of our ex-Secretaries who have achieved distinction in other walks of life, but the public will go on for a long time in the belief that the man whose duty it is to administer the State services is of an inferior type to those who manage factories or import tea and sugar by the ton.

I do not, however, wish to suggest that even to-day all Civil Servants are admirable. It is undoubtedly more difficult to administer intelligently and sympathetically the general rules of a public service than to settle prudently some question of personal self-interest in business. It is very desirable that Civil Servants should receive a better training in administrative methods, and history, and in the rules and policy of their own departments than they do at present; in this connexion I should like to commend to your notice the Institute of Public Administration, founded by men who include among their leaders two of your own members, Mr. Corner, who is its Secretary, and Mr. John Lee, who has been one of its sources of inspiration as well as the Editor of its Journal.

Nor do I wish to suggest that at any time in my own experience either the Civil Service or the Telephone department has been quite free from some irritating tendencies in dealing with the public. I remember that in old days there was a marked disinclination in some officials to personal interviews or discussions. In administering the general rules of a public service it is always easier, quicker and safer to adhere rigidly to the letter of rules than to seek a sympathetic interpretation, and it is much easier to give a cast-iron reply in writing than to face an irate member of the public with a strong sense of grievance and, possibly, armed with arguments to which it is not easy to reply. Moreover, Civil Servants formerly had often to act on rules rigidly laid down by higher officials or the Treasury. If one possessed any sympathetic imagination it was painful to have to give decisions which one knew to be wrong. I remember one class of cases with which I had to deal when I first took charge of the Telephone branch in 1899. The telephone trunk lines in those days worked very variably. The Post Office had worked the trunk system for a short time only. Moreover, although the Post Office controlled the trunk lines, the local connexions were made through the National Telephone Co.'s system, and as was probably inevitable with divided responsibility in working a good many mysterious interruptions and disconnexions occurred. When complaints were made the accepted practice was to refuse rigidly to repay trunk fees unless some direct evidence could be obtained at the offices concerned of some recognised cause of failure. The result was that many

* Paper read before the Telephone & Telegraph Society of London on Oct. 15, 1923

well-founded complaints were rejected for want of official confirmatory evidence. It was considered, however, that this was the Treasury view of the limits of concession. The result undoubtedly was to antagonise users of the trunk lines and to create a feeling of hostility, due, not so much to the loss of the trunk fees, as to a sense of injustice. In dealing with these complaints, endless references had to be made from office to office, and we suffered badly from the burden of correspondence thus caused in our efforts to do justice to the public without failing in our public duty.

It was only after considerable experience of this kind that we came to the view that, although failure to give the service required was the only ground which justified the remission of charges, yet failure was, after all, a matter of evidence, and that the evidence of a respectable subscriber might reasonably be accepted without official confirmation. With some difficulty authority was obtained to act on this view, and the effect was most satisfactory. Users of the trunk lines felt that their complaints were reasonably treated. They became more friendly, and in many cases did not complain unless they thought the matter serious. The number of trunk call complaints actually decreased considerably, and our relations with the public were greatly improved.

This instance may seem to be a trifling one, but I mention it as showing how easily a too strict sense of public duty may stimulate hostility to the Civil Service.

During the period from 1901 to 1911 when the Post Office and the National Telephone Co. were in acute competition. Although we had plenty of complaints, they seldom took the form of an unfavourable comparison between the Governmental and Commercial services, although I do remember one case in which the displacement of the Company's service by the Post Office led to the display of strong hostility on the part of some individuals. At an important commercial Exchange, when the Post Office Silence Cabinets were first installed, some individuals used to cut and destroy their fittings. This extreme championing of private enterprise was only cured by a strict watch being kept on the cabinets and by a notice from the authorities of the Exchange that the offenders if detected would be expelled.

Very soon after the transfer, however, the instinctive feelings of the business world asserted themselves in a much more reasonable form. The Association of Chambers of Commerce and other similar bodies asked for the formation of a Committee of business men to deal with general complaints against the telephone service from all parts of the country. This proposal was very strongly urged upon Mr. Herbert Samuel in 1912 by a deputation from the Liverpool Cotton Exchange, and it was Mr. Samuels' desire to meet this view that led to the formation of the local Advisory Committees. Very little consideration showed that one Advisory Committee for the kingdom would have an impossible task. Telephone difficulties are numerous, and they are also local. No single group of business men could afford time to deal with the question likely to be raised, nor would they understand the local conditions. It was therefore decided to form a local Committee in each important telephone centre. In order that it might be thoroughly representative it was also decided not to delegate the work to a single body in each centre, such as the Chamber of Commerce, but to ask the local authorities and all commercial interests in each place to nominate members of the Committee. The result was, as many of you know, that strong and representative committees were formed. Every interest desired to be well represented, and sent an active delegate who took an interest in the work. It was one of my most pleasing duties in 1913 and 1914 to take part in the first meetings of nearly all these bodies. The usual course at each meeting was to explain the difficulties of the service, due, chiefly, to the shortage of Exchange plant and underground lines, and to describe the plans which the Post Office had in view for getting over these difficulties by providing additional plant. The Committees were invited to gather complaints from subscribers and the fullest investigation was promised to any they might send to the Post Office as apparently reasonable. They were also asked to visit exchanges and see the working of the service in every branch whenever they wished to do so. They were also promised that the District Managers and Engineers would always be ready to attend future meetings and to give all information required, and to take part in discussions. Periodical statements as to new plant provided, the number of complaints and the result of service observations were also furnished.

The feeling that existed strongly in provincial centres at the time of the transfer was that a Government department was a difficult body to tackle. Its local representatives, even if willing to listen to complaints, probably had no authority to deal with them satisfactorily. The only remedy available was by questions in Parliament, by correspondence with official headquarters in London or by deputations to the Postmaster-General. These remedies seemed futile and troublesome. The formation of the Committees, however, went a long way towards satisfying reasonable apprehension. The public were satisfied that the Post Office was doing its best to meet difficulties, and a guarantee was given that grievances would be reasonably met. It was surprising how the number of complaints decreased in spite of the inevitable badness of the service in many ways, and how free the Post Office was from attacks in the provinces when in London it was subject to the most violent attacks in newspapers and in many other quarters. Unfortunately, London could not at once be dealt with in the same way. It possessed 110 local authorities in the telephone area and the commercial and other public institutions were so numerous that a Committee with representatives of all would have been unwieldly and unworkable. In 1914, however, the London Chamber of Commerce, in co-operation with the City Corporation, the L.C.C., the Port of London Authority and other bodies, did from a joint Committee, with representatives of other interests, such as the Banks, the Railway Companies, the Stock Exchange, the Cable Companies, and News Agencies, but, unfortunately, the outbreak of war stopped the work of the Committee, as it did also the work of the Provincial Committees. Since the war, the London Committee has been revived, and during the last few years has done useful work in dealing with many complaints from telephone subscribers, and especially with regard to the introduction of the universal message rate and the Post Office system of accounting. Unfortunately, its proceedings do not attract much notice in the newspapers, and the subscribers reached are only a small proportion of the total number, so that its influence is necessarily more restricted than the influence of the Provincial Committees. Since my retirement, I have served on the London Committee and can testify to the fact that its members are reasonable and fair-minded men with a great variety of experience. They appreciate the frankness of the Post Office in dealing with their representatives, but it is surprising how even after several years experience their instinctive doubts as to the intelligence and reasonableness of Civil Servants tend to reassert themselves.

Another possible way of reaching the Public in London remains to be considered. When I visited the United States a good many years ago to make a study of American telephones system, the responsible managers of the companies told me that they expended large sums every year in payments to newspapers for advertisements and notices. They did not seem then to attach much importance to the publicity thus gained. They considered the greatest advantage of the system to be security from attack. Newspapers in the United States never attacked important advertisers. For publicity the telephone companies relied chiefly on the work of their contract agents and on printed matter freely distributed. Since that time, however, the business of advertising publicity has been greatly developed in America. The companies advertise more largely and use this form of publicity for the advertisement of changes in the service and of all important developments. They also use it for the education of the Public in the best methods of using the service, and in the advantages of its use as compared with other methods of communication. I remember that after the transfer, Mr. Gordon Selfridge, who began by being rather hostile to the Post Office service, but later became one of its most helpful friends, used often to show me whole and half page advertisements of the telephone service in Chicago newspapers, and urged the advantage to the Post Office of adopting the same practice. That advice I believe to have been good and sound. I believe it would have paid us to spend, say, £10,000 a year in this way. We should have got on better terms with the public by telling them lots of things about the telephone service which it is difficult to tell in other ways and possibly we might thus have escaped some of the savage newspaper attacks which followed the transfer. As it was, the tradition of the Civil Service were considered to forbid such a policy, and I could never get authority for any expenditure. The only help of this kind we ever received was that Mr. Selfridge arranged with his Mr. Callisthenes, whose writings used to form so prominent a feature in the evening newspapers, to devote several articles to refuting some fallacies and misrepresentations about the Telephone service. I am glad to take this opportunity of mentioning the matter to you. Mr. Selfridge, though he still remains a good American, has also become a most useful citizen of this country, and, as is shown in his becoming a member of the Post Office Advisory Committee and in many other ways, and I congratulate the Society on the fact that he is to give you a paper at a later meeting.

I will now turn to the last method of conciliating the public to which I wish to refer. Probably some of you have read the first report of the Postmaster-General on the Post Office. It related, I think, to the year 1853-4. The Postmaster-General was the well-known Victorian Duke of Argyll. The writer of the report was Mr. Scudamore, who afterwards became so well known as the real founder of the Post Office telegraph system. The report contained some very interesting bits of Post Office history, and a series of amusing extracts from the account books and packet minutes of the 18th Century, which you will find preserved in the Record Room at the G.P.O. That report had a tremendous success. For years afterwards its stories used to reappear in the newspapers whenever public interest was turned to the Post Office. Its success inspired the writers of later reports to similar efforts, and year by year we used to have pretty little stories about tom-tits and cock robins which built their nests in letter boxes and carried on their domestic arrangements undisturbed by the routine of postal business. The public liked these stories, and the paragraph writers in the papers were grateful. In this way the Post Office got a reputation as a human department. Later a sterner spirit prevailed, and the reports became mere arid wastes of statistics. It was my duty to prepare for my then chief the first draft of the reports from 1888 to 1891, and I remember to this day my distress at seeing my poor attempts at purple passages ruled out one by one.

Now the Post Office telephone service does not publish an annual report, but I do not see why it should not do so. Most of you have probably seen those splendid reports which the late Mr. Vail, as President of the American Telephone & Telegraph Co., used to issue annually to set before the American public the advantages of a telephone service, the magnitude of the efforts of the Bell Co.'s to serve the public efficiently, the enormous difficulties of construction and organisation, the great amount of the expenditure involved and the collective and individual achievements of the staff. It was largely due to him that Americans have become so proud of their telephone service

and regard it as perhaps the most typical of their national institutions, combining the advantages of a public service and of commercial enterprise. Those reports are still continued by his successor, Mr. Thayer, and year by year obtain a greater publicity and serve to increase the impression of the national character of the service which the telephone companies are rendering.

Though the Telephone service has not an annual report, it does publish annually its commercial accounts, and it would not be difficult to combine with those accounts some general statement which would explain their full significance. I do not wish to disparage the accounts as they stand. It has taken a tremendous effort to get them into their present form, so that a close study of them year by year does furnish information as to the financial position and progress of the service. The Post Office Estimates and Appropriation Accounts used to fulfil the primary purpose of accounts only, *i.e.*, to show how much money has been spent and how much money has been received, but the headings of expenditure were arbitrary and gave little real information as to how the cost of the service was incurred. The present accounts are much better. They do actually give the amount of each of the main items of expenditure, and they are complete. Sir William Peat said before a recent Parliamentary Committee, that he thought they were the best accounts published for Government departments. They give more information than the accounts of commercial companies as published in their annual reports, but even so, they make very little impression on the public mind. The newspapers ignore them. Even members of Parliament do not read them, or, if they do, they do not seem to understand them. If they did I do not see how the last Select Committee on telephone rates could have made most of the financial recommendations contained in their report. The tendency of the Post Office, moreover, is to make them more general in form—to give less and less analysis—as for instance, in the recent combination of the accounts of the Local and Trunk services, the combination of the London and Provincial local service accounts, having taken place previously. There was no doubt a strong argument for this change in the increasing difficulty of apportioning items of common expenditure, but the tendency is one to be avoided as much as possible if we want to make our accounts useful as guides in administration, as well as mere records of expenditure and receipts.

As they stand, however, they might be made more useful if accompanied by a lucid explanation of their basis and method and of their significance as showing the progress of the service and its relation to expenditure and revenue. It would be of great assistance in the relations of the service to the public if the accounts were understood by Parliament and the Press. It would at any rate put an end to that ancient fallacy which constantly recurs that the Post Office is conducting the service at a heavy loss, whereas the National Telephone Co. made a handsome profit besides paying a heavy royalty.

But business concerns, though they publish simple accounts, for fear of telling competitors too much of their affairs, do not keep their accounts in such simple forms. For administrative purposes, to show what expense is involved in different elements and conditions of their business, they have to keep elaborately analytical expense accounts and it is worth their while to do so. The most elaborate system of the kind with which I am acquainted is the standard accounting system of the Bell Telephone Companies of America, which has been adopted in great part as the legal form of accounts for telephone companies generally in the United States. Some system of this kind would serve the purpose of the Post Office admirably. I am of course aware that in the offices of the Secretary, the Engineer-in-Chief and the Accountant-General many general costing and other statistics are regularly kept up, but they are not related to one another. They are special accounts kept without direct relation to the general accounting and costing system, They have neither the authority nor the utility which they would have as correlated parts of that system, and yet, I believe, that the sum total of effort expended in their competition is as great as the work involved in the most complete and elaborate costing system adopted by any commercial company. Being the accounts of a Government department there is no reason why they should not be published in full explanatory detail. A Government monopoly has nothing to fear from competitors, and we see that elsewhere whenever public control is exercised over commercial companies, the tendency is to make them publish more and more elaborate accounts—as for instance, the accounts of railway companies—as a guarantee that they are fulfilling their public duty. Why then should not a Government department apply such a system to its full logical extent.

Accounts by themselves are dull reading, but the accounts could be made the text for annual reports on the working of the telephone service which would illustrate its aims, its methods and its results in most complete manner as report succeeded report. Even if the general public did not read them at first, writers in the Press and Members of Parliament would do so and by their writers and comments could gradually educate the public mind as to the administrative aims and results of the telephone service. It is only by a scientific publicity of this kind as I believe that we shall ever get into as satisfactory relations with the public as exist to-day between the public and the telephone service in the United States.

Having left the service it is no longer in my power to take part in this work, but I should like to finish by commending it to you who are still serving as a subject of official study and as a subject for future papers and discussions of this Society.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

TELEPHONES.

NOTWITHSTANDING the intervention of the holiday season there has been no decline in the volume of new business, and in August the gross new stations connected totalled to 16,949, the net increase being 8,440. These totals compare favourably with those for the earlier months of the year and are approximately 50% better than those for the corresponding month of last year. During August the number of stations connected with Provincial exchanges passed the 700,000 mark, whilst at the end of the month the London stations were only 10,502 short of 400,000.

The lower tariff for private house connexions continues to have an important effect on development, the net addition of 2,490 residence rate subscribers in August, representing 41 per cent. of the total increase for the month. During the past year the number of residence rate connexions has increased by 23,829, or 17 per cent., whereas in the same period the business rate subscribers have increased by only 9 per cent.

Substantial progress was made in August in connexion with the rural exchange development scheme, a larger number of exchanges being opened than in any month since its inception in June 1922. At the end of the month 437 exchanges had been authorised since the new conditions were announced, and of these 230 were working, 44 having been opened in August.

Some statistics showing the general development of the service to date in the current financial year are given in the appended table :—

	At April 30	At May 31	At June 30	At July 31	At Aug. 31
EXCHANGES :—					
London	99	100	100	100	100
Provinces ...	3,107	3,140	3,166	3,187	3,223
Total ...	3,206	3,240	3,266	3,287	3,323
STATIONS :—					
(1) Exchange—					
London ...	367,403	370,576	373,845	375,679	377,445
Provinces ...	657,734	664,527	670,068	675,992	682,706
Total ...	1,025,137	1,035,103	1,043,913	1,051,671	1,060,151
(2) Private—					
London ...	12,149	12,216	12,303	12,025	12,053
Provinces ...	18,753	18,632	18,573	18,451	18,383
Total ...	30,902	30,848	30,876	30,476	30,436
(3) Total Exchange and Private—					
London ...	379,552	382,792	386,148	387,704	389,498
Provinces ...	676,487	683,159	688,641	694,443	701,089
Total ...	1,056,039	1,065,951	1,074,789	1,082,147	1,090,587
PUBLIC CALL OFFICES :—					
London ...	3,808	3,817	3,838	3,836	3,842
Provinces ...	12,766	12,915	13,000	13,085	13,169
Total ...	16,574	16,732	16,838	16,921	17,011
PUBLIC CALL OFFICES IN STREET KIOSKS	432	451	474	492	506
RURAL PARTY LINES	7,038	7,221	7,379	7,537	7,675

Further progress was made during the month of September with the development of the local exchange system. Among the more important exchanges extended were the following :—

LONDON—Enfield.
PROVINCES—Openshaw.
High Wycombe.
Bradford.

During the month the following additions to the main underground system were completed and brought into use :—

Southampton—Shedfield.
Guildford—Southampton.
Manchester—Macclesfield section of Manchester-Birmingham cable.
Coventry—Leamington.

In addition 26 new overhead trunk circuits were completed, and 57 additional circuits were provided by means of spare wires in underground cables.

TELEGRAPHS.

Baudot working has been established between the Central Telegraph Office, Reading and Oxford.

LONDON ENGINEERING DISTRICT NOTES.

Imperial Service Medal.

ON Aug. 17 an interesting ceremony took place in the Linemen's Room at Battersea Exchange, when the Superintending Engineer presented the Imperial Service Medal to Mr. A. J. King, who has recently retired after over 40 years' service with the Department.

A company of about 40 of Mr. King's colleagues witnessed the presentation, and several testified to the pleasure it gave them to see his long, faithful and meritorious service recognised in such a manner.

"Denman" Chess Club.

The programme for the session, which opened on Thursday, Oct. 11, includes twenty-five match games in the Civil Service and Municipal Chess League.

It having been considered possible to run two teams for League purposes, arrangements have been made for twelve matches in Division III of the League for the senior team, and thirteen matches in Division IV for the second team. This it is hoped will afford opportunities for all playing members to take part in League Matches.

A Club Tournament, Lightning Competitions and simultaneous displays will also be organised during the season.

All new playing and honorary members will be warmly welcomed.

It has been suggested that a Club Dinner be arranged about mid-session.

New Exchanges and Extensions.

The number of exchanges in the London Engineering District is steadily growing. On Oct. 18 a new exchange of type C.B. No. 10, was opened at Woodford in a new building adjoining the Post Office. This exchange replaces an exchange of magneto type which was accommodated in a private building where the space was cramped, and where there was no room for development. The number of subscribers' lines transferred at the opening was 500, and 65 junctions were provided. Immediate provision has been made for development up to 1,000 subscribers' lines.

On Oct. 20 a new exchange of the C.B. No. 10 type was opened at Southall with 260 subscribers' lines and 80 junctions. The area served by the new exchange was previously served by the Ealing Exchange, and the provision of an exchange at Southall will effect some much needed relief at Ealing. The new exchange has an initial capacity of 540 lines.

A new exchange of the C.B. No. 1 type is being installed at Gt. Tower Street, and will be named Royal. The new exchange is being equipped for 7,500 lines, and to it will be transferred the whole of the lines which have been served temporarily by the Minories Exchange, and also a certain number of lines from the Avenue and Central Exchanges. The building in which the exchange is being installed has been specially built for the purpose and has an imposing appearance. It will ultimately contain a large amount of automatic apparatus and will be one of the finest telephone exchanges in London. It is expected by the time that these notes appear in print the exchange will have been opened.

Progress is also being made with a new exchange of the C.B. No. 10 type at Eltham, and completion is expected by the end of November. This exchange will serve an area which has hitherto been served from Lee Green.

Extensions to the existing equipment are being made at Dalston, Hornsey, Ilford, Upminster, Walthamstow, North, East Ham, Brixton, Hop, Streatham, Bromley, Sydenham, Purley, Burgh Heath, Clerkenwell, London Wall, Hammersmith, Hendon, Kensington, Maida Vale, Wembley, Elstree, Hatch End, Paddington, Hayes, and Hampstead. New line plant is being provided in conjunction with the establishment of the new exchanges, and to provide for development.

New buildings to accommodate telephone exchanges are in hand or about to be commenced at Albert Docks, Bishopsgate, Enfield, Mill Hill, Palmers Green, Sloan and Meadway (Golders Green) and Woolwich.

Arrangements are in hand for the construction of new buildings at Battersea, Hendon, Maida Vale, Guildhall (Wood Street, E.C.), New Malden, Strand, Tilbury, Western, Warlingham, and Walworth. In all these cases sites have been acquired. Negotiations for other sites are in progress.

Extensions to the existing buildings are being made at Dalston, Ealing, East Ham, North and Streatham.

It will be gathered from the above that there is a "certain liveliness" observable in the London Engineering District.

Institution Meeting.

At a meeting of the Institution of Post Office Electrical Engineers on Oct. 9, Mr. A. B. Eason, M.A., read a paper on Power Plant in C.B. and Automatic Exchanges. Descriptions were given of the various methods of supplying power to the exchanges, and the merits of each were discussed. Mr. Eason was particularly interesting when dealing with that portion of the subject in which he is one of the foremost, if not the foremost, authority in this country, viz., the means which can be adopted to eliminate objectional vibration in buildings where it is necessary to have running machinery.

The causes of some of the overhearing which had been traced to power circuit was explained, and also the steps which had been taken to overcome the trouble. The basis on which the sizes of batteries, generators and cables were determined was discussed, and also the voltage drops which were occasioned by fuses, shunts, &c., inserted in the feed cables. One of the most interesting features to those not dealing regularly with the installation of power plant was the marked tendency towards simplification of the switching arrangements in the power supply circuits, as was evidenced by the excellent series of slides shewing ancient and modern types of telephone power boards and circuits.

REVIEWS.

"Electrical Measuring Instruments and Supply Meters." By D. J. Bolton, B.Sc., A.M.I.E.E. Pp. 16, 328. *(Chapman & Hall, Ltd.) Price* 12*s.* 6*d. nett.*

This volume, which is published in the Directly Useful (D.U.) Technical Series, fills a gap in dealing comprehensively with electrical measuring instruments of all kinds, commercial and laboratory, and while intended partly for students, will also be found of use by Engineers as the subject is dealt with both from the theoretical and practical points of view.

The volume is fully and clearly illustrated to show the construction and connexions of the various instruments, and the illustrations, together with the information given as to design, will enable occasional repairs and alterations, such as changes of range, to be effected.

The causes of inaccuracy of the various types of instrument are given together with useful comparisons of sensitivity and accuracy enabling the most suitable choice of instrument to be made where several different types may be employed for the same purpose.

For the sake of students, a set of questions on design is added at the end of the book, and, although the information given in the book will enable these to be answered, they are followed by a list of the answers which, in certain cases, where difficulty may be found, are worked out in full.

Generally, the book is well arranged and clearly written, and will prove a useful addition to any electrical engineer's reference books.

"Pitman's Technical Primers. Electrical Insulation." By W. S. Flight, A.M.I.E.E. 104×XI *pp.* 55 *Illustrations. Price* 2*s.* 6*d. nett.*

This primer contains a surprisingly large amount of information, and it is written in clear and concise language. The first four chapters describe the properties, uses, trade sizes, and limitations of the materials used in the insulation of electrical machinery and apparatus, and also the methods of ascertaining the relative value of the various materials for particular purposes. Chapter V discusses electric strength and contains several charts shewing, *inter alia*, the effects of temperature, thickness, moisture, shape of electrodes, &c., on electric strength. The methods employed and the precautions adopted in ascertaining electric strength, volume and surface resistivity, insulation resistance of coil during manufacture, &c., and methods of detecting by A.C. tests short circuits, broken conductors, and insulation faults on finished machines, are described in Chapter VI. Then follow practical details with regard to the use of the various materials in insulating medium

voltage and high voltage machines. Several good line drawings and photographs illustrate this section of the book. The final two chapters discuss sparking distances in air and in oil, and are followed by a very helpful and up-to-date bibliography. The primer should prove valuable to practical men and especially to young men who desire to make a systematic study of electrical insulation. The book is well printed, and the diagrams and illustrations are excellent in every respect.

"Radio and High Frequency Currents." By Edgar T. Larner. Messrs. Crosby, Lockwood & Son, Stationers' Hall Court, Ludgate Hill, London, E.C.4. 3s. 6d. nett.

This book, which forms the latest addition to Lockwood's Technical Manuals, is what it professes to be, an introductory treatise for those who, possessing some knowledge of electricity and mathematics, desire to extend that knowledge to wireless and its high frequency currents. The book is well printed, the diagrams are clear, and the matter is present in simple and concise language.

We think that Mr. Larner will find that many distinguished amateurs and others do not share his views, that "for short ranges short waves are used, whereas long waves are required for transmission over long distances." Much attention is at present being given to short wave transmission over long distances.

The formula for obtaining the natural wave-length of a horizontal aerial (given on page 10), would give the natural wave-length of the amateur aerial of 100 feet as 144 metres, which is not even approximately correct. In diagram No. 11, a fixed condenser instead of a variable condenser is shewn in series with the secondary winding of the transformer and diagram 17 is printed upside down instead of in the conventional way adopted in the other diagrams. But no doubt these little matters will be put right in the next edition, which the publishers will soon find necessary in view of the present demand for works dealing witn the art of wireless.

OBITUARY.

Mr. J. W. Ullett.

Another of the pioneers of the telephone passed away in the person of Mr. John William Ullett, of 27, Tavistock Drive, Nottingham, who suddenly collapsed and died as he was saying farewell to his wife at Bournemouth West Station on Sept. 24.

Mr. Ullett was born in 1859 at Higney Grange, Huntingdonshire, and educated at Merchant Taylors' School, London. He entered the service of The Telephone Co., London, on Oct. 5, 1879, on the engineering side. He was engaged on the construction of the first telephone junction lines in London and later the first trunk lines between London and the North of England. He was also responsible for the design of much of the earliest telephone apparatus. Between the years 1889 and 1893, he took a prominent part in the development of the multiple switchboard, and of the telephone transformer, work which, in those days, required much original research and foresight. In 1893 he laid out and took charge of the National Telephone Co.'s factory at Nottingham for the construction and repair of telephone apparatus.

In order to cope with increased requirements, additional works were established at Beeston in 1901 under the direction of Mr. Ullett, construction work only being carried out there, the repair work remaining at Nottingham. Both factories were controlled by him until 1903, when the British L. M. Ericsson Co. was formed to take over the Beeston Works. Mr. Ullett was then transferred to this Company as works manager, which position he held until 1918. Under his management the Beeston Works were greatly extended and improved, and to his skill, experience and untiring efforts are to be attributed the position to which these works have attained.

During the war Mr. Ullett was a member of the Advisory Committee which equipped an empty building at Lenton, Nottingham, for the manufacture of shells. This was known as the Nottingham National Shell Factory. The necessary machinery and workpeople had to be obtained from various sources, and within a very short time the concern produced a very large output. Mr. Ullett's intimate knowledge of the value of costings was of the utmost benefit to the Board, and this particular factory was often referred to as an example of economical production.

Mr. Ullett became an Associate of the Society of Telegraph Engineers and Electricians in 1884, and a full Member of the Institution of Electrical Engineers in 1891. He was elected Chairman of the East Midland Sub-Centre for the coming session.

Mr. Ullett's loss will be much feet by all his old colleagues and those who have worked with or under him in his various undertakings by whom his transparent honesty and great ability were always much appreciated.

LONDON TELEPHONE SERVICE NOTES.

London Telephonists' Society.

THE first meeting of the session was held on Friday, Oct. 5, when Miss Cox, the new President of the Society, read a paper on "Recollections." With such a comprehensive title, Miss Cox was able to keep her audience keenly interested and amused, by a number of official (and unofficial) reminiscences, which she portrayed so vividly that, when the paper ended, the feeling of the meeting was decidedly "Oliver Twistian."

In the discussion which followed, the Misses Reekie, Ashmead, West, and Sewell, and Messrs. Pink, Dive and Buckeridge, took part.

We are indebted to the Misses Tilbury and Riches for entertaining us in the interval before the meeting, which they did very delightfully.

The next meeting of the Society takes place on Friday, Nov. 2, when two papers will be read, one by Mr. W. C. Griffith, entitled "The Phonogram Room," and one by Mr. E. A. Pounds, entitled "The Influence of Sport on our Work." A large attendance is hoped for. (*Male staff, please note.*)

City Literary Institute.

The lectures arranged specially for the staff of the London Telephone Service have been well supported, a total number of 145 having enrolled. In the majority of cases more than one subject has been taken, the number of attendances being 213, a very satisfactory result.

It is of interest to note which of the items are most popular. Lectures on the History of London are an easy first, so that something is being done to destroy the legend that Londoners know the least about their city. Next in popularity are the lectures in French, followed closely by General Psychology, Landmarks in Literature and Experimental Psychology. Altogether 33 subjects have been taken, including Astronomy, Latin and Industrial Evolution.

Choral Society.

The Langham Choral Society commenced rehearsals on Oct. 2, when Holst's The Cloud Messenger was put in hand. The orchestral side is being developed, and there are now 25 instrumentalists attending rehearsals. This is of great advantage to the conductor and singers, and enables the choir to get a rapid grip on the work.

A concert in aid of the funds has been arranged for Thursday, Nov. 22, at the Steinway Hall, commencing at

Many singers have very kindly promised their services, and tickets at prices from 5*s.* to 1*s.* 3*d.* can be obtained from the Hon. Secretary, Mr. W. R. Child, 102, Dean Street, W. 1.

There is still room for good male voices and more instrumentalists.

London Telephone Service Swimming Association.

This Association held its Fifth Gala on Friday, Oct. 12, at Pitfield Street Baths, Shoreditch. Each year's event seems to achieve the impossible by being better than its forerunner, and it is certain that enthusiasm can reach no higher pitch than is in evidence at these annual events. There was very keen rivalry between the different exchanges competing, and the race for the coveted Pounds Challenge Cup attracted 15 teams, Regent being successful in retaining their hold on it.

With so much good fun provided there is small room for criticism, but it would certainly be an advantage if the proceedings terminated a little earlier. This could be done without cutting any items if the intervals between the events were shorter. We were glad to see the Deputy and Assistant Controllers enjoying themselves with the rest, the attendance being representative of the whole service.

The principal results were :—

Pounds Challenge Cup—

REGENT.—(Misses Phipps, Cole, Broomsgrove and Amos) ...	1
GERRARD.—(Misses Burt, Davies, Wilson and Havten) ...	2
CENTRAL.—(Misses, Sowden, Izzard, Knight and Milbank) ...	3

A sealed handicap in conjunction with this race resulted in Trunks being first, followed by Victoria and Toll.

Learners' Race—

Miss Rowe (Holborn) ...	1
Miss James (Trunks)	2
Miss English (London Wall) ...	3

33 *Yards Handicap—*

There were 78 entries for this race, which was run in 10 heats. The final result was :—

Miss Cummings (Central) ...	1
Miss Ackery (Hammersmith)...	2
Miss Bridges (Western) ...	3
Miss Cowper (Toll)	4

SOME NEW REVIEWS.

"*Experimental Wireless.*" (*Percival Marshall & Co., London.* 1*s. monthly.*)—This is a journal of radio research and progress, which is described as owing allegiance to no trade interests, and with a policy of complete independence. In an editorial the importance of the experimenter to the industry is emphasised and an appeal is made for greater co-operation amongst amateurs. The first number contains articles on the "Maintenance of High-Frequency Oscillations by Valves," by E. W. B. Gibb; on the "Fading of Signals," by O. W. Brown; on "Antennæ Constants," by H. Andrews; on the "Design and Operation of Tuned Anode Receivers," by Capt. St. Clair Finlay; and several other articles of high interest to wireless amateurs. The journal is well got up and well illustrated, and in our opinion is a remarkably good shillingsworth.

"*La Revue des Téléphones, Télégraphes et T.S.F.* (*Paris,* 3 *francs per number.*) *Nos.* 1, 2 *and* 3.—This review is sufficiently described by its title and is full of matter interesting to our readers. The first three issues contain amongst other articles, one on the telephone development of Paris, illustrated by a map showing the proposed reorganisation of the area and its transformation to automatic working. There is another article on the development of the rural telephone and a third and fourth on the telephone in Sweden and in Denmark, these last giving the results of official visits made for the purpose of studying the organisation of those countries. Telegraphists would find the description of the working of the multiplex apparatus at the chief telegraph office in the rue de Grenelle, Paris, very instructive. The article is illustrated by views of the various "galleries," as we should call them. An article on the telephone traffic between Alsace and France, shows that there is often a delay of 4 or 5 hours on the Strasburg-Paris line. It is easier, we are told, for an Alsatian to obtain communication with a German town than with Paris, Nancy or Belfort. Another interesting paper (fully illustrated) is one on the replacement of open wires by underground cables. Indeed it would take considerable space to enumerate the articles dealing with all aspects of telephone, telegraph and wireless work with which these first three numbers are filled. We should imagine that it had a ready sale amongst French officials and certainly it would afford very profitable reading to our own.

"*Technische Mitteilungen.*" *No.* 1—5. (*Published by the Swiss Telegraph Department, Berne.*)—This also is a telegraph and telephone specialists' journal and includes articles of practical and scientific nature on various aspects of the service. Some of them are in both French and German but the majority are in the latter language only. We notice a summary of the conference of Western European telephone administrations in Paris, and exhaustive articles on Experiments on the Firmness of Wooden Poles and on Pupin cables; and shorter ones on the localising of line faults and practical hints on the improvement of local battery exchanges. There is a full description of the Munchenbuchsee Radio Station in German and French, and in each issue are various short items of interest.

"*Das Fernkabel.*" (*Berlin, Heft* 3 *and* 4.)—This publication is issued by the Deutsche Fernkabelgesellschaft, and the two numbers under review are chiefly concerned with Mr. Gill's proposals for improving European inter-state telephone communication and with the Paris conference which was held to discuss this question. We gave in our last issue an abstract of the German view of the matter as expressed in Heft. 3. Heft 4 returns to the charge with a long article of 23 pages, illustrated by excellent maps of the trunk line development of the large European states, and diagrams showing their telephone development. It is demonstrated by these that Germany has more telephones than any three European states put together and a greater trunk mileage than any two. One of the maps is designed to show that a centre point in Germany would include within a radius of 3,000 km. a greater number of important cities than any other point in Europe, as indeed it would, and another shows suggested trunk arteries connecting the capitals of Europe. In the view of the Deutsche Fernkabelgesellschaft, of course, these should mainly follow a trans-German route.

PERSONALIA.

LONDON TRAFFIC STAFF. TELEPHONISTS.

Resignations on account of marriage:—

Miss A. TAYLOR, Assistant Supervisor, Class II, of the Paddington Exchange.

Miss V. L. WELSH, Assistant Supervisor, Class II, of the Paddington Exchange.

Miss E. M. LIMBY, Telephonist, of the City Exchange.

Miss W. G. KERRIDGE, Telephonist, of the Central Exchange.

Miss A. E. IRVING, Telephonist, of the Central Exchange.

Miss E. C. JEFFERIES, Telephonist, of the Chiswick Exchange.

Miss H. JELLEY, Telephonist of the East Exchange.

Miss E. HUCKLE, Telephonist, of the East Exchange.

Miss W. C. QUARTLY, Telephonist, of the Finchley Exchange.

Miss L. M. MAYNARD, Telephonist, of the Hornsey Exchange.

Miss A. M. SMITH, Telephonist, of the Holborn Exchange.

Miss D. A. I. BLENKINS, Telephonist, of the London Wall Exchange.

Miss L. E. GOODMAN, Telephonist, of the London Wall Exchange.

Miss I. L. OLDFIELD, Telephonist, of the London Wall Exchange.

Miss A. LEGG, Telephonist, of the Purley Exchange.

Miss F. M. CHETWOOD, Telephonist, of the Park Exchange.

Miss M. A. PATRICK, Telephonist, of the Streatham Exchange.

Miss E. TYNE, Telephonist, of the Trunk Exchange.

Miss B. E. ENDERSBY, Telephonist, of the Trunk Exchange.

Miss D. PATTISON, Telephonist, of the Trunk Exchange.

Miss M. A. HARLEY, Telephonist, of the Trunk Exchange.

Miss E. SHANKS, Telephonist, of the Trunk Exchange.

CENTRAL TELEGRAPH OFFICE.

INLAND GALLERY (MEN).

Mr. J. A. MAY, Overseer, promoted Assistant Superintendent.

Mr. G. C. JONES, Overseer, promoted Assistant Superintendent.

Mr. R. T. SUTTON, Telegraphist, promoted Overseer.

PROVINCIAL STAFF.

On Sept. 24 last, Miss M. E. Long, Clerical Officer (*ex* Assistant Supervisor), Sheffield, left to take up a higher post at Liverpool. Before her departure Miss Long was presented by her colleagues, as a mark of their affection and esteem, with a silver travelling clock. During her long service at Sheffield, Miss Long has made many friends and carries with her everyone's good wishes for her future happiness and success.

Miss L. H. Brown, of the District Manager's Office, resigned on Sept. 29 owing to her approaching marriage to Mr. J. T. Rogers, Shanghai, late of the Engineering Section, Shrewsbury. She was the recipient of a dinner service which the District Manager (Mr. A. Ramsey Lamb) presented on behalf of her colleagues. Miss Brown sailed on the T.S.S. *Sarpedon* on Oct. 13, and her marriage will take place within a few days on her arrival, at Holy Trinity Cathedral, Shanghai.

THE

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All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.*4.

SOME RANDOM REMINISCENCES.

BY ARTHUR E. COTTERELL.

(*Continued from page* 25.)

The first installation in that city which may be described as of a public character was the lighting of the Town Hall, the current from which was derived from a plant installed at the works of Messrs. Winfield & Co., brassfounders, in Cambridge Street, some quarter of a mile distant; the connecting cables being laid in wooden troughs under the streets.

The electroliers designed and executed by Winfields were much admired and well exhibited the artistic possibilities of the new form of illumination. My interest in this was added to by reason of the fact that the National Telephone Company provided a wire between the two points which was used in connexion with sounder instruments, the object of which was to signal to the works when the current was to be switched on and notify its satisfactory reception, and as at that time I had been transferred to the electrical side of the business I had some connexion with the job. The installation was specially completed in time for the Triennial Musical Festival, one of the great events in Birmingham. I think it was in the year 1882. It was my good fortune to be in the Hall at the time when the current was turned on for the first time, and I remember still how greatly impressed I was by the flood of golden light.

The event was also memorable to me as it was the occasion of one of the great rehearsals, and I was privileged to hear portions of Gounod's great work *The Redemption*, conducted by the famous composer in person.

Another event which impressed me in 1882 was the great magnetic storm of Nov. 17, when the telegraphs were seriously affected, the cause being attributed to a huge sunspot. There had, of course, been similar occurrences before, but this was something new to me and the impression which it made has remained with me ever since and afforded me much delight and interest by introducing me to a study of one of Nature's marvels which even to-day awaits solution.

The practicability and utility of the telephone has been widely known for so many years now that it may be interesting to recall that in the earliest years one of the principal efforts was to persuade the public to call at the offices and try the new invention. The show line in Birmingham was about a mile in length from the Secretary's office to that of the Managing Director, who was the principal of an engineering firm. These visitors included a wide range of business men and residents, the latter often bringing their wives and daughters; thus our telephone receiver was sometimes applied to hard business heads, at others nestled amidst bewitching curls. I well remember that one of the things which seemed to call for frequent comment was the fact that the receiver was connected merely by a flexible cord. I suppose that the difficulty in understanding this arose from familiarity with the toy telephone with a stretched string. A question which frequently arose had reference to the distance over which it was possible to talk; a point on which the experts could only theorise. Whilst on this subject I may as well confess to a *faux pas* which I made on one occasion. My only excuse or explanation is that I was very young at the time.

One day when going home in the train I was sitting next to a gentleman I knew well. In course of conversation he asked me the frequent question to which I have referred. I replied that so far my experience had been limited to about 4 or 5 miles, but, with an enthusiasm which lacked discretion, I went on to say that we should soon have a line about 12 miles long, adding: "It is a long line

for which a long price is being paid. It's for ——, the Solicitor." At this point I was pulled up shortly by a nudge from my elderly friend and a moment later a middle-aged and well-groomed gentleman leant forward with a smile and said: "Oh, please don't interrupt my young friend, I am ——, the Solicitor, and am much interested." Needless to say, I was greatly abashed and profuse in my apologies.

Mr. —— was, however, very nice and did his best to put me at ease. I saw him often afterwards when he always greeted me pleasantly, and when I had occasion to go to his house in connexion with the completion of his installation I was received most kindly. After insisting that I should partake of luncheon, Mrs. ——, who I suspected knew all about the incident, took me round their beautiful grounds and, after questioning me about my home and people, gathered a large basket of roses which she asked me to take to my mother. Needless to say it was a lesson to me to be more cautious, but I do not hesitate to recount it, though telling against myself, as the tale has a humorous side and recalls pleasurable thoughts of the good-natured manner in which my lapse was treated.

There was another incident in connexion with this line which was of a more alarming character but in which I had no share. The line was run principally on poles erected along the tow-path of a canal, which in consequence of the undulatory character of the land runs through several tunnels, one of them being approximately a mile in length. In these sections the line was laid in the form of gutta-percha covered wire stapled to the arched brickwork. Usually the barges were drawn through in train by means of a steam tug. Of course this mode of traction was too rapid for the work which had to be performed, so the gang employed in fixing the wire had to push their barge through by means of poles. As light was obviously required the men were supplied with oil lamps. When the barge was somewhere about midway through the tunnel by some mischance or carelessness one of the lamps was upset, and in its fall there resulted an escape of oil which became ignited. Needless to say the men were considerably alarmed on being confronted with flaming oil in the bottom of the barge, and with the knowledge that the boat contained various more or less inflammable things such as gutta percha, cans of oil, &c., and that they were a long way from either end of the tunnel. Fortunately they succeeded in putting out the fire, but from the accounts which were given me a day or so afterwards, I gathered that they experienced some exciting moments.

I recall another incident in connexion with that line. In 1884 the late Lord Randolph Churchill and the late Colonel Burnaby addressed large meetings in the Birmingham Town Hall on two adjacent evenings. Our subscriber was desirous of hearing the speeches over his wire, and it fell to my lot to arrange the transmitters on the platform and the receivers at his house, a matter which was considered rather an achievement in those days. Speaking of Lord Randolph Churchill I am reminded of an amusing incident. An Electrical Exhibition was held in Bingley Hall, Birmingham, in 1889, at which the Company were exhibitors. The late Lady Randolph Churchill had consented to perform the opening ceremony. Amongst the items of interest was an illuminated fountain which played in front of the platform.

As soon as her ladyship, who was accompanied by Lord Randolph, had taken her place on the platform, where the Exhibition Committee and various local magnates were assembled, it became apparent that the fountain obstructed the view and that the noise of the flowing water was likely to militate against the hearing of the speeches. Whether the person who was then instructed to turn off the flow was not conversant with his duty or was affected by nervousness I do not know, but his first effort resulted in an increased display, the spray from which mildly startled some of the company on the platform.

At last it was successfully turned off and her ladyship performed her part with much grace. After various speeches, Lord Randolph Churchill rose to reply to the vote of thanks which had been tendered to his wife, in which with mock gravity he expressed his deep regret that the Managers of the Exhibition had "endeavoured to throw cold water over the whole proceedings."

TELEGRAPHIC MEMORABILIA.

ONE of the first points at which many folks begin to drastically cut down their expenditure is on behalf of Charity! To an extent it is understandable, and yet the poor and especially the *very* poor can somehow or other always find room to shelter some poor outcast, and sufficiency in their half loaf to divide even that with the hungry stranger. Something of this spirit appears to animate telegraphists and telephonists alike. It may be that in the crafts of telegraphy and telephony one comes up against much of the tragedy as well as the comedy of human life, and that it is true of the craftsmen of both that in their breasts, "they hold the secrets of the town."

Whatever may be the root cause the results are undeniably excellent, and my preamble is set out with the sole idea of excusing (!) the liberality of the C.T.O., in this especial case for its continued generosity during times of financial stringency and bonus reductions. My fear has always been that, in recording the results of C.T.O. efforts from time to time on behalf of deserving causes, the cynic in some remote corner should be awakened and the sneering comment should be made, "and yet these men and women complain of the cost of living!"

Leaving that uncomfortable curmudgeon to *his* lonely corner—there is no feminine application of the term—let it be placed on record that the latest contributions of the London office have been as follows: Japanese Earthquake Fund, £62; Organ Recital on behalf of Fleet Street Bart's Week, £14; Collection on behalf of widow of deceased window cleaner, £130; Poppy Fund, £44 13*s.* 4*d.* The Interkom Club, too, probably before this page meets the reader's eye, will have given their representation of "The Taming of the Shrew" at the Guildhall School of Music on behalf of orphan children.

The retirement of Mr. E. Barrett, Overseer of the Cable Room, on the 22nd ult., leaves a gap in the technical staff of that department not easily filled. "Teddy" leaves us in particularly depressing circumstances in that his health has not realised the fondest hopes of himself and his office colleagues. Personal loss due to the war has no doubt had much to do with the undermining of his by no means robust condition, but it is to be hoped that freed from office cares and the stress and strain of travelling to and fro in these hurry-scurry days he may recuperate and return to something of his old bright cheery self. He leaves us with the absolutely kindest of kind wishes of every one of his old colleagues behind him, a condition of things which justly remains the due of a man who never denied his help to a single fellow creature and never asked himself if that creature was friend or enemy.

The writer would much liked to have been present at the 41st Annual Meeting of the Rowland Hill Memorial Fund on Nov. 12, when the Right Hon. the Lord Mayor of London presided, but, as the special card of invitation only reached me about fifteen minutes before the time of the gathering, my pleasure is deferred for another twelve months.

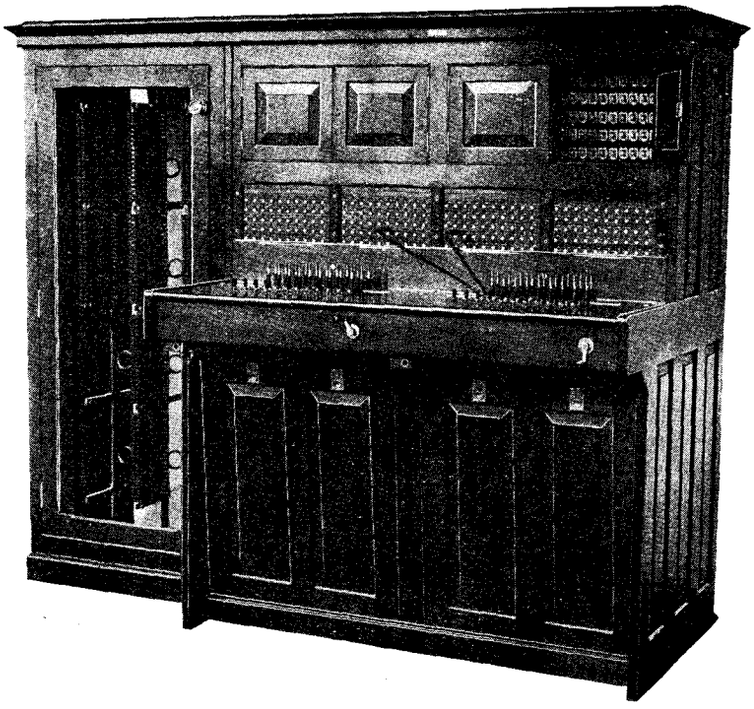
The fine art to which the manufacture of electrical conducting wire has been brought may be realised by the following abridged account of some of the work done in the laboratories of the Western Electric Co. in the U.S.A. where it has been found possible to manufacture gossamer-like metallic strands as fine as 200-millionths of an inch in diameter. Practically invisible to the eye as they are, it is found necessary to weld them together under the microscope for enclosure within the minute vacuum bulbs. Thermocouples are required to adjust circuits in the vacuum-tube repeaters on long-distance telephone lines. In general these tiny glass bulbs are used to measure the small alternating currents in telephony and radio. The wires made up from a copper-nickel alloy used in fuses to protect the thermocouples are passed through an electrolytic acid bath, where they are eaten down to the size desired, it being impracticable to draw wire through dies as fine as is necessary.

Both copper-nickel and tungsten wires are used in this laboratory. The tungsten threads are the smallest of all, being only 200-millionths of an inch thick—a good one hundred of them would be required to make one wire the size of a human hair.

The *Daily Mail* is responsible for the following:—Senator Marconi, who is at present in Rome, confirms the report that he has perfected an invention whereby only a fraction of the power formerly necessary is needed to transmit radio messages. He states that he has narrowed the direction of transmission, thereby assisting secrecy, and he has increased the speed of transmission enormously also. Senator Marconi says that with his latest invention he has been able to correspond regularly from England with the Cape Verde Islands, more than 3,000 miles, using only 1/100th of the power formerly employed.

The s.s. *Maloja*, the latest addition to the Peninsular and Oriental Steam Navigation Co.'s fleet, now on the high seas on her maiden voyage, has been equipped with the following apparatus by the Marconi International Marine Communication Co., Ltd.:—A 1½-kw. quenched-spark transmitter of 700 miles range; a 1½-kw continuous-wave valve transmitter with a range of 1,500 miles; and a Marconi marine direction-finder, which enables bearings to be taken of other transmitting stations within one degree of accuracy. The four-electrode valve amplifying detector is used in the receiving system. The emergency transmitter, with an independent power supply, has a normal range of 100 miles.

There are signs of the gradual development of Russia on all hands and our own observations of telegraph traffic tend in the same favourable direction. Russia is even supplying foreign countries with wireless apparatus for,



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The switchboard illustrated above is one we have in use on our own factory communication system. It is typical of a large number of boards we have supplied within the past few years to cater for widely varying requirements.

Such boards are suitable for public service exchanges in small communities, sub-exchanges, private-branch exchanges, or for purely private installations.

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The equipment provided makes these switchboards equivalent minatures of the No. 1 C.B. service, less that expensive item—the multiple—which is unnecessary for one or two positions.

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Telephone: 7050 Regent.
Telegrams: "Peelcontel, Westcent, London."

according to the official organ of the Soviet Council of Labour and Defence, Moscow, the first foreign contract for manufactures obtained under the present *regime* has just been secured by the Telephone and Telegraph Trust (Weak Current Trust). It is a contract with the Government of Persia for the supply of big wireless installations which will connect Persia with Europe and Asia. The contract comprises installations in Tabriz and in six other towns and four transportable stations. It is stated that the contract has been obtained in competition with companies in Germany, France, and England, which were supported by their respective Governments, and that it has been approved by the Persian Parliament. The value of the order is estimated at 500,000 gold roubles (£50,000), and it is to be executedwith in a period of ten months.

A correspondent in the columns of the *Electrical Review* adds the following story of pre-peace times, to our already weighty collection, but it is good enough to be true ! An ex-R.E. Signals was in my place one day last week, and on the subject of conductance of wire stated that on one occasion, instead of cutting a few yards of telegraph cable, he joined up to the ends of a drum of wire, when up came the " Brass Hat " with his S.M. and said : " Sergeant-Major, what is this ? " The S.M. asked the Sergeant, the Sergeant asked the Corporal, the Corporal asked the Signaller, who stated that he did not desire to cut the wire and have short ends about. " Ha ! " said " Brass Hat," " I have discovered why the messages are delayed ; two miles of wire on that drum, and they have to travel all that distance. Yes. No wonder ! Consider yourself a prisoner."

The following is a much abridged report from the columns of the *Sydney Morning Herald* of the speech of Mr. G. Mason Allard, on Aug. 31 last, at the Annual General Meeting of the Amalgamated Wireless (Australasia, Ltd.) when the shareholders were informed that the company were unable to declare a dividend and that there " would be a call on contributing shares at an early date to carry out their big work."

The company was passing through an exceptional period. It had recently changed its status in that the Government had joined with the company for the purpose of undertaking the very large scheme of direct high-power wireless communication with the rest of the world, a scheme which had also called for a considerable amount of expenditure. " During the year," the speech continues, " the gross profit, which amounted to the sum of £68,000, was in excess of the gross profit from the ordinary service of the previous year by approximately £5,000, and by still more in comparison with that of the year ended June 30, 1921—£59,000. The expenses, however, increased to nearly £62,000, which was approximately £15,000 greater than last year. That was accounted for to a considerable extent by a factor from which many trading concerns had suffered, namely, diminishing values in the world's markets, in all classes of productions and manufactures, and in common with other concerns the company had suffered. The directors had taken the opportunity of putting the company's stocks on proper financial footing. There had also been considerable current expenditure from which no immediate returns could be obtained. There had been a reduction on investments, such as War Loans and deposits. The capital had been employed in preparing for the several new enterprises the company was now engaged upon."

The Admiralty has ordered the present practice of drafting active service telegraphists from the naval depots for service in dockyard tugs to be discontinued. These men are to be replaced by civilians who are ex-naval telegraphists and not in the Reserve, or else by other competent civilian operators. They are to be employed under the general conditions applicable to yard craft ratings. One operator will be allowed at Portsmouth, Sheerness, Devonport, and Rosyth to maintain the wireless installations of the tugs, and to embark in any tug detailed for outpost service. The operator engaged for service at Sheerness will be available for service at Chatham as required.

CHILI.—*Reuter's* correspondent at Santiago-de-Chili states that representatives of French and American interests, in combination with Chilean financiers, have formed a company for the installation of a powerful radio station to communicate with Europe. The permission of the Government to carry out the scheme has been obtained.

CHINA.—It is also reported by a correspondent of the *Morning Post* that the Chinese Cabinet on Oct. 23 formally sanctioned the Federal Wireless Co.'s contract, and that the United States Legation has been informed of the fact. The construction of the first station at Shanghai will probably be begun this winter. The Japanese Legation has again protested against the scheme on the ground that it violates the Mitsui contract of 1918.

Commerce Reports state that several attempts have been made at Shanghai to establish radio broadcasting stations, the first being that of the Radio Corporation of China, whose equipment was operated for a short time. A little later the Electric Equipment Co. installed a 50-watt set, the station being used ostensibly for experimenting and for demonstrating radio sets to its customers, and is still in service. Broadcasting programmes were next offered by the *Evening News*, a local paper, and by the Wing-On Co., Ltd., a large department store, which recently installed a station, but the right of these to continue has been questioned by the Chinese Ministry of Communications. Development has been retarded by the fact that the importation of radio apparatus was prohibited by the Chinese Government on March 30, 1923. This embargo was based upon the presidential mandate of April 18, 1915, article 1, which stipulates that all " telegraphs and telephones, whether wire lines or wireless, are called electric communications," and article 11 thereof states that " electric communications shall be operated by the Government."

Publicity is given to the following paragraph from an electrical contemporary regarding employment abroad to which the writer with some little personal knowledge of the subject would add the warning that no one should take service abroad either in government or public employ without some intimate information regarding the conditions which obtain and that information should preferably be acquired from an unbiased source. Views of graceful palm trees and white-clothed Europeans, *topee* and all, with coloured servants standing faithfully in the background do not represent *everything* connected with life as it really is in the tropics or the Near East. No photograph has yet reproduced the smells—fortunately ! Apart from these inconveniences, which one willingly accepts, there is that ostracism by one's fellow whites of the men who have insufficient money to keep up at least to a moderate standard of colonial amenities and custom. There is nothing more intolerable outside the mother country than to be so placed as to be outside the pale of European society.

Here, however, is the warning as regards India :—

" EMPLOYMENT IN INDIA.—In view of the unfortunate experience of a number of Englishmen who have recently worked their way out to India in search of employment and have been disappointed on their arrival, an official warning has been issued stating that it is highly undesirable for any Englishman to go out without first securing a definite post or having the prospect of pursuing a professional career."

GERMANY.—The name of the Berlin Wireless Oversea Communications Co. has been changed to that of the Transradio Co. for Wireless Oversea Communications. The chief object for the present was radio traffic with North America, although good prospects existed for the new company in connexion with the traffic with South America, where the station at Buenos Ayres was already experimentally in operation. The construction of the station at Rio de Janeiro was progressing.

INDIA.—It is generally understood that a radio telegraph company, formed for the purpose of erecting a high-power station in India, has been registered under the name of the Indian Radio Telegraph Co., Ltd. The capital of the company is three crores of rupees and the directors include Sir Purshotandas Thakurdas and Sir Ibrahim Rahimtoola, while *India Engineering* informs us that work is proceeding rapidly in connexion with the Madras-Rangoon scheme. All the necessary machinery and apparatus for converting the old Madras wireless station for this purpose have been received and the station has been temporarily closed down, while a new station at St. Thomas's Mount took over all traffic from Aug. 1. A large staff has been transferred to Madras from different centres in India for the purpose of supervising the reconstruction of the station. It is hoped that the new station will be ready to commence work well before the end of the year. Meanwhile the St. Thomas's Mount station has been in communication with ships at sea and with Port Blair since Aug. 1. The publication in question does not however, state if the Indian Radio Telegraph Co. is connected with the last-named scheme in any way or not, but it is gathered that there is no direct connexion between the two.

IRISH FREE STATE.—Radio-telephony in Ireland is now free of military restriction. The position at present leaves the whole control as regards permits, licences, and supervision, in the hands of the Post Office authorities, who explain that at the moment no licences will be issued to private individuals pending the termination of the negotiations in progress with regard to the formation of a broadcasting company in Ireland.

MEXICO.—Broadcasting was inaugurated by the local newspaper *El Universal* in September from a 500-watt station.

RUMANIA.—According to *Commerce Reports* business circles in Constantza are much interested in a projected radio telegraph plant. The present radio station at Constantza is used for little more than the distribution of shipping intelligence. Bankers and shippers generally want not only radio telegraph and telephone connexion with Western Europe, but also with Constantinople, Piraeus, and Odessa. The construction of such a station has secured the approval of the Ministers of Communications, Finance, and Industry and Commerce, and, with a certain supply of German material now on hand, it is expected that the enterprise will soon take definite form at a cost of approximately 800,000 lei. Private business men volunteered to make up this total, to be returned to them later in the remission of taxes. The only cable service from Constantza is over the former German cable to Constantinople.

SOUTH AFRICA.—*Commerce Reports* gives the very interesting information regarding the first broadcasting station in South Africa.

As the result of an offer made by Sir David Graaff to present Cape Town with a 6-kilowatt broadcasting station, together with all accessories, a special committee of the Council is now considering a scheme of municipal broadcasting. The Council is anxious to reserve for itself the privilege of broad casting for a period of 15 years. The equipment for the station will be furnished by the Marconi Co., of England, which will also supply the technical assistance to supervise its operation. With the exception of experiments made by newspapers, the Cape Town station will be the first permanent venture of its kind in South Africa. The Postmaster-General of the Union

of South Africa has issued comprehensive regulations governing broadcasting in the Union.

SIAM.—*Eastern Engineering* states that Marconi plant is to be used for the new permanent radio station on the island of Kohsichang, where a temporary installation is at present in operation. The latter will probably be transferred to Phra Pradaeng when the new set has been installed. A long-distance receiving and dispatching station is also contemplated for Bangkok.

The new cable steamer *Faraday*, belonging to Messrs. Siemens Brothers & Co., Ltd., of Woolwich, has returned from her maiden cable-laying expedition. She has successfully completed the laying of the section of cable connecting New York and Canso, Nova Scotia, about 1,000 miles, notwithstanding the fact that she encountered exceptionally bad weather, during which a mishap occurred to the cable, and the end was lost in 3,000 fathoms of water. The vessel here proved her excellent qualities as a cable steamer, as the end was recovered very quickly, and the whole section completed to the satisfaction of the engineers of the Commercial Cable Co., who have had it in continual use since laying. This section forms a part of the Commercial Cable Co.'s new cable connexion between America and England, which will have the greatest traffic carrying capacity of any existing cable.

THE ARCTIC CIRCLE.—The *Electrical Review* gives the interesting information that the trading posts which the Hudson Bay Co. maintains for communication with the Eskimos, well within the Arctic Circle, are to be a little less lonely than they have been. The two steamers which are taking stores north and will collect fur, are taking out a radio set for each of the principal stations. Hitherto all communication with the outside world has been closed for six months of the year.

The Brazilian Government has cancelled a concession granted to the Western Union Telegraph Co. on July 13, 1918, for the construction and operation of submarine cables from Nichteroy to the West Indies and from Nichteroy to Uruguay, on account of the failure to work them within five years from the date of the contract.

There is a possibility of a new cable communication between this country and the West Indies. In a statement which he made at the Imperial Conference, the Duke of Devonshire (Secretary of State for the Colonies) said that telegraphic communication between and with the West Indies had given rise to dissatisfaction for some time past. The question was discussed at the Conference at Ottawa in 1920. They had recently put before the Canadian and West India Governments concerned a scheme for an all-British cable from Turks Islands to Barbados, with subsidiary connexions by cable and wireless telegraphy to the other Colonies, which scheme had been accepted in principle by all the contributory Governments, and he hoped that it would be carried out during the coming year.

This scheme would afford an opportunity for an even wider measure of inter-Imperial co-operation than the existing arrangement for joint contributions to the West India and Panama Cable Co.'s subsidy. The proposed cable was to be laid and maintained by or on behalf of all the Governments concerned, and it was proposed to ask the Pacific Cable Board to undertake the management and control of the cables and radio stations which would be maintained under the scheme ; but the Board would have no financial responsibility in the matter. It is expected that a new chairman of the Board, in succession to the late Sir H. Babington Smith, will be appointed before the coming meeting, and the office, it is said, will be given to a publicist with experience in the Post Office department in charge of Imperial telegraphy.

The proposal for a submarine cable between Italy and America seems to be meeting with further set-backs according to the following paragraph which appears to be inspired by the Rome correspondent of the *Journee Industrielle* :

The Italian Submarine Cable Co., which holds a concession for the laying of cables between Italy and America, has informed the Italian Government that, although the company has raised the share capital of 200,000,000 lire, it cannot yet proceed with the laying of the cable between Italy and the Azores because the Portuguese Government has not yet granted landing rights. In order to hasten the establishment of the cable it is necessary for the company to obtain a concession for the latter purpose as soon as possible, and the company counts upon the intervention of the Government. It is asserted that the Portuguese Government is under the influence of the Eastern Telegraph Co., which is supported by the English Government, the English company apprehending that the projected Italian cable would cause a diminution in its traffic. It is added that the Italian company, in agreement with the Western Union Co., is now studying another route—Fiumicino-Malaga-Cadiz, or rather Fiumicino-Malaga-the Canaries, but a new law would be necessary to authorise this alteration in the route.

The Commercial Secretary at Rome has forwarded to the Department of Overseas Trade a copy of the technical program prepared by the Italian Minister of Posts and Telegraphs, from which the following item is excerpted as particularly interesting :—

"TELEGRAPHY.—A decree has been published notifying that, reserving to the State the right to set up and work telegraph lines for public or private use, the Government has liberty to grant to public bodies, companies, or individuals concessions (1) to work State lines, (2) to work multiple-system sectors on Government circuits, (3) to construct and work new telegraph lines for private or public use, and (4) to cede the ownership in circuits and State undertakings. The concessions are subject to numerous restrictions as to the kind of any new plant or extensions set up, methods of working, tariffs, &c."

Although much of the following from the *Financial Times* is not new to readers of these columns, the condensed recapitulation of events in connexion with post-war telegraph restorations should prove of considerable use for purposes of ready reference :—

"THE FAR EAST.—CABLE COMMUNICATION.—The restoration of direct service on the lines of the Indo-European Telegraph Co. to Crimea, Iraq, India, and the Far East was accomplished last month, so that just nine years after the outbreak of the world war the three main telegraph routes between Great Britain and the Far East are again in daily operation. They are the Great Northern, *via* Russia and Siberia ; the Indo-European, *via* Russia, Persia, and India ; and the Eastern and Eastern Extension, through the Mediterranean, the Red Sea, and the Indian Ocean. The American Continent is served by the Commercial Pacific cable from San Francisco, *via* Hawaii and the Philippines to Japan."

Humour mingled with pathos is revealed in the request recently made by the foreign telegraphist on an Anglo-German circuit : " Please London wait 20 minutes I go take my money it makes much time to count it sir."

Telegraph engineers from this country have many puzzling documents to pore over when dealing with native labour in the East and Far East. The Indian babu letter writer is notorious for the flowery and ambiguous efforts which flow from his pen, but I do not think that he has ever excelled the following copy of a letter, published by the *Electrical Review*, to an electrical engineer of the Gold Coast Government Railways from a native wireman under his charge :—

Seccondee.

DEAR SIR,

I beg most respectfully to induce before you this my humby Pettition, And I hope you will not fail to show your mercy to me, Please Sir one of my friend owes me Six Pounds fifth Shilling and four Pence been the money land from me but I got a letter at Presteah that the man is ready to franch land. Again the man who have stoled my money is the same place he too five Pounds ten shilling and two penneys I therefore beging your Pardon to try your best land one Pound five shilling £1 5*s*. 0*d*. that I may pay my Passage to go there this Saturday and I shall return back on Monday morning Please I don't know that the matter will come like that I send all my money at home nothing with me here naw. Sir I beg you to try your utmost best and do the same for me for God's sake but not for my own experience Sir hope this my humbly Pettion will convienced you to have mercy on me and fillfuled my desires. Ending with my best love. Thanks in anticipation.

Yours obediently J. A. Acquah.

For Armistice Day :—

There's but one gift that all our dead desire ;
One gift that men can give, and that's a dream,
Unless we, too, can burn with that same fire
Of sacrifice ; die to the things that seem ;
Die to the little hatreds ; die to greed ;
Die to the old ignoble selves we knew ;
Die to the base contempts of sect and creed
And rise again, like these, with souls as true ;

ALFRED NOYES.

J. J. T.

THE DIGGER.

How doth the busy "digger" man
Delight in Bodo troubles,
He revels in experiment
With "tec" he fairly bubbles.

He changes "trads," he changes keys,
The brushes oft reneweth,
And then, with Saturnine delight
His handiwork he vieweth.

He sings a "song" without a tune,
And to the relay jigger
Applies a stethascopic test—
Wise pathologic "digger."

He revels in a long "run in"
Appreciates it's beauty—
From his own curious point of view—
It tends to shorten duty.

He dearly loves to take a "third"
(I mean position—not a drink)
He doesn't mind a first or fifth—
Or any number he may think.

He fairly gloats o'er faulty "trads"
A speed fault is a source of joy.
He loves his Bodo "box of tricks"—
To him a scientific toy.

Then let us thank the Lord for this
Most interesting creature,
And trust that he may long remain
Of "Bodos" the chief feature.

F. C. (HULL).

THE NEW PHONOGRAM EQUIPMENT IN THE CENTRAL TELEGRAPH OFFICE.*

BY W. C. GRIFFITH (*Headquarters Traffic Section*).

THE rapid growth of the London telephone system in recent years has resulted in a corresponding increase in the phonogram traffic of the metropolis, with the result that the phonogram equipment in the Central Telegraph Office has been loaded to its utmost limit for some time past, and considerations of space alone have prevented the provision of new and increased equipment at an earlier date. These difficulties were, at least as regards the equipment under discussion, overcome in the spring of this year, when a fine room, 178 feet by 30 feet, on the first floor of the Central Telegraph Office was released for a new installation, which was commenced forthwith and was opened for traffic on Sept. 17 last.

Distribution of incoming calls is effected by means of a concentrator switch, the purpose of which is to extend a call on any of the incoming circuits to any disengaged phonogram telephonist.

The traffic has been divided into four main classes :—

(*a*) Outgoing traffic to subscribers. The necessity for separating the outgoing traffic will readily be seen. It is obvious that in so large a room the outgoing traffic must be distributed, in the first instance at least, to certain predetermined positions, rather than be scattered promiscuously all over the room.

(*b*) Incoming foreign traffic from subscribers. This traffic is often of a difficult character, and its circulation to specially experienced telephonists is desirable.

(*c*) Incoming and outgoing traffic from and to sub-offices which are delivery offices as well as collecting offices. This division has been introduced to overcome an old difficulty. Without some such arrangement it inevitably happened that on occasion a telephonist at an outgoing position made repeatedly unsuccessful attempts to secure connexion to a sub-office already engaged on a telephone-telegram call to an incoming position in another part of the Central Telegraph Office phonogram room. The system of separating this traffic from the general bulk is, therefore, designed to trace and make use of existing connexions for passing telegrams which arrive at the phonogram room for disposal during the progress of others for the same office. This traffic has been called " message " traffic.

(*d*) Incoming inland traffic from subscribers and all incoming traffic from sub-offices which are not delivery offices. (This comprises all the traffic not included in the other categories and is by far the largest class.)

* Paper read before the London Telephonists' Society.

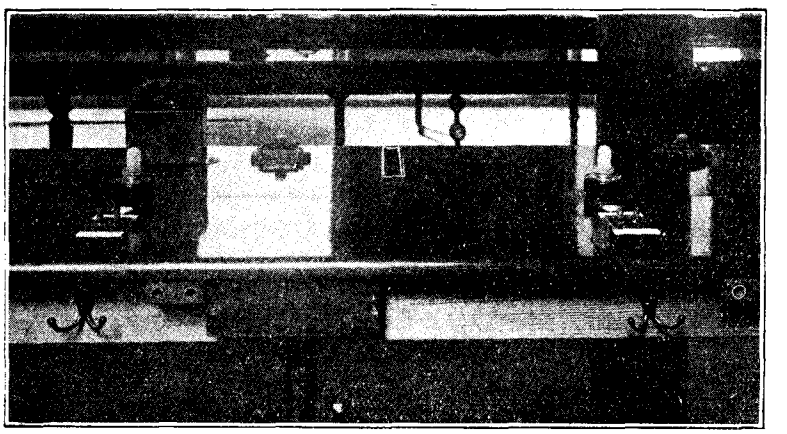


FIG. 2.—INCOMING POSITION.

Calculations based upon traffic records indicated that the following numbers of positions should be allocated to the traffic of each of the respective classes.

(*a*)	Outgoing Phonograms	42 positions.
(*b*)	Incoming foreign phonograms	8 ,,
(*c*)	Incoming and outgoing telephone-telegrams	21 ,,
(*d*)	Incoming inland phonograms	97 ,,

The great length of the room has enabled these positions to be arranged on long tables, which has greatly facilitated the provision of belts for distribution and collecting purposes. The general lay-out can best be illustrated by a plan.†

The utmost use has been made of belts for distribution and circulation. On the outgoing positions, a belt, at table level, has been provided along the first table, and across to and along the second table, so that a message placed upon the belt is carried successively before every telephonist at an outgoing position, and is picked off and disposed of by the first one who is disengaged. On the incoming positions the belt has been differently arranged, being placed below table level. A slot, like a letter box opening, has been provided on each incoming position and received telegrams are " posted " through this on to the belt. On the " message " table distribution by hand is necessary and no belt is provided.

The circulation in the Central Telegraph Office of the telegrams incoming to the phonogram room and outgoing from the phonogram room can now be traced. A telegram dictated by a subscriber is taken down at an incoming position on a form to which is attached a counterfoil for record purposes. This form complete is posted down the slot in the manner described, where it is carried along

† For photograph of the room, see page 11 of the October issue of this Journal.

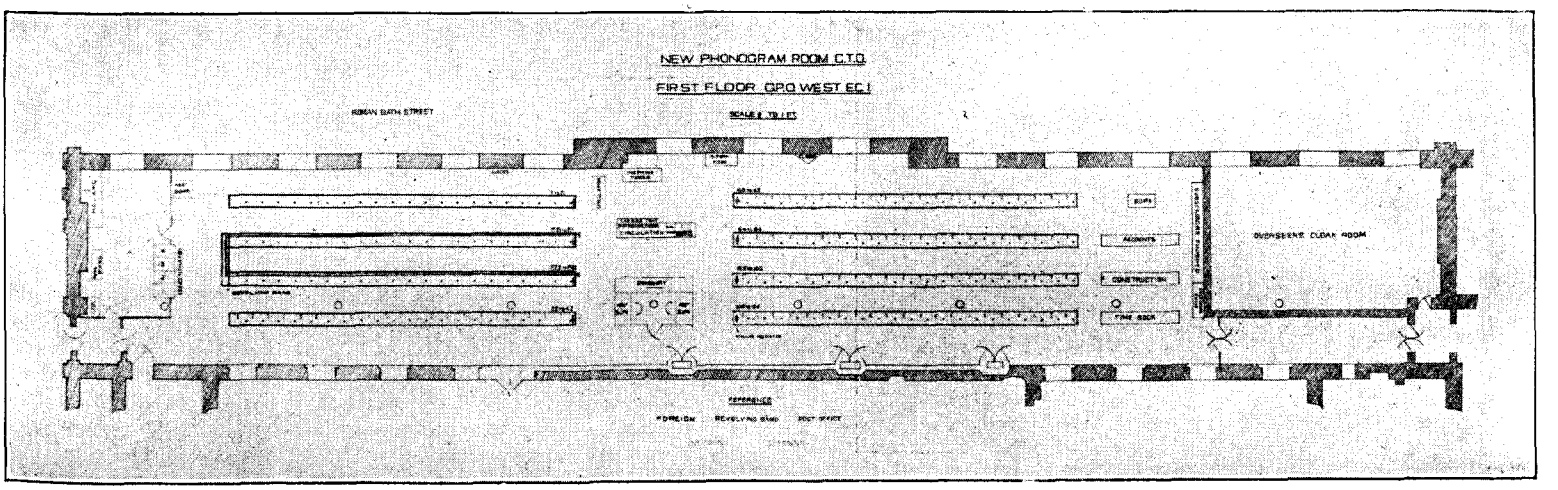


FIG. 1.—PLAN OF ROOM.

to the end of the table and discharged into a box. These boxes are cleared by a girl probationer, who places the telegrams on the circulation table at the numbering machine. The girl probationer in charge of this machine places the forms one at a time in the machine and turns the handle. The machine then—

Dates both form and counterfoil.

Puts a serial number on both form and counterfoil.

Detaches the counterfoil from the form and stacks it in numerical order.

Ejects the form, without counterfoil, on to the table.

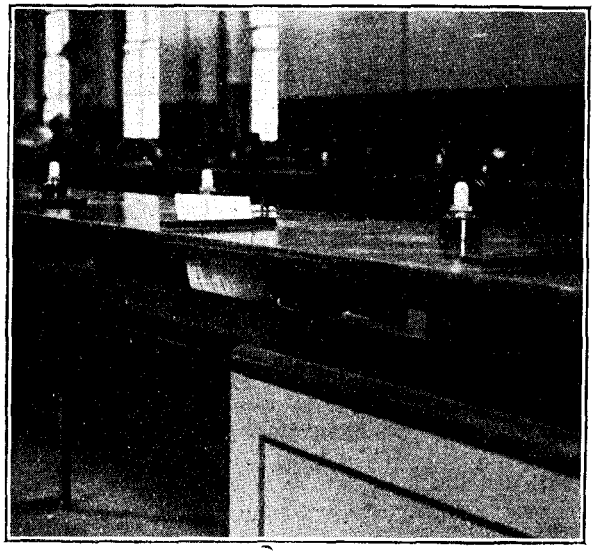


FIG. 3.—DETAILS OF BELT.

The form is then taken from the table by a circulation officer,* who must know the telegraph circuit over which each telegram must pass from the Central Telegraph Office and further, must know in what part of the Central Telegraph Office that circuit is situated.

* For photograph of circulation table, see page 11 of the October issue of this Journal.

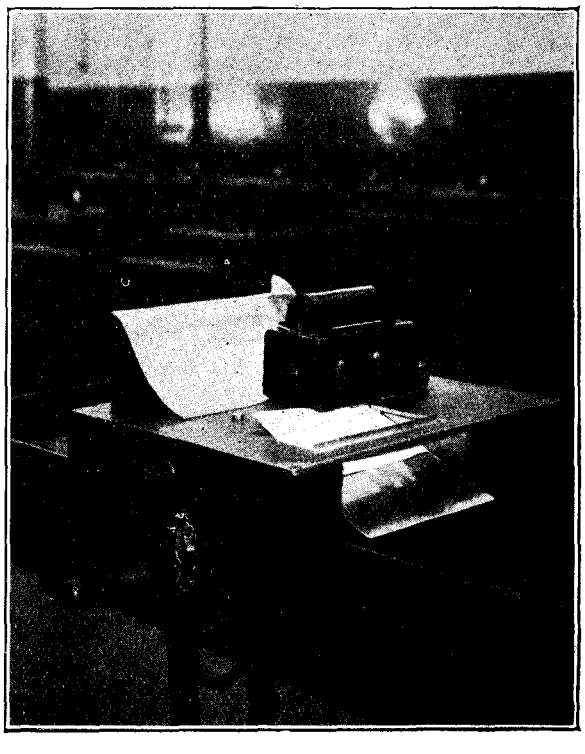


FIG. 4.—NUMBERING MACHINE.

For example, she must know that a telegram for Minehead must be telegraphed first to Bristol and that the Bristol circuit is in the N.E. corner of the third floor of the Central Telegraph Office. Each telegram, as ejected from the numbering machine, is then sorted by the circulation officer, according to its destination, into one or other of the pigeon holes labelled according to the various distribution points in the Central Telegraph Office. A pneumatic tube is provided between the phonogram room and each of these other distribution points in the office, and each pigeon hole is cleared periodically and its contents placed in a carrier and passed through the corresponding tube, where, on arrival, the telegrams are distributed to the appropriate circuits for disposal.

Telegrams for disposal from the phonogram room are similarly received from the other circulation points of the office by tube. On removal from the carriers they are separated into one or other of the following classes :—

(*a*) Telegrams bearing telephone numbers as addresses. These are placed direct on the belt on the outgoing table for distribution.

(*b*) Telegrams bearing registered addresses. These are passed to telephonists, seated at the first three positions on the outgoing table, who are provided with card indices of registered addresses showing the telephone number of each addressee. This is written on the back of the form, which is then put on the belt and automatically carried round the outgoing positions till removed for dictation by a disengaged telephonist.

(*c*) Telegrams, bearing full postal addresses, for delivery from sub-offices served by telephone. These are circulated by hand to one of the " message " positions on table one.

The system of associating successive telegrams for given sub-offices may be of interest. These telegrams are all disposed of from table 1, called the " message " table. At each of the 21

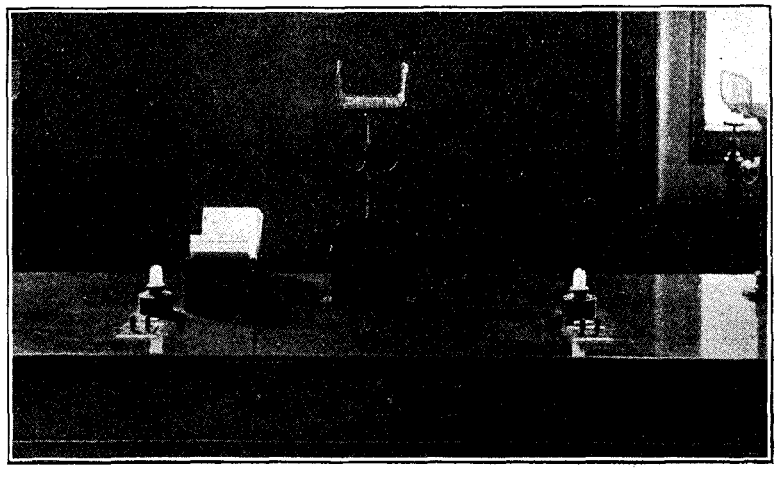


FIG. 5.—MESSAGE POSITION.

positions on this table is a card index containing a card for each delivery sub-office to which telegrams are passed from the Central Telegraph Office by telephone. These cards give the necessary information for disposing of the traffic—telephone number, hours of opening, etc. The name of the office is printed boldly at the head of the card and also on the back of the previous card in the file. The effect of throwing the cards in the box to refer to any one is therefore to exhibit the name of the office in question to the distribution officer moving along the back of the table as well as to the telephonist engaged with the message. The distribution officer having messages to distribute, therefore walks down the

table in order to see from the cards whether any position is already engaged with any of the offices for which she has messages, and distributes accordingly.

It will be seen that this system, as so far described, would associate successive outgoing messages with one another, but it would not, as it stands, meet the case when the sub-office originated the call. To meet this condition it has been arranged that sub-offices which are delivery offices shall ask for " messages " and not " telegrams." " Message " calls are routed *via* Central over a separate group, terminating on red calling lamps at the concentrator, where they are connected to a position on the " message " table in preference to an ordinary incoming position. It is then the duty of a telephonist at a "message " position on receiving, as well as on originating, a call from a sub-office to throw her cards to exhibit the name of the office to which she is connected. By this means outgoing telegrams from the phonogram room can be passed to any position already engaged with sub-offices concerned, irrespective of whether the original call was made from the sub-office or from the phonogram room.

The methods of handling the traffic having been discussed, the equipment and the operating procedure remains to be considered, and with this in view it will be convenient to trace from beginning to end an incoming and an outgoing call.

A subscriber desiring to dictate a telegram is instructed to ask for " telegrams." Such calls are passed to the phonogram room over circuits which are the equivalent of ringing junctions, and which terminate on the concentrator on lamps and jacks. Upon the concentrator key shelf are plugs and cords, each associated with an " incoming " phonogram position, and it is the duty of the concentrator telephonist to plug any cord into the jack associated with any calling lamp. This extends the call to a position and causes the calling lamp on the position to light. The position telephonist has two keys, each with three positions. The black key thrown from the vertical to the back or " speak " position, puts the calling circuit on to the telephonist's head set, extinguishes the position calling lamp, and the calling supervisory at the originating exchange. The telegram is now passed by the subscriber. If transmission is difficult the telephonist can eliminate side tone by throwing her red key to the back position, thereby cutting out her own transmitter. On completion of the telegram, the position telephonist restores her black key to the vertical position, thereby lighting the calling supervisory at the originating exchange, and, since the subscriber will have hung up, the " A " telephonist receives a double supervisory signal and clears. The clearing signal is not, however, given to the concentrator until the position telephonist pulls her black key to the forward position. This separate control of the clearing signal to concentrator is provided in order that a telephonist may prevent a further call being routed to her before she is ready to receive it, because, even though the call may have been completed, the telephonist may still have work to do in connexion with the message just received.

The system, therefore, provides for a clear to the exchange as soon as the conversation is finished, and a clear to the concentrator as soon as the writing is finished.

The clearing signal to the concentrator is a lamp on the key-shelf associated with each position cord circuit, and upon receiving this the concentrator telephonist takes down the connexion and the call is finished.

An outgoing call from one of the outgoing positions is precisely similar to an exchange call on a subscriber's circuit. The outgoing circuits terminate on subscriber's calling equipment at Central exchange, and the two positions of the key on each outgoing phonogram position correspond with the up and down positions of the subscriber's instrument switch hook. The throwing of this key therefore calls on an " A " position at Central, and calls are completed in the ordinary way. These calls do not pass through the concentrator.

There is, also, another class of outgoing call, that is, one made from an " incoming " position. Such calls are made to relieve the direct outgoing positions in times of pressure, or may be made to recall a subscriber who has just passed a telegram in order to clear up some point of doubt. To make an outgoing call from an incoming position the position telephonist pulls her red key to the forward position. This connects her to an order wire terminating on the head set of the concentrator telephonist serving her position. Upon the order wire she then asks for " Central on ——" naming the number of her position. The concentrator telephonist then inserts the plug of the position named into an outgoing Central circuit jack, thus connecting the incoming position with an " A " position at Central, and turning the incoming position temporarily into an outgoing position. The connexion is severed at the concentrator by a request on the order wire to disconnect.

Arrangements have been made to segregate foreign phonograms from inland phonograms in order that this difficult class of work may be handled by the more experienced telephonists. In order to achieve this, subscribers are being instructed to call " Foreign telegrams " when they desire to dictate telegrams for places outside the British Isles. Such calls are all routed *via* Central, and are passed thence to the Central Telegraph Office over a special group of circuits terminating on green calling lamps on the concentrator. On the concentrator key-shelf the plugs associated with the positions which are intended to handle foreign telegrams are similarly coloured green, and on the receipt of a call on a green lamp, a green plug is used to answer in preference to any other. If, however, no " foreign " position is disengaged, the call is extended to an ordinary position and not held over.

Provision has been made for dealing with enquiry work at a centralised position, staffed by telegraphists experienced in handling difficulties in connexion with phonogram work. For this purpose a three position enquiry panel has been provided, connected with both Central exchange and the phonogram room concentrator. Subscribers are being asked to call " telegrams enquiry " to make enquiries, and calls so made are routed through Central over the direct circuits to the enquiry desk. It not infrequently happens, however, that subscribers incorrectly ask for " telegrams " when they desire to make enquiries. Such calls are inevitably routed to an incoming position. On finding that the subscriber desires to make an enquiry, a position telephonist says " One moment, please, I will connect you to enquiries." The position telephonist then asks on her " order-wire " " transfer from —— (her position number) to enquiries." This the concentrator telephonist is able to do by means of double-ended cord circuits, specially provided, the answering cord being substituted for the position cord in the circuit from the exchange, and the calling cord being connected to a line from the concentrator to the enquiry positions. (It will be noticed that this transfer of cords will give a momentary calling supervisory signal to the " A " telephonist, but this is unavoidable.)

A desk for the chief supervisor and three desks for supervisors have been provided, equipped with inter-connecting lines and listening-in circuits.

A complete service observation equipment has been provided, and is being used to sample the quality of service from the subscriber's point of view. The information obtained will be published in as interesting a form as possible, and it is hoped that it will be possible to arrange for position telephonists to listen-in on the equipment at intervals in order that they may appreciate for themselves the subscriber's point of view.

In addition to the work upon " live " telegrams there is much to be done in connexion with telegrams which have been disposed of, *e.g.*, returns, confirmation copies and accounting, and suitable accommodation has been provided for this.

REVIEWS.

"Introduction to Wireless Telegraphy and Telephony." By Professor J. A. Fleming, M.A., D.Sc., F.R.S. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London. Price 3s. 6d. nett.

An excellent introduction to the study of wireless telegraphy and telephony, as might be expected from such an eminent scientist as Professor J. A. Fleming, to whom we owe the thermionic valve and the consequent developments in the art of wireless. Couched in simple language with references to other treatises for those who wish to pursue their studies in particular directions, it leaves one with a clear idea of present practice and future possibilities. Professor Fleming is justifiably enthusiastic as regards the future of the valve, especially the metal-capped variety, as an agent in high-power transmission; but, really, the wish is father to the thought when he claims that valve transmission is free from harmonics.

It is a matter of common knowledge that the London Broadcasting Station (a 1½ K.W. station) can be clearly heard on at least two harmonics, and greater difficulties are obviously experienced with higher power. The suppression of harmonics is still a matter for research; but the problem is a pressing one in view of the world desire for high-power stations, and it must of necessity be pursued with increasing persistency until success is achieved.

"Electrical Engineering Practice." By J. W. Meares, C.I.E., F.R.A.S., etc., and R. E. Neale, B.Sc. Hons. (Lond.), etc. Volume 1. Chapman & Hall, 11, Henrietta Street, Covent Garden, W.C.2. 25s. nett.

This book is a fourth edition of a well-known work. There will be two volumes altogether. The first volume has been written with great clearness, and evidently with the purpose of avoiding ambiguity, and doubtful interpretation. Cross references to paragraphs are used with much advantage, and excellent tables have been provided. Some fifty or so pages, dealing with electro-technical terms, afford, without padding, a fund of information for first year students, and others. The chapters dealing with power factor and protection of circuits, are examples of the thorough treatment accorded by the authors to their subjects.

Other chapters included in the volume are:—Materials; Instruments and Measurements; Generators and Accessories; Sources of Energy and Prime Movers; Power Plant Development and data; Water Power; Switchgear; Maximum Demand and Load Factor, etc., and Costs and Tariffs. The illustrations, especially in the chapter dealing with Instruments, are very clearly drawn, thus enabling the descriptions to be readily followed.

Two small errors are detected in paragraph 107 (*a*) where I (instead of Is) is stated to be equal to Ii R/S; and $I+\frac{R}{S}$ (instead of $1+\frac{R}{S}$) is stated to be equal to n.

A useful bibliography accompanies each chapter.

The book may be confidently recommended to those who desire to be acquainted with up-to-date electrical engineering practice, to most first and second year students, and to engineers generally.

"Principles & Practice of Wireless Transmission." By G. Parr. 5s. nett. Messrs. Benn Bros., Ltd., 8, Bouverie Street, E.C.

This is a short treatise intended chiefly for the guidance of the amateur experimenter proposing to use low power for wireless transmission and not well read in the science of electricity and magnetism as applied to electrical communications. It covers the ground and should prove of interest to those in need of such a general survey.

We do not think that it will appeal to any large extent to our technical readers whose knowledge of the science, if somewhat specialised at times, is generally sufficiently wide to enable them to assist their studies by the use of more advanced books.

ADAPTABILITY.

BY H. MORGAN (*Executive Officer, L.T.S.*)

SUCCESS in commercial undertakings frequently depends upon the measure of adaptability which exists in the establishment to changing circumstances, fluctuating exchanges, and uncertain markets.

In those branches of the Civil Service which deal directly with the public, and are revenue-earning, this factor has a very acute bearing also. The educational tests for Civil Service candidates are, therefore, framed upon this basis, and have proved the extreme value of a syllabus set with the object of adapting the candidate to varying departmental regime, and it is noteworthy that the upheavals and revolutionary happenings of the last few years have not prejudiced this principle or marred its efficacy.

In telegraphic and telephonic activities, adaptability is especially desirable, as the variable character of the work affords opportunity for the exercise of this faculty to its fullest extent.

One poem does not constitute a man a poet, neither does the spasmodic flash of genius reveal that constancy of effort which is the requisite of all who plod the path to success. This is exemplified by the frequent failure of the genius to turn to practical account the result of his ingenuity.

Adaptability reveals the striking difference which exists between the human automaton and the live and intelligent worker. The former is not greatly affected by circumstances, adverse or otherwise, his outlook being circumscribed. He has resigned himself to humdrum and like the metronome, has become exact and reliable, but with a going in which there is no music. The latter adapts happenings to his will, and becomes adept in overcoming difficulties incurred in the fulfilment of his duty. His, it is, to find rhythm and meter in the daily round, and thereby to enjoy a swinging optimism which gives dignity to drudgery and elevates the common task.

The genius is almost invariably unbalanced. Not that it follows as a *sine quâ non* that adaptability cannot be associated with him, but he is so acutely developed in one particular trait as to be impatient at suggestions which appear to cut across his ideas, or detract from their brilliance by modifications made for the purpose of rendering them practicable and profitable. Adaptability, then, implies all-roundness, and it is from this view point that departmental fitness is judged.

Engineering, Traffic, Accounting, Contract Development, &c., all have their quota of specialised duty, but the Clerical gradation meets all the requirements of the office routine and makes possible the adaptation of staff so that the particular end desired is reached satisfactorily.

This being so, it should be the endeavour of each officer to develop his, or her, section accordingly. Adaptability will then be apparent in the disposition of staff and the distribution of work in such manner as to ensure that each officer is placed upon that section most readily adapted to his ability, temperamentally and otherwise. In a word. the Controlling or Supervisory Chief must prove himself to be adept in adaptation if the maximum success and efficiency of the branch or department is to be obtained, and the officer who aspires to Controlling, Administrative or Executive authority, must cultivate the ability to adapt, and not overlook the fact that adaptability has as its synonyms :—accommodate, conform, suit, fit and adjust.

A CARLISLE AMATEUR'S EXPERIENCES OF THE ABERDEEN BROADCASTING STATION.

By R. BAXTER, *P.O., Carlisle.*

SWITCHING in on the London wavelength, the simultaneous broadcasting of the Aberdeen opening ceremony—speeches and the terminating strains of the bagpipes—were received at Carlisle with perfect volume and clarity. I understand that the effect would pass from Aberdeen to London by line telephony, and from London to Carlisle by wireless. I was careful to be certain that I was receiving the London station by wireless, and *not*, say, Newcastle or Glasgow.

This reception by wire telephony approximately 600 miles plus retransmitted wireless telephony 300 miles, total between 900 and 1,000 miles, must be rather unique, as the volume with2 valves was very good.

2 LO's time-gong at 9.30 p.m. was heard vibrating for approximately 20 seconds after the gong has been struck.

On the 10th inst. with no change of tuning, Aberdeen was heard from 9 p.m. to 9.25 p.m. ; 9.26 p.m. 2 LO speaking ; 9.29½ p.m. 2 LO counting ; 9.30 p.m. the gong note and continued vibration followed by the news bulletin. At 9.40 p.m., 2 LO said Stand by for local stations weather report, on which I heard him continue with the weather for the London area followed by the London Orchestra.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

TELEPHONES.

THE net addition to the number of stations in September last was 9,026, making the total stations in use at end of the month 1,099,613.

September completes, so far as new business is concerned, the most successful half-year in the history of the telephone service, the net increase, as will be seen from the appended table, being 72 per cent. higher than in the corresponding six months of 1922-23 and 13 per cent. better than in the half-year ended March 31 last :—

	Gross New Stations.	Net New Stations.
Half-year ended September, 1922 ...	74,076	29,457
Half-year ended March, 1923 ...	91,043	44,899
Half-year ended September, 1923 ...	100,209	50,580

That the lower tariff for private house connexions has contributed in some measure to this result seems certain, as with the addition of a further 2,634 circuits in September, the net growth in Residence rate lines in the half-year was 13,904, or 9%, compared with a growth of 20,545, or 5%, in the number of Business rate connexions.

Of the rural exchanges authorised under the revised conditions announced in May, 1922, in addition to those already existing, 42 were opened for service in September, and at the end of the month 272 of the 460 exchanges authorised were working, whilst engineering work was in progress on 179 other exchanges. The development in this branch of the service during the half-year was substantial, 187 exchanges, accommodating at the outset 2,370 new subscribers, having been opened.

The development of the Rural Party Line service has, to some extent, been arrested by the policy of establishing new exchanges in outlying areas on terms more favourable than those formerly offered. Notwithstanding this, however, the number of rural party lines increased during the half-year by 839 or 12%.

The net addition to the number of call offices during the six months ended September was 609, bringing the total up to 17,118. Of this number 523 are of the street kiosk type, the net addition thereto during the half-year being 103, or 25%.

Though the reduction on July 1 last in the call office fee has undoubtedly increased the user, the increase is not as yet sufficient to make up the loss of revenue involved by the reversion to the 2*d.* fee. Consequently, the receipts for the period July-September were some 20 per cent. lower than in the preceding three months.

Whilst there are still no signs of a marked increase in the calling rate, this, during the six months ended September, has been consistently higher than that for the corresponding period of last year. As also a record number of new subscribers has been added to the system in the past twelve months, it follows that an appreciably larger volume of traffic is being handled. This is also the case as regards the trunk traffic, which, in the five months ended August, was nearly 20 per cent. higher than in the period April to August, 1922.

Some statistics shewing the general development of the service in the current financial year are given below :—

	At April 30	At May 31	At June 30	At July 31	At Aug. 31	At Sept. 30
EXCHANGES :—						
London	99	100	100	100	100	100
Provinces	3,107	3,140	3,166	3,187	3,223	3,270
Total	3,206	3,240	3,266	3,287	3,323	3,370
STATIONS :—						
(1) Exchange—						
London	367,403	370,576	373,845	375,679	377,445	380,166
Provinces	657,734	664,527	670,068	675,992	682,706	689,047
Total	1,025,137	1,035,103	1,043,913	1,051,671	1,060,151	1,069,213
(2) Private—						
London	12,149	12,216	12,303	12,025	12,053	12,113
Provinces	18,753	18,632	18,573	18,451	18,383	18,287
Total	30,902	30,848	30,876	30,476	30,436	30,400
(3) Total Exchange and Private—						
London	379,552	382,792	386,148	387,704	389,498	392,279
Provinces	676,487	683,159	688,641	694,443	701,089	707,334
Total	1,056,039	1,065,951	1,074,789	1,072,147	1,090,587	1,099,613
PUBLIC CALL OFFICES :—						
London	3,808	3,817	3,838	3,836	3,842	3,854
Provinces	12,766	12,915	13,000	13,085	13,169	13,264
Total	16,574	16,732	16,838	16,921	17,011	17,118
PUBLIC CALL OFFICES IN STREET KIOSKS	432	451	474	492	506	523
RURAL PARTY LINES	7,038	7,221	7,379	7,537	7,675	7,755

Further progress was made during the month of October with the development of the local exchange system. New exchanges included the following :—

LONDON—Woodford.
Southall.

PROVINCES—Willenhall.
Ellesmere Port.

Among the more important exchanges extended were :—

LONDON—Streatham.
Hammersmith.
Hornsey.
Dalston.

During the month 35 new overhead trunk circuits were completed, and 91 additional circuits were provided by means of spare wires in underground cables.

The
Telegraph and Telephone Journal.

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

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. X. DECEMBER, 1923. No. 105.

A LOOK FORWARD.

LIKE a distant cloud of uncertain shape and direction bearing with it one knows not what promise of blessing and fruitfulness, or fading and dispersing with no benefits at all, is the vague "feeler" or suggestion or hope put forth in the Press recently that wireless broadcasting might include within the scope of its programme of entertainment and instruction the debates of the House of Commons. We have neither the knowledge nor the desire to assume the part of weather-prophets in this interesting connexion, nor do we believe that any prognosticator or amateur in omniscience is or can be in a position to furnish an enquiring public with a forecast of so nebulous a prospect. But it is, it must be confessed, a most intriguing one.

Admittedly great results spring from small causes. By this last term, of course, we do not designate an epoch-making discovery such as wireless telegraphy and the trans-continental and trans-oceanic services which have been successfully developed to the great benefit of mankind. We refer rather to what had its origin as an interesting side-line of that great invention, namely, the participation of the general public in its wonders by that development known as broadcasting. Beginning with the transmission of musical and other entertainments to all and sundry who could contrive to possess an inexpensive "set," the broadcasting organisations extended their programme to include important speeches and lectures, whilst at the same time raising the level of their musical programmes and giving occasion to some cleavage in the ranks of the listeners, and to some asperities between the High-brow and Low-brow factions. But to those who watch with anxious curiosity the signs of the times the development foreshadowed has a greater significance than the relative importance of classical and popular music, of opera or musical comedy, of instructive lectures or humorous stories. What if this handmaid of a new means of communication should develop from a mere concert-singer or chorus girl into some sort of Joan of Arc and protectress of the liberties of her country? The idea is not so fantastic as it might appear at first blush. No one can foretell the limits of newspaper combination of which we have seen the beginning, or foresee how far in coming decades public opinion will be in danger of being moulded by one or two voices, and how far the nation will have to rely for its knowledge of what takes place in Parliament upon much compressed summaries and one-sided selections. The average man does not read Hansard, but he is rapidly becoming a "listener-in," and if the House of Commons reports were broadcast he need lose nothing of an important debate. He would be enabled to follow those debates, often of great interest, which are not commonly reported, and hear in full those of national importance, undiluted by a process of "unnatural selection." It is not extravagant to argue that this privilege would, in certain circumstances by no means unthinkable, be an invaluable one and not the least of the benefits which wireless telephony has conferred on the world.

HIC ET UBIQUE.

THE Chairman of the Hull Corporation Telephones Committee in expressing his satisfaction with the result of an excellent year's working, said that Hull was the best telephoned city in the country with one telephone for every 23 inhabitants. It is, however, behind London with 1 to 19, and Cardiff with 1 to 22.

THE hope expressed at first of replacing Government telephone service in Italy, says the *Financial Times*, by that of a single big company has been discarded in favour of giving concessions to several companies and for a certain area. This should be a factor for competition in the tenders, which will be based on the highest annual fee offered to the State, quickness in introducing new technical material for the existing lines, and in carrying out the extensive programme approved by the Government to increase existing facilities for telephone users and linking up places still without telephone service.

The concession to several companies will not, however, leave them entirely free to adopt the material they choose; a certain standardisation will be necessary in order to provide interworking facilities. They will also be subject to Government control for both technical and administrative branches. Regarding management, the Government policy is not to interfere at all. The annual fee is 5 per cent. of the gross revenue, and in cases where dividends of over 7 per cent. are distributed a further sharing in the profit is to take place. The concessions are to be made without any time limit, but for not less than 25 years, with the Government's right to take over the lines at any time at a year's notice. Such right may, however, be postponed in the contract to after 15 years from the time of the convention. The Government would also reserve the right to purchase the share capital of the company at the average quotation during the preceding five years at the bourse of the registered offices.

As soon as the Government's intention was made known a syndicate was formed by a group of Italian financiers and representatives of electric interests and the Western Electric and Siemens companies, the participation of these companies being made necessary as their patents are mainly used in Italy.

THE New Zealand Telephone Administration has decided that flat rates are best suited to the needs of the Dominion, and by an Order in Council, dated Sept. 17, 1923, has fixed the rate for towns with more than 3,500 subscribers at £15 per annum for business premises, and £8 10*s.* for residences. There are correspondingly lower rates for two and four-party lines. The rates for smaller places range from £11 (business) and £7 10*s.* residence to £8 and £6 respectively, but at the exchanges containing 50 and 100 subscribers the attendance per day is limited to eight and fourteen hours, which detracts notably from the benefits of the service. When a subscriber's service necessitates for its provision the erection of more than one pole on private roads or private property, such additional poles must be supplied, erected and maintained at the cost of the subscribers.

ACCORDING to *Commerce Reports* work is in progress on the Koenigsberg-Libau cable, which, when completed, will put Berlin in direct telephone communication with Riga. It is expected that the circuit will be in operation within the next two months.

EVOE in *Punch* has been studying the rules for passing and receiving telephone calls, and has apparently acquired the correct pronunciation of the numbers. He says :—

Charles Copplestone rang me up the other day, and said that he was going to give a lecture, and wanted to quote one of Wordsworth's poems in it.

"Very nice too. Which one ?" I said.

"It's that one about the little child that lightly draws its breath," he said. "I can't find my Wordsworth, and I don't remember how it goes."

"I think I could manage to quote it to you now," I said, "even without the book."

I got on very well for the first three verses, but after these I found myself confronted by a difficulty. It is unthinkable to quote Wordsworth without making him scan. Nothing, on the other hand, will cause me to disobey any sort of edict from the Postmaster-General. I was obliged, therefore, to go on like this :—,

"Sisters and brothers ! Tell me then
How many may you be ?"
"How many, Sir ? We are sev-*en*,"
She said, and looked at me.

"And where are they, dear kid ?" I cried.
"Sev-*en*," she said, "are we ;
"And too-oo-oo at Conway bide
And too-oo-oo at sea." . . .

"Too-oo-oo-oo at Conway roam,
And too-oo-oo at sea,
Yet still ye are sev-*en* ? Now come,
Sweet maid, how can this be ?"

Then did the little maid reply,
"Sev-*en*, sev-*en* are we.
Too-oo-oo-oo in churchyard lie
Beneath the yew-tr-r-r-ree."

"You run, my little maid, around,
Your limbs are full of life.
If too-oo-oo are underground
Then ye are only fife."

It practically spoilt the thing.

A BELFAST evening paper reporting a lecture by Mr. Rupert Stanley, B.A., LL.D., M.I.E.E., on "The War and Wireless," says :—

"Probably the first real step was in 1838, when Professor Henry made his discovery that a LADEN jar CONDENSOR, under certain conditions, would OSCULATE. In 1853 Lord Kelvin worked out the mathematical conditions under which that OSCULATORY discharge took place."

We have heard of jars as a result of osculatory discharges not generally as a prelude ; and we had imagined that the conditions were not altogether in sympathy with mathematics. But we live and learn !

JUDGING from a discussion in the columns of the *Birmingham Mail*, the British Broadcasting Company's efforts to meet all tastes are not altogether appreciated by those not interested in classical music or in cased or winged insects. We quote some extracts :—

"There is such a thing as light comedy and broad-minded humour. Granted, it would not suit the highbrow, but it would be a welcome change to "Showpan" and "Vargner."

* * * *

"Lecture on Baxter prints, moths and beetles, &c., do not interest the masses, who can get full details of the latter in book form free of charge from Keatings."

We do not know whether to admire or deplore this correspondent's attempt to give a gratuitous specimen of his ideas of light comedy and broad-minded humour.

THE following wail from an earnest wireless experimenter was found in official correspondence :—

"I may add I seldom have the same circuit fixed up more than a fortnight. Just long enough to compare notes with my friend with whom I work, and sometimes my set is at his house and sometimes his at mine as our female relations offer strong objections to our doings."

Blame for the fair sex ! our inheritance from the ages, for, did not Adam say "she gave it to me and I did eat."

DIARY, DECEMBER, 1923.

Dec. 5.—INSTITUTION OF ENGINEERING INSPECTION.—Morning Visit to the Inspection Dept., Royal Arsenal, Woolwich.

„ 7.—LONDON TELEPHONISTS' SOCIETY.—Competition : Impromptu Debates (arranged by Mr. Horace Dive). "The Subscriber *v.* the Information Desk, Y.M.C.A. Lecture Hall, 186, Aldersgate Street, 6.30.

„ 13.—INSTITUTE OF PUBLIC ADMINISTRATION.—"The Psychology of Communications," by Mr. John Lee, M.A., Great Hall of London School of Economics, Houghton Street, Aldwych, 6.

„ 13.—INSTITUTION OF ENGINEERING INSPECTION.—Evening Meeting at the Society of Arts.

„ 17.—P.O. TELEGRAPH AND TELEPHONE SOCIETY OF LONDON.—"The Significance of State-owned Telephones," by Mr. W. Day, M.I.E.E., at Institute of Electrical Engineers, Victoria Embankment, 5.30.

„ 20.—INSTITUTE OF PUBLIC ADMINISTRATION.—"Some Public Servants in Fiction," by Mr. H. Wolfe, C.B.E., Old Council Chamber, L.C.C., Spring Gardens, S.W.1, 6 p.m.

OBITUARY.

Mr. H. Dear, Secretary's Office.

It is with deep regret that we record the death on Nov. 15 of Mr. H. Dear, a staff officer in the telephone branch of the Secretary's office. Mr. Dear, who was only 46 years of age, succumbed to collapse after undergoing an operation. He entered the service in 1896, became a clerk in the Secretary's office in 1903, and reached the position of staff officer in 1922. He leaves a wife and young daughter.

An indefatigable and conscientious worker, Mr. Dear's mind was a storehouse of telephone knowledge, and, the possessor of a comprehensive and retentive memory, he was never at a loss for the genesis of a rule or for the reason which prompted the decision in this or that case at some far-off date. On all sides, therefore, he was accounted a valuable ally, while to the novice he was a patient and painstaking tutor ; and his place will be hard to fill.

But besides this, he had a quiet, modest manner which won for him the regard and esteem of all who knew him ; and to his colleagues the tragedy of his untimely end will long remain a mournful and regretful recollection.

WIRELESS TELEPHONY.*

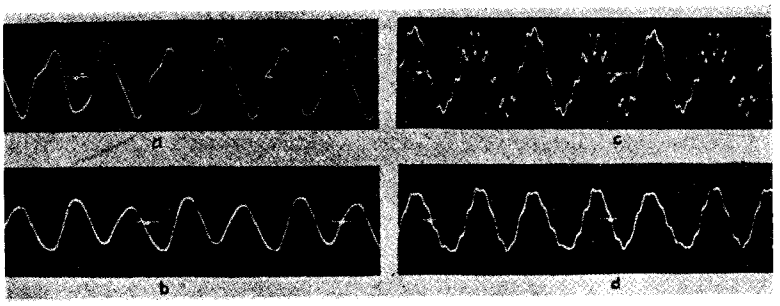
BY E. H. SHAUGHNESSY, O.B.E., M.I.E.E., M.I.R.E.

TO-NIGHT I want briefly to run through what is involved in wireless telephony, and, for the purpose of that, I shall first of all start by reminding you of the changes which take place in ordinary telephony.

In the case of an ordinary telephone line, when one speaks the mechanical motions of the mouth, tongue, teeth, &c., produce sound waves. These strike the diaphragm and impart energy to it; the diaphragm, pressing backwards and forwards on the carbons, changes the resistance of the circuit in which it is placed—these changes produce changes in the current, which changes are sent along a line. At the far end they are passed through an electro-magnetic which produces changes in a magnet field, and those produce changes in the actual position of the diaphragm, causing it to vibrate. Changes in the outside air are produced and sound waves come to the ear where they are detected.

Exactly the same processes are involved in wireless telephony, but one needs to realise even in a land line—even in this simple form of telephony—the number of these changes that take place, because at every one of them

BUREAU OF STANDARDS CIRCULAR NO. 112.



Wave forms of vowel sounds o͞o and e͞e intoned by two baritone voices:

(*a*) o͞o as in gloom. Voice A. (*c*) e͞e as in bee. Voice A.
(*b*) o͞o „ „ Voice B. (*d*) e͞e „ „ Voice B.

FIG. 2.

BUREAU OF STANDARDS CIRCULAR NO. 112.

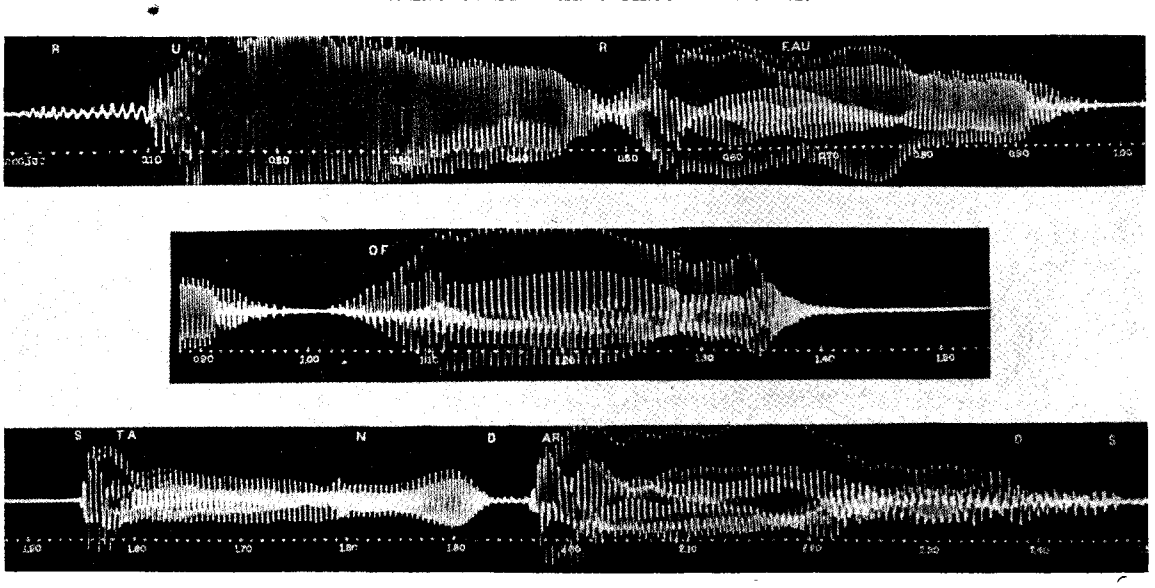


FIG. 1. WAVE TRACE OF THE WORDS "BUREAU OF STANDARDS."

there is the possibility of some distortion. There is even the possibility of distortion at the very origin. All people do not speak clearly. Then there is liability to distortion at any stage, either mechanical or electrical, due to some weakness in the precise design of the part involved.

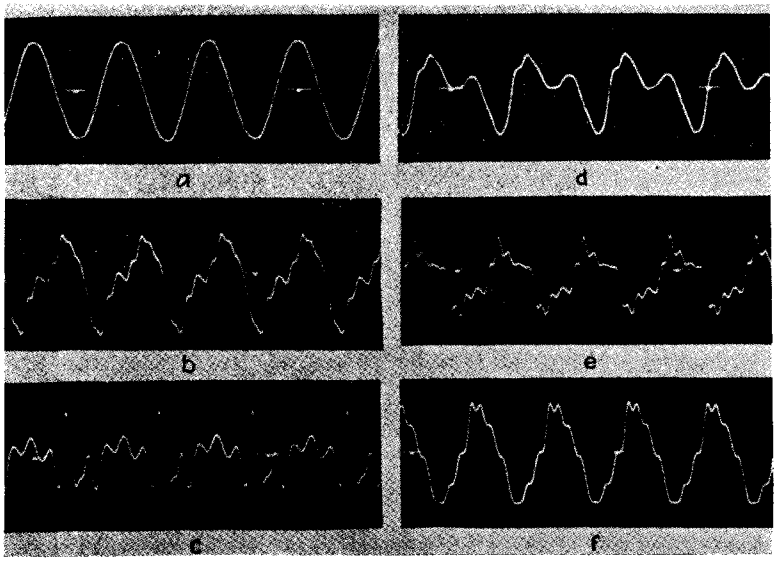
Fig. 1 indicates what will happen when someone speaks and the sound waves produced by that speaking are caused to make a diaphragm vibrate. The curves show how the diaphragm vibrates up and down a varying amplitude when the words "bureau of standards" are said. Now that is for ordinary speech. Other curves of this nature as shown in Fig. 2, indicate the variation of different voices. If we take someone saying the "oo" in gloom, we get one sort of a curve. The next person that says "OO" in the same word produces all those wobbles on the otherwise almost uniform curve to the left. If we take E as in "bee" with the same two voices, you will see there is a marked difference between the effects which these sound waves produce on the vibration of a diaphragm, and that shows you that even with ordinary voices there are very big differences for the same sound, yet ordinary land line telephony is supposed to be able to transmit and to reproduce those perfectly.

Fig. 3 shews a series of curves which show the same note, causing the diaphragm to vibrate but from different sources. (*a*) is from a tuning fork, (*b*) is the same note with a violin, (*c*) is the oboe. The difference produced is remarkable. It is possible to get all these notes going together in an orchestra; hence, in music transmission, one diaphragm has to vibrate in accord with all these waves at once.

It is clear from these curves that these fundamental oscillations have fluctuations superposed on them, and these are, at the rate of from perhaps 600 or 700 per second to two to three thousand per second. That is quite a slow rate, and, despite that rate, we find that when telephony is used over a very long line, quite a lot of the quality of speech is lost, and, further, one can make up lines over which you cannot possibly speak. We do not provide

* Paper read before the Telephone and Telegraph Society of London, Nov. 19, 1923.

BUREAU OF STANDARDS CIRCULAR NO. 112.

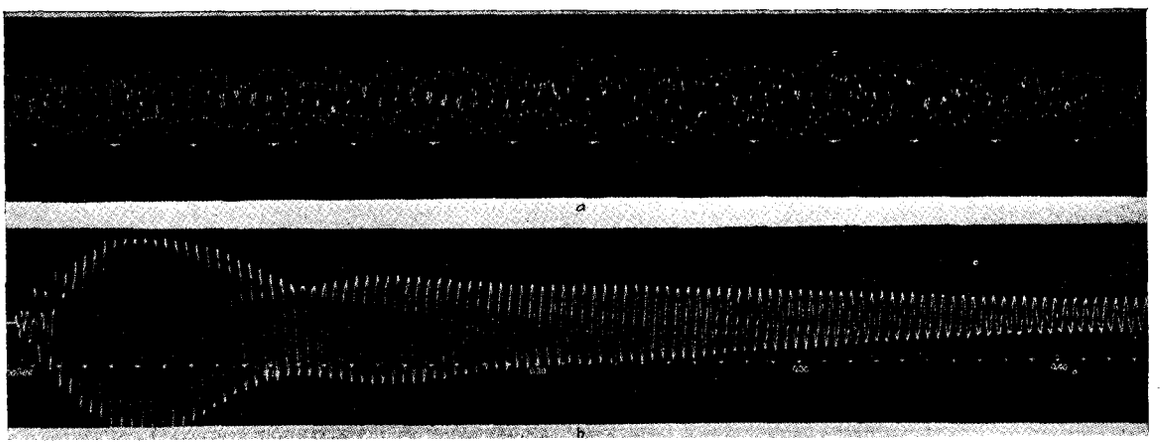


Wave forms of musical sounds—middle C pitch.

(*a*) Tuning fork. (*d*) bass flute.
(*b*) Violin. (*e*) Clarinet.
(*c*) Oboe. (*f*) Clarinet—overtones not so loud.

FIG. 3.

BUREAU OF STANDARDS CIRCULAR No. 112.



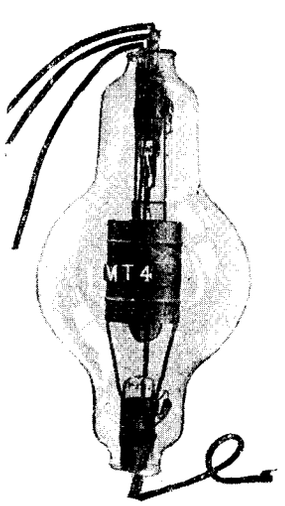
WAVE FORMS OF MUSICAL SOUNDS.

(*a*) Seven-inch dinner bell of extra good quality. (*b*) Piano string—Middle C pitch.

those for the public ; they are only for experimental purposes ! In ordinary telephony, when sending these various speech oscillations along the line at about a main frequency of 800 per second with fluctuations of two or three thousand per second superposed on them all these oscillations do not pass along the line with the same degree of loss per mile of line. One attempts to design the line to provide that effect as well as possible, but the higher frequencies diminish in amplitude more than the fundamental frequencies. I have run over these points in order to give you some slight idea of what is involved in ordinary telephony as the problems of wireless telephony are exactly the same.

If you consider the larger number of transfers and change of energy and the changes in the frequency and nature of the oscillations produced by the sources which give the sound, it is marvellous that you get any speech whatever even on a land line.

In wireless telephony it is first necessary to produce oscillations in a circuit,—oscillations of electrical energy backwards and forwards round a circuit, and these oscillations must be of very high frequency. (Oscillations of 2,000 per second would not be in any way effective.) These oscillations must then be transferred to an aerial. Let us consider that a current is sent up an aerial and is made to stay there for a moment. As it goes up it produces a magnetic field which extends for a very large distance beyond the aerial. Now, if you stop that current that field, which represents a certain amount of energy, collapses back on to the aerial, and the field will all collapse back on the aerial if this is done slowly. In order to get radiation you must put the current into your aerial, stop it and put another one in before all the energy of the field has time to collapse. Thus, a little bit of energy is thrown into the ether at each oscillation, that is how you get radiation. In order to get these bits of energy thrown off an aerial you must get the frequencies of the order of at least 20,000 per second, but generally the frequencies for telephony are nearer the order of a million per second.



THERMIONIC VALVE.

Now, the first thing we have to do is to find a means of causing our electrical energy from current to surge up and down an aerial at sufficiently high rate to produce this radiation or throw off of energy from the aerial. To do that in telephony, the usual way is by means of a valve—a thermionic valve.

A transmitting valve consists of three parts. One is the plate, which is really a metal cylinder, the second is the grid and is a round cylindrical metal mesh separate from, and inside, the metal plate, and disconnected from that is the filament. These three items are embraced in a glass container from which all the air has been withdrawn so as to get the highest possible vacuum. The filament can be lighted, and the grid is between the plate and the filament. If, while the filament is hot, a battery is placed between the plate and that filament, there is a flow of current through the valve, and the value and strength of the current is dependent upon the voltage you apply to the grid. If you put a positive voltage on the grid, you will get a large number of electrons or a large current flowing between the plate and the filament, and if you put a sufficient negative voltage on the grid the current between the filament and plate can be stopped entirely.

Oscillations may be produced by valves. The valve contains the filament, the grid and the plate. The filament is heated by a separate battery. There is no battery on the coil attached to the grid, but there is what is termed the high tension battery passing current through the anode coil to the plate. That high tension battery is tending to send the current across from the plate to the filament. One of the characteristics of a valve is that it amplifies weak signals. If a weak signal is thrown into the grid coil so as to tend to send a current between the filament and the grid the effect of that current will be either to increase very greatly, or to reduce very greatly, the current flowing to the anode circuit.

Now, when you have these grid and anode coils brought close to each other so that they are what is termed magnetically coupled to each other, the arrangement will produce continuous oscillations of current. That is a simple way of producing oscillations, but there are other things to be done before we produce distribution of wireless telephony.

If a stone is dropped in the water a " bump " is produced. The bump travels away, and it will always be observed that the wave goes along the surface of the water. The main feature, however, that should be observed is that the passing of the waves causes a float in the water to rise and fall, but not to move laterally in the direction of the waves. That is an indication of the existence of waves—in other words the waves will pass along without any actual motion of the water in that direction ; it is a vibratory motion which is imparted to the particle of water themselves. The same thing happens when two aerials are used. If you have an oscillator which is sending high frequency, current surges up and down the aerial at a very high rate, and you will have waves produced outside the aerial. You have oscillations in the aerial and these produce waves in the ether outside which traverse through the ether, and on striking another aerial cause currents in that aerial to bob up and down.

The waves dealt with for wireless telephony are continuous waves. Continuous waves are produced by oscillations in the aerial which are uniform in amplitude and each oscillation is a replica of the one immediately preceding.

When you get uniform oscillation in the aerial you will produce continuous waves outside the aerial.

(*To be continued.*)

THE AUTOMATIC TELEPHONE.

WE reprint from the *Nation and Athenaeum* the following interesting and explicit account of projected automatic developments.

Professor Fleming, at the Royal Institution, described the automatic telephone as the nearest approach, in the achievements of machinery, to the human brain. That is high praise from a specially responsible authority. When we read that this method of connecting one telephone "subscriber" with another is about to be installed in London, that it will include one million "subscribers," that it will take fifteen years to complete the task, we may well stand in awe at the prospect. Yet the central principle is not difficult to comprehend, and it is worth while to try to expound it. As a preliminary, the word "subscriber" deserves some elucidation. It takes us back to the time when a telephone system was a mutual affair which only served those who combined together to maintain the system financially. It has stuck to telephony down to this day, though the persons who use the telephone system have become customers rather than "subscribers" in the early sense. With automatic working the mutuality is emphasized in another way. The persons who propose to use the telephone must do their own operating. They are provided with a little machine for this purpose. It is a simple machine. By means of a rotating disc it sends out impulses according to the numbers required, so many for thousands, so many for hundreds, and so on.

What happens to the impulses? They find their way to what we have been pleased hitherto to call an "exchange"; but with the automatic system there need not be a centralized exchange at all. That is, the apparatus for the selection can be separated into different units. The impulses arrive on a relay and attract an armature, in turn connected with an upright rod attached to a revolving brush. On this rod are two types of notches, one type to raise the rod perpendicularly and the other type to move it horizontally. The first sequence of impulses raises the rod (and the brush) perpendicularly; the second sequence moves it horizontally. On the inside of a semicircular upright plane are rows of terminals, and the rod moves up to the required row and round to the required individual connexion within that row. From that connexion its seeks the tens and units assembly, and precisely the same process is repeated.

Now, this seems to presume that at the operating end all this apparatus is connected with the line ready for the caller's command. So it was in the first exchange in Chicago. But a practical scientific mind came along and discovered that all that was needed was a complete unit of the apparatus for a number of "subscribers." Every telephone "subscriber" is not speaking or wanting to speak at the same time. So several types of apparatus have been devised, enabling the plant to be available at any moment to any one of a number of "subscribers." It was this economy provided by several ingenious methods, which brought the automatic telephone within reach of practical finance. Other cunning devices followed. There are arrangements for call-boxes, for notifying that a line is engaged, for selecting any one of several "subscribers" grouped on a common line, and so forth. All sorts of brains have been effectively used on this approximation to a human brain.

But, someone says, is it really the fact that a London user of telephones will need seven digits? It will be pointed out that none of us can remember so many as seven, that there will be errors untold between reference to the directory and making the demand. So for London and other vast cities an adaptation has been made whereby letters will take the place of the first three of the seven digits, leaving the four figures to which we have long been accustomed. The letters are to be grouped, three to a symbol; and by careful allocation it can be so arranged that the first three indications of the required number will never be the same for different exchanges, nor that any one of the three letters attached to a particular indication will ever be used without regard to the associations of the other two. Thus a number 1674336 may become "Far 4336," and by that means be more readily within mnemonic range. There are other details of applicability to London which are more technical in their explanation, largely due to the complications of relationship between automatic and manual exchanges in the transition stage and to the special difficulties of what may be termed an abnormally large unit area with necessarily varied cross-connexions.

With this outline we may conceive of the telephonic London of the future as a vast human brain with a million nerves from its centre to a potential million human brains. It is a wonderful conception. It has philosophical and psychological aspects. It has aspects of unification of the civic sense which can only be imagined, and may operate very differently from our calculations. The human operation will be needed for the more complex connexions with the outskirts of London, and with even more remote localities. Nevertheless, so far as can be foreseen, there is no reason why the many millions of inter-connexions which will be required by a million "subscribers" within the unit district of what then will be London should not be completed by the machines.

OBITUARY.

Mr. Robert Bruce Macauley Audsley.

It is with deep regret that we have to record the death of Mr. R. B. M. Audsley, Traffic Superintendent, Rochdale, in his 56th year. Although he was only appointed to the Rochdale District in August, 1920, he was extremely popular with everybody and a highly respected colleague and friend. Unfortunately, his health was sadly impaired when he took up his appointment at Rochdale. During the course of a lengthy illness, he retired from the Service on March 31, 1923. In all, he had 30 years' service, first with the National Telephone Company, and later in the Post Office.

As a young man he served in H.M. Army in one of the Regiments of the Hussars, spending some considerable time in India. He entered the service of the National Telephone Company in 1893 as Complaint Clerk, passing on to Keith as Local Manager and later accepting a similar position at Paisley. In October, 1912, he was appointed Assistant District Manager at Galashiels, and August, 1914, found him established in the Scotland West district as Assistant Traffic Superintendent, Class I.

In spite of a heavy handicap, Mr. Audsley was always willing to enter into the social activities of the staff. Probably his work in establishing "Boys' Brigades" in the districts he was situated in, absorbed most of his available time and constituted his chief recreation.

He was one of the pioneers of a movement which has developed so amazingly during the last 20 years.

Mr. J. A. Franey.

All the members of the staff of the London telephone service will be grieved to hear of the death of their late colleague, Mr. J. A. Franey, which took place on Nov. 22 in his fiftieth year. Mr. Franey entered the service on May 16, 1904, but the disease to which he at length succumbed soon became apparent, and his last year in the service previous to his retirement in July 8, 1920, were years of suffering borne with a fortitude and cheerfulness which confirmed the admiration and respect in which he was universally held at the headquarters of the London telephone service. Mr. Franey was made an Assistant Superintendent of Traffic in 1917 and bore his full share in the great development of work and the various re-organisation schemes thus necessitated, which have marked the progress of the telephone service since he entered its ranks.

LARGEST STROWGER PRIVATE BRANCH EXCHANGE (AUTOMATIC) COMMENCES SERVICE AT NEW LONDON COUNTY HALL.

650 INTER-DEPARTMENTAL TELEPHONES.

THE public interest evinced in the completion and formal opening by H.M. King George of the New County Hall, Westminster, the magnificent headquarters of the London County Council, has been again revived by the recent completion and cutting into service of an extensive Strowger Automatic Telephone installation in the same building. This constitutes the largest private Strowger Automatic Telephone Exchange in Great Britain.

The building (see Fig. 1), the foundation stone of which was laid by the King in 1912, may claim to be considered one of the finest in the world, and in all respects worthy of the part it plays in the life of the leading city of the Empire. It was designed by Ralph Knott, whose design was selected from one hundred submitted. It is in the English Renaissance style and is located on the south side of the Thames, on which it has a frontage of 700 feet, almost opposite the Houses of Parliament. The cost of its erection was three and-a-half million pounds sterling.

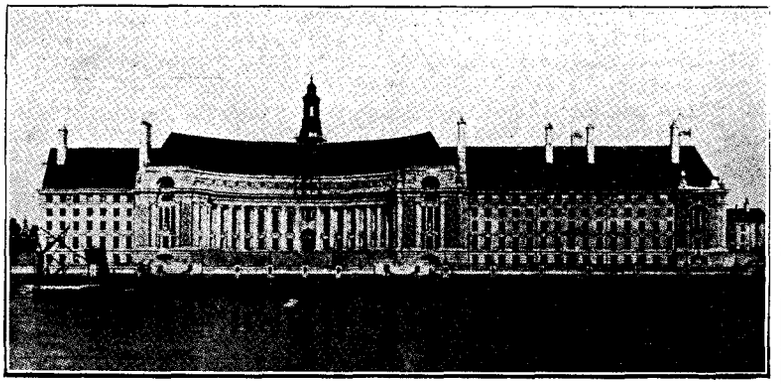


FIG. 1.—VIEW OF NEW COUNTY HALL.

The new County Hall accommodates the offices of the various Departments which are responsible for the local Government of the County of London, consisting of twenty-eight boroughs serving a population of approximately five millions, and covering an area of nearly seventy-five thousand acres. The Council, which has a standing debt of forty million pounds, spends over eighteen million pounds every year, figures which give some indication of the extent of the work directed from these offices, which includes education, housing, drainage, tramways, and many other branches of municipal activity.

The modern telephone equipment which has just been installed was, therefore, essential to the speedy and efficient administration of the vast business conducted, and the Council is to be congratulated upon setting an example which might be followed with advantage by many of the leading Provincial municipalities.

The new installation not only affords speedy, accurate and essentially private inter-communication between some 650 different departments in the building but also gives access, through an associated manual telephone switchboard, to the public telephone exchange system and the many outlying districts and local borough administrations which come under the jurisdiction of the London County Council.

The entire equipment has been manufactured and installed on behalf of the British Post Office Telephone Department by Automatic Telephone Manufacturing Co., Ltd., Liverpool.

As this automatic telephone installation is the largest of its kind in the Empire, some technical details may be interesting to our readers.

The exchange operates on what is known as a three-digit basis. In other words, every telephone number within the building consists of three digits, those below 10 being preceded by two noughts, and those below 100 by one nought. Thus Telephone No. 9 would actually be 009 and No. 89 would be 089, and so on. The act of calling any number on the system thus entails three successive movements of the dial attached to the telephone in use by the calling party. This manipulation by the finger tip is, however, extremely simple and occupies six seconds only. Assuming the called party to be disengaged the response is immediate, and in the event of an engaged line a distinctive audible signal is at once heard in the receiver at the calling station. Clearing at the conclusion of a conversation follows the replacement of the receiver upon the switch-hook and is instantaneous, the line, therefore, being immediately available for another call.

With the Strowger automatic telephone system secrecy is assured, and it is impossible for a third party to interrupt or to listen in to a conversation already in progress.

For the purpose of obtaining connexion with the public telephone exchange system an eight-position manual switchboard has been installed as a complement to the automatic installation. The function of this switchboard is to transfer the telephone traffic, incoming from and outgoing to the public telephone system of the metropolis, and to this end the switchboard is equipped with 60 out-going and 50 incoming junctions.

In view of the extent of this external traffic, special arrangements have been made, and generally the operation is as follows:—

Calls between automatic stations are, of course, completed automatically. Calls for the outside telephone system are obtained by dialling "O," which causes an individual line lamp at the manual board to glow, the automatic switches at the same time being released. The operator answers and completes the call over the outgoing junction in the usual manner.

Calls incoming from the outside telephone system are received at the manual board and are completed by the operator in a multiple of the automatic lines which is extended to the manual switchboard; the operator thus has direct access to all automatic stations without using the automatic switching equipment.

Night service keys on two of the manual positions provide means for extending thirty of the automatic telephone stations through to public exchanges for night service, thus dispensing with the need for night operators at the Council's manual board.

Provision is, of course, made for guarding the lines from intrusion whether they are engaged *via* the manual board or *via* the automatic board. The equipment is of the latest type with rotary line switches and covered type selector and connector switches, a general view of which is shown in Figs. 2 and 3.

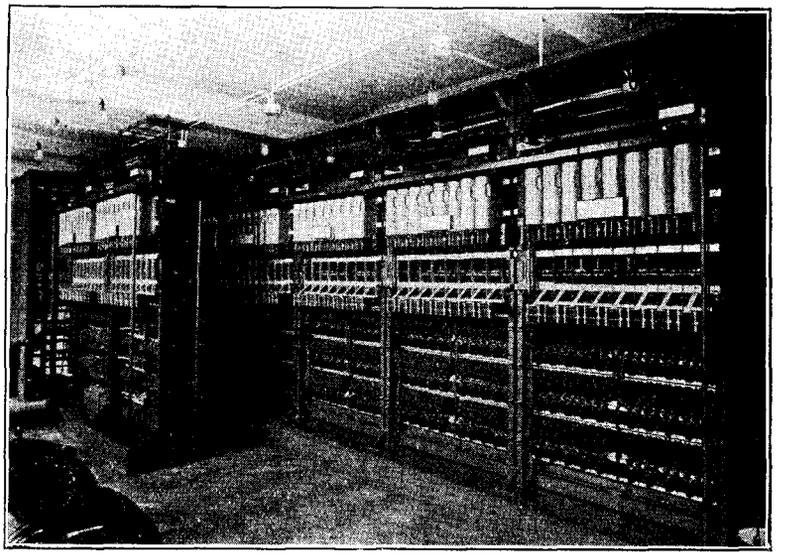


FIG. 2.—FINAL SELECTOR, SIDE.

No separate line intermediate distributing frame is provided but similar facilities are given by the "Unit" type intermediate distributing frame or cross-connecting rack, which is mounted on the top of the individual units.

Naturally the current required to operate an automatic exchange of this capacity is considerable, and the power plant for furnishing the requisite energy consists of one motor generator set rated for an output of 45 amps. at 60 volts, the motor operating on 460 volt-power supply. There are two 25-cell storage batteries associated with this generating plant together with small rotary converters for the provision of ringing current.

It is strange how little is known regarding one of the most important developments affecting our private and business interests. The first automatic telephone exchange provided by this Liverpool firm was opened in 1912. Since then many public exchanges have been equipped for the Post Office, of which Leeds is the largest with 10,000 subscribers' lines. Very shortly this city will have other automatic offices in its area connected up, thus becoming the first important automatic network in the country.

Eminently adaptable to private installations, this service can be arranged to afford many services beside telephonic communication. Over the same wires may be accommodated a fire alarm; a method of checking night watchmen; a conference system whereby several men may talk together over one line; a code arrangement which locates a missing official wherever

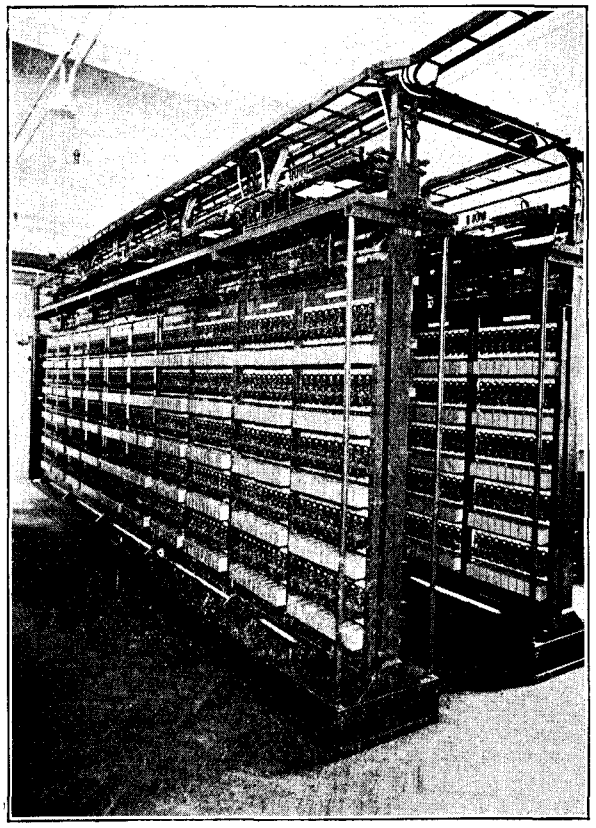


FIG. 3.—ROTARY SWITCH, SIDE.

he may be in the building; a secret credit check for large stores, and so on, whilst it excels human operation by never ceasing work, giving 24 hours a day service all the year round.

The Post Office, therefore, is extending the Automatic System wherever opportunity presents itself, whilst in a larger sense it has given a lead to the world by ordering equipment for the automatic telephoning of London. This vast scheme will engage this and other companies in the manufacture of apparatus on the Strowger-Director system for several years ahead.

A LITTLE KNOWLEDGE ——.

BY G. T. HAY.

A FEW weeks ago Penson, a humble Post Office official, was instructed to visit Oxbridge. He secured accommodation at a well-known hotel and, after inspecting his room proceeded, not to the saloon bar, as some might suppose, but to the writing room in order to send to his wife the usual postcard announcing his safe arrival and location.

Penson settled himself at a well-appointed writing table and was about to uncover the business end of his fountain pen when the door opened and the proprietor appeared. "Mr. Penson?" he inquired. Penson bowed in acknowledgment. "You are in the Post Office, sir?" came the next question. Penson, who has two brothers in very good positions and does not like his connexion with the Post Office to be too broadly advertised, was obviously surprised but again bowed in acknowledgment. He was just about to inquire into this seeming curiosity when the new comer, who had brightened up on learning that his conjecture was right, went on: "I've been looking out for a Post Office man for some time. The fact is, I've got a five-valve wireless set and the Morse signals worry me a great deal. I want to know what it's all about and you are the man to tell me—and," he continued, after a pause, "there's another thing, I'm not at all satisfied with the set."

Now Penson, who possesses a home-made crystal set ingeniously constructed out of a banana crate and a few hairpins, &c., is not regarded by his colleagues as a wireless expert. They talk learnedly in his presence of the various gadgets which they themselves understand very imperfectly, and tell stories of their achievements which would make the average angler or gardener green with envy. Penson listens very attentively to these stories, making mental notes of the inaccuracies between one version of a particular achievement and the next and getting a fair amount of amusement out of the proceedings. So to be asked to pronounce upon the imperfections of a five-valve set was something of a poser. Being an honest man who knew that he would quickly be found out if he were otherwise, he replied: "Well, I'm not very well up in wireless. I may be able to read the Morse but it would surely mean disaster to your set if I attempted to put it right. Why don't you appeal to the people from whom you purchased it?" "Why," replied the proprietor, "they know less about it than I do myself. Besides," he added, "Post Office officials are usually more intelligent than they look, and I'm certain that you can help me."

The doubtful compliment touched Penson's heart, so he decided to risk his reputation and the proprietor's flattering opinion. "I shall be pleased to join you after dinner," he said. "Righto," replied his host; "dinner is at 7."

After a modest chop and chips Penson returned to the lounge where he found his host anxiously awaiting his arrival. "Now, sir, are you ready?" said the latter, and at once led the way to his private sitting room on the second floor. One glance round the room satisfied Penson that the evening promised well—apart from the wireless turn. Almost as soon as the door was closed the invitation to liquid refreshment was extended to the delighted Penson. "Thanks, a little drop of s——, sir?" "Yes, thanks, a tiny drop of soda—just a spot in fact," he replied.

Cigars having been lighted, the host's eyes glistened with excitement. "This set cost me sixty of the best," he said, "but," he added rather ruefully Penson thought, "I would willingly swop it for a two-valve set."

"Have you got in touch with America yet?" timidly inquired Penson. "No," came the reply, "we touch the Yanks when they come here and that's the beginning and end of my interest in America."

"Do you experiment at all?" then asked Penson. "Experiment!" laughed his host, "why it takes me all my time to get 2 LO.' Then he added, confidentially: "They must keep a lot of cats at 2, Savoy Hill. There seems to be a cats' concert every night."

"What about reaction?" then inquired Penson. "Well," admitted his host, "there is a little now and again. The missus doesn't like my language when it sets in, so I have to be rather careful if she happens to be about. But let's get to business,' he continued, at the same time knocking the ash from his cigar on the exposed high tension battery. "That thing makes a very convenient ash tray," he explained. "Use it, old man; the missus grumbles if she finds tobacco ash on the carpet."

Penson placed a pair of head phones in position and his host proceeded to tune it. After a pause he called out excitedly: "There you are; that's London. Uncle Arthur is speaking but those damned cats are at it again. Anyhow, I've got 'em in record time to-night." "I believe you are oscillating,' said Penson. "Oscillating be jiggered," came the reply. "I'm sitting square on the chair," Penson explained the meaning of the term to the best of his ability, and then, without saying a word, his host left the room. Returning in a minute or so he looked dubiously at Penson and then at the set. "Well," he said, by way of explanation, "perhaps you're right, but I went without my glasses."

After endeavouring for some time to pick out Uncle Arthur from the howls and other terrifying noises which accompanied his host's attempts to improve matters, Penson suggested that they should try the Morse. "Righto," responded his host and tormentor, "I'll get you a ship in mid-Atlantic." The din now became so terrible that Penson was compelled in sheer self-defence to remove the head piece. Wiping the perspiration from his brow he clutched and emptied his glass and fell back exhausted in his chair.

"Shall I join up the loud speaker," suggested his host. "Please do," said Penson who thought that anything, even a sudden fire or explosion, would be preferable to the torture he had undergone.

After a few moments of suspense there was a lull in the storm and presently good Morse signals were received. "Now leave it alone," pleaded Penson. "I'll bet you a dollar that that ship is not far from the Statue of Liberty," broke in his host. Penson did not reply but a smile, which must have made his host doubtful, came over his face. The words he read were: "Welcome home, shall meet you at Southampton, Jimmy." "Where did you say the ship was?" he inquired. "Somewhere near New York," asserted the operator, then wonderingly, he added: "Isn't it? Where is it? What is it?" "Well, it doesn't happen to be a ship at all," he was informed. "It's a wireless station not many miles from here." "Well, I'm pipped," confessed the disappointed host. "I could have sworn it was a ship." Penson could have sworn any old way but refrained.

Penson proceeded to write down a few words as they were signalled in the hope that his host would be satisfied. But the matter was not very interesting, and after a minute or two the host exclaimed: "Well, it's all very wonderful, but let's get a ship. It's the ship's staff I want to know about." Penson, in desperation, pleaded work and fled the room. Next morning he fled the hotel.

LONDON ENGINEERING DISTRICT NOTES.

Telegraph and Telephone Society.

As the Engineer-in-Chief, Colonel Purves, O.B.E., M.I.E.E., is this year's President of the Telegraph and Telephone Society, we may be allowed to refer to the first meeting of that Society, which took place on Monday, Oct. 15, at the Institution of Electrical Engineers, when a paper on "The Relations of the Post Office with the Public" was read by Sir Andrew Ogilvie, K.B.E., C.B. (late Second Secretary of the Post Office). In addition to the Engineer-in-Chief, who occupied the Chair, many distinguished past and present members of the staff were among the large and representative audience. We were glad to see our late Superintending Engineer, A. Moir, Esq., O.B.E., M.I.E.E., looking extremely fit and well.

The Chairman made a very happy opening speech, drawing attention to the cordial relations which exist between the Telegraph and Telephone Society and the Institution of Post Office Electrical Engineers, and also the great pleasure which the Engineering Department felt at seeing Sir Andrew Ogilvie among them once more. Similar sentiments were expressed later by the other speakers who took part in the discussion.

It is out of our province to say anything about the paper, which has been published in full elsewhere in this JOURNAL. Mr. Moir made a characteristically able and witty contribution to the discussion. He referred to his impressions of the public services in Canada, which country he had recently visited, and gave some amusing illustrations of "giving service." He also humorously criticised the booklet on "How to use the Telephone," which had been issued by the Department, and he suggested that the Broadcasting Service might be utilised for educating the public in the use of the telephone.

New Exchanges.

On Oct. 18 a new exchange of the C.B. 10 type was opened at *Woodford*, and 504 subscribers' lines and 64 junctions were connected. This replaced a magneto exchange which was nearing the termination of its useful life, and the conditions at the new exchange undoubtedly constitute a welcome improvement on the congested facilities available at the old exchange. The equipment was installed by the General Electric Co., and consists of eight positions. The initial installation provides for 940 subscribers' lines, 50 incoming and 80 outgoing junctions.

Two days later the *Southall* new Exchange was brought into operation. This exchange, which is also of the C.B. 10 type, was installed by the staff of the Sectional Engineer in a very creditable manner, and has been constructed in a temporary hut placed on a site which will accommodate a permanent exchange at some future date. The subscribers' lines, 232 lines in number, were transferred from the Ealing switchboard, and this will make spare at that exchange useful equipment which is needed for normal development in the Ealing area. The keen interest shown by the representatives of the local authority and other prominent citizens in the opening ceremony was a marked feature of the event. A very commendable realisation of the growing importance of Southall was apparent throughout the proceedings.

The new *Royal* Exchange, to which the 1,840 subscribers' lines were transferred, was opened on Nov. 3. At a later date a number of lines will be transferred from Avenue and other exchanges. The equipment has been installed by the Peel-Connor Co. in a building constructed on the most modern lines in Great Tower Street. The suite of switchboards comprises 117 "A" positions and 48 "B" positions, and presents a very pleasing effect.

The construction of a new exchange at *Eltham*, with which subscribers' lines now connected to Lee Green will be connected, is nearing completion, and the plant will probably be brought into use early in November. The C.B. 10 equipment consists of 5 "A" and 2 "B" positions, and will accommodate 900 lines. A temporary hut has again been utilised, and the plant is being installed by the local staff of the Sectional Engineer.

Institution Meeting.

It was naturally to be expected that there would be a good attendance of the London Engineering District at the Institution of Electrical Engineers on Tuesday, Nov. 13, when a paper on "Some conditions affecting the lay-out of telephone plant in a multi-exchange area," was read by Capt. J. G. Hines before the London Centre of the Institution of Post Office Electrical Engineers. In addition to the members of the District staff, which included the Superintending Engineer, R. McIlroy, Esq., and Messrs. Shackleton, Stanhope, and Weaver, Assistant Superintending Engineers; the Engineer-in-Chief, Colonel Purves, O.B.E.; and many others from Headquarters, the London Telephone Service, and the Secretary's Office, were present.

The paper dealt with some of the problems which are met with when considering the lay-out of plant in an area which is to be served ultimately by a number of Automatic Telephone Exchanges. The difference between a scheme which is economically unsound, and one which is framed on right lines may involve the Department in the expenditure of large sums of money. It was well pointed out by the Engineer-in-Chief who opened the discussion, that this fact made a paper like that by Captain Hines very valuable to the External Plant Engineer. There is no doubt that many people do not realise either the magnitude of the problems concerned in connexion with the economical lay-out of plant, or the many factors which have to be taken into account. These points were clearly set out by Captain Hines, and the paper was illustrated by some excellent graphs and schedules, a close study of which will well repay anyone interested in the subject. One of the most interesting features out of many was the demonstration of a method of determining the economical size of a telephone exchange for an area of a given telephonic density on the assumption that the density is uniform over the area. As engineers, we are particularly grateful to the author not only for the information which is given in the paper, but for the fact that it demonstrated beyond the shadow of a doubt that the question of a lay out of a telephone area, and the determination of the size and position of the exchange, are primarily, if not entirely, matters which the Engineering Department is alone able to decide.

As already mentioned the discussion was opened by Colonel Purves who complimented the author on a valuable contribution to our knowledge on a very important subject. Mr. J. G. Hill drew attention to the necessity for having competent transmission Engineers in the Districts as well as experts at Headquarters. He thought too much attention was paid to the economy to be effected by improvements in design, and considered that there was a need to study the improvement of transmission from the point of view of increasing the distance over which speech would be possible. Capt. Timmis, referring to the use of the formula for finding the average length of a subscriber's line, thought that the method was not sensitive enough to be adopted in all cases, and also that the assumption that the density in a telephone area was uniform might lead to inaccurate results. Mr. Harvey Smith pointed out that the methods adopted in the paper were comparative ones, and emphasised the value of such methods for establishing an initial lay out. Mr. H. Dive, of the London Telephone Service, who made a humorous speech, wanted to have no limit in the distance over which we could speak, and looked forward to the time when any subscriber would be able to speak to any other in any part of the world.

Messrs. Hanford, Elston, Twells, Ritter, Eason, Callender and Williams also contributed to the discussion, and Capt. Hines briefly replied. The proceedings terminated with a vote of thanks to the author for an excellent and instructive paper.

London Engineering District Cricket Club.

At a meeting held at Denman Street on Nov. 14 (Mr. Hart in the chair), it was resolved to form a Cricket Club, open to Technical, Clerical and Engineering officers.

An option has been obtained on a private ground at Lee.

Officers desirous of becoming members should forward their applications to H. J. Henley (Secretary, Provisional Committee), Denman Street, at earliest possible moment.

It is thought the subscription will not be more than £1 per annum.

Fuller information will be announced in the next issue.

THE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

THE lectures and papers of E. H. Shaughnessy, Esq., O.B.E., M.I.E.E., &c., of the Engineer-in-Chief's Office, are always interesting, not only because of the subjects with which they deal, but by reason of the homely manner in which they are delivered.

That given on the 19th ult., at the Institution of Electrical Engineers, to the members of the above Society, was no exception. From start to finish of this 70 minutes' lecture, Mr. Shaughnessy never once lost grip of his audience or his subject. The latter was "Wireless Telephony." This he traced from the very commencement by means of excellent slides illustrating the variety of oscillations in telephone speech transmission, so that one soon realised how wonderful a thing was the reproduction of, say, the human voice accompanied by an orchestra, leading on to the difficulties of wire transmission and thus to wireless developments of the art.

At one stage the lecturer craved pardon for the simplicity of his exposition, but to some of us whose knowledge of the technique of the subject is of an elementary order this very simplicity was a welcome and admirable feature.

The presence of Mr. J. C. Reith, of the British Broadcasting Co., added a very genial feature to the gathering, some good-humoured criticism being exchanged as a consequence.

The Secretary of the Society notifies that, through the generosity of C. C. Vyle, Esq., the following books will shortly be added to the library:—*Harrison's Printing Telegraph Systems, Poole's Telephony, Herbert's Telegraphy* (latest edition), and *Rupert Stanley's Wireless Telegraphy.*

J. J. T.

LONDON TELEPHONE SERVICE NOTES.

London Telephonists' Society.

The Society's second meeting of the Session was held at the Lecture Hall in Aldersgate Street, on the evening of Friday, Nov. 2. There was a large attendance. Two papers were down to be read, but the one by Mr. W. C. Griffith on the subject of "The Phonogram Room," excited so much interest and the discussion attracted so many speakers, that time did not permit of the second paper by Mr. E. A. Pounds being read.

Mr Griffith's lecture was illustrated by a number of lantern slides, and his listeners came away with an excellent idea not only of the phonogram system, but of the equipment and appearance of the huge room in which the work is performed. As several of the subsequent speakers pointed out, this branch of the telegraph work is very closely allied with telephone work, and the need for the closest co-operation is apparent. It was clear from the debate, which was contributed to by many telegraph and telephone people, that the spirit of co-operation is well in evidence.

In his reply, Mr. Griffith dealt adequately with the various points raised during the debate.

The Society was glad to welcome a number of visitors from the C.T.O. and the Engineering Department, several of whom spoke during the evening.

Mr. Pounds' paper, "The Influence of Sport on our Work," is to be delivered at the next meeting on Friday, Dec. 7, and it will be followed by the impromptu debates which will be stage managed by Mr. H. Dive. There is certain to be a full attendance.

* * * *

Distribution of Swimming Prizes.

The Swimming Association held a dance at the Finsbury Town Hall on Nov. 7, and during the evening the prizes won at the recent gala were distributed by Miss A. E. Cox, the Superintendent of Female Exchange Staff. The evening was a great success, and the enthusiasm attending the presentation of the prizes was little less than that in evidence at the actual contests. At the close Miss Cox delivered a happy speech, and on behalf of the various clubs presented Mr. E. A. Pounds with a pair of field glasses.

* * * *

Proposed Wireless Club.

A movement is on foot to form a wireless club to meet the needs of the growing band of enthusiasts at St. Bride Street and Queen Victoria Street. It is felt that much good will result from an interchange of ideas and experiences. It will also provide an opportunity for the real experts who claim to have received the concerts from Paris on apparatus constructed from curtain rings, wire mattresses, disused pocket lamps, with a crystal combination of coal and lump sugar, to shew how it is done. One man bragged that he got Chili one night, but as this was followed closely by absence from the office with a severe cold it may not have been the country he was referring to.

* * * *

L.T.S. Staff Dinner.

Arrangements are now well in hand for the Staff Dinner, to be held at the King's Hall, Holborn Restaurant, on Friday, Jan. 4, 1924. The Committee are aiming at an attendance of not less than 300, and hope that all members of the staff who find it convenient will be present. It is the first function of its kind organised in the L.T.S., and "old boys" and, if one dare use the expression, "old girls" will be especially welcome. Tickets, price 8*s.* 6*d.*, can be obtained from the Hon. Sec., Mr. A. C. Atkins, Traffic Branch, 32, St. Bride Street, E.C.4.

* * * *

Retirement of Miss B. A. F. Newman.

Many of Miss Newman's service friends will be sorry to learn that she was compelled to retire recently on account of unsatisfactory health. During her 41 years of service with telephones, Miss Newman has performed duty at a number of exchanges, many of the buildings having disappeared although the names remain. Towards the end of her career Miss Newman was the Chief Supervisor at the Holborn, Central and Avenue exchanges in turn. Her many friends entertained her to tea at 32, St. Bride Street, on Oct. 25, and presentations of a cheque, reading lamp and pictures, were made.

We sincerely hope that in her retirement Miss Newman will be rapidly restored to vigorous health.

* * * *

Choral Society.

At a recent General Meeting the annual subscription was raised from 5*s.* to 10*s.* per annum, except for those members of the staff who join before they are nineteen years of age, in which case the subscription will be 5*s.* until they have passed that age. Rapid progress is being made with the works in rehearsal, and it is hoped soon to announce the date of the first choral concert of the season.

* * * *

Culled from the Exchanges.

Gerrard Exchange gave another entertainment to the disabled men at Queen Mary's Hospital, Sidcup, on Oct. 27, and as usual everything went with a swing, and the boys had a great time.

The finest thing about these entertainments, from the point of view of a non-Gerrardite privileged to take part in them, is the way everyone, senior and junior, caterer's staff and humblest helper, works together with a will to make the event a real gala day to be long remembered. And it means much forethought and careful organisation to carry through an entertainment on such a large scale, for there are still about 500 ex-Service men under treatment here.

Many of the patients are terribly handicapped by war wounds, and delightful as the hospital surroundings are, they must get very weary of hospital routine and uniforms, so that the visit of the Gerrard staff makes a very special event for them.

On this occasion 300 teas were served in the wards, followed by the dining hall tea for the more convalescent. Fortunately, there were few "diet" cases, so that the boys were able to do full justice to all the good things provided. Tea over, willing hands prepared the Recreation Hall for a whist drive, and 60 or 70 tables were soon in full swing, the zest of the game being stimulated by the knowledge that there were a number of nice prizes at stake. Every man had a packet of cigarettes at tea time and more smokes came round with the cards, so that one felt one was being slowly kippered—but in an excellent cause! The orchestra started business meanwhile, and that naturally directed thoughts to dancing, so, while the prizes were being awarded, part of the Hall was cleared and at once was filled with couples anxious to demonstrate the latest steps. The lookers-on seemed to enjoy it as much as the dancers, and applauded vigorously when not too much occupied with ices and other good things.

Altogether, the day was a great success, and if the boys enjoyed it as much as their visitors—and they looked as if they did—they are already looking forward to the next occasion. If a few interested folk outside Gerrard would like to send along some subscriptions to the Committee, that event will come all the sooner.

CHILE TELEPHONE EXTENSIONS.

Mr. William Johnston, director-general in London of the Chile Telephone Co., Ltd., has sailed from Valparaiso for England, where he will report to the directors and shareholders on the concessions he has obtained to instal longer-distance lines in various parts of the country. It is stated that the primary object of his return to London is to secure the necessary capital to ensure the working of the telephone concessions he has obtained from the Government, which are as follows: Reconstruction of the Santiago telephone plant by the installation of an automatic service, similar to that operating in Valparaiso. New trunk lines between Santiago and Valparaiso, Santiago and Talca, Santiago and San Antonio, and Santiago and San Felipe and Los Andes. Extension of the Valparaiso automatic service to Vina del Mar. New plant for Concepción, Iquique, Antofagasta, and Talco. New plant in La Serena, Chillan, and Temuco, with underground installations, and new trunk lines between Concepción and Cautin.—*Reuter's Trade Service* (Valparaiso).

ALL-BRITISH WIRELESS EXHIBITION. STAND No. 100.

On Western Electric Co.'s stand at the above Exhibition that company will, as patentees and manufacturers of the Wecovalve (the new pea-nut type valve which operates off a single dry cell) make a special exhibit of this valve, and the new Weconomy sets which incorporate them. The stand has been designed to allow for five compact compartments, in each of which visitors will be able to test the apparatus by the use of head-receivers, in comfort and without interference.

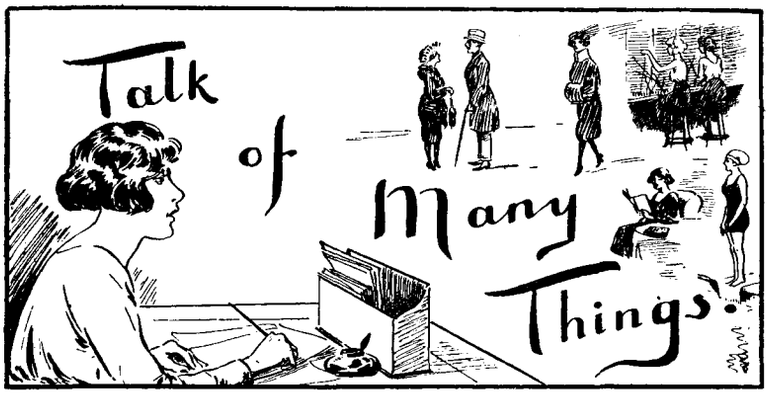
A complete line of new loud speakers and also cabinet sets de-luxe will be exhibited. The apparatus will be in a large variety of groups, and includes Wecovalve Detectors, and Amplifiers, Frame Aerial sets and Weconomy combined Crystal and Amplifier sets. Wecovalves will be shown with their sockets and adaptors, and the well-known Western Electric head-receivers.

PRESENTATION TO MR. F. E. C. B. ADAMS.

A meeting of the District Manager's staff was held on Friday, Nov. 2, to take farewell of Mr. F. E. C. B. Adams, Contract Manager, on his promotion to Belfast. Mr. A. E. Ruddock, District Manager, presided, and, in a very humorous speech, presented Mr. Adams, in the name of the staff, with a case of pipes, tobacco pouch, and cigarette holder. Mr. Clow, Chief Clerk, Mr. Barclay, Traffic Superintendent, and Mr. Jackson, Contract Department, also spoke of the good qualities of Mr. Adams and the harmony which had existed between the Contract Department and the other departments in the office.

Mr. Adams, who was considerably affected by the tributes which were paid to him, replied thanking all present for their kindness and expressing his regret at severing his connexion with Aberdeen after the very short period of eight months.

WE TELEPHONISTS



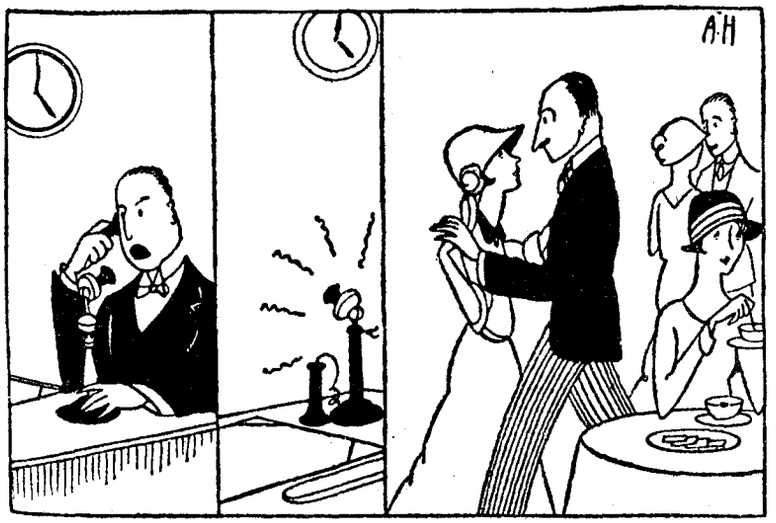
"The Good Samaritans."

IN our October number Miss Dorothy Turner wrote about the "girls" as one of the nice things of the telephone service. Anyone privileged to be present at the Sidcup Hospital on Oct. 27 could but feel that she did not say half enough. Queen Mary's Hospital at Sidcup is, as everyone knows—or should know—the War Hospital famed for its wonderful head and face surgery. The hospital has been Gerrard's pet protégé for the past five years, ever since it was known that the disablements and disfigurements of the patients had led to their exclusion from local entertainments; and twice a year a large party of the girls go down and give a festive tea to all the patients—there are still 500 of them—followed by a whist drive and dance. To collect and subscribe the cost of such an entertainment is a big undertaking, but the most wonderful thing of all is the way the girls give themselves up to making the event a success. Many of the patients are so hopelessly disfigured that they are debarred from following any ordinary career or trade, or, indeed, any ordinary domestic life. Imagine what it means to them when a party of girls put on their prettiest frocks and come along to wait on them, have tea with them, play whist or dance with them, and, in fact, give them the grateful comradeship that was felt to be their due in the war days, but that has, alas, been often neglected since they gave up khaki for hospital blue.

No, Miss Turner, you did not say enough. The girls are more than nice—they are splendid. Hats off to them, and to the organising Committee, who won't have names mentioned, and to the menfolk who always lend a helping hand.

W. M. E.

WHY THE LINE WAS ENGAGED!



Thés dansants are becoming increasingly popular with business men. The above illustration may explain why some office telephones are "engaged" in the afternoon!

[*Reproduced by permission of the Evening News.*

THE TRUTH AT LAST.

London Telephonists' Society.

"Our Mr. Pounds," on Friday night, Dec. 7, will climb the height of rhetoric for our delight, and talk of "Sport" and "Work"; and then, with no unseemly fuss, he hopes that quite a lot of us will rise, his paper to discuss, nor friendly judgment shirk.

Then spirited debates there'll be, arranged by Mr. Dive (D.V.), who asks for help from you—from me—for he on us relies. And when the arguments begin, he asks us each to enter in the lists that we perchance may win (if Allah wills) a prize. Dec. 7, please note the date and hour (6.30) *don't* be late.

A Rotherham Volley.

(*The writer does not guarantee accuracy in every particular.*)

We thank you "muchly," my dear L. C.,
For those lines you have written. We quite agree
You tackled us strongly and won the day,
But, by jove, next year we will make you pay
For hurts inflicted and damage done,
For wounded feelings and prestige gone.
You will rue the day you to Rotherham came,
For the daring way you collared the game.

Don't be caught napping; take some regard
For your tennis progress, and try and ward
The daring attacks off we'll keep in store,
As on to the Courts we go once more.
You're a jolly fine lot, and to us 'twas fun
To observe the fine way the points were won.

You refer to the food and over-consumption,
But Leeds must cry guilty to that presumption.
To see all the tea, and the nice bread and butter,
Nought came amiss to our old friend Rutter,
And Blackburn, my word, quite held his own,
On those neat little tables which gave out a groan.

Besides, in addition, we saw Jack Webster
Tackle gamely the tarts at which he's a dabster,
In Scholes and in Smith, Leeds did us outclass,
And the "scoff"—they simply attached it *en masse*.

The girls, all good sports, did exceedingly well,
We enjoyed the tea, but truth to tell
You beat us clearly by better play,
Which we hope to reverse the next time we play.

We are sorry to learn that Miss H. was enraged,
And that dear Miss J. had her lines engaged.
We forgive you all, but next year, take care
To keep quite cool, and not tear your hair;
(Although it may be you will win again,
And all our efforts be made in vain.)

U. C., L. C., I. C. U., all,
Are quite expert with the tennis ball,
Your lightning serves put us all in the shade,
And against our accounts you quickly put "paid."

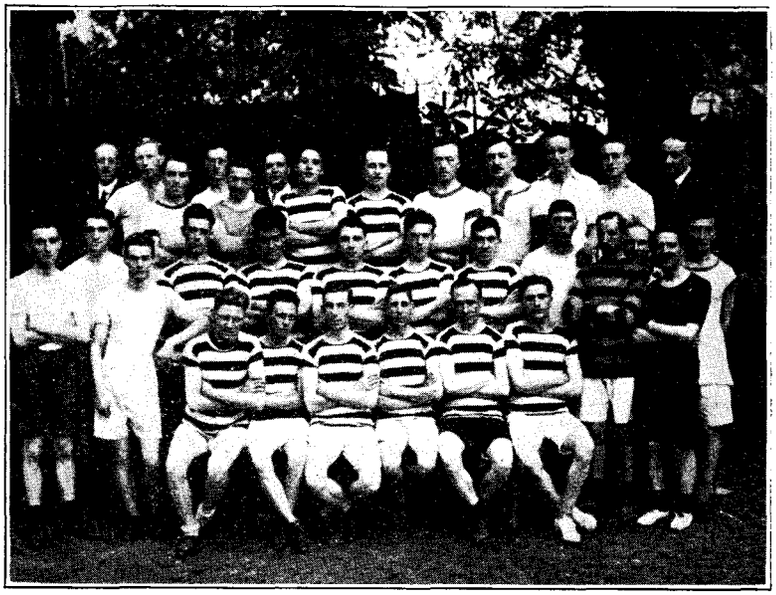
It is useless to say you were strangers all
To each other's play, the story's too tall
To consume all at once, a dose now and then
May convince us completely, so try once again.

When all's said and done, in Yorkshire we're sports,
And we take our defeats on our own Tennis Courts
As Yorkshiremen should, that's saying a lot;
'Twas all in the game, tho' the pace was so hot,
We welcomed your visit, and hope you will see
That next year the games all the keener will be.

Then all eyes to the future in battle array,
Let's hope for fine weather, and here's to the day
When you yield up your laurels; in anguish you'll yearn
To get back to Leeds and once more to learn
In the lap of the gods lies the luck of the game.
We say "Au revoir"; and always the same
Kindly feelings exist 'twixt our people and you.
So, here's to the time when we're fighting anew.

"JEE DOUBLE YOU."

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.



[*By permission of the Personality Photo Press Ltd.*

THE C.T.O. TEAM WHICH WON THE CIVIL SERVICE CROSS-COUNTRY CHAMPIONSHIP.

CIVIL SERVICE CROSS-COUNTRY CHAMPIONSHIP.

C.T.O.'s SUCCESS.

THE "Centels" Sports Association, an institution of the Central Telegraph Office, embracing all kinds of sport, brought welcome laurels to that office and to the Telegraph Service in general, when, on Nov. 17, its athletic section won the Civil Service Five Miles Cross-Country Team Championship, held at West Wickham. Their performance is all the more notable, being the third successive victory; an achievement to adorn any club's history.

Fifteen teams, composed of 124 runners, started, and by good "packing," the C.T.O. came out winners with a score of 66 points, the Savings Bank Department being second with 90 points, and Inland Revenue third with 99 points.

The first three men home in the race were: A. E. Elliott, Office of Works; G. W. Robinson, S.B.D.; E. D. Mountain, British Museum; P. A. Selman, of the Post Office being fourth.

The "Centels" team was as follows, the first five named receiving gold medals:—H. Parkinson, A. B. Warner, S. A. Pollard, W. F. Cocksedge, A. Brassington, H. E. Cole, S. F. Crisp, H. H. Agnew, G. H. Chapman, and G. C. Perry.

RETIREMENT OF MR. E. E. STOCKENS, DISTRICT MANAGER, MID-LANCS. DISTRICT.

Mr. E. E. Stockens, District Manager of the Mid-Lancs. telephone district retired on Nov. 2 after 38 years' service in the telephone world.

Mr. Stockens joined the United Telephone Co. in 1885, and, after spending several years on the engineering staff in London, was appointed District Manager of the West Kent district, subsequently filling similar positions in the East Kent district, North of Scotland district, and, finally, the Blackburn district, which ultimately became the Mid-Lancashire district. The staff, together with several supervising officers now stationed in other districts, presented him with two "Buoyant" chairs, in the hope that they may be useful for the "rest" cure. A very large gathering assembled, and, after eulogistic references had been made to the sterling and kindly qualities of Mr. Stockens, by Messrs. J. G. Greaves, A. L. May, J. Wilson, G. A. Knight, and J. F. Abbott, the presentation was made by Mr. A. N. Entwistle, Chief Clerk.

Mr. Stockens, who was enthusiastically received on rising to speak, extended his sincere thanks for the many kindly wishes expressed, which he reciprocated. The proceedings were brought to a close with the singing of "For He's a Jolly Good Fellow," and three hearty cheers for Mr. and Mrs. Stockens.

PERSONALIA.

LONDON TRAFFIC STAFF. TELEPHONISTS.

Resignations on account of marriage:—

Miss A. WORBEY, Assistant Superintendent, Class II, of the Streatham Exchange.

Miss B. M. GILLARD, Telephonist, of the East Exchange.
Miss A. W. GRANT, Telephonist, of the Chiswick Exchange.
Miss M. E. NOBLE, Telephonist, of the Hammersmith Exchange.
Mrs. C. M. EDMONDS, Telephonist, of the Hornsey Exchange.
Miss E. E. STYLES, Telephonist, of the Museum Exchange.
Miss A. POOLE, Telephonist, of the Central Exchange.
Miss A. L. LINGWOOD, Telephonist, of the Central Exchange.
Miss D. H. LEVEY, Telephonist, of the Regent Exchange.
Miss F. E. BASSETT, Telephonist, of the Regent Exchange.
Miss V. M. WOODFORD, Telephonist, of the Trunk Exchange.
Miss M. E. GEORGE, Telephonist, of the Trunk Exchange.
Miss D. O. TOVEY, Telephonist, of the Trunk Exchange.
Miss M. L. COLLIVER, Telephonist, of the Victoria Exchange.
Miss V. H. COLE, Telephonist, of the Victoria Exchange.

CENTRAL TELEGRAPH OFFICE.

Mr. W. C. SMITH, Telegraphist, promoted Overseer.
Miss F. M. GRIGSBY, Assistant Supervisor, promoted Supervisor.
Miss P. E. ARTHUR, Telegraphist, promoted Assistant Supervisor.

RETIREMENT OF MR. W. V. PEGDEN.

Mr. W. V. Pegden, who has been in charge of the Western District Contract Office since May, 1914, retired from the service on Nov. 14, having attained the age of 62 years.

He entered the service of the late National Telephone Company in February, 1899, in the Southern District of the Metropolitan area, and, on the formation of the Metropolitan Contract Branch in 1903, was transferred thereto, acting successively (and it might be added successfully) as Cessation Manager, New Business Manager and Sales Manager.

At the time of the transfer of the Company's undertaking to the State, he was acting as District Contract agent of the City district and as Sales Manager. In May, 1914, he was transferred to the larger and more important Western District Office.

Mr. Pegden has always been held in the highest esteem by the controlling officers and by the staff generally, and as a token of that esteem and regard he was presented by the Controller (Mr. W. A. Valentine) on behalf of the staff of the London telephone service with a handsome clock and a plated tea service. The presentation was made at the Fifth Annual Dinner of the Western District Contract Office, held at Gorgone's Restaurant, Denman Street, W.1, on the day of Mr. Pegden's retirement. The dinner was attended by some sixty members of the staff, and speeches were made by Mr. Valentine (the Controller), Mr. Napier (Deputy Controller), Mr. Taylor (Superintendent of Contracts), Mr. J. Brown (Sectional Engineer), Mr. Muirhead (Contract branch), Mr. R. P. Lowe (Contract Manager, Norwich), and Messrs. Glenny and Horlock and Major French (of the Western Contract Office).

Mr. Valentine, in making the presentation, referred in moving terms to Mr. Pegden's long association with the Contract branch of the London telephone service, and voiced the feelings of the staff in referring to him as one who always ran straight. He also spoke of the way in which the Western Contract area had grown under Mr. Pegden's management. Mr. Pegden replied in suitable terms, and at the conclusion of his speech, he was accorded musical honours.

An excellent musical programme was provided during the evening.

BOLTON CHORAL SOCIETY.

A Choral Society has been formed at Bolton by members of the staff, rehearsals have commenced and are proving very attractive. It hopes to inspire and encourage a taste for music of a bright and tuneful character, and also provide a pleasant recreation during the winter evenings.

The Society is open to any member of the staff who is interested in vocal music.

The Hon. Secretary is M. Edwards.

THE

Telegraph and Telephone Journal.

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CONTENTS.

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All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.4.*

THE FIRST INTER-URBAN AUTOMATIC TELEPHONE EXCHANGE.

A NEW exchange has recently been opened at Weilheim, near Munich, for the inter-urban service of the district. This exchange is of an importance beyond the interests of the neighbourhood, because it is fitted with apparatus which enables subscribers to be automatically connected with the inter-urban system. The installation is based upon the new invention of M. Langer, Chief Engineer of the "Wernerwerk" of Messrs. Siemens and Halske. He shewed the method of constructing automatic registers from which could be calculated the charges for connexions in the inter-urban service in accordance with the usual practice in inter-urban telephony, that is to say, according to the duration of the call and the distance.

The tariff unit is the charge for a local call ; for this and for calls within a radius of five kilometres, the mechanism of the meter moves one step independently of the duration of the call. For distances of more than five kilometres special apparatus for calculating time and distance influences the mechanism of the meter so that it moves forward three steps for each call of 3 minutes for distances of 5 to 15 kilometres, and five steps for distances of 15 to 25 kilometres. The adjustment up to 25 kilometres suffices for the present for the Weilheim installation, but the registering arrangements have been made in such a way as to permit of zones being added. Official calls, for example, those of the excise service, which are normally exempt from charge under present regulations, are not registered in the inter-urban automatic exchanges. A call is registered only when the connexion has been really established, that is to say, when the called subscriber takes off his receiver. But in this case, there is a waiting time of a few seconds in order that the subscribers who inadvertently call a wrong number may break it without the call being registered. At the end of the call, the subscriber can ascertain the number of chargeable units debited for the conversation. For that information he keeps the receiver to his ear, after having severed the connexion by depressing the receiver hook once ; he then hears brief tic-tac signals corresponding with the number of steps made by the register. The apparatus and arrangements for automatic connexions in the inter-urban service are the same as those utilised and proved out long since in the local service.

The first selectors of the whole area are placed at a central exchange. If the receiver is removed the subscriber is connected by the intermediary of the preselectors to a first group selector momentarily disengaged. The subscribers call up by turning a numbered disc ; they use a directory shewing all the subscribers of the area in numerical order.

For calls within the limits of the district, the connexions are obtained by means of these group selectors.

If the local calls, that is to say, the calls between two subscribers of the same neighbourhood, were made in this way, two lines, *i.e.*, that from the sub-exchange to the centre and *vice versa*, would be engaged. Since that would be very disadvantageous, a switching device known as "simultaneous movement," comes into play in these cases, and immediately enables a current to pass over a circuit to the central exchange and by this means the calling subscriber's line is connected directly to a selector of the sub-exchange. It is only when all the selectors of this exchange are occupied that connexion is made by the intermediary of the

central exchange. The simultaneous movement is, therefore, of great importance in the economy of the installation. On the one side it restricts the number of selectors, and on the other it facilitates a better use of the lines.

The subscriber is informed as to the duration of the connexion in two ways. Ten seconds before the completion of three minutes' conversation a humming sound is heard. If the subscriber does not then replace his receiver the conversation, but not the connexion, will be interrupted, and the humming sound will recur. The subscriber cannot continue the conversation unless he dials a second time. Consequently a conversation cannot be prolonged in any way inadvertently for a number of units beyond that agreed to by the subscriber.

The inter-urban service within the limits of the area, is therefore carried out quite automatically. But the installation provides the necessary means also for obtaining inter-urban connexions beyond the area. That is to permit each subscriber of the local system to obtain, without the assistance of a manual exchange, a distant subscriber by calling any inter-urban exchange with a continuous service and situated at no matter what distance from the central exchange.

On the other hand, he can also be called by any inter-urban exchange by means of the selectors. In the latter case the charges are calculated by the inter-urban exchange which establishes the connexion.

The advantages of inter-urban automatic exchanges are then as follow: on the one hand the subscriber can make use of his installation at any time independently of the hours of business of post offices; in emergencies he can call the doctor, the fire station, the police or any other help in case of danger, even if he lives far from the main lines of traffic. On the other hand, the business gains from the fact that calls are spread over the whole day instead of being confined to the hours during which offices are open; the connexions are not maintained beyond the completion of the conversation, and on that account the lines are utilised with greater economy. Much staff becomes unnecessary, especially in the country where the offices are scattered; and, finally, the number of subscribers will no doubt increase, thanks to the improvement of the service.—(Extract from the *Journal Telegraphique*, Berne, Sept. 25, 1923.)

THE EARTHQUAKE IN JAPAN.

THE Controller of the London Telephone Service has received the following interesting letter from the Director of the Tokyo Central Telephone Office:—

TOKYO, Oct. 8, 1923.

It is with greatest regret for me, who have only recently returned from a trip of investigation and study abroad in connexion with telephone industry, to have to write the following sad report about the disastrous earthquakes and subsequent conflagration in Tokyo and its vicinity instead of any amicable letter of thanks for the courtesy and kindness shown towards me while I was with you.

Sept. 1, 1923, was one of the most ominous days for Tokyo—nay, for the whole of Japan and the Japanese. Just before noon we felt very severe shocks. The exact time is quoted as 11 o'clock 58 m. 44.6 s. a.m. Almost with the first shock many houses, stone and brick walls, &c., were brought to the ground. The first fire broke out at 11.59—that is, 16 seconds after the first earthquake was felt, and was followed by the subsequent ones in rapid succession. Altogether 83 fires broke out in the various parts of the city, and they began to exercise extreme rage and rigour over the area of Tokyo all at once until 6 o'clock next morning. The flames, fanned by the strong wind then prevailing, have turned the two-thirds of the world's sixth greatest city into debris of mere ashes in 18 hours. The gale had a velocity of 24-5 metres a second at 6 p.m. on that day.

According to an official report of Oct. 1, the disasters sustained by Tokyo alone are as follows:—

Population of Tokyo as on Sept. 1	2,385,500
Number of Houses in Tokyo as on Sept. 1... ...	577,000
Number of citizens afflicted	1,604,000
Of which	
Burnt or crushed to death	77,831
Whereabouts unknown (supposed to be dead) ...	42,545
	120,376
Number of houses damaged:—	
Totally smashed	59,843
Half smashed	69,223
Burnt out	350,168
	479,234

Moreover, according to an investigation by the Home Office, the number of houses damaged reaches more than 70 per cent. of the whole number, and 2.9 per cent. died, 1.4 per cent. injured and 1.5 per cent. missing, of the citizens. But it is feared that the actual figures of the disaster will far exceed the above records and the amount of loss incurred by the Government and the other public corporations will be almost Yen1,000,000,000, and, if such losses among popular enterprises are added, it will reach the enormous figure of Yen10,000,000,000, or more.

Tokyo Central Telephone Office, of which I am the director, has lost 16 exchanges out of 20, leaving only 4 offices available for use after some urgent repairs. Most of the ill-fated centrals were burnt, just a few smashed and then burnt. On Sept. 29, the 28th day after the disastrous day, we recommenced telephone service with above 4 offices, accommodating only 18,000 stations instead of 115,000 stations existing Sept. 1.

Our officials and employees consisted of 6,527 men and women, concerning whom the result of investigation of 1st inst. says:—

26 persons died, 404 persons missing,

and of their homes:—

90 houses collapsed, 2,755 houses burnt.

The majority of such victims are female employees.

Among the young girl survivors, some lost parents, some brothers and sisters, others were deprived of houses and clothes, having no where to dwell and nothing to wear, except what they wore when they fled for life. Most of them came back to the remaining centrals and have been given food, clothes and other necessaries by the management and their friends, who had been fortunate enough to suffer less. Yet none of the refugees despair, but are attending duty called for everyday with ever unremitting efforts for our relief. That is my only consolation at the present time as their common "father."

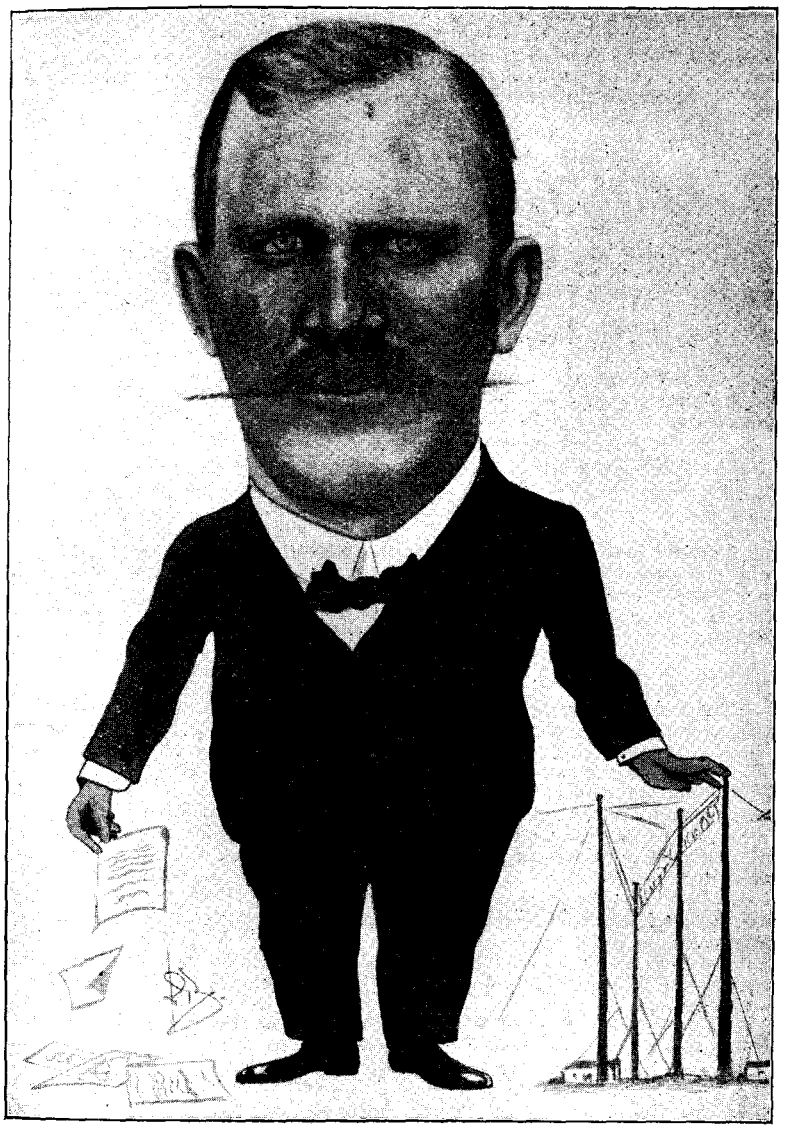
My house has also sustained damages more or less, but escaped fire. All my family are quite safe. In this connexion, I may add, that I am enjoying robust health and daily busily engaged to the rescue of sufferers and the reconstruction of telephone industry of this city.

It is, however, a very great regret—yes, a very painful matter for me—that almost all books, pamphlets, documents and papers, most assiduously collected through the courtesy of my friends during my rather prolonged stay in the U.S.A. and Europe, have been reduced to ashes, as they had been kept at the office. They had to be sacrificed in order to save the most important, or rather, essential documents of the Government's telephone institution. An address book, in which your esteemed name and address were also entered, has encountered the same fate; and I meet no small inconvenience and awkwardness in writing letters to my friends abroad.

The profound sympathy and most opportune and substantial help manifested and offered by your Government and people, have deeply been appreciated by the nation at large, and such help shown in most needed time will be remembered for ever.

In conclusion, I can assure you that we are not a nation to despair under a heavy blow of nature such as the present; our history heretofore proves the fact. Our forefathers did not fail to find the bright and silvery side, even in the heaviest and darkest clouds, however threatening and despairing they appeared to them, and had ability to turn misfortune to their advantage instead, that is, they made use of it as a stepping-stone to a higher stage. I have, therefore, a strong conviction that we, Tokyo telephone men, have been given a golden opportunity to undergo fundamental improvement both in equipment and service to the community. In this connexion and with this aim, I earnestly beseech your kind assistance and advice.—Yours most sincerely,

N. SHIMUYO,
Director,
Tokyo Central Telephone Office.



[Drawn by H. G. Brundle.

E. H. SHAUGHNESSY.

WIRELESS TELEPHONY.*

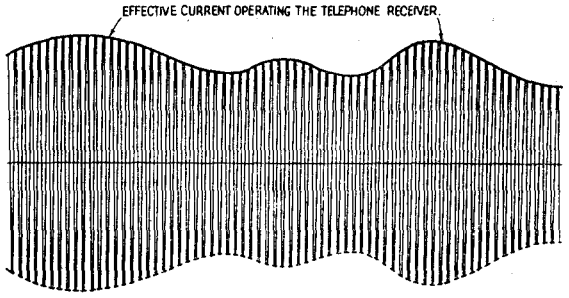
BY E. H. SHAUGHNESSY, O.B.E., M.I.E.E., M.I.R.E.

(*Continued from page* 49.)

This diagram represents continuous oscillations which are varied in amplitude. You see the distance between the peaks of current is constant, but their magnitude varies. Such variation is produced by speech. Now, let us imagine what this means. You have oscillations which, for ordinary broadcasting, vary between 600,000 and a million per second. You see how nice and smooth the modulation appears, but that is purely a theoretical diagram; it never happens in practice. It is necessary to go back now to the first few curves I showed, in which we saw the motion of a diaphragm as produced by various voices and instruments. We have to take the current oscillations that are going about a million a second, and superpose on them all the variations and sudden kicks indicated in the previous curves, and when you consider wireless telephony transmitting music you have to take the whole of these combinations at once. All these 2,000 to 4,000 per second fluctuations have to be superposed, and have to moderate the high frequency oscillations in order to get exact changes of the same nature in the vibration of the ether to produce good transmission.

Fig. 4 represents continuous oscillations being modulated in amplitude. The distance between successive peaks of current is constant but the magnitude of the peaks varies; such variations may be produced by speech, &c. These oscillations are of the order of about one million per second whilst the modulation is of the order of from 800 to 2,000 fluctuations per second. The diagram is purely theoretical and shows gentle and smooth changes in amplitude. In order to appreciate what happens in the wireless broadcasting of music it is necessary to visualise the low frequency kicks, spasms and contortions produced on diaphragms when speech and music is the source of the sound (illustrated in the earlier figures of sound wave forms), and superpose these complicated forms on the uniform high-frequency oscillations so as to modulate them in exact accordance with the source of sound. These oscillations will then produce waves in the ether that contain all the characteristics necessary to reproduce similar oscillations in a receiving aerial. It is necessary that this should happen if good transmission is to take place.

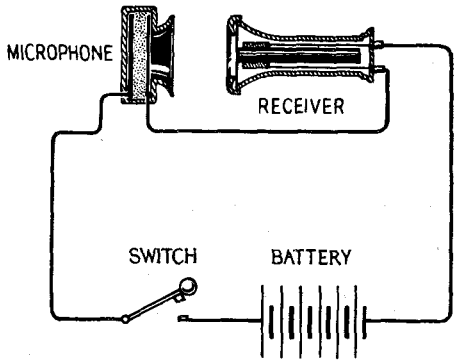
In order to show the principle of producing continuous oscillations by what is known as the reaction or feed back method, let us examine Fig. 5. Here is an ordinary microphone joined in series with and placed opposite to a telephone receiver with a battery in circuit. On depressing the key the current flowing through the receiver produces a sound—this sound "speaks" or "reacts" on to the microphone, the latter transmitting this on to the same receiver again and the whole process is repeated so rapidly that a musical note of from about 400 to 1,000 vibrations per second is produced and can be maintained.



CONTINUOUS OSCILLATIONS WITH VARYING AMPLITUDE CAUSED BY VOICE.

FIG. 4.

In Fig. 6 is illustrated a thermionic valve arranged to produce continuous oscillations by the reaction process. It will be observed that the coil in the plate circuit is magnetically coupled to the coil in the grid circuit. When the current rises to a large value in the anode circuit it induces a voltage in the grid coil which tends to stop the anode current flowing; the anode current diminishes as a result of this, but the effect of a diminishing anode current induces a voltage in the grid coil which tends to make the anode current rapidly increase, and so this reaction between the two circuits will continue and produce sustained oscillations. The frequency of these oscillations may be determined by tuning either the anode coil or more usually the grid coil by placing a condenser in parallel with it. These oscillations are usually of high frequency of from 50,000 to 1,000,000 per second, and can be utilised for producing radiated wireless waves. This can be done by using an aerial connected to an aerial tuning coil coupled to the anode coil and joined through a telephone microphone to earth. On speaking into the microphone the resistance of the aerial circuit is varied, thus varying the strength of the aerial current, or, in other words, modulating the amplitude of the continuous oscillations in the aerial and causing modulated continuous waves to be radiated.



PRODUCTION OF SUSTAINED OSCILLATIONS BY MEANS OF TELEPHONE.

FIG. 5.

That is the simple way of looking at it. In practice, of course, it is not quite so simple. You get quite good results with small power, but it is found in wireless telegraphy and in wireless telephony that troubles which are insignificant on small power become important on larger power. Fig. 7 will give you some idea of the type of set which is necessary. One thing in connexion with a fairly big transmitting set is that for wireless telephony the valves for producing the oscillations are usually worked with 5,000 volts on the anode and it is very expensive to get a satisfactory 5,000 volt dynamo. There are means of getting 5,000 volts from alternating currents, which also involve the use of valves for the purpose of rectifying those alternating

* Paper read before the Telephone and Telegraph Society of London, Nov. 19, 1923.

currents to make them direct currents, and despite the fact that you can quite simply make them direct currents, you must do more than that because, supposing we have alternating currents, it would not do to rectify the current so that the C.D. feed into the valve was of a sine wave pulse form ; if it were, you would get modulated continuous waves, and if you tried to speak on that there would be trouble. The arrangement which is used for producing direct current is to use a split transformer. One-half of the current can go through one rectifying valve and the other half can go through the other rectifying valve, between the middle point of the split transformer and the junction of the two filaments in parallel, and 7,000 volts is produced. Now that 7,000 volts has to have a very big condenser, a big iron core choke and another condenser to smooth out the line wave form of direct current feed in order to get unmodulated continuous waves in the aerial to begin with.

I dare say some of you have noticed at times when you are listening to some of the broadcasting stations that you can hear a high-pitched note. It is of so high a pitch and so well is it smoothed out that as soon as speech or music begins its effect is inaudible. The rectifying valve in a set like that is different from the oscillating valve, it simply has a filament and an anode. It has no grid and it will only pass current through it in one direction, so that if you apply an alternating current you only get half the number of impulses through it that are actually applied to it. Fig. 8 is a picture of a standard 3 kw. wireless telephony set complete with rectifier and controls.

Broadcasting in this country was first mooted at the beginning of last year. At the first meeting there were something like 20 firms that applied for transmitting licences ; most of them wanted to send in London. The Post Office said "No"; "This is only going to produce chaos"; "Settle it among yourselves."

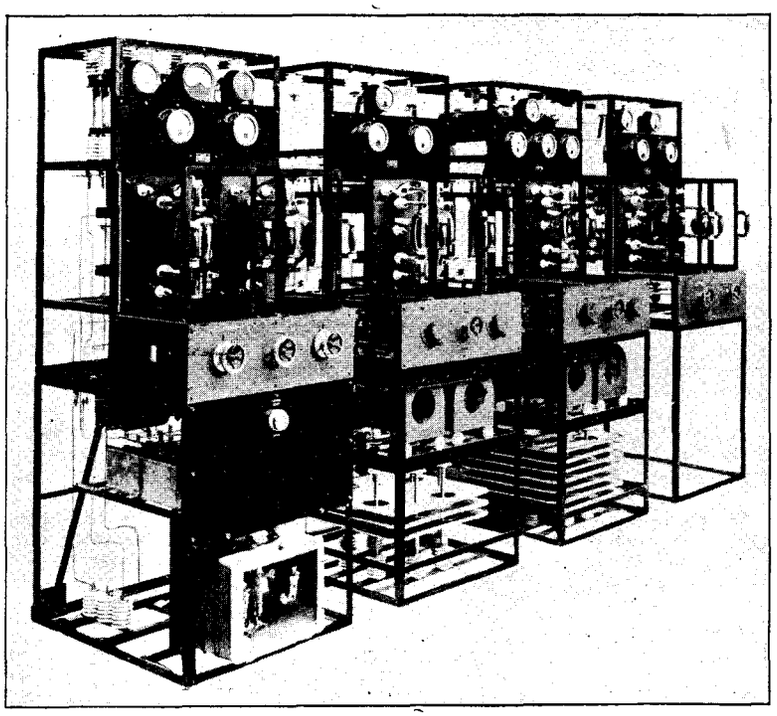


FIG. 8.

Being good business men, they went away, and in the short space of six months they had an idea of what they wanted and they brought a scheme which was workable. It was that there should be one company who should do all the broadcasting. They arranged among themselves that there should be a pooling of all patents for transmission. The advantage was obvious : the Broadcasting Company could be started without any worries as to whether they were infringing patents. They could also start with the knowledge that if they put up good stations there was no question of their being disturbed for a certain period. They were able to collect an expert staff and to consult and take advantage of all the telephone and radio experts in the country.

There was close co-operation but no petty jealousy. At the first meeting it was suggested that there should be simultaneous broadcasting. Many of us thought that the transmission of music, orchestras, and such like things over lines would never, owing to attenuation, overhearing and distortion, be on a very large scale, but when the problem was put up to the Post Office the P.O. Engineers found excellent lines and the Broadcasting Company were able to exercise their skill and ingenuity to such an extent that we have had simultaneous broadcasting which has set the pace for the whole world ; I think we are in advance of all countries. This could never have happened if there had been a number of transmitting stations. Imagine half-a-dozen companies trying to agree with each other and the Post Office as to the allocation of lines ! The thing would be chaotic. We seem to have started in this country exactly where they will have to get in America.

What has been the effect of broadcasting ? First of all, we have had this winter a development of simultaneous broadcasting ; we have seen a remarkable development of the microphone used for sending all these complicated modifications of a continuous wave. We have also had a very large number of receiving sets developed ; some good, many indifferent and many bad, but generally the result has been that we have had a large number of people producing quite good sets.

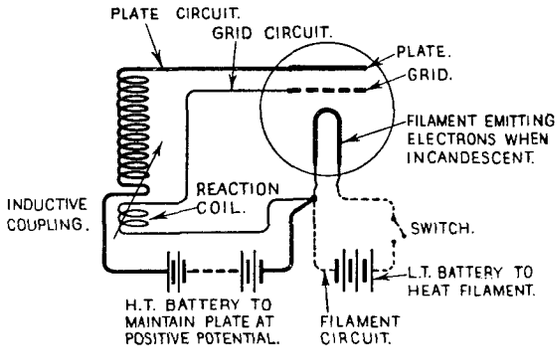


FIG. 6.

I should just like you to picture the appearance of the gardens in certain suburban streets before and after broadcasting took place ; it will give us a very valuable lesson. Before broadcasting was started the Post Office often wanted unobtrusively to put up telegraph poles in the road, but they were always told it would destroy the amenities of the neighbourhood ! The British public are now being educated to appreciate the beauty of variety in poles.

The next rather interesting point in the development of broadcasting was the appointment of a Committee to investigate the Broadcasting arrangements in this country. The Post Office in agreement with the Broadcasting people had said that wireless sets containing reaction should not be permitted for ordinary Broadcast reception. The committee recommended that all restrictions as to the type of receiving sets should be withdrawn. We were rather glad that that had been recommended. Personally I was in favour of withdrawing all restrictions. One reason was that the pirate and the amateur were able to get better results with their sets than with about 80 per cent. of the broadcasting sets which were being sold. There was also another point which had a bearing on this subject. In the early days of the amateur, practically the only thing to receive was continuous wave telegraphy. Now in order to receive the latter it is essential that you must oscillate somewhere and produce a heterodyne note, most of the amateurs did it by reaction direct on the aerial, with the result that they grumbled at one another. In telephony it is found that if one oscillates one's own signals are disturbed, so that there is no desire by anybody receiving broadcast to actually oscillate. It is sometimes done, but one can usually tell when one is doing it, and it is to be hoped that the half-million people who have sets will with practice so manipulate them that the amount of interference will be negligible.

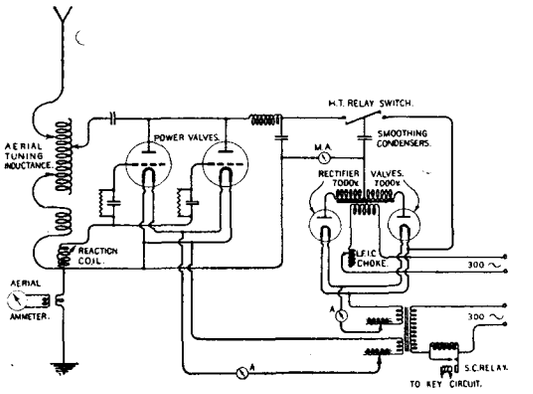


FIG. 7.

If wireless telephony is compared with wireless telegraphy, we find that the former, from a commercial point of view, shows up very badly indeed. Even our experience on land-lines with ordinary telephony, where we use the telephone for telegraph purposes, shows that the words frequently have to be repeated and spelt out. Consequently the telephone is not as good as Morse. Exactly the same thing happens in wireless telephony. There are just those fundamental defects which make telegraphy for telegraph purposes much more reliable and speedy than telephony.

Then there is another and more important disadvantage when the two are compared as means of communication between two places, and that is that for telephony you probably want 20 times as much power as you want for telegraphy for the same distance. It has been variously estimated as from about 5 to 20 times as much. The reason, I think, is fairly simple. When you send telegraphy you make the whole of the energy in the aerial

produce the waves and the whole of the wave is used to produce the signal, and you get the full value of the difference between zero and your maximum.

When, however, you are working wireless telephony, you may start with a current of 10 amps., or whatever it may be, in the aerial and you may fluctuate between 5 and 10 amps. and some of the signals may only be produced by very much smaller fluctuations, and those little bits are reproduced in the receiving apparatus to give you your signal. That is the method generally adopted in wireless telephony.

The Transatlantic trials which took place early this year were very interesting. We have to remember that the very best time of the year and the best time of the day was chosen for these trials and consequently that may be a criticism of them, but the very important conclusion they showed was that it was possible by a more efficient means than had hitherto been used (the means of taking the variations only and amplifying them and putting them on to the aerial) to get intelligible results over a distance of close on 3,000 miles. We know very well that the first Transantlantic trials in telegraphy started with about 3 k.w., and the first station built was 70 k.w. To-day it is not thought that even 300 k.w. is anything like enough to bridge the Atlantic for good commercial radio telegraphy.

Without accurate measurements it is not possible to determine whether long-distance telephony is a practical proposition, because, first of all, it is necessary to get measurements throughout the year in order to determine what power is necessary, what height of masts will be required and what the the whole thing will cost, and also the maintenance.

It should be realised that Radio Engineers had at their disposal all the accumulated knowledge and experience of the telephone engineers and consequently were able to tackle the problem of radio telephony without having to solve the problem of converting speech energy into electrical energy. This enabled them to concentrate on the solution of the problems connected with the radio frequency side of art and has resulted in truly remarkable progress.

I think we can look forward to a good time with the Broadcasting Company. They won't stand still and they have our best wishes for success. Time alone will show how far wireless telephony will be used for bridging the ocean.

TELEGRAPHIC MEMORABILIA.

THE landing of a new transatlantic telegraph cable at Havre, in connexion with the Commercial Cable Company's Anglo-French and Anglo-British extension, brings the number of submarine cables between North America and Europe up to the respectable number of eighteen. The French section is practically a branch of the Canso-Azores main cable. The importance of the Azores as a transatlantic junction for cables thus appears to be increasing, while reflections on the millions which are still being spent on cables as a means of telegraph transmission would appear to be a very practical expression of the continued faith in cables by those who should be among the best judges.

The following are a few facts regarding the cables recently laid by the Pacific Cable Board :—Sydney, N.S.W. and Southport, Queensland, 503.92 nauts. Auckland, N.Z. and Suva Fiji, 1,249.50 nauts.

Wireless is, of course, not being neglected, as the following interesting paragraph, clipt from the London *Times*, shows how eagerness for the establishment of direct radio communication from Vancouver to Great Britain has been whetted by reports that the Pacific Cable Board had conducted experiments last summer in Trans-Pacific radio telegraphy. It is surmised that the experiments have some connexion with the delay in the negotiations between the British Government and the Marconi Co. It is understood that exhaustive tests have been carried out by Commander E. C. Watson, representing the Pacific Cable Board, and the British Post Office, from the coast of British Columbia to Australia, *via* Fanning Island, with such success that an extension of the scheme is likely to include China and South Africa. Commander Watson's plans have been kept secret and the tests have been conducted at isolated points along the coast.

The same authority states that a contract for the erection of a telegraph line between Kabul and Kandahar has been signed and sealed. Work upon this is expected to commence before very long. Thus, telegraphic communication proceeds apace, none the less swiftly because of the *two* roads now open to it.

The *Journal Telegraphique* (Berne) in the November number, pays a worthy tribute to the memory of Sir Henry Babington Smith, of which the following sentences are perhaps the most striking :—

> "He was a brilliant example of a type which has always existed in the British public service ; a man of strength and of exceptional capacity who consecrated himself unselfishly, peacefully and without ostentation to the service of his country. Those who have met him at the various telegraph conferences will retain a recollection which the years will not efface."

The United States Army aviators have demonstrated at Mitchell Field a landing alimeter, or what may be termed an automatic danger signaller or *air feeler*, invented by Arthur W. Uhl, of Brooklyn, and designed to tell the flier of the proximity of obstacles within a radius of 100 feet of his machine. The device consists of plate condensers similar to vacuum tubes working in an oscillating circuit and attached to an indicator in the cockpit.

The Annual General Meeting of Marconi's Wireless Telegraph Co., Ltd., showed a credit balance of the profit and loss account of £302,948, to which was added a balance brought forward from the last account making a sum of £967,778, subject to corporation and income tax. Dividends representing 15 per cent. on the Ordinary and 12 per cent. on the Preference shares were recommended, leaving a balance of £525,272. An abridged statement in the *Electrical Review* says :—Unsettled political conditions, unstable exchanges, and financial stringency continue to render working extremely difficult and restricted. None of the company's claims against Government departments, arising out of the war, has yet been settled. Negotiations are proceeding with the Chancellor of the Exchequer with a view to referring all these questions to a single arbitrator. The general meeting had been delayed as it appeared at one time that an agreement would be arrived at between the company and the Postmaster-General in respect of licences to conduct telegraph services with the Dominions, Colonies and foreign countries. Difficulties had arisen, however, in concluding such an agreement, and it was impossible to postpone the meeting further.

The report of the directors of the Western Telegraph Co., Ltd., a company wholly engaged in the public service of telegraphy, pure and simple, shows that for the year ended June 30, 1923, revenue amounted to £1,463,174, and the working expenses to £906,474. After providing £32,747 for debenture stock interest, and £196,711 for income tax, there remains a balance of £327,242. To this is added a sum of £200,000 transferred from the provision on account of investment fluctuations, and £114,392 brought forward from the previous accounts, making a total of £641,634. A distribution of 10 per cent. was recommended, free of tax, for the year. The balance of £329,739 is carried forward.

The National Telewriter Co., Ltd., after paying interest on debentures has made a profit of £1,123 for the year also ending on June 30.

AIR MINISTRY.—The Air Ministry announce the inauguration of a Radio Weather Report service for ships at sea for all coasts of the British Isles. These, however, should also prove useful to shipping interests on shore. The service will commence on the 1st inst. and will be broadcast by the Air Ministry s long range radio station.

AUSTRALIA.—Here also a similar service has been opened, for, according to *Commerce Reports*, the Navy Department of the New Zealand Government, acting in conjunction with the Australian Government, has inaugurated a service for broadcasting weather reports sufficiently comprehensive to be available to any ship in the waters surrounding New Zealand and Australia or the Pacific islands. The co-operation of ship masters is sought in reporting weather conditions.

BELGIUM.—The first radio telephone broadcasting station was opened of Nov. 25 at Brussels.

CANADA.—It is stated on excellent authority that a new radio direction-finding station will be erected at Pachena, on the west coast of Vancouver Island, by the Canadian Government, which, on account of the frequency of shipwrecks in the vicinity, is taking this means of affording additional protection in foggy weather.

COOK ISLANDS.—Reuter's agent at Wellington, N.Z., authorises the following interesting Rarotongan item of news that the erection of two radio stations at Aitutaki and Mangaia, two of the Cook Islands in the Eastern Pacific, which has been authorised by the Cabinet, will be of great value to shipping and merchants. Three young Rarotongans have been selected for training in radio telegraphy in New Zealand, and are expected to qualify in time for the next fruit season. The installation in these islands will enormously assist towards the reduction of running costs to shipping, and will also ensure the expeditious handling of large fruit cargoes. We raise our hats to the new Rarotongan recruits to the science of telegraphy of the wireless type.

FRANCE.—A decree of April 6, 1923, regulating radio-telegraphy on French ships became applicable also to foreign ships in French ports on Oct. 6, and is the latest regulation of radio communication in the interest of safety of life at sea. It is an adaptation of the requirements of the International Convention of 1914 for Safety of Life at Sea, and the French war requirements for wireless apparatus on ships.

The *Daily Mail* recently gave the following interesting account of the results of some short-wave-length experiments before the Academy of Science in Paris :—General Ferrie, who is in charge of Eiffel Tower radio station, said that it had been found possible to communicate at a distance of $1\frac{1}{4}$ miles with a two-metre wave-length. The aerial used was 1 metre (39 in.) in length. By increasing the intensity of the oscillations and by other devices, it would be possible considerably to increase the distance at which messages could be heard.

GREENLAND'S ICY MOUNTAINS.—The Danish Government has decided upon the construction of radio stations in Greenland. They will be situated at Godhavn, on Disko Island ; Godthaab, on the west coast of Greenland ; Julianehaab on the south coast ; and the Angmagssauk on the east coast.

HONG-KONG.—During the recent typhoon at Hong-Kong, when great damage was done, the gale wrecked the masts of the local radio station at Cape d'Aguilar and also carried away the aerials of the naval station. In order to maintain the necessary radio communication with shipping while a temporary station was being erected at Cape d'Aguilar, the local Director of Public Works asked permission from the Marconi Co.'s representative at Hong-Kong to utilise the Marconi equipment on vessels in harbour. This permission was readily granted, and communication was successfully maintained, first by the Marconi installation on the s.s. *Empress of Australia* and, on that vessel's departure from Hong-Kong, by the s.s. *Kut Sang*.

INDIA.—It is the opinion of *Commerce Reports* that greater appreciation of the value of radio-telephony is apparent in India, especially among the more enterprising native States. The latest installations reported are at Srinagar and Jammu City in Kashmir, which are separated by mountains 15,000 ft. high. The success of radio-telephony in this instance has led other States to consider similar projects, stations being under contemplation in Bhopal, Gwalior, Hyderabad (Deccan) and Rajkot.

Indian Engineering announces also that a Bombay firm (? Parsee) has registered a company named the Indian Radio-Telegraph Coy., Ltd., with a capital of three crores of rupees for the purpose of erecting a high-power radio station in India.

The same authority states that good progress is being made with the erection of a high-speed radio installation to operate between Rangoon and Madras, and it is hoped that the scheme will be in working order by the first month of 1924.

ITALY.—The *Electrical Review* informs us that the full text of the concession handing over the State's radio-telegraphic service to a private company, the "Italo-Radio," has been published, and contains 42 articles. The company, it may be recalled, will have an initial capital of 6,000,000 lire, to be raised later to 60,000,000 lire. The concession enumerates the stations, &c., to be taken over, but stresses the fact that "broadcasting radio-telephonic and marine services" are excluded from its purview. For the use of the existing stations and plant an annual rent of 1,100,000 lire is stipulated. The tariff to be charged is that of the Radio-telegraphic Convention of London, 1912, that of Petrograd of 1875, and later modifications of the same. Plant for the old or new stations to be built, where possible, must be bought in Italy from Italian firms, and the company is pledged, within 18 months from the date of the concession, to arrange for the manufacture in Italy of all apparatus covered by the patents of the Telefunken Co., the Compagnie Générale de Télégraphie sans Fil and the Société française Radio Electrique, and generally all radio-electric material, according to the needs and possibilities of the industrial market. Both the State and other concessionaires are to be free to use radio-telegraphic apparatus of any kind, and in any future contracts with foreign firms this principle of absolute freedom is to be upheld. Lastly, the Government reserves the full and unquestioned right to approve or not sub-concessions granted by the Italo-Radio to other companies, which latter will assume all the obligations attaching to the former company.

RUSSIA.—According to the *Ost Express* (Petrograd) a new radio station has been opened at Tsarskoye Selo.

SIAM.—The following appears to express the opinion of commercial circles in Siam regarding the practical uses of radio-telephony in that country. "Demonstrations in Siam with Marconi duplex wireless telephone sets by a representative from England have interested officials. The Italian agents of the Marconi Co., Messrs. G. Kluzer & Co., have a few sets on order. The maximum range guaranteed is 75 miles. It is not expected that broadcasting will ever become a recognised thing in Siam, but the radio telephone may develop a limited use commercially if continually encouraged by representatives on the spot."

SOUTH AFRICA.—The following items regarding radio licences in South Africa and the latest news regarding the South African high-power radio station, are culled from *Commerce Reports*. The licencing system appears to be a considerably more complicated type than that of the home-land. Under regulations recently issued, the Postmaster-General is given extensive power with regard to the issuance or cancellation of radio licences. These are of three classes, the broadcast licence is granted for a period of five years and is renewable, on application, during the fourth year. The broadcaster is authorised to rent receiving sets, to charge for broadcasting, to send out advertising matter for not more than 10 per cent. of the total broadcasting time each day, and to make contracts with persons having listening licences. He is obliged, however, to broadcast public information free of charge during certain limited periods at the request of the Postmaster-General. An experimenter's licence covering receiving and transmitting costs is 10*s.* per annum, but such licences carry with them the obligation of a contract with the broadcaster in whose zone the experimenter is located. For the purposes of this contract, the broadcaster may charge only one-third of the listening rate, but at the present time this rate has not been specified. Receiving licences carry a charge of 5*s.* per annum. The licences for experimental or amateur stations forbid the imposition of any charge by the persons holding them. Experimenters are restricted to two periods a week for transmission, and the aerial used is limited in length to 60 ft. for a single wire and 70 ft. for double wire, while the height above ground must not exceed 40 ft. Listening licences for other than private residences carry an additional charge.

It will be remembered that the Wireless Telegraph Co. of South Africa, Ltd., was recently organised to provide international telegraphic service for the Dominion. The principal station is to be located at Klipheuvel, Cape Province—about 30 miles by rail from Cape Town. The site comprises about 2,110 acres, and is about 10 miles distant from any mountains. It is estimated that the station will be in operation in about 18 months. The power of the new station will be 750 kW., and it is probable that it will operate on a wave-length of about 16,000 metres. The aerials will be supported by 16 towers 800 ft. in height, arranged in the form of a circle, having a diameter of 1½ miles. Beneath this circle an earth screen will be supported on 250 towers 40 ft. in height.

U.S.A.—The radio-control Bill which failed to pass the last Congress because of the congestion of the Senate calendar in the closing hours of the session, will be introduced again early in the next session, according to Secretary of Commerce Hoover. The principal features of the measure are to vest control over radio in the Department of Commerce, requiring transmitting stations to obtain licences so that confusion in the air may be eliminated by regulations stipulating the wave-lengths to be used and hours of transmitting.

EARLY MORNING LISTENERS-IN.—It is reported in the daily Press that broadcast radio-telephony across the Atlantic was accomplished by the British Broadcasting Co., Ltd., in the early hours of Nov. 26, when some of the English stations were heard in various parts of America. During the early hours of Nov. 27, American stations reciprocated and several of them were heard at different places in this country, but "atmospherics were terrific," and oscillating sets also caused some trouble. Apart from the B.B.C. transmission, the Radio Society of Great Britain is organising an amateur test on Dec. 22, between 1 and 3 a.m., and French amateurs will try on the following night. An endeavour will be made to transmit messages in Morse code across the Atlantic, and the G.P.O. is permitting a number of amateur stations to increase their normal power of 10 watts to 1 kW for the tests. On Jan. 11 the American Relay League will transmit to this country.

Reference has previously been made in these columns to the early morning vigils of our young radio enthusiasts, and extracts from the log of one of our readers was, it will be recalled, actually given. This enthusiasm for the cause of science is apparently not seconded by everyone, and a reader (P. B.) in a recent number of the *Westminster Gazette* writes the following lines upon a paragraph in the daily press inviting listeners-in to rise at 3 a.m. to test the possibility of hearing America across the Atlantic by wireless. The verses are entitled "Reveille." The writer, not by any means a lie-a-bed, confesses to some considerable sympathy with the author of the lines !

There may be infinite delight
In store for one who wakes
While yet untroubled is the night,
And valiantly forsakes
The comfort of a downy bed
To sit with harness on his head ;

There may be music in the skies,
Borne gently o'er the deep,
Which fair Columbia supplies
While yet the world's asleep,
That she may tempt her distant kin
To banish dreams, and listen-in.

But is it meet that I should let
Myself be lured away
By promised melody while yet
There is no sign of day ?
Such cowardice I must decline :
You'll call me, if you please,—at nine !

An ex-Service reader sends me another well-authenticated anecdote of Army days with the telegraphs and telephones, and relates how, upon one occasion when testing a long drum of twin wire by means of the telephone, and after listening to the speech from his officer who, of course, was only a matter of a few yards away, reported in the usual technical terms, "You seem a long way off, sir." What was his surprise to receive the following rather heated reply shouted across the short intervening space, "What do you mean, you ——— fool ? Can't you see I'm only just across the road ? "

M. Belin, who lectured before the Royal Society of Arts in London recently on "Telephotography without Wires," made the following deeply interesting statements concerning television which, he said, "must not in any way be looked upon as simply an improvement on telephotography, but constituted a thing quite apart, which was nearly, and would soon be, actually, vision at a distance, a problem long considered as chimerical, but to-day looked upon as possible and to-morrow would be one of the realities." He added later the fact that "the researches made in the laboratory at La Malmaison had enabled the realisation in principle of the first experiments showing that television was no longer an impossibility. All the experiments were made with 'wireless,' and he had come to the conclusion that the expected solution of that problem was very near at hand."

So the poor old cable steamer *Faraday I*, which, in its 50 years' existence, has laid some fifty thousand miles of submarine cable in all parts of the world, is not to be broken up after all. She is destined to drag out the remainder of her life as a coal hulk at Algiers. How are the mighty fallen !

Those who recall the pathetic figure of M. Luc Victor Clement Collignon, the respected chief of the Antwerp Central Office, in August, 1914, will learn with deep regret that he passed away in his beloved city on Dec. 13 last. It may not be generally known that it was due to M. Collignon and his colleague, the Technical Technician, that direct telephonic communication was maintained with London up to literally the eleventh hour of the enemy encircling movement. Neither do they know probably how essential parts of the telegraph apparatus were hidden from the enemy at that eleventh hour. As chief of the Antwerp office, he was yet content to take the place and perform the tasks of an ordinary operator in the Cable Room though, even then, he was in his sixty-first year ! Intensely earnest in the performance of his duties while with his English colleagues, he set a splendid example to his compatriots. Never did this earnestness relax its hold upon him, never did his courage fail him right up to the joyful day when he returned to his native land. There was not a single Britisher in the London office who did not respect that aged, patient and brave personality, who deserved

so well of his country. To his bereaved wife and family the London office pays its tender sympathy, to the memory of a brave soul it pays its respectful homage. M. Collignon was an Officer of the Order of Leopold II, Chevalier of the Order of Leopold II, was decorated with the Civic Cross of the 1st Class, with the commemorative medal of the reign of Leopold II, and also with the commemorative medal of the 75th anniversary of the Belgian telegraphs.

Revenge.—This is certain, that a man that studieth revenge keeps his own wounds open and green which otherwise would heal and do well. Certainly in taking revenge a man is but even with his enemy, but in passing it over he is superior, for it is a prince's part to pardon.—BACON'S ESSAYS. J. J. T.

THE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

"The Significance of State-owned Telephones" was the title of a deeply interesting paper read by Wm. Day, Esq., M.I.E.E., at the Institution of Electrical Engineers, on the 17th ult., Mr. Kidner kindly taking the Chair in the absence of Colonel Purves. The reading of the paper was followed by an equally interesting discussion, and as is not always the case, several members being unable to voice their views owing to the number of speakers and the time limit. Mr. Day held the balance very well between State-owned and private-owned control, so much so that more than one speaker hinted that the lecturer was engaged in the perilous occupation of sitting on the fence. Mr. Day, however, proved quite capable of taking care of himself, and defended his utterances with considerable vigour not unmixed with a dry humour all his own. The spirit of the debate was excellent throughout, and was, no doubt, indicative of the trend of modern economic thought in the minds of many of our younger members. American experience was quoted *pro* and *con*, but there was a very definite stream of feeling that American usage and experience is not the last word on the question, while evidence was forthcoming from some of the speakers to the effect that private control in the U.S.A. was actually one of the influences which at one time kept back automatics! There was, however, a consensus of opinion at the close of the proceedings that, so far as Mr. Day was concerned, there was one historic sentence which best fitted the occasion, viz., "We will hear thee more on this matter."

J. J. T.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

TELEPHONES.

THE new business in October was again exceptionally good, the gross new stations added being 18,909, the highest total on record, and the net new stations 8,977. At the end of the month the total number of stations in use was 1,108,590, of which 395,032 were connected with London exchanges and 713,558 with Provincial exchanges.

There was a large addition to the number of residence rate subscribers in October, the net increase of 2,919 being, in fact, the best on record. At the end of the month the number of private house connexions totalled to 171,451, compared with 144,181 a year ago.

At the end of October, 481 rural exchanges had been authorised under the revised conditions announced in May, 1922, and of these 305 were working, 33 being opened during the month.

The following statistics give some indication of the general development during the quarter ended Sept. 30 last, in urban and rural areas. It will be seen that whilst the number of subscribers to rural exchanges represents but a small proportion of the total, the growth in rural areas was again relatively much better than that in urban areas :—

Rural Areas.	No. of Exchanges.	Exchange Lines.	Stations.
June 30, 1923	1,756	40,988	52,196
Sept. 30, 1923	1,862	44,688	56,395
Increase during quarter... ...	106	3,700	4,199
		=9%	=8%
Urban Areas.			
June 30, 1923	1,510	619,903	1,022,593
Sept. 30, 1923	1,508	635,837	1,043,218
Increase during quarter... ...	2	15,934	20,625
	(*decrease*)	=2.6%	=2%

It is interesting to note that for the quarter under review the percentage growth in exchange lines was higher, both in urban and rural areas, than the percentage growth in stations. This no doubt is due to the large increase in Residence Rate subscribers, whose needs in the great majority of cases are probably met by the installation of a single station circuit.

During the six months ended September last there was a substantial increase in trunk traffic, the number of calls originated being the highest on record. The traffic in each of the last three half-years was as follows :—

Half-year ended :	Total number of calls.	Increase over corresponding period in previous year. Number.	
Sept. 30, 1922 ...	28,833,000 ...	2,801,000	11%
March 31, 1923 ...	30,009,000 ...	4,043,000	16%
Sept. 30, 1923 ...	33,769,000 ...	4,936,000	17%

The calling rate generally, however, remains much at the same level as, although in October it had recovered from the seasonal fall in the summer months, the percentage increase over that for the corresponding month of last year was little higher than in the earlier months of the year.

Statistics shewing the general development of the service to date in the current financial year are given in the appended table :—

	At April 30	At May 31	At June 30	At July 31	At Aug. 31	At Sept. 30	At Oct. 31
EXCHANGES :—							
London	99	100	100	100	100	100	100
Provinces	3,107	3,140	3,166	3,187	3,223	3,270	3,306
Total	3,206	3,240	3,266	3,287	3,323	3,370	3,406
STATIONS :—							
(1) Exchange—							
London ...	367,403	370,576	373,845	375,679	377,445	380,166	382,884
Provinces ...	657,734	664,527	670,068	675,992	682,706	689,047	695,423
Total ...	1,025,137	1,035,103	1,043,913	1,051,671	1,060,151	1,069,213	1,078,307
(2) Private—							
London ...	12,149	12,216	12,303	12,025	12,053	12,113	12,148
Provinces ...	18,753	18,632	18,573	18,451	18,383	18,287	18,135
Total ...	30,902	30,848	30,876	30,476	30,436	30,400	30,283
(3) Total Exchange and Private—							
London ...	379,552	382,792	386,148	387,704	389,498	392,279	395,032
Provinces ...	676,487	683,159	688,641	694,443	701,089	707,334	713,558
Total ...	1,056,039	1,065,951	1,074,789	1,082,147	1,090,587	1,099,613	1,108,590
PUBLIC CALL OFFICES :—							
London	3,808	3,817	3,838	3,836	3,842	3,854	3,876
Provinces	12,766	12,915	13,000	13,085	13,169	13,264	13,368
Total ...	16,574	16,732	16,838	16,921	17,011	17,118	17,244
PUBLIC CALL OFFICES IN STREET KIOSKS	432	451	474	492	506	523	539
RURAL PARTY LINES	7,038	7,221	7,379	7,537	7,675	7,755	7,843

Further progress was made during the month of November with the development of the local exchange system. A new London exchange, "Royal," which replaces "Minories," was opened, and among the more important exchanges extended were :—

LONDON—Latchmere.
Walthamstow.

PROVINCES—South (Birmingham).
Smethwick (Birmingham).
Bradford.

During the month the following additions to the main underground system were completed and brought into use :—

Derby—Leeds.
Bristol—Bath.
Kilmarnock—Ayr—Troon.

while 37 new overhead trunk circuits were completed, and 36 additional circuits were provided by means of spare wires in underground cables.

The
Telegraph and Telephone Journal.

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

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. X. JANUARY, 1924. No. 106.

A YEAR'S PROGRESS.

THE year 1923 was not signalised by any remarkable revival in trade, but nevertheless the telephone system of this country made the greatest progress yet known. It is, of course, impossible that the full results of the year's development should be known at the time these lines are written, but we have access to the figures for November and can estimate those for the end of December with some approximation to accuracy. The total increase in telephones in Great Britain and Northern Ireland during 1922 was 67,000. We ventured in our issue of last January to predict an increase of 75,000 in 1923. As nearly as we can gauge, with a month's totals to come, it will be 100,000. There were, at the end of November, 1,119,365 telephones (of which 398,060 were in the London area) belonging to the Post Office, and at the present rate of progress the total for the year should be 1,129,800. Adding 20,000 for the Hull, Guernsey and Jersey telephone systems, we can estimate that there will, therefore, be 1,150,000 in Great Britain and Northern Ireland by Jan. 1, 1924. Another modest prediction made in these columns early last year was that London would reach the figure of 400,000 telephones by the end of the year. This seems likely to be just fulfilled—there were, as we have mentioned, 398,000 at the end of November, and the rate of progress has been above 2,000 a month.

The development of the rural exchange system has been even more remarkable. No less than 330 new exchanges, chiefly in villages or small country towns, will have been opened by Jan 1 next, raising the total number from 3,140 in 1922 to 3,470 in 1923. This, of course, represents nearly one new exchange per day, including Sundays. A feature of the year's work in this connexion was the extension of the telephone system to the Orkney Islands where 2 exchanges were opened. New exchanges were, in fact, opened in all parts of Scotland, six being opened in Bute, 5 each in Aberdeenshire, Forfarshire and Wigtownshire, and 4 in Argyllshire. In England new exchanges were opened in every county without exception, including even Rutland and Huntingdon. As might be expected the most extensive counties shewed the largest increase, Lancashire having 23, Yorkshire 20, Sussex 17, Lincolnshire 15, Hampshire 14, Shropshire and Devon 10 each, Kent 9, Herefordshire and Essex 8, Somerset 7, Cumberland, Durham, Norfolk, Suffolk, Gloucester, Cornwall and Berkshire 6 each, and Northumberland, Cambridgeshire, Staffordshire, Worcester, Warwick, Bucks and Dorset 5 each.

During the year three additional circuits were provided between England and Belgium, and the manufacture of a cable commenced which is expected to provide at least 8 additional circuits to the Netherlands before the end of next summer.

A similar story of progress cannot, unfortunately, be told regarding the Telegraph Service. That service is peculiarly sensitive to the conditions of trade and commerce and, like trade and commerce, it is passing through a period of depression unparalleled for many years. Until trade revives, there can be little reaction in the state of telegraph traffic and fortunately there is some reason to hope that better times for the country as well as for the Telegraph Service may not be far distant.

During the past year, however, there has been considerable progress in the internal practices of the Telegraph Service. The use of Multiplex machines has been extended, and another development of especial interest has been the introduction on a number of routes of the Morkrum Teletype "start-stop" machine. These and other improvements will enable the Telegraph Service to meet public demands on it even more efficiently than in the past.

HIC ET UBIQUE.

FROM the latest official figures procurable, it would appear that at the end of 1922 there were 22,937,000 telephones working in the world. The figure is made up as follows :—

North America	15,557,000
Europe	5,903,000
Asia	683,000
Australasia, &c.	388,500
South America...	283,500
Africa	122,000
	22,937,000

This is an increase of over a million on last year. We hope to give detailed statistics of the development of the world in an early issue.

A REPORT of the Dutch Postal, Telegraph & Telephone services for 1922 shews a reduction in inland telegrams from 3,957,179 in 1922 to 3,194,396. Foreign telegrams fell from 5,917,307 to 5,319,848, largely due to a decrease of 500,000 in the Netherlands-German traffic. Telephone trunk calls, however, rose from 11,150,827 to 11,471,604. The traffic to France amounted to

15,444 calls, to Belgium 276,095, to Germany 623,806, and to Great Britain (4½ months) 12,417 calls. The traffic to this country, of course, involves the use of a long submarine cable and a comparatively high charge.

IN the *Electrical Review* of NOV. 16 appears a letter from Mr. H. Moss enclosing one of the earliest telephone licences issued by the inventor's agent for Great Britain and Ireland. We consider it of sufficient interest for reproduction :—

[COPY.]

THE TELEPHONE.

SALE.

Articles of Agreement and Licence to Use.

The General Agent for Professor Alexander Graham Bell's Articulating Telephone hereby agrees to sell, and JAMES DAVIS, of 51, TYRREL STREET, in the town of BRADFORD, County of YORK, hereby agrees to purchase Two TELEPHONES .....

.....

.....

with the right to use the said apparatus for LECTURING AND EXHIBITING purposes at .....

.....

.....

in the counties of YORK AND DURHAM and in no other place, and for no other purpose, except and by the approval and under the sanction of the said General Agent, to be expressed in an Agreement to be granted for that purpose, for a sum of TWENTY-THREE pounds sterling. LESS 15 per cent.

The said apparatus shall become forfeit to, and the property of, the said General Agent, should not the terms of this agreement be observed.

The General Agent shall afford the said JAMES DAVIS all reasonable power to employ the said apparatus for purposes of a similar character to that specified in this agreement by the execution of fresh agreements at a nominal charge of £1 each for registration, notification, &c., and the said JAMES DAVIS shall afford the General Agent or his representative every facility for tracing the employment and the uses to which the said apparatus is applied, and shall, on the request of any such authorised person, refer the same to this document as the authority under which the said apparatus is employed.

Dated this EIGHTEENTH day of FEBRUARY, 1878.

WM. H. REYNOLDS,
General Agent for Great Britain and Ireland.

(NOTE.—This form is to be handed to the Purchaser.)

THE following interesting cuttings are also taken from the *Electrical Review* :—

Finland.—AUTOMATIC TELEPHONE EXCHANGES.—The directors of the Helsingfors Telephone Exchange Association have decided to extend the automatic telephone exchange at Helsingfors, which is now in course of construction, by the addition of 2,000 numbers, and the Tolo exchange by 1,000 numbers. The orders have been given to the Siemens and Halske Co.

Italy.—TELEPHONE CONCESSION.—According to reports from Stockholm, representatives of the L. M. Ericsson Co. are in Italy for the purpose of negotiating with the authorities in the matter of obtaining concessions of the telephone system in that country. The proposals of the Italian Government are said to be the division of the country into districts which are to be given to concessionnaires. Keen competition is expected to be met by the Swedish company, particularly from the Germans.

WE hear that Mr. H. P. Brown, Staff Engineer, Engineer-in-Chief's Department, has been appointed Director of Telegraphs and Telephones to the Australian Government at a salary of £2,500 a year. We offer him our hearty congratulations.

WE learn from *Commerce Reports* that long-distance telephone communication has been established between Constantinople and Smyrna, and an additional line between Broussa and Angora is under consideration. The service is administered by the Constantinople Telephone Co.

WE offer all best wishes to our readers for their health and prosperity in 1924.

THE SIGNIFICANCE OF STATE-OWNED TELEPHONES.*

BY WILLIAM DAY, M.I.E.E.

LET me say at the outset that I do not propose to adopt an attitude of an apologetical character regarding the subject I have chosen. Some may consider it incapable of fresh treatment after all that has been written and said regarding state-owned telephones—others may think it remote from their everyday work as technicians. I dissent, sir, from both these views. It is true that we may have too much discussion of the wrong sort—discussion dominated by misleading phrases and by words which fetter thought. It is certain, however, that there is far too little scientific consideration of those aspects of the industrial problem which are cognate to that which I am now introducing.

As to the second possible objection it is, in my opinion, unfortunate that the great technical institutions do not encourage to a greater extent than is the case the discussion of such subjects.

Consider the vital connexion between the achievements of the Scientist, the Engineer, the Technician, and the great industrial edifice built upon their labours. Is it not striking that they should exhibit such comparatively little formal and public interest in the industrial problems arising out of the application of their own discoveries and accomplishments to the service of man. Absorption in their life's work may be one reason. An unnecessarily delicate and fastidious dislike to consider problems which, in their very nature, are incapable of final solution and which cannot be discussed in language of mathematical precision may be another. Whatever the reasons, they are fatal to the attainment of the fullest possible influence in the development and organisation of industry. Not only so, but by abstaining from such public discussion, that most important function has been virtually handed over to the doctrinaire, to intellectual theorists, to professional advocates of one school or another, to journalists, to novelists, as well as to theologians of all shades of opinion. Therefore, permit me to say how glad I am that this Society has a comprehensive conception of its functions and, so long as such discussions as that which I am initiating are, to quote words I remember hearing one of our vice-presidents use, carried on in sincerity, and with mutual respect, nothing but good can result.

In the brief time allowed me, I can, of course, only attempt to light up the various phases of my theme by broad principles and thereby endeavour to gain an effective view point from which to commend their general bearing.

My first submission is this : that, in addition to being Civil Servants, we are workers in a branch of industry and interested, or should be interested, in all those matters which affect industry as a whole : that we should, from time to time, consider the conflict of industrial ideals, contemplate the forces operating upon industrial organisation and watch their reaction upon that particular branch in which we gain our livelihood. We must not be content with the narrow outlook of those whose gaze is never directed beyond the discharge of their particular work. I do not minimise the importance of a diligent performance of the daily task ; on the contrary, I consider it a fundamental obligation. But such dutiful performance can and should go hand in hand with at least an intelligent recognition of the exceedingly difficult problems which confront the industrial administrator and organiser of to-day.

Now, in order that our problem may be focussed aright, it is necessary to carry in mind certain characteristics of the last 100 years or so. That period has witnessed a bewildering succession of brilliant scientific achievements upon which the existing industrial system has been reared. All of us realise its terrible blots, and I certainly appreciate the fact that it is easy to pile up, in rhetorical terms and with an accumulation of epithet, an enormous indictment of that system—as indeed of any system. Some, contemplating its dark and dismal side, sigh for what they vainly imagine to be the bliss of pre-industrial times. All in vain. We cannot go back even if we would for, whatever may be the case in other spheres of human thought and activity, in the realm of science the "soul of man is marching on." Said, a few weeks ago, the late Dr. Steinmetz—a scientist of cosmopolitan stature—"we are at the threshold of an age greater in its significance to the mass of humanity than even the last 100 years—miraculous as the fruits of those may seem to have been." No, sir, there is no going back.

Again, the last 100 years has witnessed great changes in the body politic. Electoral power has passed from the aristocratic class *via* the middle classes to the masses. In this country, Governments can be overthrown, ministers rendered impotent, and policies frustrated by the popular vote. The worker, and this is important, can give a more or less effective expression to his political desires.

Another characteristic of the period under review has been the enormous increase in wealth and its unequal distribution. All thoughtful minds have been disturbed by the inequalities of fortune—to a few enormous wealth—to a much greater number varying degrees of economic security—to many a degrading poverty. Yet, on the whole, and until the tragedy of 1914, there

* Paper read before the London Telephone & Telegraph Society.

was an upward tendency in the standard of living, and that in spite of an enormous increase in population.

Again, the industrial development has changed the relationship between employer and employed. The old personal association has gone ; the worker in industry has become an almost impersonal unit in a vast organisation. This change was rendered inevitable by scientific discoveries and mechanical advances. But the sheer and unnecessary brutality which characterised the earlier phases of the transitional period was due, not to science, but to very common human frailties and, above all, to the lack of an enlightened imagination on the part of those in the control of industrial organisations.

Education of a certain type has become nation-spread and bears the promise of a hope of far-reaching effects in all the relationships, not only in industry, but of life.

Finally, there has emerged the demand of those usually described as "the worker" for a share in the control of their economic conditions and destiny. This demand has taken many forms, but consciously or otherwise it is grounded, as I see it, upon the fact that the development of social consciousness and responsibility has lagged behind the great material achievements of the last 100 years. Great concessions, gained after tremendous struggles, have been made to this demand. But these conflicts inflicted enormous losses on the community ; losses which became more and more difficult to bear in face of the developing competitive power of this country's great commercial rivals.

Before the war, far-seeing men of goodwill and of all shades of political and economic thought had realised the necessity for a better understanding in the industrial world, and were gradually, very gradually, feeling their way towards happier conditions. During the European struggle, however, industrial relationships became very embittered, and all efforts were required to keep the great industrial army at work.. Then came the peace, but not freedom from fierce internal disputes, and to-day, if there is a lull in the storm it is due to circumstances rather than to a change in temper of the opposing forces.

Many are the proposals put forward to end this melancholy state of affairs. Standing apart and surveying the conflict of ideas concerning the *remedy, I see our countrymen divided into certain schools of thought.* There are :—

(1) Those who believe in state ownership of all industries.

(2) Those who desire the national ownership of certain *vital* industries.

(3) Those who advocate Government *control* of industry instead of ownership.

(4) Those who consider it vital to the prosperity of this country that industry be carried on with the minimum of what they describe as governmental interference.

I recognise that these divisions are, in fact, not so clear cut, so well defined, so distinct, as I may appear to suggest, but they will suffice for my present purpose.

Now, to my mind, the significance of the state ownership of telephones is this : that numbers of our fellow citizens are watching the management and working of the telephone service, not because they have any great interest in telephones as such, but because they regard it as an experiment in Government ownership ; an experiment from which they hope to draw certain conclusions concerning that most perplexing of questions, control and ownership in industry.

If the community as a whole is convinced that, under state management, the telephone service is being conducted with greater administrative and technical efficiency than would be possible under private control, then, in *all probability, we shall see a gradual application of a similar form of organisa*tion to other vital utilities.

On the other hand, if the impression gains, no matter how false it may be, that the highest efficiency and the finest service is impossible under State ownership, then there is more than a probability that the verdict will be, at the very least, against any further extension of a similar form of industrial control. Indeed, it may even be demanded that the existing organisation of the telephones be modified—a development not impossible, given a certain set of political and economic conditions.

Looking at the question of State ownership of the telephones from this standpoint, that is, viewing it as a great experiment in a particular form of industrial organisation, there emerges many questions, two of which I propose to examine. The first concerns the attitude of those responsible for the creation of public opinion on this matter ; the second relates to the attitude of Civil Servants particularly those engaged in the telephone and telegraph departments of the Post Office.

As regards the first of these considerations I think we may ask whether those responsible for the formation of public opinion concerning the telephone utility perform their duty with impartiality, whether their criticisms are directed towards improving the existing methods of administration or to discredit and, if possible, ultimately to destroy it. Are the anonymous journalists who criticise the telephone service so freely merely special pleaders paid to propagate the opinions of their masters, or are they serious contributors to an important discussion ? Do they write with prejudice buttressed by ignorance or with conviction founded upon knowledge ? Do all of even our *foremost* public men whose integrity, ability and willingness to serve the State constitute, together with the unfailing loyalty of the Civil Service the surest safeguards for the stability of the social structure—do they always fairly portray the Civil or municipal servants engaged in industrial organisations ?

Ladies and Gentlemen, you can answer these questions from your knowledge of the many articles which have appeared in the Press and from your recollection of numerous platform utterances. There is no need for me to waste your time by reading typical extracts.

Here we must remember, however, that the opinions expressed in our leading journals are repeated in those of lesser repute, and that the statements of Right Honorable Gentlemen are endorsed on a thousand platforms by *public men of all degrees of influence.*

On the other hand, we must not forget the large number of important organisations and associations whose aim is, quite definitely, a complete reconstruction of our industrial system. So far as the leaders of these movements are concerned, and this is my point, they envisage a condition of society in which the Civil Servant, far from being regarded as a necessary evil, becomes the chief, if not the only, guarantee for its successful working.

To guard my position on this matter, and also the discussion, in so far as that is my responsibility, let me say that I express no opinion concerning any of these views. I merely record them because I consider it is advisable that we should clearly understand the atmosphere—the political atmosphere, in which, what I have ventured to call a great experiment in State ownership is being carried on.

Returning now to the articles and speeches of what may, for convenience, be described as the "anti-Government ownership of telephones" forces, I think they are characterised by three notable features.

Firstly, they lead their readers to understand that Government ownership of telephones is peculiar to Great Britain rather than a condition which the great majority of European States have deemed it wise to adopt.

Secondly, whenever a direct comparison is made it is usually between the British and American administrations, needless to say to the detriment of the former.

Thirdly, there is the insistence that the great qualities of initiative, imagination and, above all, courage—qualities which we shall all agree to be necessary for the conduct on a grand scale of great enterprises—cannot possibly be developed in the atmosphere created by Government administration.

The time at my disposal this evening and the intended scope of my remarks will not permit me to deal adequately with this particular criticism. It would be disrespectful to this audience if I attempted to compress it into a few sentences. It is a delicate and difficult subject, but that, in my judgment, is a reason for discussing rather than for dismissing it. I certainly think it deserves and should receive careful consideration by this Society, and perhaps I may be allowed to submit my thoughts concerning this aspect of the matter on another occasion.

Let us proceed to consider the extent to which the various administrations of the world have adopted Government ownership. We shall see that the case of Great Britain is by no means an isolated one.

I need hardly say that any facts that I shall present are based on information entirely public in character, and perhaps I should add that all figures are necessarily approximate.

Surveying the telephone systems of Europe then, I estimate that, out of a total of 5,820,000 stations in Europe, only one-tenth are owned by private companies. Of this one-tenth, one half are in Denmark, leaving the remainder distributed between Finland, Italy, Netherlands, Norway, Poland, Portugal, Spain and Sweden.

The telephones in Denmark are practically under State control as against State ownership.

In Norway practically half the telephones are in private hands, the Government owning the remaining half which includes the service in Christiania and several other comparatively big towns. The policy of the Government is, or was until quite recently, gradually to acquire the whole of the telephone plant.

In Italy one-third only of the telephones are, or at least were, before Mussolini came into power, under private control.

In nearly all the other European States, including Austria, Belgium, France, Germany, Great Britain, Hungary, Russia, and Switzerland, the telephones are State owned.

Passing now to Asia we find that out of, say, 544,000 telephones, one-tenth only are in the hands of private companies—the 544,000 include the Japanese nationalised system, which, before the recent calamity, probably reached a total of 350,000 stations.

In Africa, including Egypt, practically the whole of the telephones are State owned.

In Australia, and New Zealand, and the rest of Oceania, again the whole of the telephones are State owned except in the Phillippines.

Coming now to America, in the North practically the whole of the telephones, now somewhere about 15¾ millions, are owned by private companies, 14¾ millions of these being in the United States. In the South also, the telephone systems are in private hands.

Summarising in statistical terms this world survey, there are, say, 23 million telephone stations in the world of which only 6½ million are State

owned. But these figures, especially if you bear in mind that the United States can account for 14¾ millions out of the 23, are no indication whatever of the relative importance of the two systems of administration for, summing up our investigations on a geographical basis, we see that, whereas the American States retain private ownership, Europe, with the exceptions I have noted, Asia, Africa, and Oceania have adopted Government ownership. I submit that it would be a useful contribution to the public discussions of this matter if Press and platform explained how or why it is that those in authority in practically all countries in every Continent, except America, have decided not merely in favour of Government control, but Government ownership—countries, mark you, differing greatly in their forms of Government and in their political and economical development.

It is true that in Europe, since the war, there has been a movement in favour of denationalisation.

In England at present this tendency is not very marked, but, as you will all recall, when the Cecil Committee was appointed in 1922 to enquire into the organisation and administration of the telephones, the then Prime Minister was pressed to include in its terms of reference a consideration of the reversal of the service to private ownership.

Moreover, it is worthy of note that the Committee actually *did* recommend the encouragement of co-operative enterprise under Government supervision, and with the sanction of the railway and canal commissioners.

Although in England the reversion movement has hitherto met with small success, I do not think it wise to ignore the possibility of a determined attempt to hand back local service or portions of it to private ownership—the necessary money could be found and, as I have previously suggested, given a certain combination of political and economic conditions the opponents of Government ownership might get their chance.

In France there is strong support for a return to private ownership. A Parliamentary Committee has recommended that the Government hand over the local service to private ownership, but so far the Chamber of Deputies have refused to act on this report. The strength of this demand, apart from the stimulus given to it by interested people, not necessarily all French, may be due to some extent to the fact that the subscriber has to buy his instrument out-right, the Government undertaking the maintenance. I have seen it stated that there are over 150 varieties from which the subscriber can select. On the face of it, the arrangement does not appear to be one making for technical efficiency or for economy in maintenance.

In Germany Herr Stinnes has recently strongly urged that the telephones be transferred to private enterprise on the grounds that a great saving to the State would be effected.

In Italy, Mussolini has declared that publicly owned utilities such as the telephones must be handed over to private companies on grounds both of economy and efficiency. The transfer, is I believe, now being negotiated.

In Greece, also, negotiations are on foot for a similar change.

Before passing from this aspect of my subject, may I remind you of the existence of the International Telegraph and Telephone Corporation.

This Corporation is reported to be negotiating for the telephone systems of several European countries. If successful, the organisation will apparently follow on the lines of the American Telegraph and Telephone Company, to which I shall refer later on. The proposal is being made in conjunction with banking and manufacturing interests in the United States. Apparently the brains, as it were, of this organisation will be located in, or drawn from America, whilst the subsidiary Companies in the various European countries will be more or less under the control of local people. It would, no doubt, be an excellent arrangement for the International Corporation, but it hardly seems to me to be a condition of affairs which, in the present state of the world's development, is consistent with the dignity and demands of national self-respect, or with the requirements of national preservation. If we are to have, as we *must* have for technical reasons, unity of control for long-distance communication, then surely it should be undertaken by a body of Civil Servants drawn from the countries concerned ; Civil Servants who would be in a position to see that the vital interests of their respective nations are adequately safeguarded.

Now let us pass to a consideration of the second of the three characteristics I mentioned a little earlier—viz., the comparison which is usually drawn between the telephone service in this country and that in the States.

At the outset, allow me to say that I have nothing but the greatest admiration for the manner in which the telephone service in the United States has been created and maintained. When, however, this success is used to disparage, by comparative methods, the achievements of the administration in Great Britain, then it is desirable that we should examine critically the telephonic position in America.

First of all consider a typical example of this depreciation by comparison. Not so long ago there appeared in the *Financial Times* an extract from an American quarterly. The article gave a resumé of the history of the telephone service in Great Britain with the object of supporting the contention that "the inflexibility of Governmental institutions prove an insurmountable barrier" against the development of the telephone system in this country on the same relative scale as obtains in the States. In the course of this article the writer refers to the continuously and vigorously expressed public dissatisfaction, to the constant Press criticism, to the frequent complaints by public bodies and to the investigations by special committees concerning the administration of the telephone system in this country.

Reference is also made to the statement that there are, or were, between 5 and 6 times the number of telephones per 100 persons in the States as compared with Great Britain, and the writer I am quoting goes on to say, in effect, that the comparative lack of development in Great Britain is attributable mainly to the relationship of the Government to the service, and only to a small extent to the innate conservatism of the British people. Here let me point out that the writer does not refer only to Government ownership but also to Government control which has existed in this country for a much longer period.

I say that the article to which I am referring is typical for this reason ; a certain amount of statistical or scientific data is collected and this is presented with a number of altogether irrelevant assertions concerning what are assumed to be the inevitable defects of State ownership and more particularly in respect of the telephone system in Great Britain. Am I wrong in describing such criticism as unfair propaganda as distinct from legitimate publicity ?

As an instance, consider the statistical comparison concerning the number of telephones per 100 people in Great Britain and America. The difference at first sight seems impressive. But has it much connexion with Government ownership or even Government control ? or is it due to the tremendous difference between the economic and social conditions of the two countries ? a difference increased to the advantage of the United States by the Great War. I submit that this particular statistical comparison, standing by itself and without associated data concerning the relative condition of the two countries, is a quite inadequate basis from which to draw deductions as to the respective merits of private and State ownership of the telephone service.

Now let us proceed to a brief consideration of the telephone service in the United States in order to ascertain whether the administration there is in fact, superior to that obtaining in this country ; whether instructed opinion in America is satisfied with the private ownership of this vital utility, and whether there is any demand for its nationalisation. I propose to outline, in as few sentences as possible, the development of the telephone service in the States, to indicate the conditions now existing there, and to illustrate the functioning of this vast machinery of communication.

The national service is provided mainly by an organisation of corporations known as the Bell System and also by a number of independent or home companies standing more or less outside the Bell interest. The Bell system consists of the American Telephone and Telegraph Company ; the Operating Telephone Companies known as "Associated Companies," and the Western Electric Company. The Telephone and Telegraph Company maintains the research and headquarters organising staffs required for standardisation of facilities. It also provides for long-distance communication. The Company has contractual and financial relationship with the Operating Companies and with the Western Electric Company.

The Associated Companies provide and maintain the telephone service, *i.e.*, operators, plant, &c., in the areas in which they operate.

The Western Electric Company manufacture plant for the American Telephone and Telegraph Company and Associated Companies.

It will be seen that the first of the corporations referred to, performs for the other two such functions as can be efficiently rendered by a centralised organisation, the second controls local service, whilst the third is the manufacturing organisation for the whole combination. At first the Bell Companies operated mainly in more densely populated areas where the new industry could be more easily made to pay. It inevitably followed that the smaller communities demanded telephonic facilities and home or independent companies were formed and strongly established themselves in thousands of the smaller towns. Then the Bell interests commenced operations in areas hitherto served by independent companies, and *vice versa*. This resulted in a certain duplication of plant. Next came, of course, the public demand for a single telephone plant to a town and the independents withdrew from some areas, and the Bell interests from others—the Bell Companies, however, still operating mainly in the larger centres.

The position as I understand it to-day is that the independent companies which number approximately 9,300, are now in helpful mutual relationship with the great Bell organisations. The independent companies serve somewhere in the neighbourhood of 4½ million stations, whilst the Bell interests serve, say, 10¼ million.

Rates are regulated by Commissioners subject to the right of appeal to the highest court in the land—the Supreme Court of the United States. There is a community service, a State service, and an inter-State service. The rates for the two former are regulated by State Utility Commissioners, acting within the limits imposed by any particular State and the latter by inter-State Commerce Commissioners. The State Utility Commissioners are appointed by the Governors of the various States, and the inter-State Commerce Commissioners by the President.

The Commissioners also regulate the rates of other utilities. It is worthy of note here that there is no uniformity of State Utility laws. It would be interesting to go on to consider how far the organisations I have just sketched have been affected by the famous Sherman anti-Trust Law, and also to what extent this law is likely to affect their future development. I can only say here that the anti-Trust Law is an axe that has been wielded to some effect in the States, that there is no demand for its withdrawal, and that the great captains of industry cannot afford to ignore it.

A recent important appeal concerning rates took between 6 and 7 years to settle and then, incidentally, it was laid down by the Supreme Court of the United States that the Commissioners may regulate with a view to enforcing

reasonable rates and charges, but that they are not clothed with general powers of management—an important reservation.

During the war the Government took over the control of the whole service, thus confirming one of the reasons which, before the war, determined European Governments to insist upon Government ownership, that reason being, of course, the strategic value of modern methods of communication.

Now I submit that this brief review furnishes sufficient grounds for suggesting that, compared with Government administration, the American method of regulation and control is cumbersome and costly. Moreover, there is this fundamental difference—the American services must be run primarily for profit—they must be run at least at such a profit as will attract money into the industry, otherwise the great corporations and companies could not carry on. But in State-owned services—at least, in this country—the object is to provide the community with the best possible service—the making of profit is not the dominating motive, but rather the rendering of service.

The Post Office, said Sir William Joynson Hicks whilst His Majesty's Postmaster General, "is not a mere revenue-producing undertaking, but one in which the sole idea will be to realise that we are all servants of the public from Postmaster-General down to the least of the office boys, and that our duty, our interest, and our wishes will be to utilise this great organisation for the benefit of the public and for the improvement of the trade of the country."

Here it may be of interest to ask what the Americans think of their own system. Well, in 1914, the United States Postmaster-General was requested by the Senate to submit to that body the results of an investigation which his department had been making concerning Government ownership of the means of communication. The report is an interesting and instructive document. For my present purpose I cannot do better than extract the following :

"Government ownership of the electrical means of transmitting intelligence is brought to the attention of the American people of 1913 with the endorsement of nearly every Postmaster-General since the Civil War, with a score of favourable reports by committees of Congress, and by the example of practically every other nation of the civilised world. More than 70 bills have been introduced in Congress to accomplish it. Meanwhile, the private operation of the telegraphic and telephonic facilities has resulted in a virtual monopoly by which the people are annually taxed vast sums for which they receive no adequate return."

Mr. Chairman, Ladies and Gentlemen, that is not an extract from a Fabian tract, it is not a vague and useless generalisation by a member of this Society—it is the concluding paragraph of a serious report solemnly transmitted to President of the Senate of the United States in the year 1914.

Now, I do not suggest that, because a Postmaster-General submits a report in favour of nationalisation, it would necessarily be wise for the nation to adopt it. When, however, practically the whole succession of Postmaster-Generals presumably including men of all parties recommend such a course, we are justified in assuming that, notable as may be the scientific achievements, great as may be the organising skill, efficient as may be the service rendered by the great telephone administrations in the States, there is a grave discontent with the service, a discontent of which we in this country hear little.

It may be asked how is it that, notwithstanding this powerful advocacy of State-ownership, the service still remains in private hands. To give a full reply would necessitate a consideration of the principles underlying the American constitution—the peculiar moral and political characteristics of the founders of the nation and of their successors and also the reaction of both upon the present-day attitude of American citizens to industrial problems. Suffice it now to say that, in spite of strong traditional dislike to Government interference, in spite of the tremendous propaganda carried on by those whose interest it is that things should remain as they are, and in spite of a continuous stream of adverse criticism by clever people whose mission it is, apparently, to emphasise all the weak spots in European administrations whilst ignoring the great advantages they give to their respective peoples,—in spite of all this—a powerful body of influential opinion is rapidly developing in America in favour of State ownership of the means of communication.

Now I go back to the second of the questions which you will remember I raised at an early stage of these observations, viz., our attitude towards what I have referred to as a great experiment in industrial organisation. Let us approach it in our threefold capacity of citizens, of students of industrial efficiency and of workers in the telephone industry.

Now, as citizens, we shall be agreed that the community is justified in demanding in respect of any vital industry—firstly that it be efficiently conducted from an administrative and technical standpoint ; secondly, that the cost to the community shall be the minimum consistent with maximum efficiency ; and thirdly, that the workers in the industry shall enjoy a status which will enable even the humblest of them to maintain their self respect in so far as this is dependent upon their economic reward and conditions of labour.

(To be continued.)

CONCERNING BROADCASTING.

WE reprint from the *Evening Standard* a very amusing article on this subject by Mr. Basil Macdonald Hastings. Mr. Hastings is evidently one of those writers who believe in emphasis of exaggeration in order to make a point, and who would persuade us to take the part for the whole. But does he expect his readers to believe that patrons of wireless are drawn exclusively or even principally from the class of people which never reads a book and never hears good music ? We imagine that these are precisely the people who would form the bulk of Mr. Hastings' second-class, and we suggest, that he has "gone blah," in this point, although we are uncertain whether we have correctly caught the meaning of a phrase which is new to us. Again, we think it extremely likely that a large number of wireless enthusiasts do not listen in to political speeches, but to suggest that they turn in a body from Mr. Lloyd George to Mah-Jongg (which most of them only know of as a Press boom) or to the Blues (which probably few of them have troubled to learn) is more arresting than convincing. If Mr. Hastings' object is to provoke controversy by calling forth fierce protests, we assume he will have achieved it.

He represents a theatre manager as snarling, "I regard broadcasting as a grave peril, and I'll do all I can to stamp it out," and goes on to say :—

Everybody in the theatre with a mind adrift has been talking like this lately, and there will be a torrent of further inconsequence to-morrow when the Playgoers' Club discusses "Broadcasting and the Theatre." How do I know it will be inconsequence ? Simply because broadcasting and the theatre have no more bearing upon each other than the *Saturday Review* and *Comic Cuts*, and it is sheer desipience to associate them.

There are three classes of entertainment seekers in this country, whereas in America there is only one. But the American human is very remote from the British human, as, no doubt, Mr. Belloc is about to point out. He only wants what diverts him, and has already withdrawn his ears from broadcasting. Mr. Lloyd George was told that he had a million listeners-in for his final speech, and believed it.

The truth was that the warning in the morning newspapers drove every wireless subscriber to Mah-Jongg and a dance candidly called the Blues. America also very nearly withdrew her eyes from the movies. Then someone had the happy idea of devising a programme of good music (orchestras of 60 to 100 performers), good variety turns and an odd movie or two to empty the house at intervals. This was a great success, and Los Angeles, scorned by English producers, still fills an American want. *Non Angli sed Los Angeles.*

But in Britain, may I repeat, there are three widely different classes of pleasure seekers. The first is large and cultured enough to give a run of a hundred nights to a good play, and pay fair prices for the best music, best literature, and best works of pictorial art.

The second class patronises in immense numbers the lighter theatre entertainments and the places where boxers lie down side by side for large purses. It loves colour, shape, pretty noises, fun and bright lights. Does not Petronius make Eumolpus say, "It is a far more paying game to please the sensual than the sensible ?" Everyone knows the sort of show I mean. A dozen boys in stays and with two-coloured faces join a dozen girls without stays in three-coloured faces, and an angular youth, with the label "comedian" printed on his brow, proclaims to them and us his dispossession of bananas. Am I sneering ? Certainly not. I like to put my brains in the cloak-room, particularly at those theatres where I am given a balloon or a paper horn.

The third class is hopeless, never goes to a theatre, never buys a book and never hears good music. It consists of the people who, in New York slang, have gone "blah." And it is from this class that the patrons of the cinema and wireless are drawn.

I ask any theatre manager if he believes that the class of person who pays for seats in the stalls, and for the clothes of those who sit in the stalls, is likely in any mood of madness or depression to pick up the ear-clippers of a receiving set ? Is it credible that theatre-managers know so little of their business and the people who patronise their business as to believe they are robbed of a single shilling while Mr. Robinson sits in his suburban drawing-room listening to a throaty tenor's emulsion of "Love, could I only tell thee" into a pipe ?

A deep sorrow suffocates me when I brood over the aching emptiness of the heads of the theatre bosses. Could not the cinema have taught them ? They shrieked against the movie in just the same way, utterly unable to appreciate that the movie could only appeal to those who had gone "blah" in the early nineteen-hundreds. They protested against the use of eyesight by people who had never used it before. Now they are protesting against

the use of hearing by people who have never used it before. Cannot they realise that if this class, now so far apart from the theatre, can be taught to use sight and hearing it may one day acquire taste ?

The problem the theatre bosses have to solve is how to increase the number of theatre-goers. There are hundreds of thousands of half-crowns in the pockets of the movie and wireless audiences, which may one day be expended at the theatre. That day may be far distant, but some of us may live to see it. Then let the theatre managers combine and subsidise the Broadcasting Company, each taking it in turn to breathe forth portions of their shows. . . . .

At the risk of being left out from the next clerical garden party, I am going to remind all concerned that you cannot broadcast legs.

OUR LIBELLED 'PHONES.

UNDER the above heading, the *Evening Standard* prints the following opinions of an American postal official :—

Mr. Eugene R. White, special assistant to the Postmaster-General in Washington, who leaves for America in the *Leviathan* on Saturday, after a study of European postal and telegraph systems, does not think that Britishers have any cause for complaint.

" Your systems are as near perfect as can be, and as for your telephone work," he said, " America has nothing to teach you.

" I have not had much occasion to use the telephone since I came to Britain, but what little I have has quite impressed me with your efficiency.

" In Washington we have the automatic system working, which, I understand, is to be installed in London, and I certainly think your business-men will find that automatic exchanges are time-savers.

" Automatic exchanges are not quite error-proof, but they certainly compare very favourably with exchanges ' manned ' by girls, although, mind you, opinions differ on this matter.

" There always will be the wrong number problem, due to a variety of causes, and although it may be that one day we shall see the London business man sitting calmly at his desk asking for ' New York 1234 '—and getting it—and as calmly transacting his business—I have no doubt that even then the wrong number retort will rise to the heated lips of the subscriber the usual number of times per hundred calls.

" This is my first visit to Europe," added Mr. White, " and I must say I am enjoying the experience. I find Europe much as I expected.

" To me the chief difference between your people and my people is that Europeans appear to make a god of precedent and tradition, whereas we in America are entirely free from such bonds."

DEATH OF MR. W. H. ALLEN.

As we go to press we deeply regret to learn of the death of Mr. W. H. Allen, O.B.E., Controller of the Post Office Stores Department. Mr. Allen was knocked down by a motor vehicle and died a few days after the accident.

CARDIFF POSTAL, TELEGRAPH AND TELEPHONE SOCIETY.

THE first meeting of this Society was held on Friday, Nov. 23, in the Telephone Accounts Office, H.P.O., the Postmaster, Mr. H. J. Tipping, presided over a fair attendance, and very ably explained the objects, and aims of the Society.

" A Practical View of Education," was the title chosen by Mr. W. J. Hare for what proved a very interesting address. Mr. Hare treated the subject in relation to the actual conditions of the service, which permitted only a short period for daily study. He outlined the desirable fields of knowledge in the Sciences and Arts, leaving particular selections in any fields to the question of temperament. The broad and liberal view was one he thought should not be neglected, but it was the practical, or essential phase of education upon which the speaker concentrated most attention. The " practical view " meant study continuously pursued, and the first essential was the development of sound judgment. For this purpose, some knowledge of logic, psychology, ethics, and sociology, was advocated, and the application of each was clearly outlined. This was the first point. The second was the development of the powers of expression—oral and written—and some interesting methods were explained. The third and last phase was, having put our house in order, the matters which should engage our attention. The " practical view " pointed to those which affect us immediately ; particularly those of economy, political and commercial. Though but slightly appreciated, these were matters which were and must continue to be of growing interest, and of which a practical education required some knowledge.

After the Chairman had commented in an admirable speech on the various phases of the address, the discussion that followed showed that the first meeting augured well for the future of the Society. The criticism of Messrs. T. McGowan Hole, W. Mogford, E Tyldesley, W. J. Curtis, and N. Loran on the question of judgment, and Messrs. F. W. Somers, C. Hardcastle, and A. J. Phillips on the needs of the times was keen, well-balanced, and instructive Votes of thanks to the Chairman and speaker, terminated a delightful and stimulating meeting.

The Officers and Committee for the coming year were appointed as follows : President, Mr. H. J. Tipping ; Vice-Presidents, Messrs. B. Waite, H. A. Keenor, C. J. Collins, T. McGowan Hole, R. Evans, W. J. Curtis, E. Tyldesley, and Capt. Crompton, R.E., O.B.E. Secretary, Mr. N. Doran ; Assistant Secretaries, Miss Sloggett, and Messrs. Miles, Somers, Payne, and Linck. Committee, Misses Irwin, Lawrence, Duggan ; Messrs. Hare, Chapple, Phillips, Westacott, J. Collins, and Hooper.

THE RETIREMENT OF MR. H. J. BROUGHTON.

THE retirement of Mr. H. J. Broughton, who held the post of Superintendent of the Cable Room, C.T.O., for over ten years, removes a most worthy personality from the higher ranks of the London telegraph supervision. Appointed telegraphist Oct. 29, 1878, Senior Telegraphist and Overseer 1902, Assistant Superintendent II, 1906, thence to First-Class 1910 and to Superintendent in 1913, retiring on Nov. 27 of last year, he thus leaves behind him 45 years spent in the Government telegraph service. Almost from the first day of the transfer of the Submarine Telegraph Company to Government control in 1889 he was associated with the Anglo-Continental cables, and their working. He was also closely connected with the working of the trunk telephones, which, strange to say, were at one time worked in from the same department as the foreign telegraphs. Despite these years and the stress of the last decade with its full measure of personal loss, the interest and zeal of " Phyllis " never flagged. In whatever he took up he was thorough to the point of the meticulous. Conservative by instinct, he had yet that fine type of conservatism which yearned only to conserve what was best while slowly and carefully shedding the obsolescent.

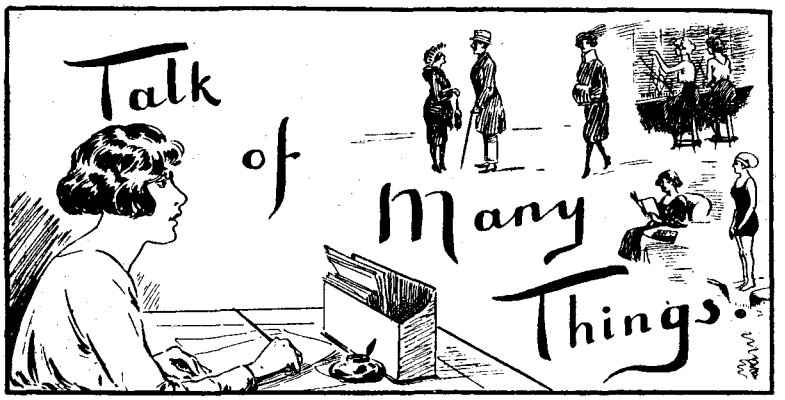
Very few who have passed through the telegraph service have gathered so weighty a sheaf of information or have preserved that useful experience of years in so orderly a manner.

It is pleasant to be able to write that the atmosphere of the closing official years of his service has proved more congenial than that which preceded them, and that the appreciation of his official worth has not been confined to G.P.O. West, but has spread to many friends in G.P.O. North.

Mr. Broughton's duties during the recent years of the kaleidoscopic staff changes in the Cable Room have prevented our dear old friend being more closely in touch with the many new entrants, but to those who have come into close contact with him as also to those who have *known* the man through sunshine and shadow, there can be only one verdict on his career. No worthy cause was ever refused assistance, no perplexed subordinate ever applied for guidance without receiving full measure pressed down from Broughton's hands. Even his bitterest antagonist was always judged with that same charity and fair-mindedness which he meted out to his friends. Happy in his work, with a keen sense of humour, and, to quote the words of a subordinate, " a real gentleman," it will be long ere *the chair* is filled by his equal.

J. J. T.

WE TELEPHONISTS



London Telephonists' Society.

MR. POUNDS' paper on "The Influence of Sport on our Work" gave rise to an interesting discussion, in which a large number of members took part. Some of the speeches erred rather on the lengthy side, perhaps; and one offender in this respect was heard to make the solemn vow that the next speech he makes will be the shortest on record! He said he had made three weeks' study of the Royal Game of Golf, and proceeded: "I use the expression 'study' because it seemed to me more of a study than a game—a most fascinating study in what might be called the innate cussedness of inanimate objects. But I am not sure whether it is fair to call them inanimate, since all the weirdly named implements I used in that rather dismal game seemed to manifest a kind of low cunning which argued the possession of consciousness; in spite of the discreet use of what I believe are regarded—even in the best behaved golfing circles—as 'standard expressions' for trying circumstances of this kind!" He then went on to say: "Whoever thinks of adopting the doctrines of sportsmanship as the basis of his or her system of supervision must face the facts. . . . If the principle of Sportsmanship is to have its full value as a basis of our relationships we must to a considerable extent visualise our life, our work, as a game. But if we picture life as a game, we shall, I think, agree that it is unique among games in that each one of us, unconsciously and automatically selects his own side—and, therefore, his opponents—in so far as he expresses himself. . . . We express ourselves by what we do, by what we consciously refrain from doing, and by what we say, in speech or writing. But at the back of all these manifestations of ourselves there is Thought. . . ."

It was suggested by some unregenerate spirit that the speaker might have prefaced his remarks with the words of the negro preacher—"Bredren," he said, "I's gwine to preach a powahful sermon. I's gwine to define the indefinable. I's gwine to explain the unexplainable. And I's gwine to unscrew the unscrutable!"

After the discussion, "Complaints" were read and answered by volunteers in the audience. The complaint that was considered the best in the judgment of the audience was awarded a prize. This was gained by the following:—(It was a complaint actually sent in by a subscriber.)

> "My number is 1992 and I wish to complain strongly of being called in error morning, noon and night for 'one fife fife two,' 'one fife nine two,' and 'one nine fife two,' ever since some new method came into force. My number is 'one double nine two' and that is the number I pay for and I rent my telephone as such. No one is to call my number 'one nine nine two'—I insist on retaining the double. I don't mind being rung for 'one double fife two'—I am used to that and have only had about six wrong calls daily for it. I object to the variations."

Which reminds us of an "Indian Love Lyric" that we have received:—

> Oh! The opals bright are calling
> And the subs. are at me bawling:
> "Come along, Miss, I can't wait here all my life,"
> Though I practice day and night,
> Shall I e'er repeat it right,
> When a sub. says, "Foer thr-r-ee double fife."
>
> Though I roll the "r" in three
> And extend the double "e,"
> That's more than you can do—you sterner sex,
> I am weary unto "deff" with avoiding final "f,"
> And I've tied my tongue in knots prolonging "x."
>
> With extending "a" in "ate"
> I but tickle my pa*late*
> With memories of dishes choice and rare.
> And whatever you may do
> Don't forget the "oo" in two,
> But I guess they'll change the whole (blank) lot next year!

C. D. D.

The election has come—and gone; and we now have eight women Members of Parliament. "The little more, and how much it is!" Their names—which it is useful to remember—are:

Lady Astor, Conservative Member for Plymouth.

Duchess of Atholl, Conservative Member for the Kinross & Western Division of Perth.

Miss Margaret Bondfield, Labour Member for Northampton.

Miss Dorothy Jewson, Labour Member for Norwich.

Miss Susan Lawrence, Labour Member for the North Division of East Ham.

Mrs. Philipson, Conservative Member for the Berwick-on-Tweed Division of Northumberland.

Lady Terrington, Liberal Member for the Wycombe Division of Buckinghamshire.

Mrs. Wintringham, Independent Liberal Member for the Louth Division of Lindsey (Lincolnshire).

Bobbed Hair.

"G.P.O. (Telephones)," writes in the *Weekly Dispatch*: "We have many operators with bobbed hair. Indeed, from the operators' point of view, it is more convenient and very much more comfortable."

A solicitor writes:—"No girls with bobbed hair for me, thank you."

> "To bob, or not to bob, that is the question:
> Whether 'tis wiser for the hair to suffer
> The cuts and shingles of outrageous fashion;
> Or to take arms ("Solicitor's," for instance),
> And let our tresses lengthen. To snip; to cut;
> No more; and by a cut to say we end
> The headache—by the thousand clips and docks
> That hair is fresh to! 'Tis a consummation
> Devoutly to be wished.

Readers of our column will be sorry to hear that we have lost Miss Dorothy Turner as a regular contributor. Miss Turner has resigned to be married, and we all, I am sure, wish her the very best of luck. We are pleased to say that Miss Turner has promised to let us have for this column, early in the new year, "Some Thoughts on Leaving." We look forward to this with very great pleasure.

We are indebted to a contemporary for the following "Ruthless Rhyme":

> "I'd just written to Aunt Maud
> Who was on a trip abroad,"
> When I heard she'd died of cramp,
> Just too late to save the stamp."

The idea deserves expansion:—

> "Give me 'Ambulance,'" I said,
> "Stormy meeting—nine are dead."
> Calm the voice upon the line—
> "Sound the vow-el, please, in nine."

Or this:—

> In a call-box once I sat
> Waiting for a friend to chat,
> When I saw him carried past,
> Gathered to his rest at last.
> What a lifetime of remorse!
> *I had paid the fee, of course.*

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.

OBITUARY.

WE much regret having to record the death of Mr. FRED HOLDSWORTH, late Chief Clerk, Telephones, Bournemouth, who had recently entered upon his 52nd year. Mr. Holdsworth entered the Service of the National Telephone Co. at Bradford in 1888, and at the transfer came over to the Department's service as Clerk on Overseer's scale, in which capacity he was transferred to Leeds in 1913. Later in the same year he moved to Edinburgh as Assistant Superintendent, Class II, and in 1915 was given the appointment he held at the time of his decease.

An abdominal complication which had troubled Mr. Holdsworth at intervals during recent years recurred about 10 days before his untimely end; this involved an operation which he survived for three days, until his death on the 11th inst.

Mr. Holdsworth was buried at Boscombe Cemetery on the 14th inst., the funeral being attended by Mr. Howe, the District Manager (who also represented Mr. Makepeace, the Surveyor), Major Compton, Postmaster of Bournemouth, Mr. F. W. Richards (late Chief Clerk, Southampton), and several representatives of the district staff.

Universally liked and respected by all who knew him, Mr. Holdsworth's painfully sudden severance from his colleagues has cast a gloom over the district with which he has been so long and honourably associated. Heartfelt sympathy will be extended to Mrs. Holdsworth and two daughters in their teens, left to mourn a good husband and father.

WHERE TO STAY.

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

BRIGHTON.—Rusthall Boarding Establishment, 11-12, Cannon Place. Central. One minute West Pier. From 2 guineas weekly.

GUERNSEY (Channel Islands).—Comfortable Board-Residence. Electric Light, bath, &c. Mrs. G. A. Rabey, 17, Havilland Street, St. Peter Port.

SHANKLIN.—Glenavon Private Hotel. Comfortable Brd.-res. Electric light and gas fires all bedrooms. Free billiards, splendid cuisine (separate tables). Highest recommendations.—T. Geere. 'Phone 37

LONDON ENGINEERING DISTRICT NOTES.

Greetings.

FROM the staff of the London Engineering District to all co-workers—Greetings. May the year 1924 prove a very happy and prosperous one to all.

Newington Causeway, London.

A very serious subsidence occurred at Newington Causeway, London, S.E., during the evening of Nov. 27, creating a cavity extending the whole width of the carriageway about 40 feet and a length of about 40 feet, with a depth up to 20 feet. Newington Causeway is a very important thoroughfare, being the main artery from London Bridge to the South, over which a double tram track conduit system runs in addition to numerous bus routes and heavy vehicular traffic. The carriageway had of recent date been repaved with wood blocks on 12-inch reinforced concrete, and this reinforcing played an important part by holding a great part of the surface intact although the underneath had dropped 20 feet. It is remarkable that, in spite of the magnitude of the subsidence and the heavy traffic carried by the thoroughfare, not a single person was injured. The cause of the collapse is the subject of inquiry by the Ministry of Transport, and this is not the place to pass judgment on what might be a debateable point.

The result of the subsidence from the P.O. point of view is interesting, inasmuch as a main Post Office duct route of 12 pipes, carrying 6 main cables, collapsed at the spot for a distance of approximately 20 yards, dropping about 6 feet at the centre of the span. 2,500 circuits were involved, yet only 3 were interrupted. The work of restoration is in hand, and it is doubtful whether the thoroughfare will be reopened to traffic before the New Year.

The Other Side.

Certain sections of the Press appear to be ever ready to publish letters from the public which are in anyway derogatory to the telephone service, but it is as well to remember that letters of commendation are frequently received, and in some cases repentant subscribers have offered apologies for inaccurate charges they have levelled against the Department. During the last few days several letters expressing appreciation of the way in which the engineers have expedited the completion of new lines have come to hand. Letters of this kind cover a multitude of sins, and make life more endurable.

Institution Meeting.

A large audience assembled at the December meeting of the Institution of Post Office Electrical Engineers to hear a lecture by Mr. E. H. Shaughnessy on "Modern Radio Engineering." A brief and masterly survey was given of the development of transmitting stations, and was followed by an indication of the probable line of progress. The testing of materials for wireless work was referred to, and the behaviour of materials which are normally regarded as excellent insulators, was shewn to be very different when subjected to pressure of 20,000 volts at a frequency of 44,000, and the curious fact was mentioned that dry whitewood under such circumstances proved a more suitable substance for use than many expensive and much advertised proprietory insulation materials. The character of walls and other surrounding surfaces was shewn to have a marked effect on the efficiency of the transmitting plant.

The lecturer gave a few of the salient features of the station which is to be erected on land acquired near Rugby, and stated, *inter alia*, that the masts would be 800 feet high.

It is possible that Mr. Shaughnessy realised that some of the audience were more interested in amateur reception than in professional transmission, and, therefore, at the end of the lecture, he shewed for their information a diagram of a dual amplification circuit which was recommended for the reception of broadcasting. This was seen to be practically identical with one which is being described in the wireless magazines as the last word in the development of circuits for reception. Mr. Shaughnessy added that the circuit was in use in the engineering department in 1913.

Composited Circuits.

The use of one pair of wires for simultaneous transmission of telegraph and telephone messages has been practised for many years in this country. A method is now being tried which differs in some respects from the systems hitherto adopted. Each wire of a telephone pair will be used as a telephone circuit, one leg being used for transmission and the other for reception.

The special feature of the system is the means adopted to prevent interference on the telegraph apparatus by the ringing currents normally employed on trunk signalling, which have a periodicity not differing much from that to which the telegraph apparatus will respond. The normal ringing current of 16 cycles per second is applied to the circuit by the telephonist, but before passing out to line, this is converted by special apparatus known as a composite ringer into a periodicity of 135 periods per second. This will not affect the telegraph apparatus, but neither will it operate the calling signal, at the distant telephone exchange. At the latter place, therefore, apparatus is introduced which will respond to the higher frequency, and thus introduce a relay which will cause the local ringing current of 16 periods per second to be applied to the local calling signal. Composited circuits of this description have been successful in America, but until an extended trial has been made it cannot be stated definitely that the system will be equally successful in this country. The experiment will, therefore, be watched with interest.

DIARY, JANUARY, 1924.

Jan. 10.—INSTITUTION OF ENGINEERING INSPECTION.—Afternoon visit to Kodak Works at Wealdstone.

13.—INSTITUTE OF PUBLIC ADMINISTRATION.—"Town Planning," by Mr. I. G. Gibson, D.Sc., C.B.E., at the Great Hall of the London School of Economics, Houghton Street, Aldwych, 6 p.m.

18.—LONDON TELEPHONISTS' SOCIETY.—"My Recent Holidays in Italy," by Miss A. A. Heap. Y.M.C.A. Lecture Hall, 186, Aldersgate Street, at 6.30.

18.—INSTITUTION OF ENGINEERING INSPECTION.—Evening Meeting at the Society of Arts.

21.—P.O. TELEPHONE & TELEGRAPH SOCIETY OF LONDON.—"What are we here for?" by Mr. H. Gordon Selfridge (P.O. Advisory Council), Institute of Electrical Engineers, Victoria Embankment, 5.30.

24.—INSTITUTE OF PUBLIC ADMINISTRATION. FINANCIAL CONTROL No. 2. "Control of Expenditure within Government Departments," by Sir Henry Bunbury, K.C.B. (C. & A.G. of the Post Office), at the Old Council Chamber, L.C.C., Spring Gardens, at 6 p.m.

IMPRESSIONS.*

BY H. MORGAN.

THE extreme restfulness of the surroundings.

The dignified and happy demeanour of those present entirely negatived the suggestion that Civil Servants are "cadaverous and ascetic."

The scope and varied character of "Post Office relations to the Public."

The brevity of forty-five minutes—when occupied in listening to the reading of a well-prepared and interesting paper.

The immense scope of the experience of the author of the paper.

The evidence of rare ability, and power of concentration, conveyed by his remarks.

The lucidity of the remarks made in the discussion, and the gentle pleasantry intermingled therewith.

The "chairman-like" deportment of the Chairman.

The remarkable grip of statistics which can be combined with an aptitude for quoting nursery rhymes appositely.

The "publicity that paves the path to profit" does not always bear that relationship to "service."

The wonderful self-control of some of those present, who refrained from speaking.

The diversity of aim indicated by the words "Dividend" and "Service."

The fact that "Post Office Telephones" signs should not be put in positions where they indicate that traffic is held up on account of engineering operations.

The favourable publicity the Press desires to give is that procured by payment at the usual advertising rates.

The impression of the advisability of noting the date of the next meeting and putting in an appearance.

* Being the impressions of a visitor to the meeting of the Post Office Telephone and Telegraph Society of London, held on Oct. 15 1923.

LONDON TELEPHONE SERVICE NOTES.

London Telephonists' Society.

THE third meeting of the Session took place on Friday, Dec. 7. There was an excellent attendance, attracted by two items of unusual interest. The first was a paper by Mr. C. A. Pounds on the subject of "The Influence of Sport on our Work," and the second an impromptu debate, or rather series of miniature debates, centering round complaints real and imaginary, conducted by Mr. Horace Dive.

Mr. Pounds, in his paper, dealt very adequately with the subject of organised games and the underlying inspiration of playing for one's side rather than for personal triumph. He thought that much more could be done in this direction than was done at present, although the activities of the Swimming Association on behalf of the day staff and the Football and Cricket Leagues organised by the night staff were very good beginnings. Mr. Pounds went on to show how the habit of playing games in the right spirit would prove of benefit during working hours and how valuable in every way would be the spirit of camaraderie which is thus engendered.

An interesting debate followed, and among the speakers were Messrs. Dive, Maycock and White, and Miss James.

The impromptu debates proved instructive and amusing. A large variety of complaints were distributed amongst the audience, and as a number corresponding to that of the complaint was drawn from a pile, the holder was required to reply. Any member of the audience could then assume the identity of the complainant and the exchanges at times were brisk.

The Society's next event is the Annual Dance on Dec. 29 at the Bishopsgate Institute, for which revel all the tickets were sold long since.

There will be a return to the more serious business of the Society on Friday, Jan. 18, when Miss A. Heap will give a lantern lecture on "Recent Holidays in Italy." Those who have heard Miss Heap's accounts of former holidays spent in that sunny land are eagerly awaiting the latest of the series.

* * * *

Choral Society.

A note should be made of the date of the Langham Choral Society's first concert of the season which will be held at the Queen's Hall, on Feb. 11, 1924. Two works of unusual interest are to be performed, Holst's "Cloud Messenger" and the "Moon Hymn" by a Swedish composer, Count Wachtmeister. It is announced that they will be performed for the first time in public.

Rehearsals are now held in more comfortable surroundings at the Y.W.C.A. Hall, George Street, Hanover Square, and they will be held on Mondays instead of on Tuesdays.

Particulars of membership or information relating to concerts may be obtained from the Hon. Sec., Mr. W. R. Child, of the Contract Branch, 102, Dean Street, W.

* * * *

Broadcasting.

An item of particular interest to telephone people was included in the program from 2 L.O. during the Woman's Hour on Thursday, Dec. 13, when Miss M. Webb gave an address on "The Training of a Telephonist." It will be remembered that Mr. Valentine broadcast an address some time ago, so that Miss Webb's was the second contributed from the London Telephone Service and it is hoped that the series will be continued. It would be of great interest to hear an expert on the engineering side tell the public of the intricacies which lie between the mouthpiece and the calling signal.

To return to Miss Webb's address, it came through very well, and must have impressed listeners with its story of the care used in the first place in selecting the recruits to the operating force and further, in the description, necessarily abbreviated, of the course of training they receive in the Operating School with its modern equipment.

Arrangements were made for members of the staff at G.P.O. South to have the opportunity of listening in, and Mr. Gibbon of the Engineering Dept., assisted by some of his wireless friends, fixed up a receiving set with a loud speaker in the rest room. A large number of the staff availed themselves of the opportunity and despite some interference by Morse stations the reception was very good.

* * * *

Traffic Branch Re-organisation.

In order to meet the needs of a rapidly-growing service and to provide for the work already commenced in connexion with the introduction of automatic switching on a large scale the traffic staff has been increased and a number of important changes have been made in the organisation. As the number of lines in the area increases, and as the number of exchanges is added to, traffic problems tend to become more complex and the need for scientific traffic study and control becomes more exacting. The new order is designed to keep pace with these developments.

Congratulations to Mr. H. G. Corner on his promotion to Superintendent.

Christmas Festivities.

Although the week preceding Christmas is a period of high traffic pressure, time is found for seasonable festivities and most of the refreshment clubs provide their members with the opportunity of having a full dress rehearsal for Christmas dinner. Traffic officers in the districts have their constitutions tested very thoroughly at this time of year when invitations pour in on them. With their usual willingness to tackle any job they accept all that do not clash, then they go home and sleep right through the Christmas holidays.

* * * *

City District Dance.

The third annual dance of the City Traffic District was held at the Royal Horticultural Hall on Saturday, Nov. 24. There were about 450 present, but there was plenty of room, a splendid orchestra, tireless dancers and everything else that goes to make such an affair most enjoyable.

The whole evening went with a swing, thanks largely to the efforts of Messrs. Dobson, Berry and Gregory, who acted as joint M.C.s.

PERSONALIA.

ON Nov. 5, Mr. G. A. Harris, Clerical Officer in the Sheffield Contract Department, left to take up a similar duty in the London Telephone Service.

On the eve of his departure, Mr. Harris was presented with a silver coffee set by his colleagues. The presentation was made by Mr. S. C. Smith, District Manager, and words of appreciation of Mr. Harris' services and good wishes for his future on behalf of the staff were also spoken by Mr. J. Wrigley, Contract Manager, and Mr. W. Thyne, Chief Clerk.

HAMPSTEAD.

Miss L. Lines, a telephonist attached to this Exchange, resigned on Oct. 26 owing to her approaching marriage.

LONDON TELEPHONE SERVICE.

Resignations on account of marriage :—

Miss E. W. PAINTER, Assistant Supervisor, Class II, of Mayfair Exchange.
Miss D. A. STERLING, Telephonist, of Woolwich Exchange.
Miss F. E. HAWKES, Telephonist, of Woolwich Exchange.
Miss W. M. LEAR, Telephonist, of Victoria Exchange.
Miss N. A. L. DUDDEN, Telephonist, of Victoria Exchange.

CABLE ROOM STAFF.

PROMOTIONS.

Mr. J. G. KING to be Superintendent.
Mr. G. A. BUTT to be Assistant Superintendent.
Mr. T. H. A. RIPLEY to be Overseer.
Mr. W. J. WRIGHT to be Overseer.

NEW ATLANTIC CABLES.

AGREEMENT WITH ITALIAN COMPANY.

The *Times* of Dec. 24 states that : "An important agreement, the effect of which will be a considerable development in cable communications, has just been signed in London.

For some time the Italians have desired to own or control cables to South America. The agreement, which is subject to the approval of the Italian Government, has been signed by Sir John Denison Pender, on behalf of the Western Telegraph Company, Limited (the English Eastern Associated Group), by Mr. Richard T. Durran, attorney for the Compagnia Italiana dei Cavi Telegrafici Sottomarini (Italy), and Mr. S. J. Goddard, vice-president of the Western Union Telegraph Company (America). It provides that the Italian company, under concession from the Italian Government, shall lay and operate a cable connecting Fiumicino, on the coast of Italy, with the Azores, touching at Malaga, in Spain ; that the American company shall lay a cable between the Azores and North America ; and that the Italians shall also ultimately lay a further cable between Malaga and the coast of South America, thus connecting Fiumicino with South America direct.

The agreement declares that the American company is not concerned with the Mediterranean—South American traffic to be carried by the Italian direct cable ; that the English company is not concerned in the Italian North American traffic to be carried by the Italian Azores cable, and is only interested in that cable so far as it may affect traffic between the Mediterranean and South America."

THE

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CONTENTS.

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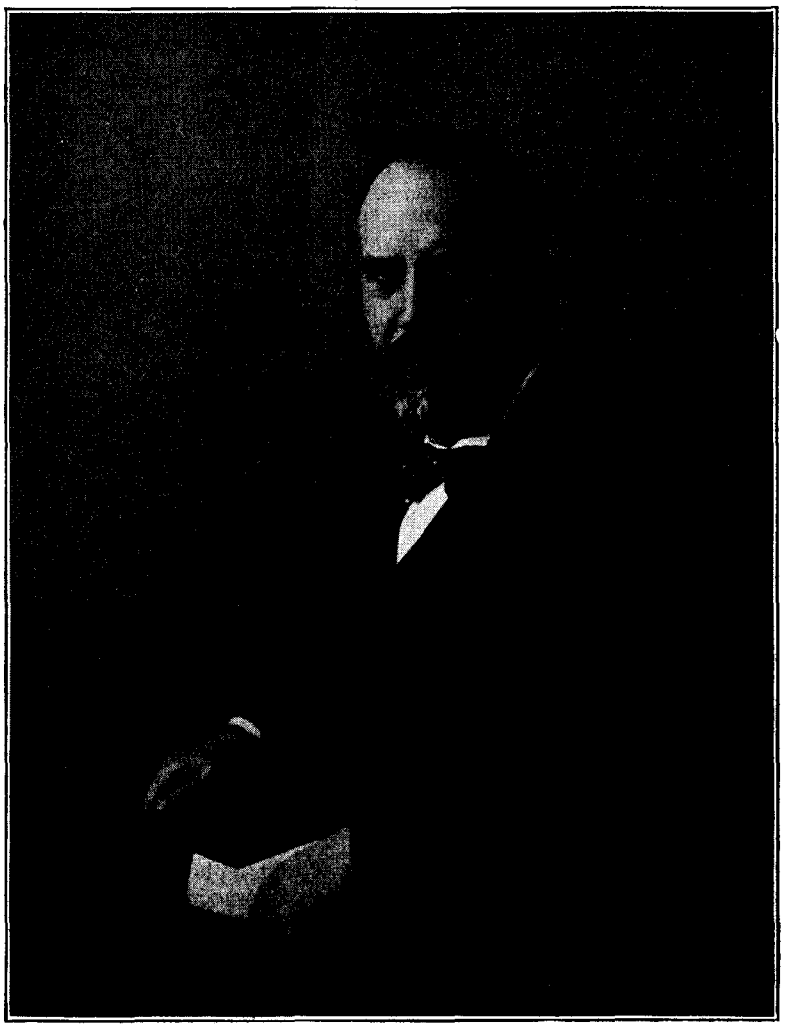
All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.4.*

TELEGRAPH AND TELEPHONE MEN.

1.—MR. JOHN SCOTT.

WE begin the series of portraits of prominent telegraph and telephone men with Mr. John Scott, M.B.E., Postmaster Surveyor of Birmingham. Mr. Scott has had a career which has been closely connected with the rapid development of telephones in the last few years. He entered the service of the National Telephone Company in 1895, becoming District Manager in 1896, and his first district was the Border District of Scotland. He came to Blackburn as District Manager in 1900, to Leeds in 1902, and to Manchester in 1905, and in 1908 he became Assistant Superintendent of the Midland Province. In 1913 he came to the Post Office and became one of three provincial Superintendents whose functions were to conduct the transition stage, then he became Postmaster of Sheffield and afterwards the Postmaster-Surveyor of Birmingham. He has thus viewed telephones from every angle, and has been concerned in the executive control of postal work, telegraph work and telephone work, so that he has had an unusual experience in respect of the executive management of services now combined under the control of the Post Office.



[Photograph by Lafayette, Ltd.

Mr. Scott is an enthusiast. His enthusiasm has many aspects. He has always sought some method by which the results of different enterprises might be put to the test in some such way as privately-owned industries are put to the test. On this aspect of an old discussion he speaks with authority and insight. He sees the merits and the advantages of State operation, but always with open-mindedness to other merits and advantages which might be added. It may be said that this is a by-product of his general enthusiasm for efficiency of service. He touches life at many points. He is interested in social and economic movements of all kinds and is anxious to develop the corporateness of life and true fellowship on the basis of efficient service. He has a breeziness of his own, a swiftness of summary judgment, which is singularly sure and accurate, and he has a talent for friendship, all of which enabled him not only to fit into the Post Office machine, but to be of help to others in the process.

J. L.

THE RUSSIAN SOVIET POST OFFICE.

BY A. GORDON, *Secretary's Office.*

ACCORDING to newspaper reports, there has been a reaction among Communist die-hards against the Soviet New Economic Policy. They fear the evil effect on the comrades of a system under which there will be real money to handle.

Much depends on the point of view. The New Economic Policy led to a drastic reduction, in some directions, in Government staffs, and is not likely to please everybody. Further, there is certainly something inconsistent (to take a concrete example) in ranting one moment about the Capitalist wolves who are seeking to devour the Communist lamb and rejoicing the next (as is done by the monthly journal of the Soviet Post Office) that there is a prospect of the successful flotation of an internal loan of a million gold roubles for the construction of much-needed telephone trunk lines.

Having got back to sane finance and real money, as the gold "chervontsy" certainly are, it seems highly improbable that, as a matter of considered policy, there will ever be a reversion to the former state of chaos.

The journal of the Soviet Post Office, a well-produced brochure of 100-150 pages, gives a very complete picture month by month of the effect on postal affairs of the new policy.

Up to the middle of 1922 the Soviet Post Office was handling practically nothing but the free telegrams and correspondence of the new mushroom Government Departments. Things had got to such a pitch that, although trade and commerce, even at an official estimate, had dropped to about 20 per cent. of what they were in 1913, the postal and telegraph traffic had actually risen at one time above what it was in 1913.

With the introduction of the New Economic Policy, the Government Departments came under a budgetary regime, and, for the first time, had to pay for what they sent. They speedily discovered that they could not afford to send long wordy telegrams of 200 words or more. As an immediate consequence, the telegraph traffic fell off by about one-half, and the average length of a telegram fell from 100 to about 20 words. High-speed instruments, such as the Baudot, with which it had been necessary to equip some of the circuits in order to cope with the intensive Government traffic, ceased to be required, and are now in a fair way to the scrap heap. A recent circular points out the iniquity of wasting Government property by neglecting them. The postal and telegraph traffic found its real economic level at about 20 per cent., and 35 per cent. of the 1913 figures.

The Post Office itself, as a Government Department, felt the pinch in its own budget. The pay and rations of Soviet officials have always been precarious; but systematic retrenchment was now introduced. Estimates were cut down on the Geddes principle. Not only that, but the amount actually received worked out at a fraction only of the reduced vote.

For example, only about 9 per cent. of the amount required for uniforms was actually received. The vote for stationery was not enough to cover even bare necessities; even the salaries were not adequately covered. In the current year there appears to be little likelihood of any better results.

The Post Office naturally had to start economising, and did so on the systematic plan of sacrificing the unremunerative parts of its services. So far as it could, it induced the local authorities to take over financial responsibility for local services; but many offices not only in the provinces, but also in the towns (in that case branch or sub-offices) had to be closed down.

Unfortunately, this economy campaign runs directly counter to the new political slogan given out by Mr. Trotsky: "junction with the country," which preceded a desperate effort to get into touch with the elusive peasant,—"horny handed from the plough," as he figures in Communist oratory.

The village Post Offices were, of course, the most unproductive. One writer mentions as typical of 50 per cent. of the Post Offices in Russia an office with a dozen or more of a staff is a district serving perhaps 10 villages with a population of 5 to 8,000 in all. The turn-over of such an Office would be 600 ordinary letters a *month.*

On Sunday, the one day in the week when the peasant comes in to church and market, the Post Office, which has been standing idle all the week, is closed. The peasants, who, in many cases, provide the building for the Post Office and the post horses for the conveyance of the mail, and are, nevertheless, liable to be bullied when they present themselves at a Post Office counter, and are made to pay for small services such as the addressing of their letters, are, naturally, not likely to view Communistic brotherhood from the same angle as the state-supported lad behind the counter. Even the official local committees sometimes prefer to send their letters by private means rather than through the State Post Office.

It is clear that in the "present objective conditions" (a favourite Communist phrase) the Soviet Post Office is powerless to reach the country. The usual jealousy between the Departments will doubtless effectively prevent any fusion of official activities in the provinces. There seems little prospect of a cheap service for State insurance, banking, co-operative trading, &c., combined with the posts and telegraphs which would give, artificially, to the villages such a conglomerate institution as that which is found in full natural growth in English villages in the shape of the village Post Office and grocer's shop. There is as little co-ordination, apparently, between the various Soviet organs in a district town or a village as there is between the various public utility services which have the right to dig up the London streets.

It was natural, since a one-horse postal service was too expensive, that telephones should be suggested as a solution of the difficulty of bringing the town to the country or the country to the town, not merely ordinary telephones, or farmers' party lines a l'Américaine, but actually automatic telephones. It is true that the initial cost of an automatic exchange for, say, 50-100 subscribers would be rather greater than the cost of an ordinary exchange; but the engineer who puts forward the suggestion points out the saving in staff and adds that no special building is necessary—the exchange can be put down in a cellar or up in a garret and left, apparently, to function in proper order indefinitely.

Of 11,887 points where there are district executive committees, only 2,219 are served by Post Offices. In the plans for 1924-31 it is proposed not only to open Post Offices at the remaining 9,668 executive centres, but to furnish each of them with a radio receiving station.

There are said to be 126,000 telephone instruments in Russia, not necessarily in use or usable, but just instruments.

The number of telephone subscribers is 80,000. Of these, over a quarter (22,000) are in Moscow alone. Most of the remainder are in the big towns like Kharkov, Kiev and Petrograd. Some kind of overhaul of the Moscow telephone system has been undertaken by the Soviet Post Office at its own expense as part of a so-called "Remount Campaign" for overhauling the very dilapidated telegraph system. Some of the other systems—Kharkov is one—are being practically rebuilt at local expense. Most of the radio stations are the result of local effort. The Red Air Fleet is being built up partly by voluntary subscriptions.

The telephones are under a separate administration. As a result of some political move which seems to be resented by the administration, the local systems are due to be handed over to the local authorities, but apparently the decision has not yet been put into effect.

It will be evident, however, that for a country the size of Russia, the telephone service is in its most rudimentary stage.

In addition to its monthly journal, which contains a colossal amount of material in the shape of returns, leading articles, progress reports, and letters from the provinces, the Soviet Post Office issues a weekly Bulletin which may be compared to our Post Office Circular. There are also other publications of a more or less official nature on staff matters and so on.

The Bulletin bears evidence of the colossal activity on paper of the Soviet organisers. As examples, we find pages and pages of rules, worked out with Teutonic thoroughness, about what to do when a letter is undeliverable, an elaborate telegraph code for reporting the different kinds of faults and breakdowns, an analysis for 539 separate operations of the time which should be taken on repairs of Baudot, Hughes, Morse and other telegraph instruments. The repairs are charged in to the factory or to the mechanic on standard time and charged out on the actual time taken. The workmen apparently receives a premium for time saved. There seems to be a danger of an increase in the number of major operations under this system.

Preparations have been made for changing over to the metric system of weights and measures from the beginning of this year. Tables are given of equivalents.

The reverse of the medal to this immense activity in the making of returns and the promulgation of rules, is indicated in an address to a forthcoming Congress of Administrators, prepared by the Deputy Head of the Soviet Post Office in which it is pointed out that the one urgent problem of the moment is the reduction in the amount of paper work. The time spent by the Post Office on writing work is actually greater than that given to manipulative work, and an ordinary enquiry for, say, a missing registered letter simply gets lost in the vain search for records with which to connect it.

With its reduced traffic, the Soviet Post Office should not now be suffering to the same extent from the grave defects in its equipment; and there are clear indications that it is laying a solid foundation on which a creditable service could quickly be built up. Whether such a service will be realised, evidently depends on how far the counsels of the wild men have ceased to prevail. Its present political head, who has equal ministerial rank with the Commissars for Foreign Affairs, War, and so on, seems to be a pre-war revolutionary of peasant origin who has had experience of Siberia.

CALL BOX AMENITIES.

SOME AMERICAN SUGGESTIONS.

I THINK something or other should be done to make the telephone booths more comfortable. There isn't enough room inside a telephone booth. Personally, I have to empty my pockets every time I have occasion to use a booth—if I don't I can't close the door. And I don't like to leave the door open because my language is not any too choice when I become excited.

Of course, if the telephones were removed, there would be more space—but that's silly. The only solution seems to be to build the booths slightly larger—say seven or eight times the size they are now. Yes, that's it—larger booths. Then they could be furnished appropriately and made comfortable.

There seems to be room, too, for improvement in the directories. Why, for instance, wouldn't it be practicable to stimulate interest among the public by turning out monthly issues with pretty telephone girl covers by the leading artists?

The public would eagerly peruse the issues if good, red-blooded fiction, funny stories, jokes and comic pictures were sandwiched between names and numbers of subscribers. Just think of the business A. Cohen, Central 4178, would get if his name, for instance, followed the joke about the Irishman who had to shoot the rabbit before he loaded his gun because the rabbit wouldn't wait.

The telephones themselves could be greatly improved. What could be sweeter than an attachment that would enable a subscriber to buzz back in the operator's ear? And another arrangement whereby a person who had deposited his two pennies and had failed to receive a satisfactory number would receive in its place a bar of chocolate or something?

JUDGE (New York).

THE BOOK BESIDE THE TELEPHONE.

COULD any popular author, even in his wildest dreams, hope to produce a book the circulation of which ran into $1\frac{3}{4}$ million copies a year and the readers of which numbered millions a week? Could he face with any semblance of equanimity the task of introducing hundreds of thousands of different characters into his work? Fielding once said that no cook, although he were to concoct a dish which should include every species of animal and vegetable food in the world, would be called upon for so great an effort as is required of the author who aims to deal with all the manifold phases of human nature; likewise the mental and physical limitations which are imposed upon an author prohibit him from attempting to write a book dealing with as many as 664,000 characters.

1.—THE LARGE TYPE OF MONOTYPE KEYBOARD MACHINES USED IN COMPOSING THE TYPE FOR THE TELEPHONE DIRECTORY. THE KEYBOARD IS SOMEWHAT SIMILAR TO A LARGE TYPEWRITER AND THE OPERATOR PUNCHES HOLES IN A ROLL OF PAPER ACCORDING TO THE LETTERS REQUIRED. THE PERFORATED ROLL IS AFTERWARDS TAKEN TO A CASTING MACHINE WHERE THE CORRESPONDING TYPE IS PRODUCED FROM MOLTEN METAL.

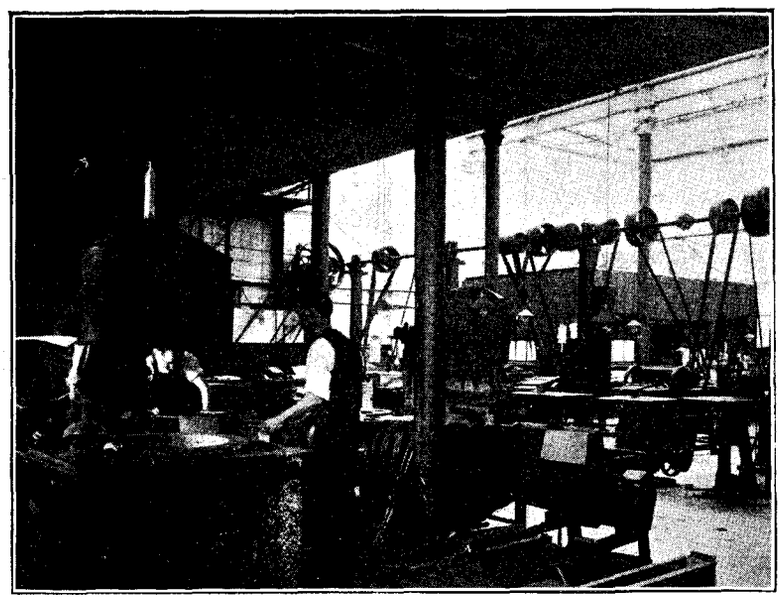
But such a work is published by the Post Office in various parts and sizes. It is the biggest printing job carried out by the Government, besides being the biggest thing in the way of guides published in the British Isles.

The Telephone Directory is issued in 37 sections, one for London and 36 for the Provinces. To print the whole of the 37 sections simultaneously twice a year would be a far too expensive task. It is both economical and convenient, therefore, to split up the work of publishing in different areas over twelve months; that is the reason why the London Telephone Directory is issued

2.—GENERAL VIEW OF THE READING DEPARTMENT. CHECKING AND REVISING THE PROOFS.

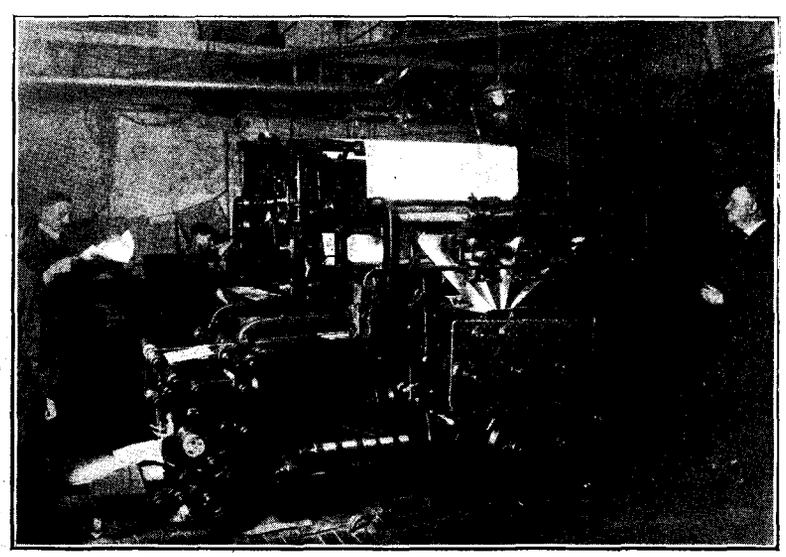
in April and October of each year, the volume for the East, South and West of England and for South Wales in March and September, that for the Midlands and North Wales in May and November, the North of England volume in July and December, and the Scotland and Northern Ireland section in February and August.

The number of copies of the London volume is approximately 600,000 and nearly a thousand tons of paper are required for it each year. The paper consumed by the October issue alone reached a total length of 6,000 miles, 45 inches wide. The sheets of paper used, if placed end to end, would more than encircle the world. The weight of type used was $9\frac{1}{4}$ tons, and the number of pages per copy was 1,095. A single copy of the book weights $3\frac{3}{4}$ lb.

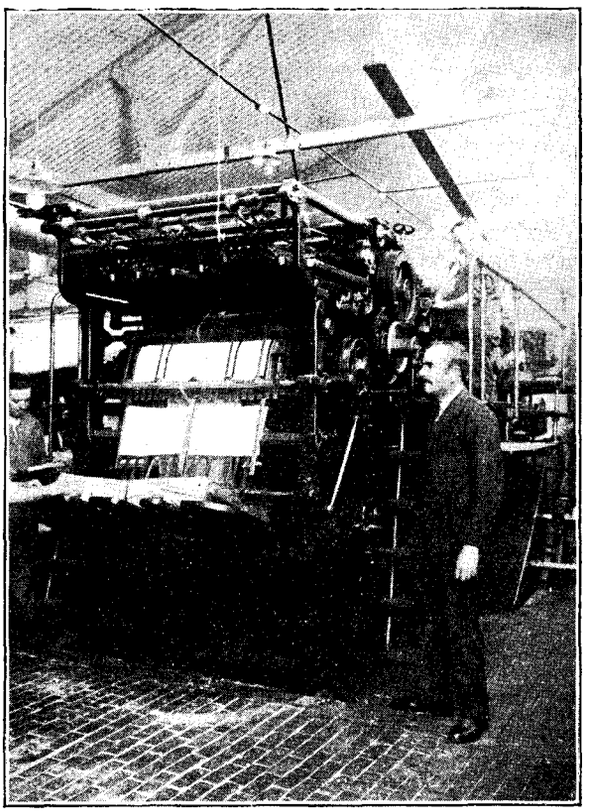


3.—A CORNER OF THE FOUNDRY WHERE THE FINAL METAL PLATES ARE MADE BY THE STEREOTYPING PROCESS FROM THE TYPE FORMES.

The Telephone Directory does not spring complete from the earth. It has to be built up laboriously and painstakingly, item by item and column by column, and when the groundwork is in course of preparation an elaborate system of indexing and cross-indexing must be followed. The editorial work starts almost as soon as the agreement is signed by a subscriber. A card record is sent by the Telephone Department to the Engineer, a copy going simultaneously to the Directory Section for insertion of the

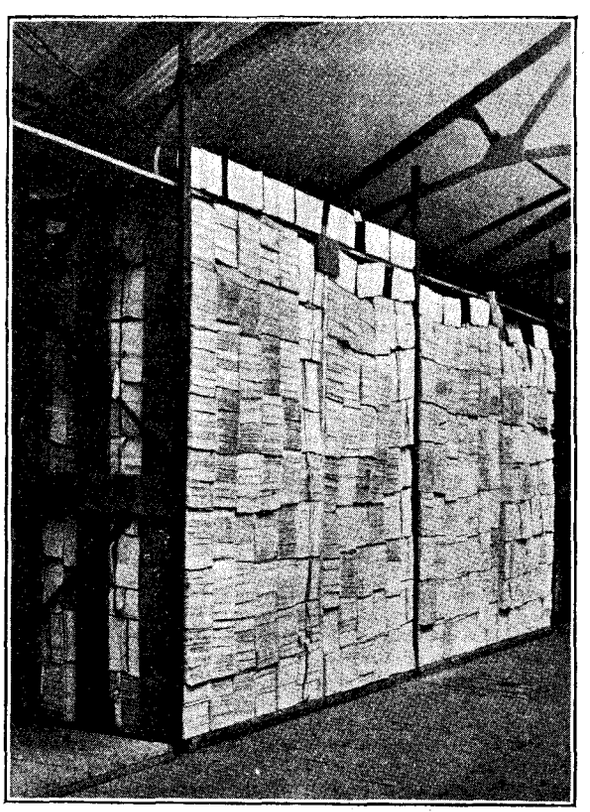


4.—SIDE VIEW OF ONE OF THE ROTARY PRINTING PRESSES. THE PRESS SHOWN PRINTS ABOUT 7,000 PAGES OF THE TELEPHONE DIRECTORY PER HOUR.



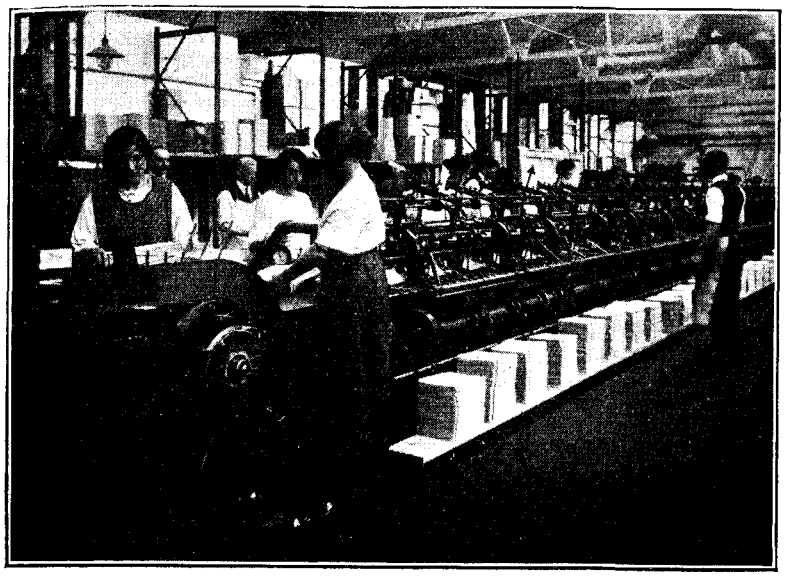
5.—END VIEW OF THE SAME PRESS.

particulars on the press copy. Three cards of different colours are prepared for the Directory Section. One, the numerical card, is filed in Exchange Number order; the second, or street card, which is filed in street order, is a duplicate of the numerical card; the third, or delivery card, contains particulars of the number of Directories to be delivered for each line rented. From



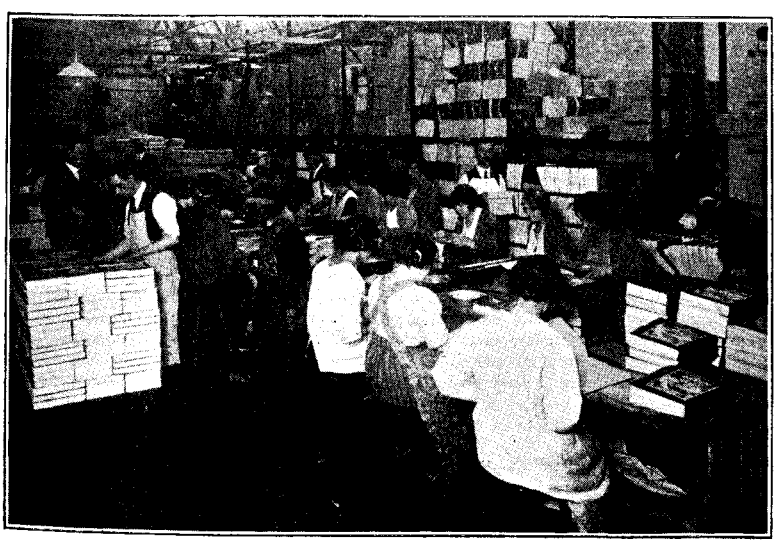
6. TWO OF THE FEW DOZEN STACKS OF UNBOUND PRINTED SHEETS READY FOR THE GATHERING MACHINE.

these cards then is extracted the necessary information for the "copy" sheets of the Directory, and particular care must be taken over the alphabetical arrangement. Sometimes a subscriber with a double-barrelled name will ask that the name shall be printed twice in the Directory—under the initial letter of both parts of



7.—THE GATHERING MACHINE IN OPERATION. THE GROUPS OF PAGES ARE ASSEMBLED AND PUT IN PROPER SEQUENCE, THE FIRST STEP IN THE PROCESS OF BINDING.

his name. It may be mentioned that one free entry only is allowed, owing to the pressure on space; but if a second entry is desired, it is included on payment of an appropriate charge. Complaint is sometimes made by the possessors of double-barrelled names, in the case of single entries, that the name appears in the Directory



8.—FIXING LABELS AND STACKING FOR TRANSPORT. SOME OF THE 287,500 COPIES PRODUCED IN THE OCTOBER EDITION TO GIVE LONDON THE LATEST INFORMATION REGARDING ALL THE MEMBERS OF ITS GROWING TELEPHONE FAMILY.

under the wrong portion of the name, some subscribers favouring the initial letter of the first part and others the initial letter of the second part. It is generally found that in filling up the Directory form subscribers are very hazy as to the portion of the name determining the alphabetical position.

Another type of complainant is he who, with a trace of superstition in his composition, finds that the number allotted to him totals thirteen. Objection has even been taken to a number because it coincides with that applied to a trade commodity.

The forms inviting particulars for the Telephone Directory are sometimes the repository for information which is valueless from the Directory point of view; but which might be useful to the taxation authorities. "Married, with separate estate," was the description of herself given by one applicant for telephone service. "Widow," stated another applicant; and let it be confessed that by an oversight this designation crept into one edition of the Directory; which led to the pertinent inquiry whether the book was to become a matrimonial agency.

Many of the fairest names in history and literature are enshrined in the pages of the Telephone Directory. There are Macaulay, Shakespeare, Keats, Byron and Shelley. Not only is Homer to be found there, but also Hector and Troy, as well as Pindar, Walter Scott, Disraeli, Catesby and Capel, Dickens, Rudge (but not Barnaby) and Pope, besides Carlyle, Lytton, Tennyson, Burns and Thackeray all have their telephones; but whatever the subscriber's social standing, whether he be of royal or noble birth, his entry occupies no more space than that accorded to the plebeian. Rather, the heavy type allowed to commercial houses, for which, of course, extra payment is made, would seem to indicate that this is a book which has necessarily to deal with materialistic things.

New Telephone Directories are delivered by hand to every subscriber, and, as most readers of the JOURNAL are aware, the Post Office is insistent that the copy which has been in use for the preceding six months, being obsolete and no longer a reliable guide, should be handed to the messenger in exchange for a new copy. The old Directories are returned to the mills to be pulped.

C.

DIARY, FEBRUARY, 1924.

Feb. 1.—LONDON TELEPHONISTS' SOCIETY.—Competition Papers, 6.30. Y.M.C.A. Lecture Hall, 186, Aldersgate Street.

1.—INSTITUTION OF ENGINEERING INSPECTION.—Evening Meeting at Society of Arts.

14.—INSTITUTE OF PUBLIC ADMINISTRATION.—"Whitley Councils and their Place in the Public Services," by Mr. G. H. Stuart Bunning O.B.E. Great Hall of London School of Economics, Houghton, Street, Aldwych, 6 p.m.

18.—P.O. TELEPHONE AND TELEGRAPH SOCIETY.—"Improved Methods of Production and Distribution of Electrical Energy," by Sir John Snell, K.B.E., 5.30 p.m. Institution of Electrical Engineers.

22.—INSTITUTION OF ENGINEERING INSPECTION.—Evening Meeting at Society of Arts.

28.—INSTITUTE OF PUBLIC ADMINISTRATION.—Financial Control, No. 3. "The Exchequer and Audit Department," by Sir Sydney Olivier, K.C.M.G., formerly Assistant Comptroller and Auditor of the Exchequer. 6 p.m. Old Council Chamber, L.C.C., Spring Gardens.

PRESENTATION TO MR. G. W. LIVERMORE.

On the transfer of Mr. G. W. Livermore to take up duties of District Contract Manager of the Western District, London Telephone Service, he was presented with a cheque and wireless equipment as a token of esteem and regard from the staff of the North-Western District, with whom he had been associated for thirteen years.

Mr. Livermore expressed a desire that he might still be considered as "the sincere friend" of the officers from whom he had, for so long, received such loyal and efficient support. This desire was heartily reciprocated by all present, the acclamation being of a particularly hearty character.

TELEGRAPHIC MEMORABILIA.

Radio Signalling and Aviation.—At the air demonstration arranged for the Dominion representatives at Croydon Aerodrome a few weeks ago, Captain S. Baker, Civil Aviation Traffic Officer, described the organisation of aerial traffic and its control by means of radio and other signalling systems. A demonstration of the methods employed in the daily routine of the aerodrome was given by means of the Marconi Company's aeroplane, which represented a commercial machine flying on the Continental air route, and two Marconiphone loud-speakers which were arranged near the control tower in such a manner that the orders given to the aeroplane and the pilot's replies could easily be followed by the whole gathering. The machine was called as it would be in the ordinary way when over one of the reporting points, such as Biggin Hill. The pilot asked for a bearing, which was given, and the machine flew on that bearing until it reached the aerodrome. Directions for landing were given as would be done if the ground were enveloped in fog. After the landing, the Imperial representatives examined the Marconi telegraph and telephone apparatus on the aeroplane, by means of which conversation has been carried on between a pilot and the aerodrome, under favourable conditions, up to as great a distance as 400 miles.

According to the *Industrial Australian and Mining Standard* a series of tests was recently carried out in low-power radio transmission by Mr. Maclurcan of Sydney (N.S.W.) and Mr. Hull, a Melbourne amateur. The experiments were commenced with an expenditure of 7 watts, which was gradually reduced until Mr. Maclurcan was transmitting with 0.078 watts. The signals were clearly received by Mr. Hull in Melbourne. The following night Mr. Maclurcan succeeded in transmitting code messages which were quite readable in Melbourne (although commercial stations were working) with an expenditure of 0.044 watt. Later the power was further reduced to 0.012 watt, and although some of the signals were received in Melbourne, atmospheric disturbances resulted in others being unreadable. Mr. Maclurcan's measuring instruments were read and checked by independent observers, and were found to be correct within 1 per cent. In view of the success attained, Mr. Maclurcan carried out further work, over longer distances, with Mr. Bell, of New Zealand. Commencing with 0.7 watt, he gradually reduced to 0.04 watt, then to 0.01 watt, and finally 0.0037 watt, and the signals were strong and steady throughout, even on the lowest power. In this case also the instruments were subsequently found to be correct.

According to the New York correspondent of Reuter's Agency, radio home study courses are about to be inaugurated by Columbia University. The first and experimental course will be one on the poetry of Robert Browning. Should this prove successful other courses embracing English literature and other subjects will be added to the curriculum.

The first cable ship built in Holland has been launched by the Nederlandsche Scheepsbouw Maatschappij at Amsterdam, being intended by the Dutch Colonial Department to serve for the laying and repair of cables in the Dutch East Indies. The ship has a length of 88.70 metres, and the cable machinery is reported to have been supplied by Messrs. Johnson & Phillips, of London.

Further Dutch news regarding cables comes from the Hague correspondent of the *Daily Chronicle* who states on the authority of a Dutch technical journal concerning the projected second telephone cable between Holland and this country that the cable itself has been ordered from Siemens Brothers, of London. It will be constructed on the so-called East Prussian system. This means that the cable will be identical with the German cables laid in the Baltic connecting Berlin and East Prussia since the direct line was severed by the annexation to Poland of part of East Prussian territory. To this the Department of Overseas Trade adds the information that the new submarine cable is now in course of manufacture at Woolwich. It has 16 paper-insulated cores laid as four quads, each core being continuously loaded. There is a double lead sheathing and single-wire armouring. The contract was placed by the British Post Office on behalf of the Governments interested. A similar cable has been laid in the Baltic, but the Anglo-Dutch cable will be the first in tidal waters.

The *Electrical Review* of Dec. 7 last contained an enlightening leaderette on a paper read before the joint meeting of the I.E.E. and the Physical Society on Radio Telephone Speakers. A complete report of the proceedings appeared in the same issue, but for the benefit of readers of this column the abridged leader will probably serve if only to whet the appetite of the scientifically inquisitive. The Institution theatre was crowded. Dr. W. H. Eccles pointed out that it was a shocking confession to have to make that the efficiency of radio telephone loud-speakers was not greater than a few tenths of 1 per cent. It should be remembered, however, as was emphasised by Mr. S. G. Brown, that for the want of a perfect transmission system, it is not possible to determine the real inefficiency of a loud speaker. It is presumed to be inefficient because, in the electrical transmission to it, the perfection of listening to, say, the music of an orchestra itself is never approached.

Moreover, the human ear being the wonderful thing that it is, it expects much, and bearing in mind the minute amount of energy that suffices for comfortable hearing, the task of attempting to fulfil all its expectations is an enormous one. Nevertheless, while theoretically and practically it would appear that to procure reproduction absolutely perfect both physically and accoustically is not possible, there is no need to strive after the attainment of the ideal. For, although the fact that present loud speakers are capable of being improved cannot be evaded, there is some degree of probability in Prof. A. O. Rankine's conception that perfect fidelity of sound reproduction alone may never give complete satisfaction, it being at least arguable that visual conditions are not entirely unimportant to complete the effect.

When all is said and done, what is being attempted is *the deception of our auditory mechanisms by offering imitations*, and, therefore, it would suffice under practical conditions if the reproduction were, in the case of speech, faithful enough to be intelligible and, in the case of music, sufficiently pleasing. Loud speakers are at present obtainable which will give such results if operated intelligently, but unfortunately the public seems invariably to demand too much loudness, and in the endeavour to produce volume, amplification is forced to such an extent as to cause distortion.

In conclusion, it may be remarked that if amplifiers and loud speakers did really function as they ought to do according to theory, there would be very little to worry about and, consequently, a good deal of the interest in radio work would be lost.

Messrs. Siemens Brothers & Co., have received the contract for 1,700 nauts of submarine cable for Turks Island to Barbados, and thence to Trinidad and British Guiana. It is stated that the cable will embody all the latest improvements.

The old custom of exchanging Xmas and New Year's greetings and cards with foreign and colonial telegraphists is being revived in the Cable Room, London. Of the principal European centres this year may be mentioned Paris, Antwerp, Brussels, Berlin, Cologne (The Rhine Army), Hamburg, Amsterdam, Rome, Rotterdam, Prague, and of the smaller towns, Ostend, Ghent, Leipzig, Dresden, &c. Cards have also been received from the Indian telegraphs, and from New Zealand, while some of our old colleagues, Munro (in Egypt) and Meyer in the Isle of Wight have remembered us with views typical of the widely different districts in which their respective lots are at the moment cast. It is hoped that the happy idea will be more thoroughly carried out at the next opportunity, thus emphasising the world-wide unity of our craft. The cable companies also did not forget us, neither did our wireless friends, private or Governmental. To all many thanks and heartiest reciprocations.

Private sources in New York give us the information, not perhaps exclusive, that the use of *permalloy*, a substance composed of iron and nickel possessing large magnetic properties, has increased the traffic-carrying capacity of cables to such an extent as to increase the rate of transmission by 300 per cent. It is stated that a thin tape of *permalloy* will surround the central conducting core of the cable, but that otherwise the construction of the remaining coverings will remain much as before.

Simultaneously the news appears in the London daily press that direct telegraph working has been established between London and Chicago at a rate only slower by one or two letters per minute than that between London and New York, a remarkable achievement of the ever-enterprising Western Union Cable Company.

The New Year has seen the opening of a wireless service between this country and Austria through the Marconi Company, and the handing over of the Coltana Radio Station (Italy) by the Italian Government to private enterprise.

The closing days of the old year and the opening days of the new witnessed some remarkable results of broadcasting, and all those who listened to to Pittsburg (KDKA) or to Paris, or again to the twelve deep booms of Big Ben as the sonorous notes struck across the surging sounds of London's welcome to 1924, cannot but express their keen appreciation of the enterprising efforts of the British Broadcasting Company.

Reverting to the London Foreign Telegraphs again, once more local history is repeating itself in the Cable Room which is again to lose a number of its younger and most efficient staff due to their successes in examinations for higher appointments. The Imperial staff also expects to be a loser to a proportional extent and from the same cause. While most heartily and sincerely congratulating the successful candidates, one cannot but sympathise with the supervision who are continually training new entrants for cable work and its intricacies, only to find that, so far as their own special department is concerned, there is a distinct feeling of Love's Labour having been lost. Perhaps, however, it is not quite as bad as that, but any way, it is rare uphill work !

The presentation to Mr. E. Barrett on his retirement took the form of a gold watch and chain, &c., and to Mr. H. J. Broughton of an expanding book-case. The special type of book-case chosen by the latter is indicative of the spirit in which our ex-Superintendent friend accepted his retirement. *Expanding* is an excellent term, and somehow leaves one with the impression of renewed and rejuvenated activities, a larger library, further intellectual developments, and an ever-widening horizon of thought and interest. Surely an excellent ideal upon entering upon one's *retiring* period !

It is not often that information regarding the extension of the submarine cable systems of Europe comes to us through the provincial non-technical press, thus, we the more gladly acknowledge our obligation to an early issue of the *Chatham, Rochester and Gillingham News* for the following interesting item :—" The Eastern Telegraph Company has entered into an arrangement for the opening of direct cable communication between Emden and London. A cable ship is in the mouth of the Thames to lay the shore end of the cable at Dumpton Gap, near Ramsgate. The agreement, however, is subject to the formal sanction of the German Post Office."

Very early in the new year one more notable T.S. figure passed the sixtieth milestone and thence onward to what all will most sincerely hope will prove to be the happy sunlit path of Retirement. One cannot write of Mr. G. T. Bennett, Assist. Superintendent, C.T.O., "John" as he was generally called, without recalling the years of consistent labour which our friend devoted to the cause of his colleagues. Whether this was as Committeeman on one or other of the benevolent or provident societies or as Treasurer in organisations which at one time were not unaccompanied by real personal risks. The writer has a very clear and happy recollection of "John" in his capacity as Treasurer on the committee of one such association, and whatever may have been the policy, whatever may have been the issue, and there was the slightest reference to finance, "John" would be up on his feet, vigilant and persistent at the slightest hint of divergence from the straight line laid down by monetary stringencies. Sometimes we were annoyed that our schemes could not be made to work without reference to the more sordid question of £ s. d. Sometimes we were inclined to say, "bother John with his *points of order*," but in cooler moments we generally had to acknowledge that the cold calculations of our Treasurer had brought us back to the solid facts of a very solid earth. So now he leaves us! Yet glad we are to note the promise of renewed youth in eyes, and hands and limb, and to follow him with our grateful thoughts for his forty odd years of good comradeship unsullied by word or deed that did not become a man!

It was a happy idea indeed on the part of someone to think of handing the final balance of £8 13*s.* 7*d.* from the C.T.O. Bazaar Fund to the Games and Recreation Fund of the Sanatorium at Benenden which had nearly become exhausted.

Endeavours have been made to keep our readers up to date regarding Italy and her submarine cables to America with perhaps but partial success, and probably *ad nauseum*, so many have been the changes in the items of information which have come to hand. Here, however, is what the *London Times* has recently published. It is probably the last word :—

"An important agreement has been signed in London, subject to approval of the Italian Government, by Sir John Denison Pender, on behalf of the Western Telegraph Co., Ltd. (the English Eastern Associated Group) by Mr. Richard T. Durran, attorney for the Compagnia Italiana dei Cavi Telegrafici Sottomarini (Italy), and Mr. S. J. Goddard, vice-president of the Western Union Telegraph Co. (America). It provides that the Italian company, under concession from the Italian Government, shall lay and operate a cable connecting Fiumicino, on the coast of Italy, with the Azores, touching at Malaga, in Spain; that the American company shall lay a cable between the Azores and North America; and that the Italians shall also ultimately lay a further cable between Malaga and the coast of South America, thus connecting Fiumicino with South America direct. The agreement declares that the American company is not concerned with the Mediterranean-South American traffic to be carried by the Italian direct cable; and that the English company is not concerned with the Italian North American traffic to be carried by the Italian Azores cable, and is only interested in that cable so far as it may affect traffic between the Mediterranean and South America.

The Italian company agrees in principle to a participation by the English company in the capital to be invested by the Italian company in meeting the cost of manufacture and laying of the cable from Fiumicino to Malaga; and the American company is to take part in the issue of debentures by the Italian company, the money being exclusively devoted to the cost of manufacture and laying of the cable from Malaga to the Azores."

Congratulations to the Relay Automatic Telephone Co. of London, which, according to Reuter's Agency, has signed a contract with the Telegrafia Co. of Prague, for the manufacture of patents for a period of ten years. This is the first time a British electrical business has succeeded in competition, says the *Electrical Review*, with the long-standing combination of interests of Central Europe.

AUSTRALIA.—The *Australian Electrical Times* says that a new Government radio station is to be erected shortly in North-Western Australia. Nine police stations in New South Wales, *viz.*, those at Sydney, Tamworth, Goulburn, Bathurst, Newcastle, Grafton, Albury, Dubbo, and Broken Hill, are to be equipped with radio apparatus. The water police are also to be similarly equipped to enable them to keep in touch with vessels over a wide radius.

BELGIUM.—The King of the Belgians laid the foundation of the new inter-continental radio transmitting station at Ruysselede in West Flanders on Dec. 19. The station is to be provided with three 250-kilowatt aerials, which can either be used alone or in parallel pairs, in the latter case giving a power of 500 kilowatts. It will be possible to transmit messages on a wavelength of from 16,000 to 25,000 metres at high speed (100 words per minute). Messages for transmission will be handed in at a distant office, probably in Brussels, connected to an ordinary wire telegraph circuit. This office will also deal with receiving; the receiving station will be set up in the neighbourhood of Brussels, and will likewise be connected by wire with the central office.

CHINA.—From the *Electrical World* we learn that the Radio Corporation of America, through its affiliated organisation, the Federal Telegraph Co. of California, is perfecting plans for a group of radio stations in China, to cost $13,000,000 and to be completed in 24 months. The central plant in Shanghai will be of 1,000-kW capacity, with seven steel towers, each 1,000 ft. high. Other stations will be at Pekin, Canton, and Habin. Mr. R. P. Schwerin, president of the Federal Company, will be in charge.

DUTCH COLONIES.—A Board of Trade report states that the outstanding feature of interest in radio telegraphy in 1923 was the formal opening by the Governor-General of the new installation which has been set up by the Government at Malabar, near Bandoeng in the highlands of Western Java. Unfortunately, the usefulness of the new station is much diminished by the fact that the station at Kootwijk in Holland, has a power of only 400 kW and is incapable of keeping up communication with Java for more than five hours per day.

Plans have been approved for the erection of six new wireless stations in the neighbourhood of Merauke (in Dutch New Guinea), on the Island of Boeton (off Celebes), and in the neighbourhood of Siak-Sri-Indrapoera (East Coast of Sumatra). The above installations are in readiness, whilst the expense of erection, &c., will be borne by the provincial Treasuries. Work is proceeding on the strengthening of the wireless stations at Sabang, Sitoebondo (East Java), Koepang (Dutch Timor), and Amboina.

FRANCE. According to the London *Times* a number of offices will be opened experimentally in Paris in the new year for the transmission of photo-telegraphic messages (by the system invented by M. Edouard Bélin) to Lyons and Strasburg. By this service exact reproductions of the originals will be delivered to the persons to whom they are addressed. The cost of photo-telegrams will vary from 2*s.* 6*d.* to 5*s.*, according to the dimensions of the document or picture to be transmitted, which must not exceed 5.3 in. by 3.75 in. Additional offices will be opened in Paris as the scheme developes.

GERMANY.—From the same source it is learnt that a new German machine for the transmission of radio messages in cipher was tested on Dec. 11. Telegrams exchanged between Dr. Höfle, the German Minister of Posts, and the Swiss Postal Administration at Berne were correctly decoded. It is claimed that no unauthorised receiver can decipher messages dispatched by the new machine. There is no loss of time in transmission.

ITALY.—Senator Marconi states, according to certain financial papers, that the reported declaration by the Postmaster-General to the Italian Senate that the Italoradio Co., the concessionary for radio telegraphy in Italy, has the use of all French, British, and German patents for the Italian services cannot apply to the Marconi Co.'s Italian and foreign patents. A further denial is given to the statement that the Italoradio Co. is participating in a world radio trust, for this has not so far been constituted. The Italoradio, however, is associated with the German Telefunken Co. and the French Société Télégraphie sans Fil.

NEW ZEALAND.—The Minister of Marine, it is understood, is having experiments carried out with radio direction-finding apparatus in the hope of having all important mainland lighthouses equipped with such devices.

Looking through the Rules and Regulations regarding the conditions of admission into the Civil Service of certain foreign countries, the writer came across the following—to European eyes—curious prohibition of the Persian regulations which applied to the telegraph section of the Administration as to any other. Chapter I, Article 2, states that the entrant "must be of Persian nationality, must not be less than 18 years of age, must not have been condemned for insurrection, must not have a bad reputation due to debauchery, and *must not be addicted to the use of opium.* From these and other items from this interesting document, reproduced by a telegraphic publication, one gathers that they do not mince words in the Persian Government telegraph service.

The Growth of the Mind.—The mind grows, not like a vegetable, by having its roots littered with etymological compost, but like a spirit, by mysterious contact of spirit, thought kindling itself at the fire of living thought!—T. CARLYLE IN SARTOR RESARTUS.

J. J. T.

SHEFFIELD TELEPHONE DISTRICT.

On Dec. 31 last, Mr. J. Wrigley, Contract Manager, retired from the Service, having reached the age limit. Mr. Wrigley, who has been in Sheffield since 1905, entered the late National Telephone Co., Ltd., some 35 years ago. During his long and valuable service, he has been in no little degree responsible for the growth of the telephone system in the various districts with which he has been connected.

Before leaving his old colleagues, Mr. Wrigley was presented with a handsome proof of their esteem in the form of a cabinet of stainless cutlery. Colonel Westbury, O.B.E., the Surveyor, spoke appreciatively of Mr. Wrigley's enthusiasm and work on behalf of telephone progress. The presentation was made by Mr. S. C. Smith, District Manager, with a few appropriate words in recognition of Mr. Wrigley's loyalty and sterling qualities. Mr. W. Thyne, Chief Clerk, Mr. H. G. Rowe, Engineering Department, and Mr. G. H. Hamer, Contract Staff, also contributed on behalf of their several Departments, expressing regret at the severing of old associations with Mr. Wrigley and wishing him future happiness and prosperity.

Mr. Wrigley suitably responded, and expressed his sorrow at leaving old friends and colleagues.

The
Telegraph and Telephone Journal.

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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DIRECTORY ENTRIES.

WHAT the *Liverpool Post* describes under the heading "Telephone Muddles" as one of the minor worries of daily life, viz., a certain lack of uniformity in the indexing of associations and other corporations or public bodies is, no doubt, a fruitful source of vexation, but the Telephone Authority is not responsible for the difficulty, nor is the remedy entirely in its hands. The *Liverpool Post* indeed suggests "an occasional cross reference and a little more uniformity." The occasional cross reference is not so light a matter as it appears to be to our contemporary. The ever-increasing tendency of telephone directories to become unwieldy in bulk necessitates a rigid application of the rule that only one entry can be allowed to each subscriber. If once this be relaxed it is difficult to know where to draw the line, and there would be a danger of enlarging the books to one-and-a-half times their present size. Some institutions in order to be readily discoverable in the directory would require not one entry but three, and a Federated Society of Candlestick-makers might appear amongst the F's, the S's, and the C's. The real remedy is, of course, for those who use the directory to make sure of the correct title of the institution or body whose number they seek, and for that body to ensure that its name is entered under the proper title. Uniformity of practice is certainly imperative, and to achieve this it is incumbent on subscribers to fill in the directory form with their full title or the one by which they are generally known. It is manifest that in an area such as that covered by the Liverpool directory, containing, amongst other large towns, Birkenhead, St. Helens, Warrington and Runcorn, there will be Liberal and Conservative Clubs at most of these places and that there should be uniformity of practice in entering them. The prefix of the word "Royal" or "Incorporated" or "Amalgamated" to a title is often a stumbling block, but here we think the only remedy consists in the subscriber's taking the trouble to ascertain the full name before he looks in the directory. What would an indexer make of Mr. Ralph Nickleby's "United Metropolitan Improved Hot Muffin and Crumpet Baking and Punctual Delivery Company"—and there are some corporations with titles nearly as complicated? Four or five cross entries would hardly suffice. Even this *Journal*, with its explicit title, is occasionally mistaken for the *Daily Telegraph* by ladies who ring up with advertisements to entice the shy housemaid.

The remedy does not lie in cross-reference which is impracticable for the reasons we have indicated; but we think there may be cases where public bodies might elect to be entered under the titles by which they are best known, and, above all, a strict uniformity of practice should be maintained in all districts.

PERSON TO PERSON CALLS.

CERTAIN critics of the British Telephone Service deplore from time to time the fact that a person-to-person service is not in existence in this country, thus, in the opinion of a former General Manager of various large American Telephone Companies, affording evidence that they have no experience of telephone management. The following anecdote or true story from *Telephony* of Chicago is instructive in this connexion:—

> A subscriber of a large independent company in Indiana put in a call to reach a business associate in a Michigan city. It was a person-to-person call; there was much delay in locating the designated party, and when the Indiana subscriber received his bill for telephone service at the end of the month there was a tidy little item of over $20 for that Michigan toll.

The fly in the ointment begins to appear. It is gratifying to have a particular person hundreds of miles away tracked from place to place and, by a final achievement of the telephone staff, brought to the telephone to speak to one at a given moment. It is, however, not so pleasant to have to pay over £4 for this satisfaction when perhaps an unparticular person belonging to the same firm might have served one's turn just as well. The sequel follows:—

> Naturally, there was a big kick. He (the subscriber) rushed to the company office, and made the air there blue, until the matter was investigated and explained to him. It turned out that a station-to-station call would have served his purpose satisfactorily, and incidentally would have cut his toll charges down to less than one-fifth of the person-to-person bill.
>
> "The company was innocent, but the patron was convinced that he had good ground for complaint," said the man who told the story, and who, by the way, was the general manager of the company involved. "What did we do? Why, we reduced his bill to the station-to-station basis. Now that fellow is one of the best friends our company has in Logansport."

Possibly this action has increased the "patron's" admiration of the person-to-person service; but what will it cost to retain it? This specialised service is costly to work, and a few such generous gestures might add to the *reclame* of the person-to-person system but could hardly increase its revenue-earning properties. The requirements of the self-important and exigent "patron" who is always "convinced he has good ground for complaint" and who likes to enjoy a *service de luxe* without paying for it, are usually, in the end, paid for by the commoner sort of subscriber—in a concern run on sound commercial lines.

HIC ET UBIQUE.

THE fact that London had attained to 400,000 telephones at the end of December called forth some comment in the Press. The *Evening Standard* remarks that this is only one telephone to every 20 inhabitants. The correct figure is 18, and we who watched it annually and gradually improve from 21, and 20 to 18 may be pardoned for pointing out a discrepancy of 10 per cent. The following figures show the recent development of London:

End of	Telephones.	Ratio of population to telephones.
1911	211,341 ...	33.8
1921	345,797 ...	21
1922	369,038 ...	20
1923	401,060 ...	18

Of course, development was stationary between 1914 and 1919.

WE congratulate Sir Charles Sanderson, the Controller of the London Postal Service, on the honour of knighthood which was conferred on him at the new year.

WE also congratulate Mr. H. Sparkes, O.B.E., on his promotion to the controllership of the Post Office Stores Department, and Messrs. G. F. Mansbridge and H. A. Cheel on their appointment as Vice-Controller and Assistant Controller respectively of that Department.

AUTOMATIC equipment has been decided on for the Berlin telephone system—in fact a 2,000-line exchange has been working in one of the suburbs for some months. Munich and Leipzig have each over 30,000 lines working on the automatic principle and Hamburg and Stuttgard nearly as many. The equipment adopted is on the Strowger system and the work is being carried out by Messrs. Siemens & Halske.

"BISHOPSGATE," the first automatic telephone exchange in the City of London, will be put in construction immediately at Little Pearl Street, E.C.2. The contract has been placed with Messrs. Chessums, Ltd., of North London. This exchange is a step in the transition from manual to automatic operation of which our readers have already had an intimation. Sites for other automatic exchanges have been chosen.

THE following is the report of a sub-postmaster who was the victim of a night test call at a small country telephone exchange:

> "Sitting down to an unpeaceable meal, telephone bell rang. Jumped up instantly, lighted candle, dashed through door, along passage, through another door, across office to instrument (age seventy)."

We take it that the age refers to the sub-postmaster and not to the instrument, and, if so, a very creditable agility and devotion to duty seems to have been shown.

Chinese telephone subscribers who flirt over the wires with the telephone girls more than three times will have their numbers cancelled.

This, says the Hong Kong correspondent of the Central News, is the effect of a new order just issued by the Director of the Telephone Department

We had thought flirting was an occidental and not an oriental pastime, but here East and West seem to meet. We cannot but approve the clemency of an ordinance which allows of three flirtations before disconnection.

WE regret to find that the illustration to the Automatic Telephone Manufacturing Company's advertisement on our back cover was inserted upside down last month. The block was not furnished to the Printers in time to allow them to supply a proof and consequently the mistake escaped detection.

Mr. A. J. SIMS, who is retiring from the London Telephone Service, has a complete set of old *National Telephone Journals* (Vols. I-VI) and TELEGRAPH AND TELEPHONE JOURNALS up to date of which he would like to dispose.

THE SIGNIFICANCE OF STATE-OWNED TELEPHONES.*

BY WILLIAM DAY, M.I.E.E.

(*Continued from page* 68.)

As students of industrial efficiency, let us go on to enquire as to how far Government ownership in industry will meet those conditions if the method of administration be similar to that existing in connexion with the telephone service.

This is an alluring aspect of our great subject, and much hard and honest thought will assuredly have to be devoted to it in days to come. It is a matter which has long engaged my spare time reflections. But for obvious reasons I cannot embark upon its consideration this evening, so, with your courteous permission, I propose to defer my remarks concerning it until I next have the privilege of addressing this Society.

Now, Ladies and Gentlemen, we come to the most vital of the three standpoints I have just mentioned, viz., our attitude as workers using that word in its most honourable and comprehensive sense. The mental attitude any single worker, particularly if he is in the ranks, may appear to the thoughtless and unimaginative as a matter to be regarded with indifference. That is a mistake, very often a costly mistake, but in any case, the psychology of a great number of workers cannot be ignored except at a very big price—that price is goodwill and, goodwill gone, there is no power that can obtain the best possible results. You may get results, you may get even good results, but not the best possible. I know the cynic will say that this is merely empty platitude, and that it is impossible to organise successfully if you allow yourself to be dominated by motives of consideration for others. There is, on the surface but only on the surface, a measure of truth in this standpoint. The gaining of goodwill, however, does not imply that every individual must be treated as though he were an inspired Solomon, or that *any* group of workers, however articulate and powerful, should be allowed to impose a policy fatal to the highest interests of the industry in which they are employed. But, frankly, I do *not* consider that *that has* been the danger in the past; on the contrary, except in the case of a few far-shining pioneers, very little attempt was made until comparatively recent days to enlist the intelligent co-operation of the workers and to explore the possibility of alleviating the hardships arising out of rapid industrial changes.

The recognition by a great body of workers that they are engaged, not only in providing communications, but also in carrying out a great experiment in the encouragement of industry, would have a tremendously stimulating effect. It would give a significance to their labours quite apart from the economic one; it would constitute no mean dynamic.

If I am right in regarding the Government ownership of the telephones as an experiment from which all schools of economic thought will draw conclusions, then, not only in the interests of the telephone industry—not only in the interests of all the vital industries, but also in the paramount interests of the commonwealth itself, it is of the utmost importance that such an experiment be carried out with a thoroughness which will enable reliable conclusions to be drawn by impartial and competent thinkers.

I know it will be said that, whatever be the efforts of Civil Servants, particularly if they are engaged in industry,—they will be misrepresented, depreciated and ridiculed, and that by this means our fellow-countrymen will be prevented from forming a wise judgment. Well—that is not our responsibility. I do not think it should unduly disturb us: certainly it

* Paper read before the London Telephone & Telegraph Society.

should not deflect us from our purpose. Sooner or later hostile and prejudice critics will realise that from the administration and organisation of the telephone service in Great Britain many useful lessons and much helpful guidance may be gathered.

Our attitude then, towards the industry in which our lot is cast, should be energised not only by the opportunities of advancement it offers—not only by pride of profession or of craft, but by a recognition that we are, it may be, pioneers in experiment greater than we know—an experiment from which our fellow citizens will draw far-reaching conclusions concerning certain aspects of the great industrial problem—conclusions vital perhaps to the welfare of our country.

Our task, Ladies and Gentlemen, each according to his ability and opportunity, is to see that this experiment is well and truly made.

REVIEWS.

"*Modern Radio Communication.*" *By J. H. Reyner, B.Sc. (Hons.). Messrs. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway. 5s. nett.*—This book is described as "a manual of modern theory and practice covering the Syllabus of the City and Guilds Examination and suitable for candidates for the P.M.G. certificate," and has a foreword by Prof. G. W. O. Howe. It presents in a simple form a large quantity of useful information on up-to-date theory and practice, and the illustrations and diagrams are good. There is a lack of the usual padding about past theories and practices which, while interesting in themselves to those studying the lines and development of scientific thought, are prone to confuse the reader whose main object is to learn something about a science in its present-day aspects. As mathematical problems are also avoided as much as possible, there is little to distract the attention of the student from essential facts. We can recommend this book to our readers.

"*The Practical Electrician's Pocket Book*, 1924." *S. Rentell & Co., Ltd. 3s. net.*

The twenty-sixth edition of this hardy—and handy—annual runs into 570 pages, excluding the diary at the end. It has been carefully revised and kept in every way in line with present day installation practice, thus forming a convenient pocket manual for every contractor, foreman and wireman. The chapter on wireless broadcasting has been revised and enlarged while the section on turbines and water power has been re-written. The return to the pre-war binding is a decided improvement, and we are confident that this book will appeal to all members of the technical staff.

"*Pitman's Radio Year Book*, 1924." (*Sir Isaac Pitman & Sons, Ltd. 1s. 6d. net.*)

This is the second year of this publication, which besides general information on licences, lists of societies, broadcasting stations, amateur ratdio stations and such like, and a useful trade directory, contains a number of articles both of a general and technical nature, all by recognised authorities. Professor Fleming deals with the Thermionic Valve, Mr. J. F. Corrigan with Crystals and Crystal Detectors, Mr. Harley Carter with modern Wireless Valves, Messrs. Burnham and Sutton with aerials. Professor Howe, Capt. Eckersley, Mr. A. P. M. Fleming, Mr. P. R. Coursey, Mr. J. W. C. Reith, and other well-known writers also contribute papers useful both to the technical man and to the amateur. Altogether it is a very enterprising and instructive handbook.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

TELEPHONES.

THE volume of new business in November exceeded the high standard attained in recent months, the gross new stations totalling to 19,154, and the net additions to 10,775, both of these totals being the highest so far recorded. The total number of stations in use at the end of November was 1,119,365 of which 398,060 were connected with London exchanges and 721,305 with Provincial exchanges.

A large proportion of the new circuits added during November were private house connexions, the net increase of 3,368 being the best on record. The total number of residence rate lines at the end of the month was 174,819, compared with 146,667 a year ago, a net growth of 28,152 or 19 per cent. In the same period the number of business rate connexions increased by 37,252 or 9 per cent.

A further 23 exchanges were opened in November under the rural exchange development scheme, and at the end of the month 328 of the 498 exchanges authorised were working. As a result of the more favourable conditions under which rural exchanges may now be opened over 4,000 subscribers in outlying districts have been provided with service, whilst circuits for a further 2,000 subscribers are in course of construction.

The number of public call offices working at Nov. 30 last was 17,337, 3,900 of which were in London, and 13,437 in the Provinces. During the past year the net addition to the number of call offices averaged 100 a month, about one-half of these being installed in rural areas.

With regard to traffic, the average calling rate per line in November reached the highest point attained since the universal message rate was introduced in 1921. Taking into consideration the rapid increase in exchange lines, a large proportion of which were residence connexions where the calling rate is normally below the average, there is no doubt that a much larger volume of traffic is now being handled.

Statistics showing the general development of the service in the current financial year are given in the appended table :—

	At April 30.	At June 30.	At Sept. 30.	At Nov. 30.
EXCHANGES :—				
London	99	100	100	100
Provinces	3,107	3,166	3,270	3,333
Total	3,206	3,266	3,370	3,433
STATIONS :—				
(1) Exchange—				
London	367,403	373,845	380,166	385,827
Provinces	657,734	670,068	689,047	703,267
Total	1,025,137	1,043,913	1,069,213	1,089,094
(2) Private—				
London	12,149	12,303	12,113	12,233
Provinces	18,753	18,573	18,287	18,038
Total	30,902	30,876	30,400	30,271
(3) Total Exchange and Private—				
London	379,552	386,148	392,279	398,060
Provinces	676,487	688,641	707,334	721,305
Total	1,056,039	1,074,789	1,099,613	1,119,365
PUBLIC CALL OFFICES :—				
London	3,808	3,838	3,854	3,900
Provinces	12,766	13,000	13,264	13,437
Total	16,574	16,838	17,118	17,337
PUBLIC CALL OFFICES IN STREET KIOSKS ...	432	474	523	548
RURAL PARTY LINES ...	7,038	7,379	7,755	7,936

Further progress was made during the month of with the development of the local exchange system. New exchanges opened included the following :—

London—Eltham,
Provinces—Long Eaton,

and extensions of equipment were completed at :—

London—Streatham.
Hampstead.

During the month the following additions to the main underground system were completed and brought into use :—

Huddersfield—Halifax section of Oldham—Huddersfield—Halifax Cable,
Derby—Birmingham,

while 26 new overhead trunk circuits were completed, and 43 additional circuits were provided by means of spare wires in underground cables.

"RELAY" PRIVATE AUTOMATIC BRANCH EXCHANGE FOR DEBENHAMS, LTD., LONDON.

400/1,270 LINE AUTOMATIC EXCHANGE.

CLOSELY following the cutting-over of the automatic exchange at the County Hall, another very large private automatic branch exchange has been brought into service in the Capital.

The Relay Automatic Telephone Company have manufactured and installed on behalf of the Post Office, a private automatic branch exchange with an initial equipment of 400 lines and an ultimate capacity of 1,270 for Messrs. Debenhams, Ltd., of Wigmore Street. The new apparatus (Fig. 1) is located in the old switchroom, which is an hexagonal chamber at the base of the tower on the roof, and the exchange will give automatic service between all departments of Debenhams, Ltd., Debenham & Freebody's, and Marshal & Snelgrove.

The new installation has four manual positions each fitted with 15 cord circuits and positive lamp supervision. The board is provided with charging generator, two battery-driven dynamotors, and two 32-volt batteries of accumulators of 244 ampere-hour capacity. There are 40 outgoing public exchange lines and 25 incoming, while facilities are provided for extending the exchange lines to 10 automatic extensions at night.

Owing to the limited space, only 320 lines could be fitted until such time as the old manual switchboard had been removed.

During the first week of service, the automatic calls on the initial equipment of approximately 300 lines averaged over 3,000 per day; automatic calls to the exchange (about 1,200) and the incoming calls from the exchange kept four operators fully employed.

The new switchboard was cut over at 2 p.m. on Dec. 8, by inserting insulating plugs in the break jacks of the old manual board, and then removing insulating plugs at the main distribution frame, a matter of a few minutes' work. During Saturday afternoon, Dec. 8, and Sunday, Dec. 9, the plant and instruments were thoroughly tested out, and on Sunday the old manual board was disconnected and removed in preparation for the completion of the initial equipment of 400 lines.

Fig. 2 shows the distributing frame at Debenhams, Ltd. Each subscriber has an ordinary type telephone instrument to which is attached the dial switch. The automatic numbering of the first 700 lines will be on the 3-digit basis, and the remainder on 4 digits, while the cipher "O" is assigned for the manual operator.

Every operation in this exchange is performed by relays, which are assembled in groups, each group enclosed in a light iron case, protected back and front with covers. The groups are divided into two main classes: those containing the relays individual to subscribers' lines, and others comprising apparatus common to the exchange as a whole. The relay groups that deputise for operators are known as recorders (Fig. 3). These are probably the most interesting groups in this ingenious system as their functions so closely resemble those of a manual operator. Normally, they are quite detached from the lines.

When a caller lifts the receiver, he is immediately offered the services of an idle recorder. While dialling is proceeding, the recorder takes in the impulses, translates these into digits and stores them. The arrival of the last impulse from the caller is the signal for the recorder to establish the desired connexion. This it does in an instant of time by selecting a special single wire leading directly into the equipment of the wanted party.

The wanted line is thereupon caused to seek and establish contact with the caller—an operation of a moment's duration. Having performed its work, the recorder disengages itself from the caller's line and is available for other calls elsewhere. In the meantime the required party is rung, and the caller hears the ringing current passing out to the distant telephone. Ringing ceases immediately the wanted party answers, and current is then supplied to both telephones for speaking purposes.

The direct communication between a recorder and the wanted line over the special wire belonging to the latter is characteristic of the system Also, the incidental search backwards from the wanted line towards the caller, in place of the usual reverse process, is unique.

The time elapsing from the moment dialling ceases until ringing tone is heard, is somewhere in the region of 1/10th second. It may, therefore, be said that the speed at which a connexion can be established is only limited by the rapidity with which the required number can be "pulled" on the dial. This may occupy from 2 to 4 seconds according to the digits in the number required.

A recorder is competent to discriminate when engaged or faulty lines are called, and also when a telephone number is not in use. In all these cases the recorder detaches itself from the circuit, but not before it has directed an audible indication to the caller, which signal continues till the receiver is replaced.

In a manual system, an operator is quickly aware if a calling signal is the result of either a faulty line or a receiver left off the hook. In such cases

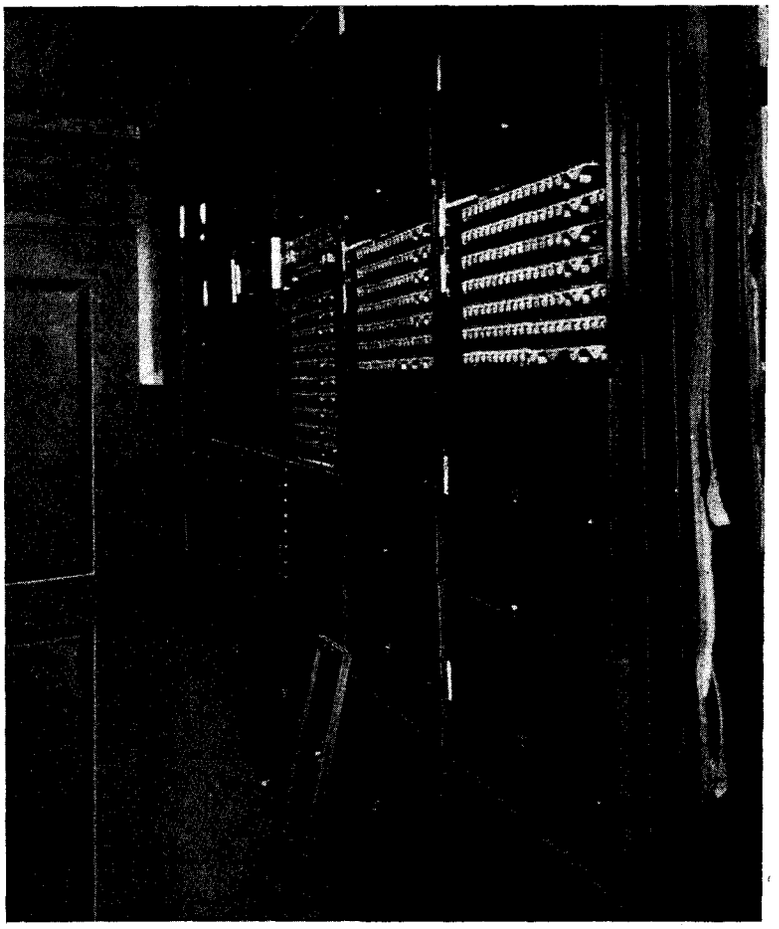


FIG. 1.—ONE OF THE "RELAY" AUTOMATIC APPARATUS RACKS.

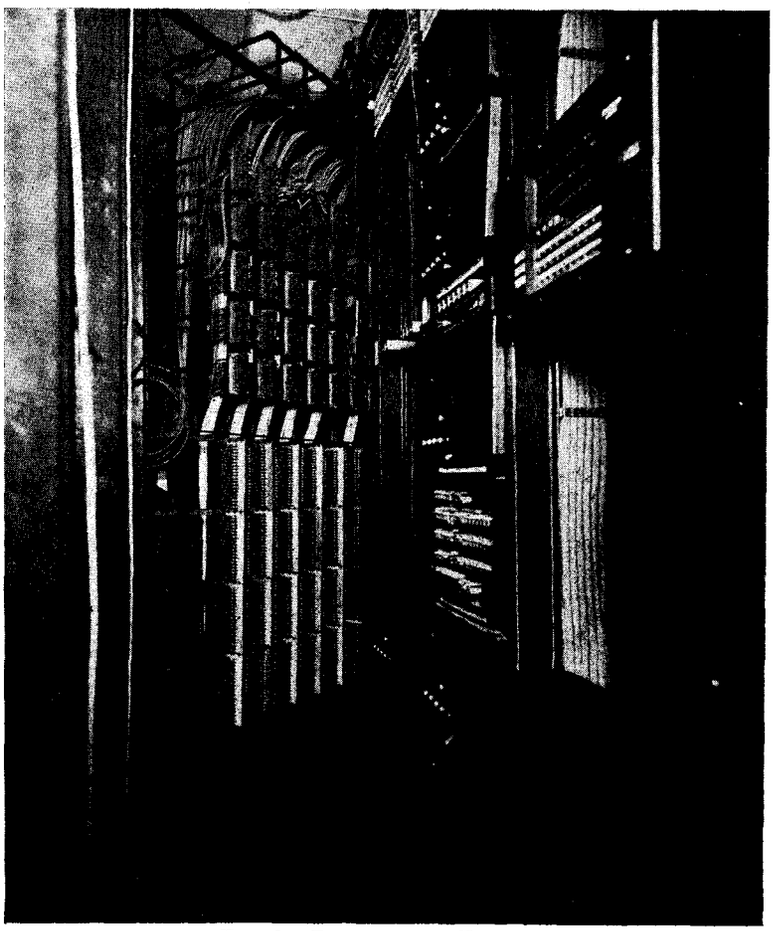


FIG. 2.—DISTRIBUTING FRAME.

the operator ignores the signal and attends to other calls. A recorder is allowed the same latitude by being only partially identified with a calling line until impulses actually commence to arrive. While the number is being delivered, however, a recorder is definitely at the service of the person who is dialling.

As with a manual system, several persons on the Relay system may deliver their calls simultaneously, the separate recorders being entirely independent of one another. As the service grows, other recorders may be easily added, just as an operating staff may be augmented for the same purpose in a manual exchange.

The equipments individual to subscribers' lines are assembled in groups of ten. Fig. 4 shows one such group. As the number of subscribers increases, it is a simple matter to add another group of ten without causing disturbance to the traffic; the group is ready wired in the factory and merely requires to be placed in position, and its cable tails led to the top of the frame where it is inter-connected with existing circuits. All groups are easily fitted—it will, therefore, be evident that the entire work of installing or extending such a plant is no difficult task.

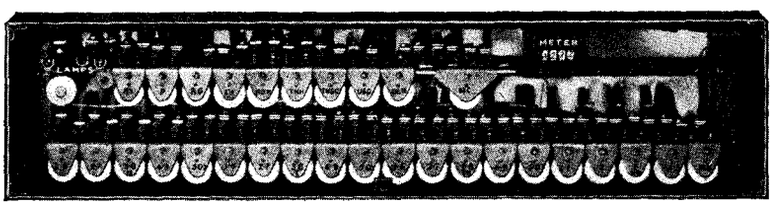


FIG. 3.—"RELAY" RECORDER.

"Relay" exchanges are almost motionless and silent in operation, owing to the minute movements and light construction of the apparatus. The relays are not affected by reasonable quantities of dust nor by the heat and humidity of tropical climates.

Maintenance is, of course, a consideration of the highest importance. If this were a heavy item, automatics could not compete with manual systems, as apart from labour charges incurred, frequent troubles would degrade the service.

The Relay engineers have paid particular attention to the problem of unattended exchanges. In the first place, no lubrication of any kind is required, and frequent cleaning is unnecessary. All circuits are protected by miniature fuses, but the circuit design is such that when a common group of apparatus, for example, a Recorder, is rendered inactive owing to the opening of a fuse, the defective group automatically tests engaged to all calls and is virtually withdrawn from service. This precaution is a valuable one, as no telephone is deprived of communication and the repair of the defect is consequently not an urgent matter. Moreover, the opening of a fuse causes a small lamp to glow and an audible alarm is also given, if and where required.

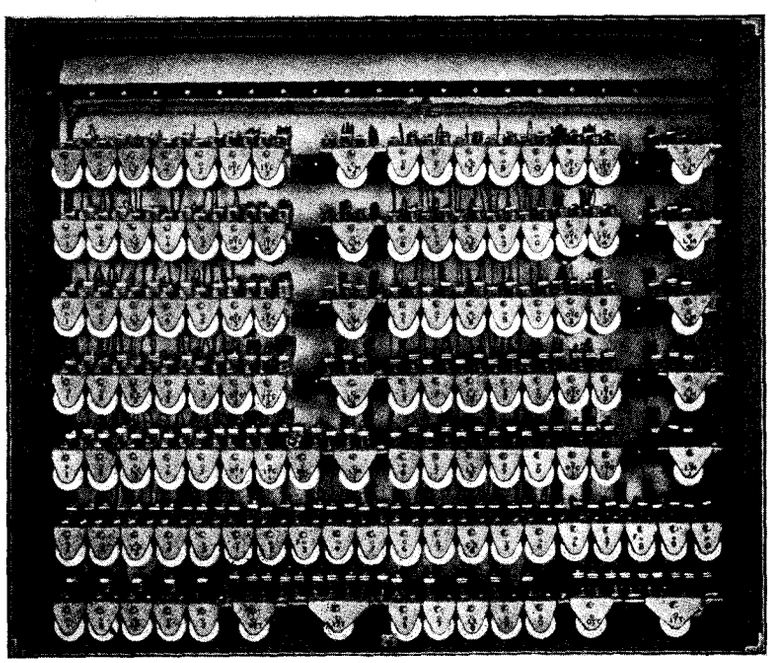


FIG. 4.—"RELAY" SUBSCRIBERS GROUP.

A very simple thermostatic device is utilised to act as a safety valve. This small apparatus is instrumental in correcting the effects arising from various faults and irregularities:—

(1) Faulty line.
(2) Receiver removed from the hook.
(3) Caller omits to replace receiver after correspondent does so.
(4) Caller dials part of a number, decides to abandon the call but omits to replace receiver.
(5) Required number is engaged but caller omits to replace receiver on hearing engaged signal.

In all these cases, the offending line is automatically restrained from interfering with any common equipment. Immediately normal conditions are restored, however, the line is automatically released and given its usual service.

No reference to the question of maintenance would be complete without mention of trouble attributable to faults. There are remarkably few in a well-installed plant. A summary of a report issued in connexion with the faults observed on relay exchanges will be of interest. From records drawn from several plants over a number of years, it has been established that, on an average, one exchange fault per subscriber has occurred in 7.4 years.

Many "Relay" private automatic branch exchange plants have already been installed in England, among the most notable being the Bank of England, Babcock & Wilcox, India Store Depot, Middlesex Hospital, Magasins de Louvre, Liverpool Courier, North Eastern Marine Engineering Co., Wallsend, &c., and many others are now under construction, but when the exchange at Messrs. Debenhams is fully equipped, with its 1,270 lines, it will be considerably larger than any private automatic branch exchange at present existing in the British Empire.

LONDON ENGINEERING DISTRICT NOTES.

Retirement of Mr. J. L. Brown.

MR. J. L. BROWN, Executive Engineer of the North-West External Section of the London District, retired from the Telephone Service on Dec. 31, 1923, and the event has been marked by making him a handsome present of a leather letter wallet with the monogram "J.L.B." in gold upon it, and containing a cheque, also of a case of pipes. The presentation was made by Mr. McIlroy, Superintending Engineer of the London Engineering District, Postal Telegraphs, at a Smoking Concert held at the Lords' Hotel Lords' Cricket Ground, on Saturday evening, Jan. 5, before a large number of Mr. Brown's colleagues and friends. The Chairman, Mr. J. A. Hunt, spoke felicitously of Mr. Brown's earlier days in the Telephone Service, after which he asked Mr. McIlroy to make the presentation. Mr. McIlroy, in doing so, spoke of the great esteem in which Mr. Brown was held. He proceeded to give a laughable instance of an earlier experience he had had of the presentation of a cheque, when the officer making the presentation discovered at the crucial moment, to his very great dismay and embarrassment, that the cheque was not to be found in any of his pockets, or elsewhere amongst his immediate belongings or surroundings! The presentation was, however, duly made, and the "recipient" duly returned thanks for the cheque which he did not receive! This contretemps did not occur at Mr. Brown's presentation. Various other speakers paid tribute to Mr. Brown's capability and broadmindedness.

Mr. Brown, in a brief but characteristic speech, returned thanks.

Upon the completion of the presentation ceremony an interesting musical programme was proceeded with, which terminated about 10.30 p.m. with the singing of "Auld Lang Syne."

Mr. Brown joined the United Telephone Co.'s service in 1887, and whilst with this Company he built the first routes to Brixton Hill, to Putney and Richmond, and to Wimbledon. These were all overhead routes. In 1889, being of a roving disposition, he left the United Telephone Co.

In 1893 he joined the National Telephone Co., which had recently taken over the South of England Telephone Co., and was sent by Col. Clay to take over the Kent District, with headquarters at Canterbury. In 1895 he was transferred to South Wales. In 1896 he returned to London as District Engineer of the Southern District. Subsequently he was placed in charge of the Company's underground work in London, until this work was stopped by the legal injunction against laying underground plant, in 1899. After the injunction he was transferred to the Western District as District Engineer with Mr. Dalzell, where he remained until the reorganisation of the Company's staff in 1905. During this time he was concerned in the opening of the first C.B. Exchange in London, viz., Kensington. After the reorganisation he was appointed Western Divisional Engineer and supervised the building of Paddington Exchange, the new exchange at Gerrard, and the new exchange at Hammersmith.

Upon the transfer of the telephones to the State, Mr. Brown was appointed Executive Engineer of the Centre External Section, with headquarters at Mount Pleasant, when his first work was to cut out the old Westminster

Exchange. During the next few years he was engaged upon the opening of the Victoria and Museum Exchanges.

Mr. Brown was marked by broadness of mind in dealing with the public and with official matters, acquired by a wide knowledge of the world and of men, by courtesy and comradeship in dealing with his brother officers, and by a kindliness and shrewdness which have made him the friend of all with whom he has come in contact. He leaves the Department's service with the heartiest good wishes of all who knew him, and with the assurance of a very warm welcome whenever he feels inclined to come amongst his many friends in the Engineering Department.

Retirement of Mr. F. G. Brown.

Mr. F. G. Brown, Assistant Engineer, retired from the Service on Dec. 31, 1923, after a period extending over 35 years. A representative gathering of the staff of the London Engineering District met at the Bridge House Hotel, London Bridge, on Monday, Jan. 14, 1924, to bid farewell and God-speed to their esteemed colleague.

Mr. J. M. Shackleton, Assistant Superintending Engineer, who presided at the function, during the course of the evening made a presentation in the form of a gold inscribed wallet containing a cheque subscribed to by Mr. Brown's many friends in the Service. He paid a glowing tribute to the sterling qualities of Mr. F. G. Brown, both as a personal friend and as an efficient officer in his work. He recalled many incidents of interest in Mr. Brown's career and voiced the heartfelt sentiments of his many friends, absent and present, in wishing him long life and happiness in his well-earned retirement.

Several other speakers, including Mr. H. Davis, late District Manager, Southern District N.T.C., Mr. A. H. Wood, Mr. J. L. Brown, Mr. H. Denmar, Mr. W. J. Dawson, Contract Department, L.T.S., Mr. F. W. Hibberd, Mr. J. O. Robertson and Mr. E. R. Carr, suitably eulogised their guest. Mr. A. H. Wood particularly requested Mr. F. G. Brown to impart to the company present his secret of "perpetual youth" and another speaker appeared to be very sceptical of the accuracy of Mr. Brown's birth certificate.

Mr. F. G. Brown, in rising to reply, was greeted with great enthusiasm. He thanked everyone for the magnificent send off given to him and confidently informed his audience that the secret of his apparent youth was to be found in hard work and plenty of it. The company then settled down to an excellent musical entertainment under the direction of Mr. Charles Harris. The whole of the talent was of a high standard and the thanks of the organisers are due to the artists for their splendid assistance in making this event one of the most enjoyable Smoking Concerts held in recent times.

Telegrams regretting inability to attend were received from Mr. C. W. Appleby and Mr. R. W. Holliday.

Automatic Telephones.

One of the largest audiences which has ever met under the auspices of the Institution of Post Office Electrical Engineers gathered on Jan. 8 to to hear a lecture by Mr. B. O. Anson on the above subject. The size of the audience was partly due to the general interest in the subject and partly because of Mr. Anson's well-known aptitude for describing highly technical subjects in a manner that is easily understood. On this occasion Mr. Anson did not deal with the maze of circuits which is inseparable from automatic working, but to the delight of the audience he outlined the progress of machine switching from its conception and concluded by describing the main outlines of the system which will be installed in London. The majority of those present were not directly concerned with the design of circuits but were nevertheless keenly interested to know what facilities were to be provided under an automatic scheme and how these facilities would be obtained. The lecture suited these admirably. At the same time those who are directly concerned on the design and provision of the exchanges found the lecture interesting and instructive. Sometimes it is difficult to see the wood because of the trees and it is a good thing to be occasionally lifted to a hill top and to see the wood and the surrounding country in proper perspective. It is hoped that other officers who are expert in special branches will emulate Mr. Anson and give in clear outline a statement of what has been achieved and the probable line of advance.

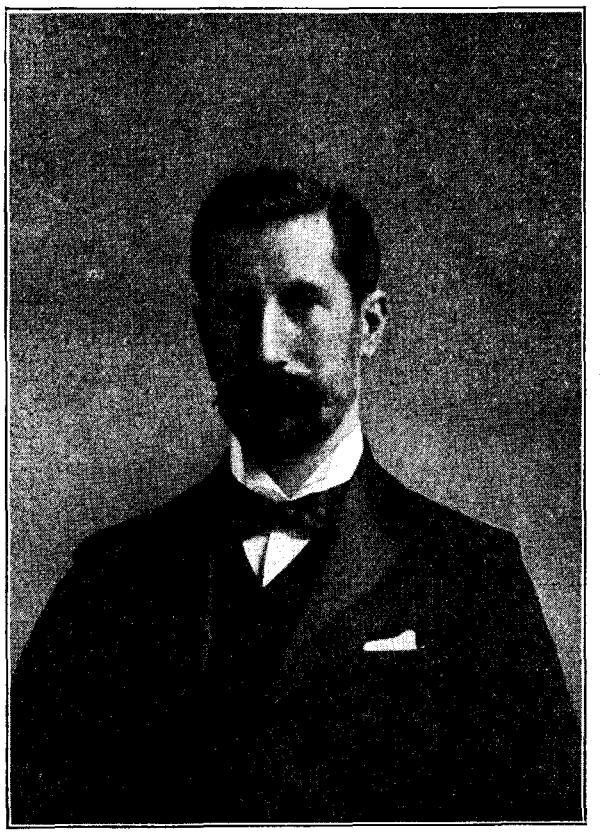
Papers dealing with the more technical aspects of work are valuable and desirable, but an occasional broad view of the whole matter is very welcome and stimulating.

A keen discussion followed the lecture, and still further added to the interest of the meeting.

"ALLEN OF THE STORES."

[Mr. W. H. Allen, O.B.E., to whose untimely death we referred briefly in our last issue, entered the service in 1882, and had reached the rank of Deputy Staff Officer in the Stores Department by 1903. He became Staff Officer in 1905, Assistant Controller in 1908, Vice-Controller in 1914, being appointed to the Controllership of his department in April, 1919. A correspondent sends us the following personal note.]

WILLIAM HENRY ALLEN spent the whole of his forty years' official service in the Stores Department, and those who knew him best knew that he did indeed spend his life for the Service. But, though he was of the Stores, he lived in no watertight compartment, the cultivation of close official—and harmonious—relations with other Departments inside and outside the Post Office was one of the objects which loomed large in his field of vision. This was the outcome, not of sentiment, for which he had little use, but of his hard-headed practical outlook; in short, it was good business. Perhaps his dominant characteristic was Justice, calculated and weighed to the ultimate particle, so, whether the subject were matters or men, it had to be examined from every angle, and not until that had been done was judgment given; after that, it was *une chose jugée*.



[*Reproduced by permission of Civil Service Opinion.*

W. H. ALLEN, O.B.E.

Allen did not claim to be an engineer, but he had studied engineering and took a lively interest in physics. His mind tended naturally to mathematics, and the theory of relativity was something more than a phrase to him. He was very fond of chess and many an intricate official problem was resolved by the analytical method common to chess or mathematics, and he possessed in uncommon degree the power of concentration on the subject in hand to the absolute exclusion of everything else. His reading, of which he did much, and his thought, embraced the realm of metaphysics, and he had a deep sense of the meaning of religion. Himself a finished pianist, music was one of his greatest joys; he frequently attended the musical services in Westminster Abbey, and it was while he was on his way to one of them that the tragic accident happened. That Allen, one of of the most cautious and careful of men, should be the victim of such a mischance illustrates indeed the irony of fate.

By Allen's death, the Post Office has lost an extremely able, hardworking and efficient servant whose genius for organisation often found scope in the work of the various Committees to which he was appointed: one whose personality and mental equipment were greatly respected, and whose ethical standard was recognised as of the highest.

G. F. M.

[*Photograph by F. A. Swaine.*

LONDON TELEPHONE SERVICE. STAFF DINNER.

THE first general staff dinner of the London telephone service—in future to be an annual one—was held at the Holborn Restaurant on Friday, Jan. 4 last. The Controller, Mr. W. A. Valentine, in the chair, was supported by the following guests:—Sir Evelyn Murray, K.C.B., Secretary to the Post Office, Messrs. E. Raven, C.B., Second Secretary, F. Gill, M.I.C.E., M.I.E.E., late Engineer-in-Chief, National Telephone Company, Limited, R. A. Dalzell, C.B.E., Director of Telephones and Telegraphs, Colonel Purves, O.B.E., M.I.E.E., Engineer-in-Chief, Miss Loch, O.B.E., Establishment Officer, Secretary's Office, Messrs. F. J. Brown, C.B., C.B.E., Assistant Secretary, Telegraph branch, A. R. Kidner, Assistant Secretary to the Post Office, G. F. Preston, C.B.E., late Controller of the London Telephone Service, Miss Heap, I.S.O., late Superintendent of Female Staff, London Telephone Service, Messrs. J. W. Bowen, of the Union of Post Office Workers, J. M. Shackleton, Assistant Superintending Engineer.

There was a large and representative gathering, all grades of staff being present, including several members of the "Royal" family. The dinner was followed by a musical programme, contributed by members of the staff, the artistes being the Misses Lillian Flint, F. Blair-Street and Frances Wood; and Messrs. Alfred Cracknell, Arthur M. Hemsley, John Jacob and Hugh Williams. All the items were enthusiastically received. One of the duets—the Miserere Scene from "Il Trovatore"—caused, paradoxically, a good deal of amusement, Mr. Hugh Williams, who sang with Miss Blair-Street, disappearing behind a screen—presumably to convey the effect of distance. On receiving an unmistakably enthusiastic encore, the duet was again given, Mr. Hugh Williams again making himself invisible, with the restricted stage accessories at his disposal—to the amusement of the audience.

Between the items, the following toasts were honoured:

The King.
The London Telephone Service.
The Visitors.
The Chairman.

Sir Evelyn Murray said that the service had finally and triumphantly surmounted its post-war troubles. He deprecated the idea that any inefficiency there might have been in the past was due to Government management, referring to the possible political objects of Press criticisms, and expressing the opinion that, under private control, the public would have had to pay much higher rates than those imposed by a benevolent Government. He stated that complaints at the moment were relatively few, which was an indication that the service was as satisfactory as any telephone service was likely to be. He referred to the advent of the automatic system, and brushed aside the view that this would mean turning adrift the army of London telephonists, adding that he could not imagine a London telephone service dinner ten years hence being attended by a company of Robots. In conclusion, he said that the automatic system would have at least one advantage. It would teach the public that many of the troubles they at present complain of are due to themselves, and not to the operators. The automatic telephone could not very well be charged with knitting jumpers instead of attending to its duties.

Mr. VALENTINE, in replying, said that he would like to acknowledge on the part of the staff of the London telephone service the generous tribute which Sir Evelyn Murray had just paid to them. He gave some striking statistics indicating the development of the London telephone service from the year 1912, when the combined systems had 224,000 telephones, up to the present time, when a total of 400,000 has been attained, notwithstanding the check to development inflicted by the late war. He pointed out that estimates of future development suggest that, in about fifteen years, 1,000,000 telephones will be working in London.

The growth in traffic had also been phenomenal, the originating calls during a recent busy week being over 9,000,000; while the developments which are taking place in wireless telephony suggest that the time cannot be far distant when a London subscriber will talk to a New York subscriber through their respective Exchanges, and by the medium of the ether. He claimed for the staff of the London telephone service that it realises its duty in providing the highest grade of service to the community, and pointed out that in a number of its aspects, the quality of the service has been improving gradually. In commenting upon the service troubles, Mr. Valentine referred to the fact that telephone service is a very intimate thing: the originator of a call is constantly in touch with the medium for effecting communication—unlike in this respect the sender of either the posted letter or the telegram—and any failure of courtesy or care is noticeable immediately; and nothing appears to be more irritating to the average man or woman than a wrong number given or a disconnexion in the middle of an important conversation.

In referring to the introduction of automatics, from the staff point of view, Mr. Valentine pointed out that the result of the change would be to ensure that the more mechanical work will be performed by machines—described by Professor Fleming as the nearest approach in the achievement of machinery to the human brain—while the more interesting and important work will be retained for human agency. Mr. Valentine concluded by pointing out that it is essential to the proper furnishing of telephone service that we should have the goodwill and respect of the public whom we serve. Sometimes ill-advised and badly informed criticism is levelled at us, but the great body of the public who use the service wish to be fair. We have, he said, a great opportunity of rendering a real service to our fellow citizens in London. "Let us," he added, "be worthy of the trust."

Mr. STIRLING made humorous references to the distinguished visitors present, and expressed the welcome of the L.T.S. staff to its guests.

Mr. DALZELL congratulated London on having so quickly and so successfully surmounted the difficulties arising from the transfer and the war. He expressed some doubts as to the transmission equivalent of the room, and caused much amusement by referring to the sounding board over the Chairman's seat as a repeater station.

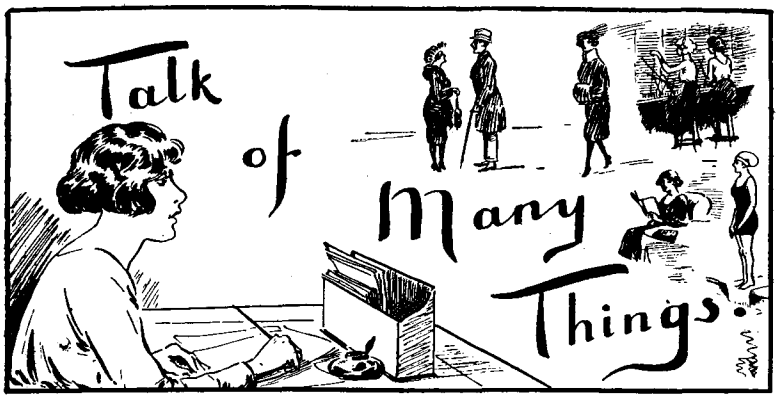
Mr. GILL spoke of the immense possibilities of the telephone business in this country. He said that with vision and energy the 1,000,000 telephones envisaged by the Controller in fifteen years' time would be required now. He gave examples of telephonic enterprise on the American continent, which, he suggested, might be emulated here.

Mr. PRESTON, announced by the Toastmaster as the "Commander of the British Empire," in proposing the toast of the Chairman, prefaced his speech by a modest disclaimer of his new title. He referred to two outstanding characteristics of the Chairman—his invariably unruffled demeanour in all circumstances, and his sympathy with the under-dog.

During the evening a photograph was taken, and is reproduced above. It should be stated that the melancholy aspect of some of those present does not actually represent the facts. On the contrary, everybody present had a very enjoyable time.

J. M. M.

WE TELEPHONISTS



Post Office Telegraph and Telephone Society.

MR. SELFRIDGE'S address on "What are we here for"? in conjunction with Mr. Buckeridge's recent paper "Where are we going?" should supply members of the London telephone service with a completely comprehensive guide to their future progress.

An outstanding feature of Mr. Selfridge's address, given on the 21st inst., was an appeal for greater definiteness of purpose in our life and work, for the cultivation of a spirit of optimism and faith in the powers of everyone to achieve what is resolutely planned, and for a sustained effort on the part of each one present to make his section of the world of business the better for his presence. In regard to discipline, by a striking illustration, Mr. Selfridge emphasized the enormously higher constructive value of the "Pat on the back" as compared with repressive criticism, and the need for humanity in all dealings with staff. In this connexion, he referred to the importance of a bright and cheerful official environment for the workers. Mr. Selfridge's address was warmly received by an audience which could be described as large considering the dual handicap of the railway strike and the weather. An interesting discussion followed, to which Mr. Selfridge briefly replied.

Majesty or Travesty.

I am moved to write this because I have read a circular issued recently in which it is laid down that Girl Probationers shall be supplied with "two overalls and a set of crowns." Note the subtle connexion between "Crown" and "Over All." Is it a prophetic and inspired utterance or is it merely a material conjunction of words? I fear it is the latter, for I have scanned the circular in vain in the hope of finding a paragraph promising that "after full and approved service harps and wings *or* asbestos overalls—*but not both*—will be issued."

Now, overalls may—no doubt do—cover a multitude of sins and it is not of these that I would write, but of crowns. As Civil Servants we are familiar with the crown—not the five-shilling piece, of course, but the regal headgear. We are accustomed to regard it in the abstract as the emblem of State and Authority—as something as puissant as the red line in the attendance-book, and as awe-inspiring as the silent reproach of an untipped waiter.

Have we observed, however, that there is a curious inversion of value in the use of this emblem? If it be the sign of State and Authority, one could expect it to be worn as a badge of Service and Lignity by Secretaries of State. But do they wear it? No! Why? Because it has become the sign of Servitude instead of Service—messengers wear it and so do postmen. It is stamped on our paper and envelopes, on our rulers (oh! irony) and on our ink-pots, and it may be stamped on our pins, but my sight is not so good as it was.

Possibly one reason for thus marking our stationery is to prevent the unscrupulous from stealing it. But who wants to steal messengers and postmen? It seems such a foolish hobby, and so expensive, too, for they need feeding, I suppose. True, I have occasionally waylaid a postman in the street, but I have usually ended tamely by asking the way or the time.

No, gentle reader (I don't suppose I have more than one reader by now, and he or she must be very gentle to have read so far), the crown is not what it was. Did Defoe foresee this, and was he thinking of humble Civil Servants when he wrote:

> "They are no kings, tho' they possess the crown;
> Titles are shadows, crowns are empty things."

PERCY FLAGE.

London Telephonists' Society.

We went last Friday night to see a "lantern" tour in Italy. The pictures flashed upon the screen showed where the lecturer had been. Siena, Florence, Pisa, Rome—while *we* scanned Gazetteers at home! We saw St. Mark's, the Leaning Tower; examples of Bernini's power; the Forum vast—the Appian Way—that shattered dream of yesterday. The Colosseum and St. Paul's—outside the City's ruined walls. St. Peter's and the Catacombs; and "all the glory that was Rome's." Miss Heap, in language eloquent, told of her days in "Roaming" spent, making a very earnest plea to us to venture Italy and see its past and present glory. Alas! That is another story.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.

PERSONALIA.

LONDON TELEPHONE STAFF.

PROMOTIONS.

The following promotions have taken place recently in the Controller's Office:—

W. BEVAN to be Executive or Higher Clerical.

T. A. BECK, to be Assistant Superintendent of Traffic, Class I.

C. S. BIRD, to be Higher Executive.

C. C. A. BRODIE, to be Assistant Superintendent of Traffic, Class I.

G. BUCKERIDGE, to be Assistant Superintendent of Traffic, Class I.

A. W. T. CLARKE, to be Executive or Higher Clerical.

L. G. EVANS, to be Executive or Higher Clerical.

W. GLENNY, to be District Contract Manager.

F. C. HOWE, to be Executive or Higher Clerical.

J. R. JACOB, to be Assistant Superintendent of Traffic, Class I.

J. A. JENKINS, to be Assistant Superintendent of Traffic, Class I.

N. MCCRIMMON, to be Executive or Higher Clerical.

A. C. NORRIS, to be Executive or Higher Clerical.

LONDON TELEPHONE SERVICE.

Resignations on account of marriage:—

Miss R. G. THORNLEY, Assistant Supervisor, Class II, of East Exchange.

Miss A. L. POWELL, Assistant Supervisor, Class II, of Paddington Exchange.

Miss L. E. GILDER, Telephonist, of East Exchange.

Miss P. GWYN, Telephonist, of Paddington Exchange.

Miss H. LONG, Telephonist of Paddington Exchange.

Miss N. A. F. S. BOURNE, Telephonist, of Paddington Exchange.

Miss D. NORTON, Telephonist, of New Cross Exchange.

Miss D. E. MUSK, Telephonist, of Central Exchange.

Miss M. E. PORTER, Telephonist, of Central Exchange.

Miss F. E. TITMASS, Telephonist, of Central Exchange.

Miss E. R. SPURLING, Telephonist, of Victoria Exchange.

Miss D. A. PACKER, Telephonist, of Victoria Exchange.

Miss H. M. TURNER, Telephonist, of Victoria Exchange.

Miss G. I. COOPER, Telephonist, of Victoria Exchange.

Miss G. E. TORODE, Telephonist, of Trunk Exchange.

Miss D. E. JENNINGS, Telephonist, of Trunk Exchange.

Miss A. E. WENMAN, Telephonist, of Trunk Exchange.

Miss F. R. BALL, Telephonist, of Trunk Exchange.

Miss E. L. IRWIN, Telephonist, of Park Exchange.

Miss L. L. WRAGG, Telephonist, of Park Exchange.

Miss F. M. ADAMS, Telephonist, of Chiswick Exchange.

Miss D. M. BEVAN, Telephonist, of Museum Exchange.

Miss D. A. L. SMITH, Telephonist, of Museum Exchange.

CENTRAL TELEGRAPH OFFICE.

The following promotions have been authorised:

Mr. H. A. BOLTON, Overseer, to be Assistant Superintendent.

Mr. W. LAMBERT, Telegraphist, to be Overseer.

Mr. T. A. PERKINS, Telegraphist, to be Overseer.

Mr. R. HOWLE, Overseer, to be Assistant Superintendent.

Mr. C. LAND, Telegraphist, to be Overseer.

LONDON TELEPHONE SERVICE NOTES.

Telephonists' Society.

THE fourth meeting of the Session of the London Telephonists' Society took the traditional form of the annual dance, which was held at Bishopsgate Institute, on Dec. 29, and as always, the evening was one of the most enjoyable events of the season. The arrangements in previous years having proved most satisfactory, the Dance Committee considered that to repeat them as nearly as possible was the most likely method of ensuring success, and everyone present on former occasions could be certain that the combination of the familiar ball room, Mr. Skinner's Orchestra, and the dainty supper tables to prepare one for more strenuous efforts after the interval, meant a thoroughly pleasant evening.

From the moment the orchestra struck up the overture the whole affair went with a swing. Mr. Skinner himself made a point of being present—he is a very old friend of the Society—and Mr. Buckeridge, who was again M.C., has worked with him on so many of these occasions that they run everything like clockwork without appearing to *work* at all. There were a number of new faces this year, but still a goodly collection of the old members, some of whom have attended the Society's social events more years than they care to remember. We missed several senior officers of the Society, some of whom were unable to get away from domestic functions, while another, by sharing in a juvenile ailment with his own youngsters, was proving that perpetual youth has its disadvantages.

All members were very pleased to have with them Miss Cox, this year's president, and particularly appreciated her coming to share in their enjoyment as a looker on. Those who had a good time this year and others who for various reasons were unable to come, will be interested to know that the Hall and Mr. Skinner are both booked for Jan. 3 1925 !

* * * *

L.T.S. Staff Dinner.

An account of the first annual staff dinner appears elsewhere in this issue, but it may be stated here that it was a great success. The most gratifying feature from the organisers' point of view was that the gathering was thoroughly representative of all branches of the service. The operating staff arranged exchange parties, and the small outlying places were well in evidence. The remark one heard on all sides was, "Why have we not had a function of this kind before," and the answer is, "Why not" ? The success attending this occasion establishes the event as surely as the calendar and it is certain that the 300 present on this occasion will be greatly augmented next time.

The launching of an undertaking of this kind calls for a considerable amount of voluntary effort and the Committee were amply rewarded by the congratulations showered upon them. Special mention should be made of two members who bore the brunt of the work: Mr. Hugh Williams, of the Accounts Branch, Chairman of the Committee, who was responsible for the arrangement of the programme, and Mr. R. C. Atkins, of the Traffic Branch, who acted as Secretary. The Secretary, of course, is the person who takes all the knocks aimed at the Committee, but, thanks to Mr. Atkins' efforts, nothing had been neglected and he shewed no signs of being bruised next day.

* * * *

Appreciation.

Letters of congratulation have been received from the Press Association, The Exchange Telegraph Company, and the Central News, thanking the Department for the efficient service which was rendered during the General Election in December last, and specially thanking the staff for their assistance.

* * * *

Choral Society.

H.R.H. Princess Arthur of Connaught and the Swedish Minister have expressed their intention to be present at the Langham Choral Society's first concert of the season at Queen's Hall, on Feb. 11. Apart from a first performance of Count Wachmeister's "Moon Hymn," and Holst's "Cloud Messenger," there is an additional attraction in the announcement that Mr. Ben Davies, the famous tenor, has been secured as one of the soloists. Tickets at the usual prices can be obtained from representatives at most exchanges and from the Secretary, Mr. W. R. Child, 102 Dean Street, W.

* * * *

Culled from the Exchanges.

Central.—Once again it was the pleasure of Central to provide dolls and toys for the children having the misfortune of spending Christmas in the "East London Hospital for Children," at Shadwell. This hospital is, of course, situated in a most depressing and poor neighbourhood, and our endeavour to brighten the festive season for the little inmates was greatly appreciated by children and staff alike, as a letter from the Matron testifies. It is hoped that a photograph of the toys, taken while on show in the Rest Room at Carter Lane, will appear in the next issue of the *Journal*. A New Year's gift of £20, was also sent to Mr. Roberts, Secretary of the War Seal Foundation, as a result of collections during the past six months.

Kensington.—On Saturday, Jan. 12, the staff at Kensington gave a tea and entertainment at St. John's Hall, Chelsea, to 120 poor children of the neighbourhood. Judging by the rapidity with which the food disappeared, the children thoroughly appreciated the good things provided and more than one boy was heard to remark that he was "bustin' full."

An excellent programme had been arranged, including ventriloquism and living marionettes by Mr. Arthur Hill. Mr. Thorne, a member of the night staff, also amused the children by playing popular songs, which they sang lustily. Later he appeared as Father Christmas and distributed the toys—dolls for the girls, dressed by the Exchange staff, and guns, mouth-organs, knives, &c., for the boys. The Christmas tree was electrically illuminated by Mr. Fox—a member of the Engineering staff.

At the conclusion, Mr. Dunbar proposed a vote of thanks to the Committee and the many willing helpers, to which the children responded with three hearty cheers. On leaving, each child received an orange, an apple, an air balloon, and a bag of sweets. Thus ended a very enjoyable evening for all concerned.

* * * *

Park.—On Friday, Jan. 11, the staff of Park Exchange held a social and dance. The primary reason was to raise funds for the poor childrens' annual tea, but as one gazed at the merry party looking gay in carnival dress with balloons and streamers flying, it was difficult to remember this. Wade's Orchestra played all the latest dance music in very fine style, and was by no means the least of the evening's attractions. Three or four songs sung by members of the staff met with great applause, and another popular item was a delightful little dialogue. All too quickly came 11 p.m. with the strains of "Auld Lang Syne," the merry makers leaving with many expressions of regret that it was all over.

Everyone is feeling better for the evening's programme, and I might add that our funds have greatly benefited by it.

* * * *

Victoria Exchange.—On Saturday, Jan. 5, the staff of Victoria Exchange gave a Christmas tea and entertainment to 400 children mainly from the Lambeth Central Hill Mission. The children did ample justice to the good things provided, many of them taking cakes home for their younger brothers and sisters. An excellent entertainment had been arranged, the programme included fancy dancing by Miss Mollie Ralls, and conjuring, ventriloquism, and hand shadows, by Mr. John Hunt. At various intervals, Miss E. V. Brown played while the children sang the latest popular songs with great enthusiasm.

The Christmas tree was presented by Messrs. Moyses Stevens of Victoria Street, as a token of their appreciation of the splendid service given by the exchange during the year. Messrs. Smith and Turner of the engineering staff, kindly illuminated the tree again, and other engineers helped to make the party a success.

At the conclusion of the entertainment, Father Christmas (Mr. Tickner), after a few well-chosen words, presented each child with a gift, dolls for the girls, dressed by the exchange staff, knives, guns, pistols, printing sets, &c., for the boys, books for the older children. As they passed out, each child was given a bag containing fruit and sweets, and a penny, kindly collected as last year, by Miss W. C. Rushworth.

Votes of thanks to Miss Butler and other helpers were passed by the Reverend Thomas Tiplady, and Mrs. E. Brown, Secretary of the Mission. The children responded by loud and prolonged cheers.

Thus ended for all, grown-ups as well as children, a most enjoyable evening.

YORK DISTRICT.

Mr. B. Bradley, Assistant Traffic Superintendent, was presented by the District Manager and staff of the York district with a handsome oak clock, on Nov. 30, 1923, on leaving the district to take up a position on the Headquarters Staff, as Assistant Inspector of Telegraph and Telephone Traffic.

THE

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CONTENTS.

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TELEGRAPH AND TELEPHONE MEN.

II.—MR. ROBERT INGLIS.

IT is a coincidence that the series of portraits of prominent telegraph and telephone men should commence with two Scotsmen, but it is a significant coincidence. Scotsmen have the habit of climbing to the top of their profession, whatever it may be, and the Telegraph and Telephone Services provide several notable examples of this enviable faculty. The Director of Telegraphs and Telephones, the Engineer-in-Chief, and the Controller of the London Telephone Service all hail from north of the Tweed, and it is perhaps worthy of remark that the Permanent Head of the Department bears a name which is famous in Scottish history.

This racial habit, so far as the mere Englishman can observe, seems to be due to the passion of Scotsmen for thoroughness. Whether it is in business, in politics, in golf, in football or even in less laudable pursuits there are no half measures about them. They do not believe in short cuts; they deliberately begin at the beginning of anything they undertake in order that they may learn all there is to learn.

The subject of this notice, Mr. Robert Inglis, Chief Superintendent of the Telegraph Department at Glasgow, has been true to Caledonian tradition. He entered the service of the Post Office as an Indoor Messenger at Glasgow in the year 1880, and he is now the head of the particular Department which he entered as a boy. In the intervening years he has passed through every grade and filled every position which it was possible for him to occupy and there is no phase of telegraph work on which Mr. Inglis cannot speak with the authority of extensive and intimate knowledge. He is, in fact, a typical example of Scottish thoroughness.

Mr. Inglis is a good golfer, he can sing a good song, and he has a charming and endearing personality, which may well be the envy of men less fortunately endowed. So long as the Telegraph Service produces men of the stamp of Mr. Inglis, its tradition of efficient public service will be faithfully upheld.

THE TELEPHONE DEVELOPMENT OF THE WORLD AT THE END OF 1922.

BY W. H. GUNSTON.

THE latest available statistics of the telephone development of the world show that there were at 31st December, 1922, nearly 23 million telephones in the world which, summarised by continents, were distributed as follows :—

North America	15,557,000
Europe	5,900,000
Asia	680,000
Australasia, &c.	389,000
South America...	325,000
Africa	122,000
	22,973,000

The total for 1921 was 21,800,000 and for 1920 about 20,800,000, so that it will be seen that the telephonic development of the world increases by roughly a million a year and is now probably somewhere near 24,000,000.

The statistics have been chiefly compiled from information supplied by the various Telegraph Administrations and Telephone Companies. The American Telegraph and Telephone Company supplied figures, difficult otherwise to obtain, relating to the numerous Companies operating in South and Central America. These figures refer to 1921 and estimates have been resorted to, as in some other cases, to obtain the statistics for 1922. The total of 22,973,000 may be analysed thus :—

Obtained from :—

Official information for 1922	21,273,000
Pro-rata estimates of increase on reliable figures for 1921	1,400,000
Rough estimates (relating chiefly to States formerly part of the Russian Empire)	300,000
	22,973,000

EUROPE.

Europe possesses nearly six million telephones or about one to every 80 inhabitants—an apparent falling off from 1921 (when the ratio was 1 to 74), despite the fact that there has been a considerable increase since. This is due to the fact that the result of later censuses are known and more accurate information of the population of the re-arranged States has been obtained, and the population is now given as 475 million instead of 400,000,000. The unfavourable average figures shown by Europe are largely accounted for by the poor development of the Balkan and Russian States—indeed the South of Europe generally is backward in this respect. A division of Europe, however, into groups roughly corresponding to the groups of languages spoken, shows some instructive figures, flattering, but perhaps not unfair, to the countries where the telephone development is more progressive.

	Telephones. Thousands.	Population. Thousand.	Popn. per Telephone.
(1) Countries chiefly speaking Teutonic languages— (Great Britain, Germany, Austria, Scandinavia, Holland, Switzerland) ...	4,480	136,000	30
(2) Countries chiefly speaking Latin languages— (France, Italy, Spain, Portugal, Belgium, Roumania)	840	130,000	154
(3) Countries speaking Slavonic and other languages ...	580	209,000	360
	5,900	475,000	80

If France and Belgium be included, as they should properly be, with the more progressive countries of Europe it will be found that this north-westerly part (a little over a third) of the continent contains 5,100,000 telephones to a population of 184 million (1 to 36) while the other part, comprising nearly two-thirds, has only 800,000 telephones to a population of 291 million (1 to 364).

The number of telephones in Europe increased during the year from 5,560,000 to 5,900,000, the largest additions being those of Germany 157,895, Great Britain and Ireland 68,317, and France 35,804. The total of the various associated Soviet States is difficult to estimate. No official information was received from the Moscow Government, but an official journal *Jizn Svyazi* gives the number of subscribers as 91,120 which might represent 120,000 stations. It is not clear, however, whether the Ukraine and other States are included in this figure, as the total furnished last year was over 170,000 and this figure has therefore been adopted. The figures for Czecho-Slovakia refer to the Government system only ; no information is available to show whether any considerable number of stations exist on systems belonging to private companies.

The figures shown in brackets against the names of the various countries in the following tables refer in all cases to the number of telephones in existence in 1921.

	No. of Telephones.	Population thousands.	Inhabitants per Telephone.
Austria (113,232)	129,564	6,067	47
Belgium (79,523)	94,000*	7,577	80
Bulgaria	7,691	4,861	632
Czecho-Slovakia	89,006	13,588	153
Denmark (257,652)	264,413	3,283	12.4
Danzig	12,807	356	28
Esthonia (4,594)	5,000†	1,250	250
Finland (estimated) ...	70,000	3,402	49
France (488,818)	524,622	39,209	74
Germany (1,915,717) ...	2,073,612	59,858	29
‡Great Britain (997,805) ...	1,045,928	44,150	42
Ireland (997,805) ...	20,194	3,139	156
Greece	4,700	6,800	1,457
Hungary (68,000)	68,066	7,482	110
Iceland, 1921...	2,360	94	40
Italy (120,103)	126,000†	38,500	305
Latvia	7,370	2,000	275
Luxemburg (6,023)	6,226	263	43
Netherlands (187,697) ...	202,000*	7,029	35
Norway (158,352)	172,000†	2,649	15
Poland (estimated)	79,000	13,000	164
Portugal	16,500	6,399	398
Russia, 1921	172,405	—	—
Rumania (22,998)	29,605	17,000	574
Serbs, Croats and Slovenes (19,660)	23,000†	11,600	504
Spain (estimated)	80,000	21,658	270
Sweden (387,337)	394,535	5,987	15
Switzerland (160,332) ...	167,440	3,888	23
Turkey (estimated) ...	8,000	2,000	250
TOTAL (with allowance for Lithuania)	5,900,000	475,000	80

* Stations estimated from lines.
† Estimate from last and previous years.
‡ Now (1923) 1,150,000 telephones or 1 to 38 inhabitants.

ASIA.

The figures for India, China, the Dutch Indies, Persia, Iraq and Palestine are official. Of the total number of telephones in India 14,499 were connected with the Government system and 25,590 with those of various licensed Companies. Those for Japan and most of the other States are based on last year's figures by taking the rough average increase. The figures for Russia in Asia, Georgia and Azerbaijan are doubtful as they are based on the development of those countries in the days when they were part of the Russian Empire.

The proportion of inhabitants to telephones has not been worked out for each State, as the results would be insignificant in these populous countries.

	No. of Telephones.
Japan (407,036)	450,000*
Chosen (15,589)	17,000*
Manchuria (11,280)	12,000*
Sakhalin (1,818)	2,000*
Formosa (9,901)	11,000*
China (38,330)	45,169
Hong Kong	7,569
India (37,467)	40,089
Ceylon (4,923)	5,000*
Straits Settlements, 1921	1,264
Singapore	4,138
Federated Malay States	2,941
Dutch East Indies (37,162)	38,029
Phillipines (13,530)	14,600*
Siberia, Russian Turkestan, &c., 1915	18,600
Azerbaijan, 1915	6,500
Georgia, 1915	2,700
Iraq	774
Palestine	1,350
Persia	2,262
French Indo-China	2,500
Add for Turkey in Asia and Syria, say	2,000
	687,500

* Estimated from last year's figures.

A probable decrease in the telephones in the late Russian Empire would give an estimated total in Asia of 680,000. The population of Asia is 1,013,000,000, or 1,489 to each telephone.

AFRICA.

These statistics call for no special comment. Those for the principal States are official.

	Telephones.
South Africa (51,439)	54,939
Egypt (24,719)	27,727
Algeria (14,905)	16,300
Tunis (5,298)	6,000
Morocco—1921	4,298
S. Rhodesia—1921	1,563
Mauritius	608
Senegal and Dahomey	348
Belgian Congo	239
Kenya—1921	1,089
Erythrea	200
Portuguese Guinea	6,000
Nigeria and Camerun	1,073
	122,000

Population 143,000,000 or 1,172 inhabitants per telephone.

NORTH AMERICA.

United States.—The total is made up as follows:—

Bell Telephone system	9,514,813
Companies in connection with above	4,535,752
Independent Companies	445,000
	14,495,565

Canada.—The number of telephones in the principal provinces is as follows:—

Ontario	405,019
Quebec	157,993
Saskatchewan	96,195
British Columbia	81,853
Manitoba	67,514
Alberta	66,581
Nova Scotia	36,303
New Brunswick	27,314

The figures for Central America and West Indies have been kindly supplied by Mr. Berthold of the American Telephone and Telegraph Company. They related to 1921 and have been increased in accordance with the normal development.

The South American figures have been obtained from the same source.

North America.

	No. of Telephones.	Population thousands.	Inhabitants per telephone.
Canada (902,090)	944,029	8,800	9.4
United States (13,875,219)	14,495,565	108,000	7.4
Mexico (45,416)	46,000	16,000	347
Cuba (38,038)	42,000	3,000	71
Other West Indies	12,500	—	—
Central America (16,577)	17,000	—	—
	15,557,000	146,000	9.4

SOUTH AMERICA.
(Estimated.)

Argentina (130,707)	144,000	8,700	60
Bolivia (2,609)	2,700	—	—
Brazil (87,586)	90,000	30,650	340
Chile (29,661)	30,000	3,800	127
Ecuador (4,306)	4,100	—	—
Guinea	2,500	—	—
Paraguay	400	—	—
Peru (8,621)	8,700	—	—
Uruguay (24,048)	26,000	1,400	54
Venezuela (918)	9,300	—	—
Colombia (7,301)	7,800	—	—
	325,500	64,000	196

AUSTRALASIA, ETC.

Australia.—The telephone development of the various States of the Commonwealth is as follows:—New South Wales 108,936, Victoria 81,179, Queensland 33,181, South Australia 24,402, Western Australia 14,748, and Tasmania 8,032.

	No. of Telephones.	Population thousands.	Inhabitants per telephone.
Australia (251,029)	270,008	5,633	21
New Zealand (94,849)	102,261	1,320	13
Hawaii (15,124)	16,000	256	16
Fiji, &c., say	1,000	—	—
	389,000	7,500	19

THE WORLD.

	Nol of Telephones.		Inhabitants per telephone.
	1921.	1922.	
Europe	5,561,000	5,900,000	80
North America	14,882,000	15,557,000	9.4
South America	307,000	325,000	196
Asia	585,000	680,000	1,489
Africa	102,000	122,000	1,172
Australasia, &c.	361,000	389,000	19
	21,798,000	22,973,500	

(To be continued.)

SUBMARINE CABLE EXPERIENCE IN EUROPE.

THE *Telephone Engineer* of Chicago has an interesting review of telephone development in Europe, containing the following report on submarine cable studies, chiefly of German experiences :—

This year it was possible to gather experience in Europe with various submarine cables for telephony which helped to a great extent to clear up the question as to whether Pupin cable or Krarup cable should be used. In the first instance there are the cable lines from Germany to East Prussia (two cables each 106 miles long), besides the cables from Germany to Sweden. The cable from Pommern to Danzig, which is 93 miles long, contains 12 telephone lines and 4 double telegraph lines. This cable represents the most important innovation respecting submarine cable telephony. It shows particularly that the demand of speech across land and across the ocean has increased, and that therefore it is necessary in many cases to put a larger number of speech channels into one cable.

The results of experience till now are as follows :—

If a number of telephone connexions across shallow water with sandy ground is to be made, Krarup cables with paper and air-space insulations and lead casings are to-day considered first of all. The space required for a double conductor has been reduced to about one-third with an equal output. If the sea is deep and stormy and the coast is rocky or there are other circumstances which make laying cables with lead casings and paper and air-space insulation seem inadvisable, two types of cables are available : Pupin-Balata cables or Krarup gutta-percha cables. Pupin-Balata cables seem to have all the advantages the longer the distance at sea that is to be bridged. Finally, if telephone cables are to be laid in very deep sea, or if separate connexions are to be made, single cable lines à la Devaux-Charbonnel may be used. The characteristics of these cables are that single lines are used just as for telegraphic purposes. The copper conductors of this kind of cable are spun with iron-wire after Krarup's proceeding in order to raise the self-induction.

Altogether the problem is not yet absolutely solved in which way submarine cable telephony will be executed in the future, when the possibilities given by thermionic repeaters are taken into consideration.

C.T.O. BOWLERS' AND GOLFERS' DINNER.

"And there was sound of revelry by night."

WE do not know by whom the suggestion of a combined Bowlers' and Golfers' Dinner was first mooted but it was certainly a happy one, as evidenced at the second annual function of this combination, held at the "Ship," Ivy Lane, on the 15th inst., when under the genial chairmanship of Mr. John Lee, supported by Messrs. A. W. Edwards, C. Sanderson and Arthur Avery in the Vice-Chairs, a thoroughly enjoyable evening was participated in by the 46 members and visitors present.

Of the dinner !—That was excellent ! And the most exacting trencherman could not but admit its amplitude. Despite this, however, we noticed that the wielders of the "woods" kept their "end" up admirably, whilst the Golfers stayed right through to the 18th—yea, even to the 19th hole. Everyone being thus made—more or less—comfortable, the musical programme was proceeded with. Mr. Sanderson (Bowlers) in proposing the toast of the Golfers, expressed unbounded admiration of their good sportsmanship—they were such excellent losers—referred (somewhat enviously we thought) to their wonderful nether garments, and welcomed this annual gathering at which they could fraternise. Mr. Avery previously warned by the Chairman as to the bounds of veracity, followed with the toast of the Bowlers, describing the doughty deeds of their various members, amongst whom was Mr. T. G. Donno, of International fame, and expressing the Golfers' reciprocation of the fraternal spirit in which the Bowlers had met them that evening. Messrs. A. Reeves for the Golfers and H. Almond for the Bowlers responded.

The Golfers were gratified to hear from the Chairman that Lord Riddell had again invited them to Walton Heath and had expressed the hope that the participating number would be doubled this year. A touching tribute was paid to the memory of David Hain and Jim Florey, two of their number who had joined the Great Majority since their last meeting.

The next toast, "The Visitors," was delightfully proposed by the Chairman. The visitors present were Messrs. Stuart Jones, J. P. Leckenby, Capt. Foakes and Monsieur Roszak, the majority of whom were intimately associated with us in other spheres. Incidentally, the Chairman mentioned his own demerits as a Golfer but claimed the advantage that in the Royal and Ancient game the less skill the greater pleasure, and one could always reckon on getting "all square" at the 19th hole.

Mr. Leckenby responded for the Visitors, and after the toast of the Chairman by Mr. A. W. Edwards, and response thereto, the prizes won by both Bowlers and Golfers during the past twelve months were presented as under for respective Championships of C.T.O. :

BOWLS :—Mr. J. Wesley. Mr. H. Almond, runner up.
GOLF : Mr. E. Woods. Mr. A. W. Edwards, runner up.

The musical programme under the direction of Mr. Bert Sainsbury was of the highest order, items being rendered by Mr. George Owen, tenor ; Mr. John Orchard, baritone ; Messrs. Harry Parr, Will Jennings and Bert Sainsbury, humorists ; and Mr. Frank Hudson, monologues ; with Mr. Edward Bonnor as accompanist.

These artistes are well known to all and it would be invidious to discriminate where each and all were in splendid form, and appreciation was conveyed in the generous applause accorded to each item contributed.

The general arrangements were made by the Dinner Hon. Sec., Mr. A. T. Jacobs, to whom hearty congratulations are due for the very complete manner in which he provided for the amusement and comfort of those present and brought the function to so successful an issue.

MEMO :—Members for the Golfing Section are still in request. Nominal Annual Subscription of 2*s.* 6*d.* Mr. A. T. Jacobs, F. Div., C.T.O., will be pleased to receive nominations. C.

THE MINNIOTTI TELEGRAPH SYSTEM.

BY V. CASTELLI (*Cable Room, London*).

IN view of the rapid intensification of the telegraphic traffic passing over the world's lines of communications, the manual system of transmission of signals has now become inadequate for promptness of despatch of telegrams and has led to recourse to obtain better results by means of automatic and mechanical transmission.

Till now the sole practical means so far devised is that of accumulation of signals by means of perforated paper slip similar to that used for piano-players and by this method hand-manipulated Morse transmission has largely given place to the Wheatstone automatic system.

The storage of signals on perforated slip has also now been adopted for the French Baudot Multiplex fast-speed printing apparatus, a telegraph system extensively used in Europe ; the Siemens, a German invention, and the American Morkrum. Practice, however, has demonstrated that this system of storage involves drawbacks of such magnitude as to discountenance further adoption.

The principal disadvantages are increased working expenses, caused by the cost of specially prepared paper, the necessity of complicated, delicate and costly perforating mechanism, and the expense of upkeep owing to rapid deterioration of the mechanism. Furthermore, the use of perforated slip systems has a detrimental influence on quick working, by reason of the pyschological factor of the operators losing that personal contact with each other which has been recognised as an important factor in efficient telegraphy.

The perforated slip system also leads to continuous confusion in resumption of working after the inevitable interruptions which occur on many of the international telegraphic communications, and the average output also can rarely be great, because of the numerous staff necessary.

By means of the new Miniotti system of automatic transmission the process is the same as with the perforated slip with the exception that the signals are mechanically stored by the use of balls which, once having effected transmission, return to be re-accumulated for further signals.

Of the various advantages of the Miniotti the first is that its action is based on very elementary principles of mechanics and is, therefore, simple in operating and adjustment ; secondly, its maintenance is practically nil, there being no frictional or rapid rotary movements and continuous lubrication is unnecessary ; thirdly, its application to installations already in use is an easy matter, a slight adjustment being all that is required.

Another great advantage is that, with its adoption, the ordinary keyboard transmitter is no longer necessary as an auxiliary, this naturally resulting in a considerable saving of installation upkeep.

The element of personal contact already referred to is here re-introduced, as will be shown in working. An operator, without extra exertion, can easily maintain the maximum output of the system's capacity, having always the index of the quantity of signals accumulated before him, and, if necessary, he can always even forestall the accumulation with a fresh set of signals, and effect the latter's transmission without any interruption. This, it has been found, allows the operator to personally attend to all incidental service and to work without any interruption in transmission.

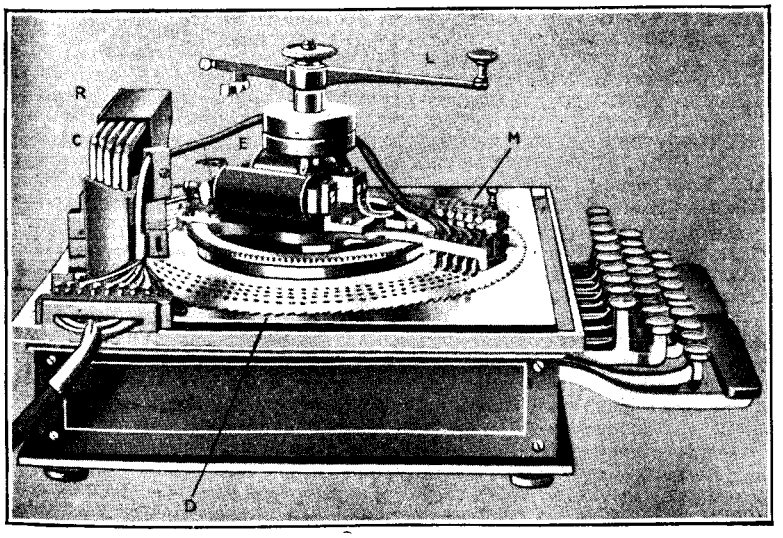
Repetition of stored signals can also be given *ad infinitum* without renewing their formation.

The Miniotti automatic telegraph transmitter, with its system of a continuous cycle metallic combination and storage of signals, is the invention of Cavaliere Giovanni Miniotti, of the Italian State Telegraphs, who was awarded the 1st prize at the International Exhibition of Inventions recently held in Turin. Its practicability has now been completely demonstrated by lengthy and severe tests, always giving highly satisfactory results in every respect, and confirming its claim of great superiority over the perforated slip system.

With the use of the Miniotti an increase of from forty to sixty messages per hour has been maintained with a high degree of perfection, the operator having at the same time attended to all the incidental clerical work which, with other systems, is entrusted to special employees.

In Italy this transmitter has been in operation, on the Turin-Rome, and the Turin-Milan circuits, seventy messages per hour having been obtained. In Germany the apparatus was subjected to lengthy and severe tests by the Technical Department of the telegraph service at Berlin, and in view of the improved results obtained the technical advisers there declared the system to be the future one for all automatic telegraphic transmission. In France it has now been for some time in operation on the Paris-Bordeaux line, completely mastering the whole of this busy line's traffic. In Spain it has been tried over the Madrid-Cartagena-Malaga line and here also gave the utmost satisfaction.

The apparatus described below is the type adapted for the Buadót system.



By manipulating the usual typewriter keyboard, the flat steel disc D rotates with a ratchet and pawl movement in an anti-clockwise direction, carrying in its movement small half-sunken steel balls, which constitute the elements of the telegraph signals.

The disc, passing under the ball container R, receives the balls which, by special arrangements, select certain positions. When the balls have effected their purpose, they are again caused to re-enter the container R through the five conduits C, by means of certain devices actuated by the key levers.

The automatic transmitter M, mounted on an arm rotating in an opposite direction to that of the disc, carries out the functions of transmission over the lines of the electric signals corresponding to the combination of balls which slide into cups projecting from the disc.

The movement of the arm is governed by the electro-magnet E, which latter is connected with and controlled by the distributor of the telegraph apparatus.

The lever L which rotates with the arm, outside the apparatus, indicates to the operator the position of the transmitter, and therefore the number of accumulated messages which precedes the transmission.

TELEGRAPHIC MEMORABILIA.

WITH the settlement of wireless as part and parcel of our modern civilisation litigation has readily put in an appearance. Taking up a New York newspaper we read that the Federal Trade Commission charges the principal corporations engaged in the manufacture and distribution of radio equipment, and the rendering of radio service, with creating and maintaining a monopoly in radio apparatus and communication. The various companies were cited (Jan. 27) to answer within thirty days a charge of violating the law regarding unfair competition.

Coming nearer home there was the case of a gentleman who rented a cottage in Berkshire and bought a two-valve wireless set which somehow or other failed to hear London. He then consulted certain specialists (?) who advised him to buy a four-valve set. This he did and installed it in South London, but entirely failed to get any station beyond London Radio! He then deported the recalcitrant piece of apparatus to Didcot. It was still dumb. The purchaser then sued the vendor but lost his case, because this wonderful four-valve set was only fitted with a fixed wave-length at 365 metres, and because, said the judge, "it was inconceivable that twelve months ago, when wireless sets were in an experimental stage, that any man would give a warranty when the thing was in its infancy!" To ourselves it also appears "inconceivable" that any man should be able to manufacture so advanced a type of wireless as a four-valve set and yet omit all facilities for varying the wave-length, even in the early part of 1923.

In these days of State economies there may possibly be room for the following suggestion of a Mr. J. N. Phinney of the U.S.A., who maintains that anyone who wishes to become an expert telegraphist can do so in double quick time by learning while asleep. According to this gentleman, whose credentials we have no means of examining, all you have to do is "to go to bed with your head 'phones over your ears or within sound of a clattering telegraph instrument, and in an almost unbelievably short time you will be able to receive code messages at a speed that will amaze you. That is the way I learned telegraphy as a boy. That is the way the Bureau of Aeronautics of the United States Navy now is teaching radio transmission and reception to student aviators. The method is past the experimental stage. At the age of 17 years I was forced to the conclusion that, unless I increased my speed at once in some miraculous manner, I was likely to find myself out of a job. I slept beside the main-line relay, which was always clattering away much faster than I could copy. In a surprisingly short time I found myself able to read the fastest operator on the line. Years later—in 1914—I was obliged to receive messages from a crack operator in Jacksonville whose speed was much too great for me. For several nights I slept beside an electrically-driven automatic sending device. At the end of that time I found myself able to take all the Jacksonville operator shot at me and ask for more. The results of experiments convinced me that I had fallen upon a method of teaching telegraphy that was quick, easy, and certain. My first opportunity to carry it out came a short time ago when twelve naval medical officers started our flight course. One, a noted specialist in psychology, expressed a desire to try my method. A single night with radio messages throbbing in his ears as he slept enabled him to copy with much greater ease, accuracy and speed than ever before, and the result of his report gained me the coveted opportunity to conduct further experiments with official sanction. Tests were carried out among students who were so backward that failure appeared certain. Seventeen volunteered for a test. The following results were noted the next day:—

One of the 17 copied five words a minute faster than before. Four copied three words a minute faster and one nearly three words faster. Four copied two words faster, and one nearly two words faster. Three copied one word faster and one half a word faster. Six subsequent tests have been made on these students, with the result that they averaged a gain of three words a minute each night in receiving ability. Errors and uneven sending cause restlessness and muttered protests. We are using the new system at Pensacola and have replaced hard wooden benches and tables with the regular army cot for radio students. Men learn just as rapidly when sleeping in comfort as in discomfort."

It is perhaps best to leave these statements with our readers without further comment, except to hint that if successful the upkeep of Telegraph Training Schools should become considerably reduced.

ARGENTINA.—The Trans-Radio International Co.'s high-power radio station at Monte Grande, near Buenos Aires, was opened on Jan. 25. The company represents British, French, German, and American radio interests.

The object of the Transradio Internacional Compania Radiotelegrafica Argentina is to place the Argentine in direct radio communication with North America, Europe, and the Far East. The transmitting station at Monte

Grande, 20 kilometres from Buenos Aires, covers an area of 1,200 acres. There are ten steel towers 500 metres apart, each tower being 690 ft. high. The power of the station is 800 kW. The receiving centre is at Villa Eliza, 39 kilometres from Buenos Aires, and the same distance from the transmitting station. The telegraph office, from which the transmitting station is automatically controlled and to which the receiving station is connected by telegraph lines and an automatic linking device, as is the case in the Marconi system in this country, is situated in the centre of the commercial quarter of Buenos Aires.

AUSTRALIA.—If expectations are realised broadcasting will become an accomplished fact in Melbourne and Sydney within the next three or four months. The Postmaster-General has issued a licence to Messrs. Farmer & Co., of Sydney, for the erection and conduct of a broadcasting station in New South Wales. It is understood that this firm, in association with others, intends to establish broadcasting stations in other States. Application has been made for a broadcasting licence in respect of a station capable of transmitting matter all over Victoria. The broadcasting stations to be built by Amalgamated Wireless (Australasia), Ltd., will comprise two for Victoria and Tasmania, two for Sydney, and one each for Adelaide and Perth. Messrs. Farmer's Wireless Broadcasting Service, Ltd., were to have commenced operations last month. Their station is being erected at Northbridge, two miles from Sydney proper. The broadcasting regulations as adopted by the Government are somewhat extraordinary, especially from the point of view of a British Isles licensee who will, perhaps, more keenly appreciate the value he receives and the freedom he enjoys under our own home regulations. Each listener will be required to subscribe to one broadcaster and his instrument will be "sealed," so that it can receive the programme of that particular station and no other. If he wishes to take advantage of two or more services he will be required to subscribe separately to them all. Again, the broadcasting companies are at liberty to charge whatever they like.

Further dissatisfaction has been caused among experimenters possessing transmitting licences by the receipt of a notification from the P.M.G.'s department stating that each has been allotted a specified short wave-length. Manufacturers and suppliers of receiving apparatus are to be licensed, such dealers being required to sell only appropriate sets to licence holders. The licences will cost 10*s.* per annum where one station only is listened to, or 20*s.* where two or more are listened to, in addition to the fee payable to the broadcasting companies.

CANADA.—It is reported that the Canadian National Railways are about to erect a radio station at Ottawa for broadcasting Parliamentary debates and radio concerts on trains may soon be expected.

It is also this country which apparently contains an abnormal number of radio pirates, for there are at least 50,000 radio receiving sets in use in Canada, representing an investment of about $2,500,000, and of that total only 16,118 have taken out licences. In Toronto there are at least 10,000 sets in operation, and so far this year (1923) only 841 have taken out licences, as compared with 918 last year.

CHILI.—THE LAND OF CHANGING GOVERNMENTS.—The special correspondent of the *Electrical Review* informs us that an application has been made to the Chilean Government by the Siemens Schuckert Co., of Germany, to instal a system of radio stations in the Chilean Republic. The proposed stations would be of the Telefunken type and would cost $1,385,000 (gold) (1 gold dollar=18*d.*). The offer comprises the completion of 11 stations in the course of 15 months to be located as follows:—5-kW stations at Iquique, Antofagasta, Valparaiso, Santiago, and Punta Arenas; 2-kW stations at Caldera and Valdivia; and 4½-kW stations at Tocopilla, Taltál, Coquimbo and Ancud. There is every probability that the offer will be accepted, an intimation to this effect having already been made by the Minister of the Interior. At present all radio stations in the Republic are of the Marconi type, operated and controlled by the Chilean Naval Department. Public disapproval has already been expressed of the change-over from the British to the German type, but in view of the fact that the Chilean Ministry is so frequently changed before projected plans can be carried into effect, it is not improbable that the concession asked for by the Siemens-Schuckert Co. may be deferred, or, if granted, subsequently cancelled.

LITHUANIA.—A French technical periodical informs us that a French company has secured the contract for the installation of a wireless station at Kovno.

MEXICO.—The *Financial Times* reports that the Mexican Government has placed an order with a German company for the erection of four large radio stations in the Republic to connect the capital with the neighbouring Republics of Guatemala, Costa Rica, San Salvador, and Nicaragua.

With reference to the suggestion that the American Telegraph and Telephone Company is associated with the International Telephone and Telephone Corporation in planning a world telephone trust, Mr. H. B. Thayer, president of the American Telegraph and Telephone Company, has issued an official statement denying that any such association exists.

SPAIN.—A concession has been granted to a British concern for radio broadcasting throughout Spain; a station is to be erected in Madrid.

On the homeward voyage of the Cunard liner *Aquitania*, which reached Southampton on Feb. 1, the chief radio officer, Mr. C. V. Maudsley, accomplished the feat of receiving two messages simultaneously on wavelengths of 2,200 and 600 metres. Two aerials were used, and it is reported that the experiment was so successful that it has been decided to adopt the scheme permanently.

The *Electrical Review* recently stated what is apparently not generally known that one of the most successful occupations taught to the blinded soldiers at St. Dunstan's is telephone operating. A large number of these men have found employment with important business firms and organisations in London and the Provinces, and not a few employers state that their board has never been so well and efficiently managed as by their blinded soldier operator. We have seen some of these testimonials, and they are certainly very satisfactory. This may be because the freedom from outward distraction—a natural accompaniment of blindness—enables the blind operator to concentrate on his work to a much higher degree than is possible in the case of a sighted operator, and thus he can maintain an excellent service. St. Dunstan's has several fully-trained men ready for work. The authorities at St. Dunstan's Headquarters, Inner Circle, Regent's Park, N.W.1, will gladly supply full particulars. A point to bear in mind is that the employer's liability for his blinded soldier operator is no more than in the case of any ordinary employee. To his employer he is a perfectly normal member of the staff. His special needs as a blinded ex-Service man are the permanent and sole responsibility of St. Dunstan's After-care Organisation.

At a recent French exhibition, Messrs. Carpentier, the well-known Parisian constructors of telegraph apparatus exhibited a new type of page printing telegraph apparently developed on the lines of that firm's original type-writer Baudot slip perforator.

Wireless experiments were recently made between the London C.T.O. and the C.T.O. Budapest by means of Hughes printing apparatus, London controlling the aerial at Northolt, while Budapest controlled the Hungarian transmitting station of Szekesfehervar. London received well on the whole, but the experiment was not entirely satisfactory and it is understood that the Hungarian administration hope to continue the trials under improved conditions through their new and more modernly equipped station at Tarnok as soon as the latter is ready.

Sarajevo and London are also connected by wireless telegraphy for short daily periods, and so far good results appear to have been obtained.

The Australian Postal Assistant thus describes the Cash Registers in use at some of the larger cities of Australia:—

"The clerk behind the counter takes the customer's telegraph form, puts it on the printing table of the register, presses the keys representing the amount chargeable for the telegram, and as quickly as electricity can do it (and there is nothing quicker than electricity), the form has had printed upon it the amount of money paid, the designating mark of the clerk who took the money, the date, and the consecutive number of the telegram. The public has no annoying delay—and in proof of this, one has only to visit the Department at a rush hour to see the way customers are handled, as compared with the system previously in use and described above. From the point of view of the clerk behind the counter, it is 'paradise' for him. The public are pleased, and he therefore has a better time. The cash register adds up every amount that is recorded; consequently when he goes off duty, his superior officer simply looks at the addi g total on the cash register, and the clerk hands over the money. There is no possible shadow of a suspicion as to wrong charges, mistakes in change, or anything of that kind. The register automatically shows the amount that should be in the cash drawer, the clerk hands over the money, and everybody is satisfied and happy. From the point of view of the Department itself, the results are more than pleasing. When the telegrams go to the dispatch room there is no doubt but what the money has been received, because the printed figures on the forms show that it has not only been received, but accounted for—so the Department is protected. Then again, the figures given by the cash register are printed, and are thus much more easily read than written records. No elaborate detail has to be kept, no person has to be employed checking the stamps—the whole thing is done by the cash register automatically and accurately. Above and beyond all these other reasons that are of intense satisfaction to the Department is the one outstanding feature of the public getting better and quicker service and being more satisfied with the work of the Department."

It may not be general information, but a special cash register for accelerating the acceptance of telegrams is actually in use on trial at an English provincial post office counter and from all accounts is doing well.

The following is a succinct though not absolutely accurate account in detail from *The Times* of some particulars in connexion with the opening of direct telegraphic communication between the Eastern Telegraph Company's London Office and the German port and repeater office of Emden. It is *not* as would appear from some newspaper accounts the *re-opening* of telegraphic communication between this country and Germany which was re-established comparatively soon after the close of hostilities.

"An agreement has been reached between the German Cable Co. and the Eastern Telegraph Co. by which the latter's system will carry German overseas traffic to South America pending the completion of the new German cable connexion between Emden and Vigo. For this purpose the Borkum cable, belonging to the German company, has been lengthened *via* Dumpton Gap to London in the one direction and to Emden in the other. The London end is to be linked up direct to the Eastern Co.'s system. The agreement is for a period of about three years, and has been made in order to renew certain parts of the cable which were left derelict when the German cables were appropriated by Great Britain and France in the early days of the war. The negotiations have been in progress over a year.

The Eastern Telegraph Co. has laid ten miles of cable to connect at Dumpton Gap, with the land line which it rents from the British Post Office and which is used in connexion with a Belgian cable. Through that line German traffic will therefore be put direct on to the systems of the Eastern and Western Telegraph Companies."

As a sign of the improved relationship of this country with France, the London-Dusseldorf telegraph line is about to be re-opened if this is not a

fait accompli by the time this reaches our readers. This communication was cut about twelve months ago at the commencement of the difficulties in the Ruhr.

The sixth annual report of the C.T.O. Refreshment Branch is an interesting document reflecting as it does the result of the withdrawal of Government subsidies. It is a thoroughly business statement, and deals with facts with a worthy directness. For example, speaking of the ex-Government plant which it is now the duty of the Branch to keep in repair, the report says :—"Much of the plant is upwards of a quarter of a century old and has already cost about £200 to re-condition, representations for redress having fallen upon deaf ears." Nevertheless, despite all the adverse circumstances, the year's working has yielded a profit of £458 15*s.* 6*d.*, so,

"All's right with the world."

From an American study of "Radio Signal Fading," which recently appeared in the *Electrical Review*, the following interesting items are excerpted and were the results of the investigations of the American Radio Relay League.

"Fading does not ordinarily take place within the daylight, or reliable, range of the transmitting station. It is primarily a phenomenon noted at long distances from the transmitter, and hence is more prevalent during the night time when transmission ranges are greatest." . . .

"A changing barometer at the transmitting station does not affect the fading. Fading is greater when the transmission takes place up or down the barometric gradient; no difference was noted in the fading between transmission up and transmission down the barometric gradient. Waves which travel *along* the isobars produce stronger signals than those travelling up or down the barometric gradient; no difference was found between transmission up and transmission down the barometric gradient. Transmission along the isotherms is slightly more conducive to stronger signals than when transmission is up or down the temperature gradient, and transmission along the isotherms tends toward less fading. Transmission along the isobars is slightly less conducive to fading than transmission along the isotherms."

"Clouds at the transmitting station have no effect upon fading, but if it is generally cloudy at and between the transmitting and receiving stations, fading is more likely to be bad than when it is clear. Clouds at the transmitting station have no effect upon signal intensity though clouds at the receiving station are conducive to stronger signals. Generally, cloudy weather at and between the transmitting and receiving stations has no effect upon the signal strength but clouds at the receiving station produce strong strays."

"Only those waves which travel along the earth's surface are useful during the daytime. In travelling along the earth's surface the waves are diminished in intensity by absorption of their energy in the earth. At night, however, the waves may reach the Heaviside surface and travel and slide along it without appreciable absorption, which means that the waves travel enormous distances at night and short waves travel farther than long ones."

The success of the Teletype is apparently assured in the British Telegraph service for information reaches the T. & T. JOURNAL office that a score or so of these handy instruments are now on order.

If a little late in the day, yet none the less sincere are the congratulations to an old member of the C.T.O., Mr. G. Mansbridge, upon his appointment. Despite all the changes which have taken place since he left the manipulative side of the Service, there is still a number of us who recall his strong personality and some who have had first hand knowledge of his kindly nature.

It was a truly interesting gathering at the I.E.E. on the 18th ult. when Mr. J. Stuart Jones, M.B.E., of the Secretary's Office, Traffic Section read a paper on the British Telegraphs, their present position and their hopes for the future. Owing to an official function, which tended to overlap the period allotted to the gatherings of the P.O. Telephone and Telegraph Society, the lecturer was compelled to abridge his lecture and the audience its comments thereon. Mr. Jones deserves something more than the measure of praise which he received on this occasion, firstly, because at short notice he took the place of Sir John Snell, K.B.E., who had been compelled to defer his paper on "Improved Methods of Production and Distribution of Electrical Energy," owing to circumstances which could not have been foreseen and for which he handsomely apologised in a letter to the Chairman, Colonel Purves, and secondly, because of the compulsory curtailment of his carefully-prepared lecture, which latter, however, receives a little more justice by its publication, *in extenso*, in the current number of this journal.

The discussion which followed was divided, on broad lines, between the pessimists, who apparently were agreed that the telegraphs were in a bad way and that there was only a measure of hope for them, and the optimists, the majority, who agreed with the lecturer that," there was life in the old dog yet!" Among the speakers were Mr. John Newlands, ex-Controller of the C.T.O., Mr. A. W. Edwards, Deputy-Controller, Sir Henry Bunbury, K.C.B., Mr. Sellars, and others.

Happy Doggerel :—

When you ever feel blue,
Find something to do
For somebody else
Who is worse off than you.

—THE BISHOP OF ST. ALBANS.

J. J. T.

SPEEDWELL.

These lines were found in the waistcoat pocket of a Goblin seated dis consolate on Hampstead Heath very late on the last night of the Old Year.

On 1820H—a plan
Framed by an Engineering man
(A class one hastens to remark
In brains the equal of the clerk,
And—rid your cheek of tongue or toffee, Sir,—
Not far behind the Traffic Officer),
My name was writ and could be seen
Simply and plainly—GOLDERS GREEN.

That blueprint gave me cause for hope,
But hid, alas! the hangman's rope,
Which cut me off with jerk dramatic
On advent of the "automatic"!
GOL equals HOL on standard dial
Demanding alternate names for trial;
House agents whom requests importune
Make the suggestion "TEMPLE FORTUNE."

Fortune, forsooth! full soon, fanatics
Proudly had proved by past phonetics
That such a name would but encumber
And multiply mistakes in number,
"Four two" or "foer too," which you will
Made sacrifice of "TEMPLE"—till
When sundry names were being tested,
"MEADWAY" someone at length suggested.

O! honeyed name of field and flower,
My love for you increased each hour;
You came like sunlight after tapers,
Had solemn sanction in registered papers,
And hosts of others have proved your blessers,
Yet you ended like your predecessors,
For though you made most wonderful headway,
The Engineers *would* pronounce you "MEDWAY."

Here was an awful, appalling thought,
Reducing the labour of years to nought,
And the E. in C. reported at once
To show the effect if ever a dunce
Should attempt that troublesome name to spell,
Being able as evidence to tell
Of the complications that always occurred
When an Engineer repeated the word.

The Director himself called the Chief Inspector,
But neither, alone nor combined, could detect a
Name to suit—so, in terms of some pity,
They passed the task to the Traffic Committee,
Who tackled it fiercely, and counted it blest
When one of their number put up "HILLCREST,"
A name of good import, suggesting beside
"MOUNTCREST" and "MOUNTSIDE" as well as "HILLSIDE"

One may dive for a penny but come up without it;
You think you could find a good name, but I doubt it;
There are names of great persons, and names of great trees,
There are jewels, and colours, and sweets, and cheese,
There are birds, beasts, and flowers, some wild, some tame,
And at last, Heaven bless me, I have a new name!
That somebody likes it is good news to tell
If that number increases, why, then, 'twill SPEEDWELL.

For will you believe it? I'm SPEEDWELL, it's true,
Though I open in pink, I shade off to blue,
I am tiny and common, but surely the best,
Since I came out unscathed from a practical test;
If I'm sometimes called "Bird's-eye," or "Cat's-eye"—what matter
I'm the "eye of an Angel" to those who would flatter,
As "Veronica Officinalis" I'm known
To Botany students, but them alone.

I earnestly hope that my name is now fixed
For sometimes at night I get hopelessly mixed,
As SPEEDWAY and WELLMEAD file past in alarm
Lest GOLDCREST or HILLTUNE should do them some harm;
And, dear reader, just pause and a note of thanks raise,
That you leave "automatics" with your last of Earth's days.
Even two letter codes carried on for a spell
Thereafter, would vitiate HEAVEN or HELL

C. P.

The
Telegraph and Telephone Journal.

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

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. X. MARCH, 1924. No. 108.

THE ANGLO-FOREIGN TELEGRAPHS AND TRADE.

IN the hearts of most of us there has been of late a growing hope that our much-tried country has seen the worst of the trade slump. Some months back there were those in the telegraph service who, carefully studying the dry-as-dust figures, began to note, day by day and week by week, first a slight and then a distinct rise in Anglo-foreign telegraph statistics. Reviewing the closing quarter of 1923, the average weekly increase in Anglo-foreign telegraph transactions at the London Central Telegraph Office as compared with the corresponding quarter of 1922 was no less than fifteen thousand items. Very little of this was of a *seasonal* nature, and a comparatively small percentage, perhaps five per cent., was purely *social*. Practically the entire increase was, therefore, due to financial and commercial telegraphic intercommunication. Of over three thousand telegrams exchanged between London and Hamburg in a single day, quite recently more than 99 per cent. were purely commercial.

It is most satisfactory, too, to learn that the figures of last year, up to the present, have also been well maintained, and without being unduly optimistic and without expecting too much of the current quarter, it may be said, as we write, that the tendency is still upwards. From the narrow point of view of a service in which many of our readers are specially interested, this is most heartening. From the larger and wider interests of the nation it is even more so, for the very simple fact that a rise in Anglo-foreign telegraph figures has generally proved an index of improved national business. We sincerely hope that in the present instance also the prophetic sign will prove a true one.

Encouragement of this kind will, no doubt, inspire the powers that be to further expansion and development of the Anglo-Continental services. Greater facilities are needed with Czecho-Slovakia, the restoration of at least one of the two direct wires with Vienna is long overdue, and a direct line between London and Warsaw is a crying need. Increased facilities mean increased business, and a slow telegraph service is synonymous with a dying industry !

Perhaps we may venture a step further and give a friendly warning to those who would reduce the all-night telegraph facilities between country and country, forgetting that American closing prices for the Continent, for example, should have unimpeded passage through this country to France, Belgium, Germany, Switzerland, Italy, and Eastern Europe. That less progressive and wide-awake nationalities may here and there prefer to hold up such traffic is surely not an example for Great Britain.

Rumour whispers that, despite the excellent and hopeful traffic tendencies, there has been or actually exists a movement in the direction of sensibly curtailing existing night facilities to the Continent. For ourselves, we cannot believe it !

THE WORLD'S TELEPHONES.

THE annual statement which we usually publish about this time of the year showing the telephone development of the world discloses that there were nearly 23 million telephones in existence at the end of 1922 and that by a reasonable computation there should be about 24 million at present. We could wish that a larger proportion of them were in Europe. As our contributor indicates if the South and East of Europe showed anything like the development of the Western part there would be some twelve millions in existence in that continent, instead of less than six, and the Old World would bear comparison, in numbers if not in ratio, with the New. It is, however, idle to speculate on what might be ; we can only hope that Europe will progress faster in this direction in the future than in the past. England, France and Germany show a solid increase in their totals each, though all still have ample scope for development, but the highly developed Scandinavian countries with their small populations cannot add largely to the general sum. We have yet to see the effect of the transfer of the Italian systems to private hands. The present development of the land of Volta, Galvani and Marconi is behind that of Hungary and Spain. A revival of business in and with Russia might conceivably lead to considerable expansion of the telephone in that country where it has gone back lamentably since the War.

An extraordinary feature of American progress is that despite the high percentage of telephones in that country, it still adds its 600,000 stations per year. Paradoxical as it may seem it is demonstrably easier to increase a large system largely than to make a small one show even a modest growth. Where the telephone is in nearly everyone's hands, everyone else feels the necessity for it. Where as in many parts of Europe the telephone is confined to small systems in the principal towns, the countryman feels as little need for it as a Bedawi for railway communications. And this brings us to an interesting point—the development of the telephone in the Moslem East. Persia, Iraq and Syria have now their telephone systems, while that in Egypt is of considerable development with its 27,000 stations, and Algeria, Tunis, and Morocco have some 26,000 telephones between them. In fact, Arabic-speaking countries can show altogether some 60,000 telephones, and the modern Ala-ed-din can summon a slave of the ring to put him in instant communion with his distant Bedr-ul-Budur without calling to his aid any other or more potent djinn.

THE RIGHT HON. VERNON HARTSHORN, O.B.E., M.P.,
H.M. POSTMASTER-GENERAL.

HIC ET UBIQUE.

AT the end of 1923 the Swiss telephone system comprised two automatic exchanges, Zurich-Hottingen (semi-automatic and automatic combined) with 8,500 lines, and Lausanne with about 4,000 lines. Apparently this exchange is at present partially automatic, for it is expected to be completely converted during 1924 and will then comprise 8,000 lines. The Zurich-Hottingen exchange will be converted to full automatic working in 1924-5, and in that year the conversion of exchanges in Geneva (Mont Blanc), Basle (Safran), Bern (Bollwerk), and Zurich (Limmat) with 6,000, 10,000, 10,000 and 6,000 lines respectively will be carried out.

WE learn from *Eastern Engineering* that it is reported that the scheme proposed by M. Lepissier, French Consul at Harbin, for the construction of a long-distance telephone line in Manchuria under Sino-French control has been approved, and a company is in progress of formation. The new line is to start at Pogranichnaya, on the borders of North Manchuria and Siberia, running westward to Manchouli, the western terminus of the Chinese Eastern Railway. In time, it is to connect with Vladivostok on the east, and Chita on the west. The new company is to be capitalised at S.Y. 1,000,000, to be paid up in full between the French and Chinese sides. Sixteen years hence the new telephone system is to pass into Chinese hands unconditionally.

AS an item of special interest to the C.T.O. especially, and to radiographers generally, on the evening of the 18th ult, the Milan office advised the Cable Room that they were listening-in and could hear 2 L.O. exceedingly well.

ACCORDING to the *Telegraph and Telephone Age*, wireless enthusiasts in Norway have heard the bagpipes broadcast from Aberdeen (Scotland). It should be pointed out that the proper quarter in which to prefer this complaint is the League of Nations.

FROM the following letter to the *Manchester Despatch* it would appear that certain landlords would like to levy a toll on wireless subscribers who have the misfortune to be their tenants.

SIR,—I hope the tenants of the Liverpool Corporation dwellings who possess wireless apparatus will whole-heartedly resist the demand of the Corporation for a rent of 1s. a year for the so-called privilege of listening-in.

If this practise is adopted we shall have to be very careful not to let our landlords know we intend putting up some Christmas decorations or we may expect a "demand" for the "privilege."

The Corporation or any other landlord has a remedy if any damage is done to property, and there the matter must end.

C. J. ENDACOTT.

Moss Side, Manchester.

Some of us will begin to feel perturbed about possible wayleave charges in respect of our clothes-posts and lines—especially those of the more permanent kind with pulleys and attachments on the wall.

AN indignant correspondent has sent the following communication to Headquarters :—

I have been informed that there is no (*sic*) law by which a person listening-in without a licence can be punished. I wish the B.B.C. would make this point clear. I could supply numerous names and addresses of these ether pirates, and I should have no qualms about doing so, as I consider the person who pays is being robbed by this contemptable practice which is as bad as robbing blind beggars. Why not make an example of a few hundred of them. If this is not done the B.B.C. will soon suffer a decrease in their income, will in fact become a Society for providing Charitable Concerts for Super Perishers. From my own experience I am convinced that for every one licence-holder, there are three Radio Peeping Toms. The man who would object to paying such a small amount for an entertainment similar to that of the Minshaha Minstrels would make Shylock blush with shame.

H.M. Postmaster-General, if not the B.B.C., could (and no doubt will) make the point he raises at the beginning of his letter abundantly clear to transgressors.

THE proposed wide extension of the practice of erecting telephone kiosks in the streets is attracting considerable attention in the newspapers. Favourable and unfavourable comments on what Mr. Pecksniff would have called their architectooralooral aspect are plentiful. The *Daily Chronicle* says that kiosks have always been alien to London and endure in a certain amount of suspicion, if they endure at all, and seems to consider that the Postmaster General's action may do something to remove this reproach.

Why is it that the bright kiosk
Should be suspect and alien here,
Exotic as a moslem mosque,
A minaret or belvedere ?

Yet, where Dubonnet and Dubosq
Do congregate, kiosks are near
And flourish in Berlin and Mosc-
ow, Rome, and, possibly, Kashmir.

In foggy London's rare *chiarosc-*
uro perchance they would appear
Strange in those Chelsea streets to Osc-
ar Wilde, Carlyle and Whistler dear,

Though useful for belated bosk-
y revellers their course to steer.
But here I pause for rhymes in "osk"
Are rare in English, whence 'tis clear

The picturesque (not picturosque)
Utilitarian kiosk,
Is not indigenous, I fear. W. H. G.

DIARY, MARCH 1924.

March 7.—INSTITUTION OF ENGINEERING INSPECTION—Evening Meeting at the Society of Arts.

„ 7.—LONDON TELEPHONISTS' SOCIETY—Competition Papers and Distribution of Prizes, 6.30. Y.M.C.A. Lecture Hall, Aldersgate Street.

„ 13.—INSTITUTE OF PUBLIC ADMINISTRATION.—"The Public and the Administration of Telephones," by Sir Andrew Ogilvie, K.B.E. London School of Economics, Houghton Street, Aldwych, 6.30 p.m.

„ 17.—P.O. TELEPHONE AND TELEGRAPH SOCIETY.—"Post-War Trunk Development," by Mr. H. G. Trayfoot. Institute of Electrical Engineers, Victoria Embankment. 5.30.

„ 21.—INSTITUTION OF ENGINEERING INSPECTION.—Evening Meeting at Society of Arts.

„ 28.—INSTITUTE OF PUBLIC ADMINISTRATION.—"Financial Control in Local Government Administration," by Sir H. E. Haward. Old Council Chamber, L.C.C., Spring Gardens. 6 p.m.

THE PRESENT STATE OF TELEGRAPH TRAFFIC AND THE FUTURE OUTLOOK.*

BY J. STUART JONES, M.B.E.

THE paper which I have the honour and the pleasure to read to you to-night had its genesis in an expression used by a colleague—a colleague not directly concerned with the Telegraph Service or the Telephone Service. We were discussing some point or other concerning the Telegraph Service, and he said that the Telegraph Service was moribund. In his opinion the Telephone Service was diverting traffic from the Telegraph Service so rapidly and so seriously that it was only a question of time before telegrams disappeared altogether, or, at all events, sank to insignificant numbers. His opinion seems to be shared by quite a number of people. The view that the number of telegrams has been steadily decreasing and was bound to continue to decrease through the increased use of the telephone is not, by any means, a new one. To my own knowledge it was held many years ago, but I imagine that those who held that view then would be surprised if they knew the state of vitality of the Telegraph Service even in these depressing times. For the past three years or so the total number of telegrams has been declining. The number dealt with during the last complete financial year, the year ending in March last, was some 25 per cent. less than the number dealt with three years previously. There are many who attribute this decline to telephone inroads and doubt the possibility of revival, but my own view is that the decrease is almost entirely due to the depressed state of trade, and that encroachments by the Telephone Service have had very little to do with it. I think that much too much is said of Telephone competition with the Telegraph. Each Service has its own proper sphere. The Services are complementary to each other rather than in competition. In the past, the Telegraph Service carried communications which, as the Telephone Service grew, were diverted to that Service because it was more suitable, but this transitional stage is nearing an end.

STATEMENT SHOWING NUMBER OF TELEGRAMS (ALL CLASSES) FORWARDED WITHIN UNITED KINGDOM DURING UNDER-MENTIONED YEARS.

Year.	Telegrams. Millions.	Year.	Telegrams. Millions.
1900-01	89½	1912-13	88½
1901-02	90½	1913-14	87
1902-03	92½	1914-15	91
1903-04	90	1915-16	84
1904-05	89	1916-17	73½
1905-06	89½	1917-18	75½
1906-07	89½	1918-19	84½
1907-08	86	1919-20	94
1908-09	84¾	1920-21	80
1909-10	86¾	1921-22	74½
1910-11	86¾	1922-23	70½
1911-12	89½		

FIG. 1.

Let us, however, get to the facts of traffic and see whether they show that the Telegraph Service is dying. Fig. 1 shows the total number of telegrams (Ordinary, Foreign, Press, Government, &c.) dealt with over the Inland telegraph circuits since 1900. I would have you observe, in the first instance, that the busiest year in telegraph history was so recently as the year ending March 31, 1920, when the total number of telegrams reached 94 millions. That fact in itself is proof that the Telegraph Service has at all events not been dying by slow degrees. During that year, the year ending March 31, 1920, the number of Ordinary Inland telegrams alone was nearly as high as it ever had been, but I deprecate the idea that the health of the Telegraph Service is to be judged from the number of Ordinary Inland telegrams only. The Telegraph Service is not merely an Inland service. It is an organism for the conveyance of all kinds of telegrams, and judgment as to the state of the service should be based on the total number of all classes of telegrams which the inland telegraph wires carry.

Pessimists will no doubt seize on the statistics of the past three years as evidence that their views regarding the declining state of the Telegraph Service are sound, but is the state of trade in this country at the present time—a state of depression unparallelled since the years following the close of the Napoleonic wars—to find no repercussion in the state of telegraph traffic? Is it to be expected that the Telegraph Service—the so-called "hand-maiden of commerce"—would be unresponsive when commerce was depressed? It was responsive enough in the "boom" year of 1919/20. It can hardly fail to be responsive in the years of commercial poverty. In an address given recently by Mr. McKenna, Chairman of the London Joint City and Midland Bank, and formerly Chancellor of the Exchequer, to the Belfast Chamber of Commerce, he stated that British exports were at least 25 per cent. less last year than in 1912 and there is ample evidence that the comparative state of internal trade is at least as bad. We may legitimately expect that there would in consequence be a serious depression in telegraph traffic and in point of fact the fall in telegraph traffic comparing the year ending March 31, 1922, with the year ending March 31, 1912, was 16.6 per cent. Purely Inland Traffic has fallen 18.5 per cent. as between those years. I do not take the year ending March 31, 1923, into account because the internal telegraph traffic of the Irish Free State is excluded from these returns as from April 1, 1922, and the year ending March, 1923, is therefore not strictly comparable with previous years.

One may regard with envy the absence of a slump in the Telephone Service, but the Telephone Service does not stand alone in making progress during these years of general depression. The motor industry, electric light undertakings and other services all show signs of progress. One may ask oneself, rather futilely, why the Telegraph Service should feel the pinch of the times while other services, some closely allied with it, apparently do not. Well, the Telegraph Service is not alone. It is probably suffering no more than, if as much as, the great majority of the long-established businesses of the country at the present time. Long-established businesses cannot expect to compete in growth with comparatively new industries which are providing the public with a facility which is becoming a new fashion or is meeting a new social necessity. It has become a fashion to have a motor-car, to introduce electric light into one's house, to have a private telephone, and the dictates of fashion—or if you prefer it, social needs—usually override questions of cost. The sending of telegrams can hardly be developed into a fashion but, while the Telegraph Service cannot have the advantage of the booms which fashion gives, it can and does conduct a solid business as these figures indicate.

STATEMENT SHOWING NUMBER OF INLAND PRESS TELEGRAMS FORWARDED WITHIN UNITED KINGDOM DURING UNDER-MENTIONED YEARS.

Year.	Telegrams. Millions.	Year.	Telegrams. Millions.
1900-01	7	1912-13	4¼
1901-02	6¼	1913-14	4
1902-03	6½	1914-15	4½
1903-04	6¼	1915-16	3¾
1904-05	6¾	1916-17	3
1905-06	6½	1917-18	2¾
1906-07	6	1918-19	2½
1907-08	4½	1919-20	3
1908-09	4¼	1920-21	2¾
1909-10	4½	1921-22	2¾
1910-11	4¼	1922-23	2
1911-12	4½		

FIG. 2.

STATEMENT SHOWING NUMBER OF FOREIGN TELEGRAMS FORWARDED WITHIN UNITED KINGDOM DURING UNDER-MENTIONED YEARS.

Year.	Telegrams. Millions.	Year.	Telegrams Millions.
1900-01	7½	1912-13	11½
1901-02	7½	1913-14	11½
1902-03	8	1914-15	9½
1903-04	8	1915-16	7½
1904-05	8¼	1916-17	7¼
1905-06	8¾	1917-18	6¾
1906-07	9	1918-19	7
1907-08	9	1919-20	11½
1908-09	9½	1920-21	12¼
1909-10	10¼	1921-22	12
1910-11	10½	1922-23	14½
1911-12	11		

FIG. 3.

On examining the figures one is struck chiefly by the apparent state of stability of telegraph traffic. The figures year by year vary little, apart from the war years and the last three years.

This state of stability is, however, more apparent than real. The volume may have kept at much the same level, but there has been a considerable movement amongst the constituents. There has been, for example, a marked diminution in the number of Press telegrams during the past 20 years as Fig. 2 shows. This depreciation began with the establishment of private wires by newspapers and has latterly been accentuated by the development of a private wire system by the Press Association. However much we may deplore the loss of this traffic, such a development could not be prevented and there is, in any case, the consoling feature that Press traffic has little to attract it from a financial point of view.

Again, Foreign telegrams have by no means been stable in quantity. As you will see from Fig. 3 there has been during the past 20 years, apart from the war years, an almost uniformly upward trend of traffic. The unusually heavy increase for the year ending March last is mainly accounted

* Paper read before the London Telephone and Telegraph Society on Feb. 18, 1924.

for by the fact that as from April 1, 1922, telegrams passing between Great Britain and Northern Ireland on the one hand and the Irish Free State on the other have been classified as Foreign telegrams. We may look forward with confidence to the Foreign traffic continuing to grow. Apart from trade with Foreign Countries, the development of the Dominions will inevitably involve increased telegraphic communication and the Imperial Cables and the Government Wireless services will have their share of this increase.

Government telegrams have fluctuated considerably though their total number, in times of peace at least, is comparatively small. Before the War they numbered about 600,000 a year. During the war the number increased rapidly and reached its peak in the year ending March, 1919, when it was no less than 11 millions. At the present time, influenced no doubt by the fact that the telegrams have now to be paid for like all other telegrams, they have dropped to 400,000.

STATEMENT SHOWING NUMBER OF ORDINARY INLAND TELEGRAMS FORWARDED WITHIN UNITED KINGDOM DURING UNDER-MENTIONED YEARS.

Year.	Telegrams. Millions.	Year.	Telegrams. Millions.
1886-87	40	1905-06	72
1887-88	43	1906-07	72½
1888-89	46¾	1907-08	70½
1889-90	50¾	1908-09	69½
1890-91	54	1909-10	70½
1891-92	57	1910-11	69¾
1892-93	57	1911-12	71¾
1893-94	58	1912-13	70½
1894-95	59	1913-14	69½
1895-96	64½	1914-15	72¼
1896-97	65½	1915-16	64½
1897-98	68¾	1916-17	54¼
1898-99	72	1917-18	55
1899-1900 ...	74	1918-19	63
1900-01	73	1919-20	74¼
1901-02	74¾	1920-21	62½
1902-03	75¾	1921-22	58½
1903-04	73¾	1922-23	52¼
1904-05	72		

FIG. 4.

But in this connexion I wish to direct your attention in particular to the Ordinary Inland traffic (Fig. 4). The 6*d.* telegram was introduced on Oct. 1, 1885, and the statement shows the statistics for each complete financial year since that date. You will see that, apart from the War years and the three years of the existing period of trade depression, the figures have been remarkably stable since the year 1898. I would have you observe that that year was immediately after the Post Office took over the trunk lines of the National Telephone Company and began the systematic development of the trunk telephone system. It would appear, therefore, that the development of the trunk service has had the effect of preventing growth of the number of purely Inland telegrams. This, however, is not what the pessimists, to whom I referred earlier, have argued. Their argument is that the trunk Telephone Service has attracted traffic in wholesale fashion from the Telegraph Service. They deduced from this the erroneous conclusion that the Telegraph Service was, in consequence, going rapidly down hill. They are right in so far that large quantities of short-distance communications which formerly were telegrams are now dealt with by the Telephone Service. There is ample evidence of this in every large instrument room. The telegrams which at one time passed in large numbers, for example, between Leeds and Bradford, between Manchester and Bolton, between Glasgow and Greenock, have melted away and almost vanished.

Despite these heavy inroads into the short-distance traffic during these past 25 years, there is in this statement incontrovertible evidence that on the whole the purely Inland telegraph traffic has held its own. One may wish that a better showing could be made, but nevertheless there is scarcely occasion for pessimism. If Inland traffic has held its own for 25 years, and in fact reached the high level which it did three or fo r years ago, there is every reason to suppose that it will continue to hold it. Indeed the signs are that, when trade revives, it will do more than hold its own. The transfer to the Telephone Service of the short-distance communications cannot go on for ever. The field for such inroads is not inexhaustible. It must, indeed, be nearly exhausted now. The Telegraph Service has become a long-distance service. The average distance between office of origin and office of destination of telegrams is no less than 150 miles. The improvements which may be made from time to time in the long-distance trunk service either by increased facilities or by reducing the tariff will no doubt draw traffic from the Telegraph Service but the loss from this source is not likely to be serious.

There are important conclusions to be drawn from these figures. Obviously, if large quantities of short-distance traffic have been withdrawn but the total traffic has kept up, the loss is being made good by other traffic, that is to say the long-distance traffic has been growing practically at the same rate as the short-distance traffic has disappeared. There is, therefore, clearly a field which the Telegraph Service has been unconsciously developing and the conclusions which one might draw are : (1) the growth will soon exceed the loss, as the supply of short-distance traffic becomes exhausted ; and (2) if traffic has been attracted without special effort, it can be attracted in greater measure by special effort. Special measures have never been taken to attract telegraph traffic, but, just as the growth of the Telephone Service has been largely fostered by special efforts of one kind or another, so the Telegraph Service might develop through measures of the same kind. I assume that it is right deliberately to set out to attract fresh traffic. Effort towards development is a normal characteristic of a sound business undertaking, and the Telegraph Service should presumably be regarded as a business organism.

The question thus arises as to the directions in which special efforts might be made. Three main lines of effort suggest themselves : (1) Publicity—advertising if you prefer that word ; (2) Improvement of service ; (3) Reduction of tariff.

I take the case of publicity first because advertisement is the most common method of increasing business and the one to which one's thoughts naturally turn in the first instance. Advertisement has great merits, and there is certainly plenty of advertising material in the Telegraph Service. In the United States of America the telegraph companies advertise largely, and the result is that the growth of their traffic during recent years bears favourable comparison even with the growth of the Telephone Service in the United States, phenomenal as that growth has been.

In this country gas and electric light undertakings have, within recent years, developed an extensive advertising campaign, the railway companies are advertising largely, and one hears of proposals for advertising churches, and even for such a business as the sale of milk.

It seems to me that the Post Office, in comparison with outside business organisations, hardly fulfils its responsibilities in regard to publicity. The Post Office Guide is an indifferent medium and there are many services of which the general public knows little or nothing. Newspapers are the best means of educating the public, and I am convinced that it will be necessary sooner or later, if the Telegraph Service is to be properly developed, for paid advertisements to be inserted in the Press.

Then again, if the walls of the Post Offices are to be used for advertisements, why not spare a little space for our own wares ? The Telegraph Service has taken advantage of the accounts distributing machinery of the Telephone Service to call attention to the telegraphic facilities which are available in conjunction with the Telephone Service. This in particular applies to the Phonogram Service, and I think that, if the Telegraph Service is to grow, the growth will largely come in the form of phonograms. The Telephone Service has an immense advantage over the Telegraph Service in the fact that the sender of the communication can have the service which he requires without leaving his desk. If we can bring subscribers to regard the Telegraph Service as readily available as the trunk service through the medium of the telephones on their desks, that step will bring ample reward in the form of increased telegraph traffic.

The Telephone Directory might be employed to advertise the Phonogram Service to a greater extent than is the case at present. There are other methods of advertisement but it is hardly necessary to say more on this head.

The second line of effort to increase traffic, that of improving the quality of the service, is less spectacular than advertising, but nevertheless would be a sure, even if a slow, method of developing the service. In suggesting this I am far from wishing to imply that the speed with which telegrams are transmitted is not what it should be. One hears from time to time assertions that the service has depreciated in efficiency as compared with the good old times, but these assertions are in direct conflict with the statistical evidence compiled over a long period of years. These statistics show conclusively that on the whole the speed of the service has never been better than it is at the present time.

My point, however, is that we should not rest content with the quality of the present service. Few things are not capable of some improvement, and the worst thing that could happen to the Telegraph Service is that it should get into a mood of self-complacency and be satisfied to let things go on as they are, without endeavouring to discover and apply better methods in every branch of its activities.

The gas industry is much older than the telegraph industry, and like the telegraph industry, but for a much longer period, it went on in its old ways. If electric lighting had not arrived it would probably have been going on in the same old ways yet. The new competitor, however, was so formidable that the gas industry was forced to revolutionise its methods, and the result is that at the present time it is working more successfully than it did in the days when it had no competition.

Several ways suggest themselves as affording possibilities of improving the service and thus of attracting traffic. Let us take the counter service first. We certainly need some better system of payment than by means of stamps. Stamp-licking is very crude, and it must be highly objectionable to many people. The whole process, moreover, has not the expedition which the public are entitled to expect. A better system, possibly the Cash Register, is urgently called for.

Then again we can hardly be proud of the form in which telegrams are delivered. The paper may be of better quality than its appearance indicates, but it is flimsy and gives one the impression that cheapness has been the first consideration in its selection.

Again, I think we ought to keep in view the desirability of delivering all telegrams in type. The legibility of the handwriting in the Telegraph Service is nothing less than wonderful, but at the same time, hand-written communications are nowadays seldom met with in business outside the Telegraph Service, and the hand-written telegram, I really believe, does convey to the recipient a suggestion that, somehow or other, the Telegraph Service is "behind the times," and one is chary about patronising an undertaking which is "behind the times." We are, of course, making progress in providing the public with telegrams which are type-written or, to be more accurate, machine typed, but even more rapid progress is called for.

I give these suggestions merely in explanation of my general argument, not by any means as an exhaustive or even as a definite list. My argument is that if we wish to attract traffic, we must do all we can to impress on the public through the quality of service which we provide that the Telegraph Service is an efficient organisation, anxious to meet their requirements.

I will now pass on to the question of reducing the tariff. Some persons seem to think that the panacea for the present depressed state of traffic is to be found in reducing the minimum charge for a 12-word telegram to 9*d*., or even to the old rate of 6*d*. Apart from any other result, such as the financial result, I do not think that a reduction in the tariff would bring with it an appreciable increase in traffic. In framing an estimate as to what the effect would be, we have little experience to go upon. The increase of traffic which resulted from the reduction in the minimum charge to 6*d*. in Oct. 1885, is no guide, because at that time the Telephone Service was in its very infancy and the whole field of inter-communication was open to the accelerated service provided by the telegram. The minimum charge was increased to 9*d*. on Nov. 1, 1915, but the war was then on us in all its seriousness, traffic was already on the down-grade and it is impossible to disentangle the result of the increase in charge from the effect of the other contributing factors. The high traffic of 1919/20 suggests, however, that the 9*d*. telegram was not a serious check.

Then came the increase in the minimum charge to 1*s*. on Sept. 1, 1920. It was estimated by the Accountant-General that the increase might result in a depreciation in traffic to the extent of 5 per cent., but unfortunately the trade boom was exhausting itself and the depression which followed and which has continued ever since made verification of the estimate impossible.

I doubt whether a reduction in the minimum charge to 9*d*, would bring in more than 5 per cent. extra traffic or whether a reduction to 6*d*. would result in more than 10 per cent. increase.

Reductions in tariff must, however, be considered from the point of view of telegraph finances, and the state of these finances is such as, to my mind, to make a reduction in tariff unthinkable. Those of us who are directly concerned with the Telegraph Service can hardly regard with anything but distaste the fact that the business by which we earn our livelihood not only does not pay its way but shows a very heavy annual loss. Before the War the annual deficit was usually about a million pounds sterling. Since the War it has been much greater. For the year ending March, 1921, the loss was no less than 3½ million; and, although the loss at the present time is not so heavy, it is very serious.

These figures are justification against any proposal to lower the tariff. A reduction in the minimum charge to 9*d*. with a 5 per cent. increase in traffic will involve an additional loss of at least 1¼ millions. A reduction of 6*d*. with a 10 per cent. increase in traffic would involve a loss of 2½ millions over and above the present deficit.

You are probably aware that the 6*d*. rate which prevailed from 1885 to 1915 was not proposed by the Post Office. The 6*d*. rate was authorised by the House of Commons against the advice of the Chancellor of the Exchequer after a short debate, and what the House of Commons did in 1885 it may of course do again, but the country is comparatively in a very much less favourable financial position now than it was in 1885 and any such action seems unlikely.

The heavy loss on the Telegraph Service is to be deplored. It lowers the prestige of the service and in many ways has had a serious hampering effect on its development.

I will not go so far as to say that the Telegraph Service ought to hand over a balance to the Treasury each year in the same way as the Postal Service does. It performs certain important national functions which, although involving considerable expense, bring in little revenue. The coast-communication system is an essential national safeguard. Its value to the nation was realised during the War, but it earns no financial dividend. The telegraph has been carried to almost every village in the country, as a matter of national policy, and there are many hundreds, probably thousands, of such offices which are a charge on, and not a help to, telegraph finances. The Press traffic is carried at a loss, but the tariff for such telegrams was made purposely low by Parliament in order that news might be widespread for the benefit of the people. But, making due allowance for these factors, I think that every effort should be made to place the service on a self-supporting basis.

To sum up briefly the views which I have placed before you to-night, I think that telegraph traffic will increase with the revival of trade but, if it is to be developed to the extent to which it is capable, it is necessary that the Post Office should adopt the methods of all progressive business undertakings, that is to say, it must advertise the service, must unceasingly try to improve it and must endeavour by deeds to convince the public that it is doing its utmost to meet their requirements.

REVIEWS.

"*Alternating Currents.*" *By Albert E. Clayton, D.Sc., A.K.C., A.M.I.E.E. Longmans.* 10*s*. 6*d*. 1923.

There have been many books published on this subject but it is one which, perhaps, needs as many different manners of presentment as any other.

The author has aimed at presenting the essential and fundamental matters of his subject in his own manner, which is certainly most lucid, simple mathematics only being used, and each new fact being approached by small and carefully described steps. It is not always thus with text books, the authors of which frequently appear to have forgotten the difficulties which present themselves to the average student, but in this case the chapters almost give one the impression of having received the instruction by the very best means—the lecture; a feeling which is enhanced by the fact that all, except two, of the illustrations were prepared specially for this work.

In presenting the subject analogies are not employed and, although these are frequently helpful, clear statement has, after all, the advantage of avoiding an6 such confusion as is likely to arise on pressing an analogy too far.

The book contains a chapter on the "Symbolic Methods of Calculating Problems" and also a set of many useful examples to be worked out by the student, the latter being a useful adjunct inasmuch as it leads the mind through paths the existence of which is not always likely to be inferred by the learner.

"*The Inspection and Testing of Materials, Apparatus and Lines.*" *By F. L. Henley, M.I.E.E., Staff Engineer in the Engineering Department of the British Post Office. Published by Longmans, Green & Co.* 21*s*.

This is the third book of a series of Manuals on Telegraph and Telephone Engineering, edited by Sir William Slingo, late Engineer-in-Chief, G.P.O., London. It describes in some detail the methods employed in the British Post Office for the inspection and testing of supplies of the various materials used in Line-construction, Cables and Telephone and Telegraph apparatus. The object is to furnish the inspector with a basis of sound information upon which to form a judgment in those cases where electrical, mechanical or chemical tests are either not available or are not conclusive.

The work consists of 355 pages with 151 diagrams and illustrations, divided into 18 chapters dealing with a considerable variety of subjects, including methods of Purchasing, Contracts, Stress, Strain, Iron, Steel, Wood, Copper, Rubber, Gutta-Percha, Balata, Cement, Clay, Paint, Batteries, Electrical Apparatus, Thermionic Valves, Telephone and Telegraph Apparatus, and a final chapter on Maintenance Testing of Lines.

With such a variety of subjects it is obvious that very much matter had had to be omitted in order to keep the work within due bounds. While some of the information can be found in Mathematical, Mechanical and Electrical treatises, there is also a considerable amount that is special and probably quite new to many possible readers, who will welcome such information and the concise manner in which it has been given.

The book should be invaluable to those who have to carry out the work of examining material for the Telegraph and Telephone Services; but it should also prove an attraction to those who, apart from conducting the work of examination, are in any way connected with the use of such material, either from the manufacturers' or users' point of view; giving as it does a very good insight into the care that is taken to ensure that everything, from the smallest item to the most elaborate Telephone switchboard or complex Telegraph apparatus, is of the most suitable and accurate

manufacture, and functions satisfactorily in all the varied operations that one and all are required to perform reliably for long periods, when once they have been brought into service.

"The Elements of Automatic Telephony." By Arthur Crotch, M.Inst., P.O. Electrical Engineers. E. F. & N. Spon, Ltd. 80 pp. 42 illustrations. Price 3s. 6d. net.

Mr. Crotch's clear and succinct method of describing the processes of automatic working is already well known to our readers. The present work is largely based on the articles by him which appeared in our columns and are now offered to the public in a neat, convenient and inexpensive form. The systems of the Automatic Telephone Company, the Siemens and the Relay Automatic Company are fully described and illustrated by numerous and clear diagrams. The automatic question is at the present moment well in the forefront of telephonic problems, and this handy description of the main principles of automatic working should find a ready sale. There is a useful index.

"Kalender für den deutschen Funkverkehr, 1924. (*Wiedmannsche Buchhandlung, Berlin, SW68.*)

This is a very attractively got up work in pocket-book form. It contains a diary, a general description of the organisation of the German radio graphic system, extracts from the regulations of the various international wireless conferences, maps, lists of German wireless stations with their wave-lengths and calling codes and much similar information. There are also useful and fairly comprehensive hints for wireless subscribers, schedules of tariffs, and lists of firms engaged in wireless construction. Graphs showing the development of wireless traffic since 1918 conclude a very informative book.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SERVICE.

TELEPHONES.

ALLOWING for the interruption caused by the Christmas holidays the new business in December last was well up to the average, the net increase in stations for the month being 8,947. This addition makes the net growth in the December quarter 28,699, a total which exceeds by 3,000 the increase in the June 1923 quarter, hitherto the best on record. The increased rate of development in 1923 may be seen from the following table which shows the net growth in each quarter of 1922 and 1923 :—

Quarter.	1922. Net Increase in Stations. No.	1922. Net Increase in Stations. %	1923. Net Increase in Stations. No.	1923. Net Increase in Stations. %
March	15,041	1.53	22,414	2.18
June	14,425	1.48	25,756	2.46
September ...	15,032	1.52	24,824	2.31
December ...	22,485	2.24	28,699	2.61
Total for year ...	66,983	6.97	101,693	9.91

The number of stations working at Dec. 31 last was 1,128,312, the Provincial total being 727,247 and the London total 401,065, the latter total passing the 400,000 mark during the month.

The number of Residence Rate circuits increased during December by 2,807, making the total at the end of the month 177,626. The net growth in the December quarter (9,094 or 5.4 per cent.) is the highest so far recorded, and compares with 7,403 in the September quarter, and 6,501 in the June quarter. Since the introduction of the Residence Rate tariff on July 1, 1922, the number of private house subscribers has grown from 138,453 to 177,626, an increase of 39,173 or 28 per cent. In the same period the number of Business rate subscribers increased by 52,465 or 12.7 per cent.

The number of public call offices in use at the end of 1923 was 17,404, of which 5,339 serve rural districts. The corresponding totals a year ago were 16,196 and 4,682 respectively. 568 of the call offices are installed in kiosks in public thoroughfares, the growth in this type of call office in 1923 being 212 or 60 per cent.

At the end of December 515 exchanges had been authorised under the rural exchange development scheme announced in May 1922, and of these 366 were working whilst a further 147 exchanges were in course of construction. Altogether 343 of these exchanges were opened for service in 1923, 94 in the December quarter.

As regards the general development in rural areas it will be seen from the following tables that the percentage growth in stations and exchange lines connected with rural exchanges continues to be substantially higher than in the case of stations and exchange lines connected with urban exchanges.

STATIONS.

1923.	Urban Exchanges. Total.	Urban Exchanges. % Increase in quarter.	Rural Exchanges. Total	Rural Exchanges. % Increase in quarter.
March 31 ...	1,000,842	2.0	49,830	5.2
June 30 ...	1,022,593	2.3	52,196	6.2
September 30 ...	1,043,218	2.0	56,395	7.7
December 31 ...	1,068,102	2.4	60,210	6.8

EXCHANGE LINES.

1923.	Urban Exchanges. Total.	Urban Exchanges. % Increase in quarter.	Rural Exchanges. Total.	Rural Exchanges. % Increase in quarter.
March 31 ...	605,884	2.3	39,190	4.8
June 30 ...	619,903	2.5	40,988	6.4
September 30 ...	635,837	2.6	44,688	8.7
December 31 ...	653,535	2.8	47,890	7.2

The latest traffic returns indicate a substantial increase in the number of originated calls, and during the December quarter the average calling rate per line at the larger exchanges reached the highest level attained since the new tariff was introduced in April, 1921. So far as London is concerned a larger number of calls is now being handled than at any time in the history of the service. In the Provinces, however, the traffic is still considerably below the pre-revision level.

The trunk traffic continues to grow and in October last the number of calls for the first time in any month exceeded 6 millions, the actual total being 6,039,592, or 106,000 more than in July, 1923, when the previous highest total was recorded.

Further progress was made during the month of January with the development of the local exchange system.

Among the more important exchanges extended were :—

London—Hendon.
Kensington.

Provinces—Macclesfield.
Sale (M.R.).

During the month the following additions to the main underground system were completed and brought into use :—

Birmingham—Kidderminster,
Chatham—Maidstone,

while 77 new overhead trunk circuits were completed, and 92 additional circuits were provided by means of spare wires in underground cables.

LONDON ENGINEERING DISTRICT NOTES.

Coin Collecting Boxes. Prepayment Type.

As a number of statements have appeared in the Press about a coin collecting box which is under trial by the Post Office, it is thought a brief description of its operation may be of interest.

The main features are :—

1. Two pennies must be placed in a slot marked "Penny" before the attention of the exchange can be obtained. These pennies are held temporarily in a form of balance.
2. The telephonist enquires what number is required.
3. The number is given and, assuming that no additional fee is required the telephonist calls the wanted subscriber. In doing so, she reverses the current on the calling line and operates a polarised relay which short circuits the caller's transmitter.
4. The called subscriber replies. The caller hears the reply but cannot speak to the caller until the short circuit is removed from his transmitter.
5. The caller presses a button marked "A." This allows the two pennies to drop into the cash box and removes the short circuit from the transmitter. Conversation can now take place.
6. If the wanted subscriber is engaged or for some other reason the call does not mature, the caller presses a button marked B and the coins are returned to him.
7. The box is adapted to receive coins for additional fees and means are provided to enable the telephonist to check the amount deposited. Separate slots are provided marked "Penny," "Sixpence" and "Shilling" respectively. Any combination of these may be effected. A penny is made to run down a chute and strike a coiled wire gong once, a sixpence strikes a bell gong once and by an ingenious mechanical contrivance a shilling is made to strike the bell gong twice.
8. A small transmitter fixed inside the coin collecting box ix brought into circuit as each coin strikes a gong and the telephonist checks by the sound the value of the coins inserted.
9. *If a caller inserts a coin in the wrong slot it is returned to him via* a small trough in front of the box.

C. B. Clay Football Challenge Cup.

The competition is being resuscitated to promote sport and good fellowship among the staff of the Post Office employed in the telephone industry in the London Telephone Service.

The competition for the season ending April 30, 1924, is being governed by a Committee of Trustees, consisting of Messrs. A. F. Paddon (City External), Chairman ; A. E. Wild (L.T.S.) ; F. D. Hibberd (L.E.D.) ; F. Woollard (Centre Internal) ; F. G. Brown (East External) ; F. Ellis (S.E. External) ; and C. J. Head (South Internal), Hon. Secretary.

The response to the circular sent out was very good and 14 teams are now competing for the trophy and the medals which will accompany it.

The draw for the 1st round resulted as follows :—

West External	*v.*	W. Internal.
City Internal Fitting	*v.*	City External.
C.T.O.	*v.*	S.W. External.
E. External	*v.*	N. External.
Centre Internal	*v.*	S.E. External.
L.T.S. Accts. Branch	*v.*	City Internal (Central).

Headquarters, L.E.D. and South Internal drew byes.

The 1st Round matches are to be completed by March 1, the first-named club having choice of ground.

Enthusiasm is already running high and there is every prospect of the competition being a great success.

Society P.O. Engineering Inspectors (London Branch).

The fourth annual dinner of the above branch of the Society Post Office Engineering Inspectors was held at the Connaught Rooms on Monday, Feb. 4, when upwards of one hundred and fifty ladies and gentlemen—including the Superintending Engineer and Mrs. McIlroy—were present. Mr. Bagley—General Secretary of the S.P.O.E.I.—proposing toast of the "London Branch," paid a tribute to the organisation of the largest branch of the Society which accounted in measure for absence of the amount of trouble which might be expected from so large a branch.

Mr. Butler, Branch Secretary, replying to the toast, paid ungrudging tribute to the work and "one-ness" of the branch committee. He stated that the Society was founded in 1910 with sixty members, whereas now it contained some nine hundred and fifty members of which the London membership alone numbered approximately two hundred and fifty.

The Chairman, Mr. Boulton, proposed "The P.O. Engineering Dept." in a masterly speech which was loudly applauded. Mentioning statistics to prove progress made in the Telephone Service he claimed a more generous recognition for the many sided and valuable work of the engineering inspectors, an example of whose versatility he proved by a days' work in his official life.

Mr. McIlroy, Superintending Engineer, whose name was coupled with this toast, responded appreciatively to the chairman's words, and was enthusiastically received. Giving interesting examples of the difficult tasks of an administrator in the Engineering Department he entered a plea for protective action by local authorities to safeguard public telephone cabinets.

Speaking of his efforts to find "fit men" for advancement to the higher posts, he stated his opinion that within the Department were to be found all the requisite brains and ability to fill these posts in the future and recommended his hearers to see that the brains and ability were suitably trained and directed. "The Ladies" toast, proposed in a witty speech by Mr. Sullivan, recognised the assistance, perhaps indirect, given to the Society by the "Inspectoresses," *i.e.*, wives of inspectors.

In reply, Mrs. Taylor roused the ladies to an enthusiasm which will, we hope, be maintained for the joint good in the coming years.

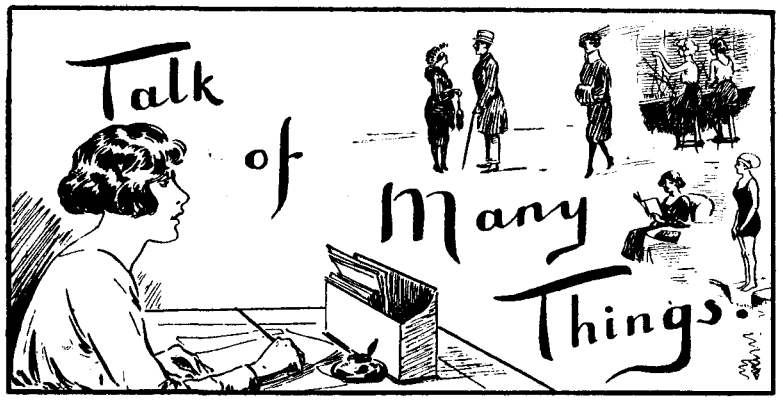
The toast of the "Visitors," proposed by Mr. A. Miller, was responded to by Mr. A. C. Greening, who spoke highly of the good achieved by such social gatherings.

A hearty vote of thanks was rendered to Mr. E. W. B. Howe and all those who assisted him towards making the function such a successful one.

The lighter side was well catered for by an orchestra of ladies and gentlemen under the direction of Mr. R. Beddoes and, subsequent to the dinner, by a party of delightfully accomplished ladies and gentlemen whose contributions to the evening's entertainment were very highly appreciated by all who were present.

"Auld Lang Syne" and the National Anthem brought to a close the fourth and, it is generally conceded, the best of these annual re-unions.

WE TELEPHONISTS



THE following, a graceful tribute to the "voice with a smile" girls, appeared in the Press recently. The author of it has forwarded it to the Department, expressing gratitude for the "pleasant replies so cheering to us old jaded business men" :—

"The unseen telephonist who occasionally answers my impatient calls has the quality of sunshine in her voice. When she says "Number, please ?" she makes a surly reply impossible. And when, as sometimes happens, she gives me the wrong number, she apologises so charmingly that it is I who regret the trouble I cause her.

"I shall never see her, but I like to imagine that her hair is as golden as her voice, and that she really is as happy as she sounds.

"These jolly, cheerful, imperturbable girls are a tremendous asset at all times, but their radiant influence is never more welcome than at this period of the year, when winter's dreariness and discomfort are apt to make churls of the best of us.

"Their happy influence comes, I think, from deep within them. It has nothing to do with the beauty that is but skin-deep. Its secret is an unquenchable optimism that springs from a generous soul in a healthy, well-poised body."

"A GRATEFUL MAN."

The Langham Choral-Orchestral Society gave a concert at the Queen's Hall on Feb. 11, which was remarkable in the choice of choral works selected by the conductor—Mr. Hugh Marleyn.

The first part of the programme was devoted to a rendering of Holst's "The Cloud Messenger"—an idealistic work in the composer's most flowing

style, impossible to render successfully without the utmost confidence of all who take part in the performance.

The lack of this most necessary confidence was apparent in the conductor and was, naturally enough, transmitted to the choir. In fairness, it must be stated, however, that some of the very fine choral passages in this work were rendered with great beauty: but there were times when one felt that there has been insufficient rehearsal and that the choir was handicapped by weakness of control.

The first performance in public of Wachtmeister's "Hymn to the Moon" showed the choir to great advantage, but the work itself is not of great merit.

Unquestionably there is much latent talent in the Society—there has been ample evidence of that in previous concerts—but on this occasion one was left with the feeling that the conductor had chosen works which he did not understand. That the choice was not popular was evidenced by the comparatively small attendance.

"TEMPO."

The Telephone Staff Hospital Collections.

(Associated with the Hospital Saturday Fund.)

The Annual General Meeting in connexion with the Telephone Staff Hospital Collections took place in the Telephonists' Rest Room at G.P.O. South on Monday, Feb. 4.

Mr. Valentine, the Chairman, presided. The report for the year 1923 showed that the collections amounted to £2,109 11*s.* 1*d.*—a record collection—and £18 increase on the previous year.

The Chairman, in proposing the adoption of the report, referred to the good work done by the collectors, and thanked them for their successful efforts on behalf of the hospitals.

Mr. Stirling, in seconding the adoption of the report, complimented the Secretaries on the year's work.

Mr. Reed, the Secretary of the Hospital Saturday Fund, spoke of the work of the Fund, and told the meeting some interesting facts regarding the distribution of the collections to the various Hospitals and standing committees dealing with Dental and Surgical work.

Everyone was pleased to see Miss Heap at the Meeting looking, as the Chairman said, younger than ever.

Miss Heap spoke of the Hospitals for Women, and made a special appeal on behalf of the South London Hospital for Women, of which she is a governor.

Miss Cox referred to the benefits issued to the staff, and said how helpful the Fund had been in assisting necessitous cases. She stated that an appeal was never made in vain, and applications were always dealt with expeditiously.

On the motion of Miss Cox, seconded by Miss Butcher, Mr. Valentine was unanimously re-elected Chairman for the ensuing year.

Mr. J. F. Page was unanimously re-elected Hon. Treasurer, and the Misses A. E. Reekie and H. Wormald Hon. Secretaries.

A vote of thanks was passed by the meeting to the collectors for the work they had done on behalf of the collections.

The Chairman was also thanked for his kindly help and sympathy in connexion with the staff collections—it was stated that this had gone a long way towards making the year a record one.

A. E. R.

Telephone School, Clerkenwell.

The teaching staff at the Telephone School held their first "At Home" on the evening of Jan. 29.

A very enjoyable evening was spent by all those who were fortunate enough to be present.

The teachers made it an opportunity to show their visitors over the School; and provided an excellent musical programme.

The catering arrangements, which were under the direction of Miss Priggen, were carried out on a lavish scale and did great credit to the catering committee who had made and provided the good things.

Owing to the lack of accommodation the teachers were unable to invite all they would have liked to, but the guests numbered about 100, and included the Female Superintendent and all the Chief Supervisors.

During the evening Miss A. Webb, who had recently left the School for promotion at Royal, was presented with opera glasses and a jewel case, with good wishes from the staff, and Miss Reekie was presented with a bouquet of pink carnations from the teachers.

The visitors thanked the teachers for the excellent arrangements made for showing them over the school. A number of them took the position of learners in order that they might fully appreciate the teachers' demonstration.

Both Miss Reekie and Miss Widdinson did their best to give the visitors a good time, and everyone present said it was one of the most enjoyable evenings they had spent.

ANNIE O'NEAME.

A PARADE OF DOLLS, PROVIDED AND DRESSED BY THE CENTRAL EXCHANGE STAFF FOR INMATES OF THE CHILDREN'S HOSPITAL, SHADWELL.

We reproduce, with admiration, the following from the *Daily Chronicle*:—

A Good Name and Great Riches.

Villagers of Bettwsgwerfilgoch are agitating for a public telephone.

Desiring a lodge in the mountains of Cymry,
I thought of the parson, inquiring of him re
The chances of getting, from one of his floch,
A bed in the place—Bettwsgwerfilgoch.

I rang the exchange, and was put through to Corwen,
From one of those three-minute 'phones with a door, when,
Before I could say—Bettwsgwerfilgoch,
"Time's up," said exchange, "twopence more, by the cloch."

A. W.

A Melancholic Frolic.

The following paragraph appeared in a leader in the *Daily News*: "The writer is entitled to assume imagination in his reader, and it is to this quality that he most delights to address himself. When he finds that he has been misunderstood, he is a saddened man."

I quote this because I also am a saddened man. I will explain. Last month I was persuaded into print and later I was summoned into the editressial lair. It is usual to say "editorial sanctum," but the events of that day convince me that it would more properly be called a lair. On entry I was greeted with a few moments of impressive professional silence broken only at intervals with the venomous hiss of a blue pencil. Then "She Who Must Be Obeyed" spoke and said, "Percy Flage?"—with a rising inflection. "At your service, Madam," I replied, with genuflexion. "Your article," she continued, and then I lost most of what followed in the dazzling vision of a fat cheque. But alas, I heard her concluding sentence, a grim and inexorable command, "go and write some more funny articles and keep on till I say stop."

I slunk out alternating between rage and despair. I would have gnashed my teeth but I did not want to risk spoiling a new set. "Funny article."—Ye gods! My philosophic dissertation on crowns, funny! True, there was a touch of nonsense here and there, in clerical fashion, to keep my congregation from snoring. But funny! No! It is easier to imagine Dean Inge writing for *Punch* with illustrations from Bateman. My only consolation is that the readers of this JOURNAL probably saw the article in its true perspective. Indeed, a frank colleague told me that I should feel flattered at the description and that it was fortunate that I had been misunderstood. He said he had read the article and that——Yes, yes, I think I see what he meant, but then he is a low fellow without true literary appreciation.

My rage, however, is giving place to a bitter despair, and horror is beginning to look out from these eyes of mine. What if I am so unfortunate as to become regarded as a humourist? The awful thought crushes my spirit; I am beginning to suffer from insomnia during office hours. Of all the blights that can afflict a human being the acquisition of a reputation for funniness is the most to be feared. *Vide* Mark Twain. I knew such a one: the poor fellow became as dotty as a set of dominoes. He began innocently enough with small jokes in a monthly magazine, but the fateful lure of print tempted him. Against his better judgment and the advice of his friends he wrote on and on. His end was sad. He attempted to crack a joke with an enormous thirsty navvy after having stolen his beer. He was tactless, though, for it was a hoary joke.

From my youth up I have been told that "Fools rush in where angels fear to tread." My best friends have never, even in their most critical analyses of my disposition, called me angelic, and when further I reflect that I have rushed into print I am forced to the one and only obvious conclusion. So you see why I am sad. Possibly a correspondence course in Traffic Instructions would cure me—I must try.

PERCY FLAGE.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.

LONDON TELEPHONE SERVICE NOTES.

London Telephonists' Society.

THE first of the successful competition papers was read on Friday, Feb. 1, by Miss A. G. Turner, of the Trunk Exchange, who had chosen the subject of "Authorised Expressions." It was evident that Miss Turner had devoted much time and thought to the preparation of her paper and she contrived to include a number of controversial points which produced a good discussion. Miss Turner's main point was that greater freedom in the matter of operating expressions would be beneficial from many points of view, and that difficulties which sometimes arise between callers and the operating staff would consequently be removed.

The weightiest point against Miss Turner's contention was advanced by Miss Cox, who presided. It was that that fixed expressions are absolutely necessary to the new entrant and that it would be exceedingly difficult, if not impossible, to give them adequate training without their aid. An amusing example was given of an improvised expression on the part of a learner at the operating school. The stage was on the side of the authorised expression.

Miss Turner is to be congratulated on producing a very interesting paper.

The next meeting of the Society will be held on March 14 when further competition papers will be read by the Misses D. L. Bott, W. M. Etheredge, and J. M. McMillan.

Choral Society.

The first big concert of the season took place at Queen's Hall on Friday, Feb. 11, in the presence of H.R.H. Princess Arthur of Connaught. The Langham has attracted larger audiences and it would be interesting to know why there was a small attendance on this occasion. It could not be because the Society's patrons did not care for the fare provided because one of the works was performed for the first time and another had not been heard in London for about 12 years. It may be that the works performed by the Society do not appeal to the popular taste, and it is rumoured that the Committee contemplate rehearsing Edward German's tuneful work "Merrie England." It is hoped by appealing to popular taste to revive interest in the Society. It has been clearly demonstrated in the past that the success of the Choral Society depends entirely on the support it gets from within the Service, and its first aim should be to study and cater for the tastes of the large telephone staff. It is felt by some that more enthusiastic support would be forthcoming if some of the popular vocalists within the service were associated with the performances and something may be done in this direction.

It would be a pity if the Society had to close down for lack of support, as it gives so much genuine pleasure to a large body of music lovers, but there is a danger that this may happen if strong efforts are not made by the Society and those who wish it well. So all you who are interested look out for the announcement of the next concert and make a point of going to it.

Lotos Swimming Club.

The office club for men has appointed its officers for the coming season. They are Mr. Frier of the Accounts Branch, captain, and Mr. Oliver of the Traffic Branch, secretary. It is hoped to secure the services of a famous ex-champion as coach. Already there are several useful swimmers in the club and it is hoped that with proper advice a few speed merchants will be produced. The Secretary will be pleased to furnish particulars of the club to anyone who is interested.

Presentation to Mr. A. J. Sims.

To mark the occasion of his retirement, Mr. Sims' colleagues and numerous friends presented him with a watch, suitably inscribed, and a wallet of treasury notes. The presentation was made by Mr. H. G. Corner. Mr. Sims is a young man of 62 and completed 31 years' comtinued service, first with the N.T. Co., and then with the Post Office. In his capacity of Chief Call Office Attendant in the L.T.S., he was a well-known figure particularly in the Houses of Parliament. May his future be as happy and comfortable as his service in the past has been loyal and devoted.

Culled from the Exchanges.

Central.

There is a proverb that "coming events cast their shadows before them," but in the matter of automatic equipment for the London Area we have passed that stage and there are on trial some specimen keyboards of different design. They look delightfully simple and we understand that there is to be a tandem junction switching centre and that the type of keyboard which proves most suitable will be installed there.

East.

For several weeks immediately preceeding Jan. 19 members of the East Exchange staff were occupying their spare time making arrangements for the entertainment of 100 poor children of the East End of London. When the day arrived the tea and entertainment was a huge success. In addition to the tea, games were played and there was a band performance by members of the exchange staff, leading up to the crowning event of the evening, the arrival of Father Christmas to distribute toys and dressed dolls from the heavily laden tree. Then there was a real live fairy in her sledge with its load of toys. The happy kiddies, after cheering themselves hoarse, were sent home with pockets bulging with sweets, nuts and cakes. The Rev. G. A. Dempster, of the British and Foreign Sailors' Society, presided, and our grateful thanks are due to him for so kindly performing this office. Our sincerest thanks are also tendered to members of the Engineering Department who co-operated so enthusiastically with the Traffic staff in making the venture such a success.

Holborn.

The annual tea was given for the fourth successive year to the children of the King's Cross Wesleyan Church, on Saturday, Feb. 2. Three hundred excited guests came scrambling in at 4 o'clock, and made short work of the good things provided for them. Members of the staff waited at the tables, and some of our engineer friends were kept busy at the urns. A general feeling of fun and good-will prevailed. It was very embarrassing, to say the least of it; for some of waitresses to be hailed as "Madam," while their companions had to answer to "Missus!" The appetites of the small guests showed no signs of flagging until the last plateful of shortbread and jam-tarts had disappeared. Then grace was sung, and the children dispersed for a few minutes while the tables were cleared. When they returned, some of the gentlemen present started some popular choruses, and for a few minutes anyone with a tendency to headache was to be pitied!

Then—"Cinderella" appeared! and by and by the Ugly Sisters, the Baron and Baroness, the Fairy Godmother and the Fairies, and the Prince! A mere spectator of that well-known play would never have realised the many difficulties which had been overcome by the performers with regard to practices, &c., or the number of hours spent by members of the Engineering staff in painting and arranging the scenery. At any rate, it is unnecessary to thank them here—they had their reward that evening in the expressions of wonder and delight from the excited audience. In fact, one small grubby gentleman found it impossible to restrain his admiration, and offered to marry the lonely "Ugly Sister" on the spot—much to her amusement.

The usual distribution of oranges, sweets, and presents followed, and everyone went home with happy memories of Cinderella mingled with "Yes, we have no bananas," and "I ain't Nobody's Darling" to carry them through another year.

Park.

On Saturday, Feb. 9, the staff of the Park Exchange held their annual children's tea, at St. Peter's School, Portobello Road.

The little guests were invited from the neighbouring schools, and long before 4.30 p.m., a number had already gathered at the gate. After a sumptuous tea, which evidently exceeded all expectation, the children were marshalled into the concert hall to witness a performance of "Cinderella." As the curtain rose before the eyes of the expectant audience there was breathless silence, and as the fairy scene appeared before them a great shout of joy arose from the happy youngsters. At the close of the performance a mysterious array of parcels and balloons appeared on the stage which were soon clasped tightly in the hands of the merry children. The afternoon had indeed proved a joyous one, which no doubt will leave many happy reminiscences in the minds of the little folk, and I may add the big folk as well.

Paddington.

On Saturday afternoon, Jan. 19, the Paddington Exchange staff, following the precedent of former years, again acted as host to a large number of girls and boys at one of the L.C.C. Schools in the Paddington district. This year the scene was laid at the very fine school building in Senior Street, Paddington, the 300 girls and boys entertained being truly representative of the life of the Paddington district.

It was pleasant to note the zest and verve with which the youngsters entered into the festive programme, which, indeed, came as a pleasant anti-climax to the Christmas season.

Under the surveillance of Mr. Driver, the indefatigable headmaster, and Miss Jones, the school mistress, the children were assembled for a four o'clock Tea, which some thought even outshone previous efforts by the variety and daintiness of the table decorations and the sumptuousness and liberality of the fare provided. Then, with scarce a pause, came music and songs led by Miss Robertson at the piano, whose efforts in this direction received a hearty and boisterous backing from 300 lusty throats. Then followed one hour's unqualified enjoyment of Mr. Beaumont's mysteries of wizardry and ventriloquism, adults and children alike being mystified and charmed in all they saw and heard.

The proceedings terminated with a neat and appreciative speech by Mr. Driver, the Headmaster, and a chorus of approval by the children, each of whom took away with him or her a parcel of bonbons, &c., as a memento of a happy and memorable afternoon.

The Committee desire to thank all those ladies and gentlemen who so generously contributed towards the success of the tea and entertainment, and in this connexion owes a deep debt of gratitude to a large number of friends and supporters outside the telephone service.

London Trunk Exchange.

Friday, Feb. 8, brought with it the retirement of Miss E. Pratt, Assistant Supervisor, Class I, in the London Trunk Exchange.

Miss Pratt, who was one of the pioneers of the London Trunk Service, was transferred from the Manchester Trunk Exchange to the London Trunk Exchange, which was then situated in the Central Telegraph Office, in 1902.

She took part in the transfer of the exchange to its present home in G.P.O. (South) and has seen the phenomenal growth of the service during the past 22 years.

Early in the evening a presentation of a solid silver set of dressing table requisites and a cheque, accompanied by a magnificent bouquet of pink carnations and blue iris, the gift of her numerous colleagues past and present, including officers of the Engineering Department and of the night staff, was made to Miss Pratt by Miss Nurse, the Supervisor in charge of the London Trunk Exchange.

Miss Pratt was also the recipient of several other gifts, including one from Miss Sharphouse, the Supervisor in charge of the Manchester Trunk Exchange with whom Miss Pratt worked in the early days of her service.

A reception, held by Miss Pratt at the G.P.O. (South) Refreshment Club at 6 p.m., was attended by a large gathering of her colleagues, past and present, including a number of married ladies, some of whom travelled considerable distances in order to be present.

During a part of the evening, the Controller (Mr. W. A. Valentine), the Assistant Controller (Mr. M. C. Pink), Mr. H. G. Trayfoot of the Secretary's Office, and the Superintendent in charge of the Female Staff (Miss Cox) were able to be present.

The reception was followed by a concert, arranged by Miss Rowland, and a dance which was conducted very successfully by Mr. Dobson, the Superintendent in charge of the Trunk District. The concert included songs by Misses E. Barker, Longman, Walder and Foot, and by Messrs. Jacob, Cracknell and Hemsley, and Russian and Spanish Dances by Misses G. Marfleet and R. Quixley, all of which were much enjoyed by the company present.

THE

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CONTENTS.

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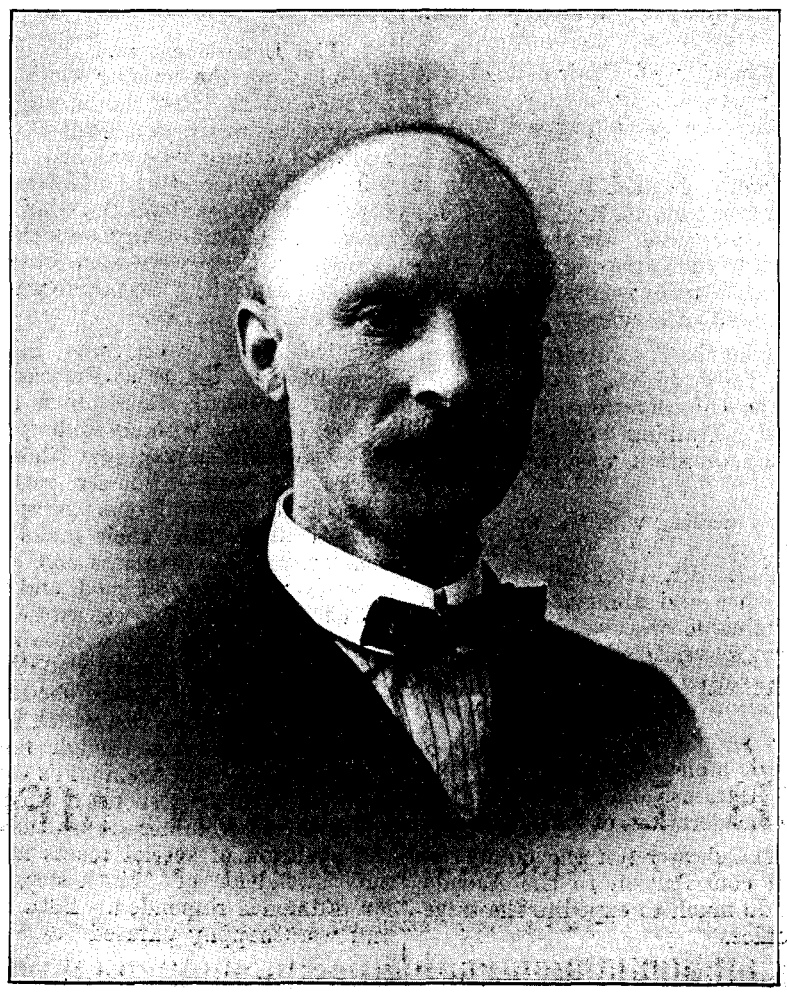
TELEGRAPH AND TELEPHONE MEN.

III.—MR. ELLIS JOHN HIDDEN.



THE subject of our sketch was born in London, and educated at Purley, subsequently obtaining electrical training at the Finsbury Technical School. He joined the electrical staff of the United Telephone Company in 1886. These were the days of Bell "slipper" switchboards, Edison "peg" boards, flat-boards on the multiple system and branching-jack multiple boards, and the maintenance staff were much dependent on their own resources in clearing faults. After the amalgamation of the United with the National Telephone Company, Mr. Hidden was, in 1894, appointed Assistant Engineer for London with headquarters at Heddon Street, and in 1896 became Electrician for the City District. In 1900 he was promoted to be District Manager for Liverpool, a post which he has now held for nearly 24 years. Needless to say, Mr. Hidden has seen the development of telephony throughout practically all its stages, and the system of which he is now in control is a very different one from that which he managed in 1900—not only in kind, but in extent. In fact, it has increased its number of telephones more than fourfold. In 1900 there were 12,000 stations in the Liverpool district to which the Birkenhead district was added in 1909 bringing the number of telephone stations up to 27,500. The district was further increased after the transfer of the National Co.'s system to the State by the inclusion of Warrington, St. Helens, Widnes and Runcorn, and now contains 51,044 telephones—being exceeded in numbers only by London and Manchester.

Mr. Hidden occupies the position of senior district manager in the service, and in view of the long period during which he has guided, so to speak, the telephonic destinies of Liverpool, no one has a stronger claim to appear in a representative list of telephone men. It goes without saying that he is a well-known and popular figure on both sides of the Mersey.

CONFERENCE OF TELEGRAPH SUPERVISING OFFICERS.

SOME IMPRESSIONS.

BY A PROVINCIAL REPRESENTATIVE.

THE Conference of Telegraph Supervising Officers, which was held in London from Feb. 19 to 22, was most helpful and inspiring to all who took part in the proceedings. I question whether a gathering more unique in its composition, or wider in its scope of representation has ever assembled at headquarters. From North, South, East and West, came the delegates. Edinburgh nodded to Plymouth, Aberdeen smiled to Swansea, and the solitary representative from the unruly Isle saluted all and sundry. Men from the busy, industrial, centres shook hands with brother officers from the sunny districts and for one fleeting moment they looked beyond the Conference room and visualised delightful woodlands, crystal streams, and hedge-rows ablaze with glorious blossom—sweet memories of some byegone summer holiday.

Sir Evelyn Murray's address was a fitting prelude to the business of the conference. His remarks were listened to with marked attention and respect. A glance around the tables gave one the impression that all present were met in unity of purpose—London in personal touch with the Provinces, Provincial men standing at the very centre of the telegraph organisation.

It was good to see Mr. Dalzell again and to hear what he had to say to us.

Mr. John Lee, too, impressed us all and by his eloquence and his very humanity he raised the tone of the conference to a high level indeed.

It was pleasant also to see our old friends Mr. Stuart Jones and Mr. Mackenzie, and to feel that the sympathy and help of their counsel were ours to command.

Mr. J. F. Edmonds, in his capacity of Chairman of the Conference, won golden opinions for his courtesy, ability, and the genuine kindliness of his disposition. We are all agreed that it would be good to meet him again.

The Conference arrangements were planned in an excellent manner, and we owe a deep debt of gratitude to Mr. Thomson for the thoroughness of his work in this connexion. By their presence alone the ladies lent a finishing touch to the gathering, but, further to this, they demonstrated also that true womanliness spells efficiency in any, and every, department of service.

Mr. Thomson's paper "A Scheme for the Training in Telegraphy of Probationary Sorting Clerks and Telegraphists," gave rise to a most profitable discussion as did the consideration of a kindred subject, "The Recruitment and Training of Temporary Telegraphists." The debate on each question was carried to a successful issue.

It was anticipated that the paper dealing with the application of the Staffing Standards would prove to be of intense interest, nor was this expectation unfulfilled. Mr. Archibald prepared the way for discussion with confidence and ability, and we are indebted to Mr. John Lee for his valuable observations in regard to the setting up of the Standards. The notification that certain concessions of staff are to be made, caused much satisfaction and removed any fears that the application of the Standards would imperil the efficiency of the service.

Mr. J. Stuart Jones, M.B.E.,made a clear case for the setting up of a standard transit time for telegrams, and it seems certain that good results will follow the consideration of this question.

The paper by Mr. Jewell, of Manchester, on the circulation of Press telegrams was a practical contribution to the Agenda, and the decisions arrived at should do much to expedite the treatment of Press work at Provincial offices.

Mr. Ogilvie touched upon very vital matters in his presentation of the case for the extension of machine telegraphs. His statements were convincing, and revealed the fact that the programme outlined with respect to the development of machine telegraphy is both scientific and progressive. The subject was discussed very closely and the conclusions agreed upon should tend to ensure greater stability in working arrangements generally.

The very able and useful paper on "Phonogram Staff and Service," written by Mr. T. B. Barrett, of Nottingham. was well received and recommendations were made by the Conference which should assist the development and efficient working of the Phonogram service.

I have touched all too briefly upon many important discussions. What impressed one most was the atmosphere of goodwill which prevailed throughout the Conference. The survey of the matters introduced for consideration was critical and very pertinent, but the fraternal spirit was so strong in its expression that all constraint and timidity vanished under its spell.

The gathering together of the scattered units has bound, more firmly than ever, the whole body corporate of the telegraph system into one great, living, organisation. I cannot omit some reference to our friends of the Central Telegraph Office. Always courteous and helpful to Provincial men, they excelled themselves when met in their own domain. From the Controller downwards, we owe them grateful thanks for the manner of their welcome to us all.

Long will the Telegraph Conference of 1924 be remembered. Its influence cannot be measured by any known standard, the vital forces it brought into being will live on. The stream of life has carried us back to our respective stations, each to his, or her, appointed task, but we are the better for having met together and we feel that though the pathway upward be steep, yet is there light upon the horizon.

THE IMPRESSIONS OF A LONDON MAN.

The Department and the delegates to the fo rth Conference of Telegraph Supervising Officers held at the Secretary's Office on Feb. 19-22, 1924, should be proud of the gathering which was if anything, more successful than its precursors. New delegates might of course be pardoned for believing in their ascendancy, but as the older attendants seemed to be of the same opinion as regards success perhaps the comparison with the earlier Conferences may be forgiven. Anyhow, the meeting was representative in *personnel*; there were some interesting, practical and well-written papers to consider; and there was a very live feeling of the essential amity of the Service.

The week's work was inaugurated on Monday evening, Feb. 18, by a dinner at Frascati over which Mr. J. F. Edmonds, M.B.E., presided. Englishmen (not to say Scots and Irishmen) seldom do meet without finding time for a dinner; and there are really positive advantages about the arrangement—despite the cynics. It was a homely gathering on this occasion and an exceedingly cheerful one. Most of the delegates had arrived in time to attend and their ranks were reinforced by friends from Headquarter Departments and even from provincial offices. The speeches were few and good, and the principal toast of the evening (which might have been sardonically described as "Our Noble Selves") was received with abundant enthusiasm. Sir Charles Sanderson and Mr. Dalzell who dealt with the "Telegraph Service" faithfully, no doubt—were cheerfully reminiscent and wonderfully optimistic. To a service which has had its bad days of late these talks were reviving—though telegraph men are not given to despondency. Mr. Archibald's capably proposed "The Ladies" drew an eloquent response from Miss Clarke of Liverpool, though one gathered from her speech that the ladies will ere long demand the abolition of special toasts in their honour. Mr. Jewell, Chief Superintendent of Manchester, gave "The Chairman" and Mr. Edmonds responded. Both these speeches fitted the occasion and were happily phrased.

EXTRACT
from
THE EVENING TELEGRAPH,
DUNDEE,
MONDAY, MARCH 17, 1924.

BIG 'PHONE RUSH AT DUNDEE.

Offices Test the New System.

Installation Surpasses All Expectations.

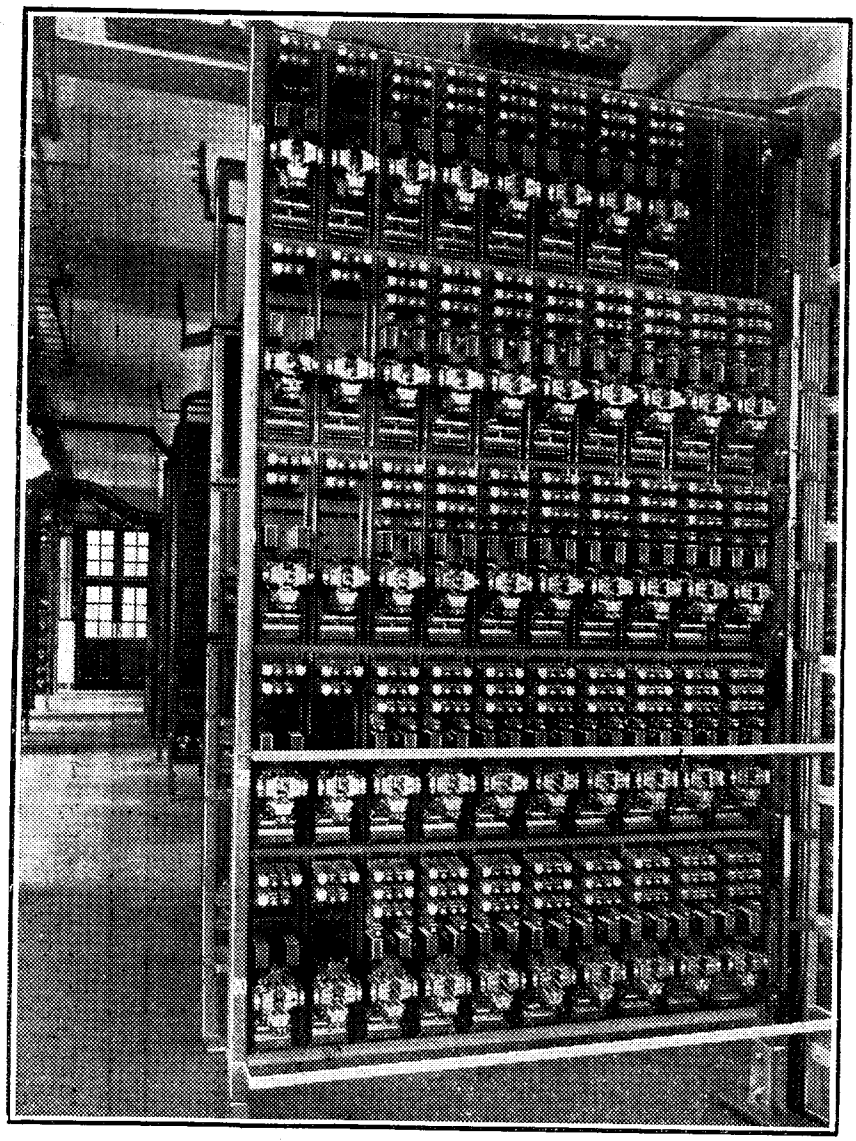
Dundee automatic telephone system had a thorough try-out this forenoon.

Private subscribers had had their innings during the week-end, as an observation shows that practically every householder possessing a telephone had "rung up" or been "rung up" by friends.

When offices opened this morning the new system was immediately put to a thorough test. Business friends were "dialled" in succession, and the traffic in the early part of the day was exceedingly heavy.

The official view is that the system had come through to-day's tests in a highly satisfactory manner, and had indeed exceeded in this respect the highest expectations.

It was to be expected that such



G.P.O. AUTOMATIC TELEPHONE EXCHANGE, DUNDEE.

A View looking down the Main Aisle.

The programme of entertainment—as distinct from entertaining eloquence—was given by service people and was not without its topical references. Mr. S. W. Burton had plenty of work at the piano and all the songs were good. Mr. J. F. Darby gave us sleight-of-hand exhibitions with cards—perhaps only modesty prevented him describing this item as "Tricks of the Traffic Section!"

The business part of the gathering occupied four days, the first step taken being to assemble in Mr. John Lee's room at the Central Telegraph Office whence the delegates were escorted by very competent and enthusiastic guides through the galleries. It is true that all of us had seen telegraph offices before, but there is always something interesting in T.S., and the guides made the tour a very pleasant one. The Foreign Gallery and the Delivery Room (where the stencil system of addressing is now in vogue) were the outstanding points of interest.

Sir Evelyn Murray's welcome to the delegates was a cordial one; and Mr. J. F. Edmonds was an admirable and charming Chairman. It could not be said that Mr. Edmonds ruled with the rod of iron that some chairmen consider indispensable, but his method was eminently successful for he kept the work going, guided the delegates to conclusions, and finished the Conference to time. That he "guided the delegates to conclusions" would be open in some cases to misinterpretation, but the members of the Conference will appreciate the point. This gathering did not start with definite resolutions on the agenda, but had to consider papers which had been circulated and this procedure led, naturally enough, to a condition in which from a large volume of speech-making certain general deductions had to be drawn for record. The Chairman was very acute in his selection of salient points and he placed the delegates under a deep sense of gratitude.

It struck the writer of these notes that there was perhaps a rather too considerable dependence upon the written word. The course of debate is not a thing that is measurable at a long distance from the day and the occasion, and it is sometimes a real handicap to be burdened with notes that have been prepared too carefully in the remoteness of our offices. The Conference was not of course a fitting one for debating points, except rarely, but, not the less, discussion is of greater benefit on the whole when it is not too hampered by preconceived views.

There is naturally the point that the official view of higher authorities in our offices has to be taken into account but this need not, and indeed should not, prevent personal views being put forward also. Having said so much I ought to add that there were not wanting cases in which delegates followed the action of the successful parson by discarding their notes.

THE TELEPHONE DEVELOPMENT OF THE WORLD AT THE END OF 1922.

By W. H. GUNSTON.

(*Continued from page* 91.)

CITIES WITH OVER 80,000 TELEPHONES.

New York	1,072,632	*Hamburg*	113,482
Chicago	638,650	Toronto	112,211
London (401,065 at end of 1923)	369,038	*Copenhagen*	111,580
Berlin	355,691	Cincinnati	109,206
Boston	340,352	*Stockholm*	103,760
Philadelphia	284,000	Washington	103,085
Los Angeles	189,458	Kansas City	102,398
Paris	185,312	Minneapolis	101,529
San Francisco	172,742	Baltimore	98,071
Detroit	168,950	Milwaukee	94,034
Cleveland	158,306	Montreal	92,376
St. Louis	157,400	*Vienna*	84,338
Pittsburgh	141,208	Seattle	80,911

The proportion of inhabitants to telephones is not given because it is difficult to ascertain the population of the area served by the European urban systems. To take the bare population of the city itself would give misleading results.

It may, however, be said that there were, in 1922, 1 telephone to every 4.5 inhabitants in Chicago, 1 to every 5.5 in New York, 1 to every 12 in Berlin, and 1 to every 17 in Paris.

There is at present 1 telephone to every 18 inhabitants in the London telephone area, or 1 to 14 within the administrative boundary of London.

CITIES WITH 10,000 TELEPHONES.

At the end of 1922 there were as far as can be ascertained 232 cities with upwards of 10,000 telephones. They were distributed as follows. (The numbers in brackets represent the number of telephones in thousands):—

United States of America.—(The principal towns are shown in the foregoing list)	132
Germany.—Greater Berlin (355), Hamburg (113), Munich (49), Leipzig (46), Cöln (41), Frankfurt (Main) (40), Dresden (38), Breslau (31), Düsseldorf (29), Stuttgart (27), Nuremberg (25), Hanover (25), Bremen (22), Chemnitz (21), Stettin (19), Essen and Mannheim (17), Magdeburg (16), Duisburg and Dortmund (15), Königsberg (14), Elberfeld (11), Barmen (11), and Halle (10)	24
Great Britain.—London (369), Manchester (50), Glasgow (43), Liverpool (40), Birmingham (28), Edinburgh (17), Newcastle (14), Leeds (14), Bradford (12), Sheffield (12), Cardiff (10), Bristol (10), Nottingham (10), Hull (13)	14
Canada.—Montreal (92), Toronto (112), Vancouver, Ottawa, Hamilton, Quebec, London, Edmonton, Halifax N.S. (11), Victoria	11
Japan.—Tokyo, Osaka, Kyoto, Nagoya, Kobe	5
Australia.—Sydney (66), Melbourne (54), Adelaide (18), Brisbane (14)	4
Switzerland.—Zurich (21), Geneva (14), Basle (12), Berne (10)	4
France.—Paris (185), Marseille (13), Lyon (12)	3
Holland.—Amsterdam (33), The Hague (25), Rotterdam (26)	3
Sweden.—Stockholm (103), Gothenburg (25), Malmö (13)	3
Belgium.—Brussels (23), Antwerp (11)	2
Italy—Rome, Milan	2
Russia.—Moscow, Petrograd	2
Spain.—Barcelona, Madrid	2
New Zealand.—Wellington (12), Auckland (11)	2
South Africa.—Johannesburg (15), Cape Town (10)	2
Austria.—Vienna (84)	1
Czecho-Slovakia.—Prague (22)	1
Danzig.—Danzig (11)	1
Denmark.—Copenhagen (89)	1
Hungary.—Budapest (44)	1
Ireland.—Dublin (12)	1
Norway.—Christiania (32)	1
Poland.—Warsaw	1
Portugal.—Lisbon (11)	1
India.—Calcutta (10)	1
China.—Pekin (12)	1
Egypt.—Cairo (11)	1
Argentine.—Buenos Ayres (73)	1
Brazil.—Rio de Janeiro (29)	1
Cuba.—Habana (27)	1
Mexico.—Mexico (23)	1
Uruguay.—Monte Video (14)	1

Of these 232 towns, 145 are in North America, 68 in Europe, 7 in Asia, 6 in Australasia, 3 in South America, and 3 in Africa.

The number of telephones in the British Empire at the end of 1922 was 2,510,000, made up as follows:—

	Thousands.
Great Britain	1,046
Ireland	20
India	40
Ceylon, Straits Settlements, &c.	13
South Africa	55
Kenya, Rhodesia, &c.	2.5
Canada	944
Australia	270
New Zealand	102
Hong Kong	7.5
Other places (West Indies, Mauritius, Fiji, British Guiana, &c.)	10
	2,510

It may be assumed that this total has now reached about 2,700,000.

TELEGRAPHIC MEMORABILIA.

THE South Wales Electrical Power Distribution Coy. has recently experienced considerable trouble owing to the aerials of amateurs falling on to its overhead heavy power lines. A warning was broadcasted from the Cardiff station of the B.B.C. on the subject, but the former company took further, not to say *higher*, measures for they have attached notices to all their *overhead* line poles pointing out the danger,—to those gifted with the necessary long vision.

The White Star *Olympic* made a successful high-speed wireless trial from ship to shore *via* Devizes to the C.T.O., London, towards the end of February, when about 700 miles out from Southampton. The signals received were beautifully clear-cut at about 70 words per minute, and were thus easily printed by means of Creed apparatus.

With the advent of wireless concerts on board of express trains, to which has recently been added the exhibition of kinema pictures, it is supposed that the tedium of long railway journeys will have been removed. Enthusiastic as one may be concerning the wonders of latter-day scientific development of one's vocation, it is a question whether the travelling telegraphist or telephonist would be any more pleased at the prospect of listening in all the way from London to Penzance any more than would the kinema actress were she compelled to watch, say, the Daughter of Death in six reels when rushing through Glorious Devonshire at sixty miles per hour. Yet one has heard of telegraph engineers who calculated the travelling rate of an express train by the number of telegraph poles passed in a given minute !

The following electrical system for controlling speech-makers as published by *Electrical Merchandise*, an American periodical, is submitted with due deference to the many telegraph and telephone societies of our Administration for due consideration and possible action !

" A traffic signal tower was used recently in New York City during a dinner given by friends of William Chilvers, in celebration of his election to the Municipal Court bench, to notify the speakers, of whom there were fifteen, when to go ahead and when to stop. The toastmaster explained that each speaker would have seven minutes from the time the amber light was shown. When he had spoken five minutes, continued the toastmaster, the red light would be flashed on as a warning, and after two minutes more the green would be shown to indicate it was the toastmaster's turn again, to announce the next speaker."

The London *Daily News* states that Professor Vigard, working at Christiania University, has made an important discovery regarding the meteorological phenomena popularly known as the Northern Lights, which has led the Professor to confirm his theory that the earth's atmosphere outside the air strata surrounding it is closed up as if by a balloon skin consisting of solid crystalline nitrogen. He maintains that the temperature of the high air strata is so low that nitrogen vapour becomes solidified in crystal form. These nitrogen crystals account for the hitherto inexplicable green line in the spectrum of the Northern Lights. It is also held that the stratum gives the sky its blue colour and makes radio telegraphy possible, as without this wall electric waves would lose themselves in the ether instead of travelling round the earth.

According to the *Board of Trade Journal* the use of the metric system was made compulsory by the Soviet Government in a number of trades including those connected with electro-technical on and from Jan. 1 of the present year. From certain " standardised " (?) parts one has seen from time to time it would appear that some such step in this country—given due notice—would be likely to prove a boon and a blessing.

The first German wireless exhibition will be held in Hamburg from May 29 to June 2, and is organised by the Hamburg Radio Club. An area of 2,000 metres is to be placed at the disposal of German and Austrian exhibitors.

It is noted that that excellent and compact invention, the Teletype, has recently been installed by the Great Western Railway Company on their London—Birmingham circuits in place of the old sounder.

The Postmaster-General recently stated that up to Jan. 31, 686,000 wireless receiving licences were in force. The total amount which the Company would be entitled to receive in respect of the fees on this number would be something in the region of £350,000.

The following is a much abridged report of the Pacific Cable Board for the financial year ended March, 1923. It outlines the year's working and shows that the receipts, £529,228, exceeded the ordinary expenses by £256,299. In view of the duplication of the northern cables, the Board is of the opinion that the whole of the surplus receipts, viz., £169,603, should be employed to strengthen the reserve and renewal fund, which is not yet adequate for the purpose. The traffic receipts (£509,299), fell short by £12,343 of those of the previous year.

There was a substantial increase both in the volume and value of the international traffic. Most of the increase in volume was in the week-end telegrams, the number of words of this traffic being 50 per cent. greater than in the previous year. There was also a gratifying increase in ordinary and deferred ordinary traffic. The anomalous position of the traffic receipts showing a decrease, while the traffic value was greater, arises out of the circumstances in which money is transferred to the Board's account by connecting administrations after the end of the period during which it is earned. The traffic receipts are also affected by the variation in the rate of exchange between the United Kingdom and Canada. The gross revenue includes £16,189 net earned by the cable ship *Iris* for services to other administrations.

The revenue for the six months ended Sept. 30 of the current year was substantially in advance of the estimate.

Throughout the year the cables have worked without interruption, and no repairs have been called for. The Board inserted a new shore end at Bamfield in the Bamfield-Fanning Island cable, which has been down for 21 years, enabling superior results to be obtained by multiple cored cable. It was manufactured by Messrs. Siemens Brothers & Co., of Woolwich. Contracts were placed on Feb. 9, 1923, for the manufacture and laying of a direct cable between Auckland, New Zealand, and Suva, Fiji, and between Sydney, N.S.W., and Southport, Queensland, with the Telegraph Construction and Maintenance Co., of Greenwich. The manufacture of the trench and conduit cables for the connexions between the landing places of the respective cables and the Board's offices was entrusted to Messrs. Siemens Brothers & Co., of Woolwich. The laying of the Sydney-Southport cable was completed on July 11, 1923, and the Auckland-Suva cable on Aug. 12, 1923, both within the contract time. The total cost of the new cables, including buildings, apparatus and engineer's fees, will not exceed £360,000, considerably less than the forecast.

During the year under review a small expedition was despatched to Vancouver Island and to Fiji to investigate the possibilities in those localities for radio stations in case it might be found expedient in the future to instal them.

The Board's cable maintenance vessel *Iris* was employed from January to April, 1923, on survey work on the routes of the projected cables between Sydney and Southport, and between Auckland and Suva. In addition she carried out the following repairs :—New Zealand Post and Telegraph Department's Cook Straits cables—July, 1922 ; Eastern Extension Co.'s Sydney—Wellington No. 1 cable—August, 1922 ; P.Q. Cable Co.'s section between New Caledonia and Queensland—August, 1922. New Zealand Post and Telegraph Department's Cook Straits cables—September-October, 1922.

A new grade entitled " Principal Electricians " for technical officers of outstanding merit was instituted during the year. The number of officers concerned is at present limited to two, and the emoluments of the posts approximate to those of the superintendent's grade. The officers first appointed to the new grade were Mr. G. B. Winkfield and Mr. K. C. Cox. The former is the assistant to the chief electrician, and the second is possessed of much inventive genius.

During the year nearly 10,000,000 paying words of international traffic (*i.e.*, other than local traffic between Australia, New Zealand and the Pacific Islands) were transmitted across the Board's system—approximately 1,300,000 words in excess of the total during the previous year, and was the largest volume of traffic handled in one year by the Board. The full rate international traffic showed an increase of approximately 100,000 words, the deferred ordinary approximately 275,000 words, and week-end telegrams an increase of approximately 1,255,000 words. On the other hand, there was a decrease of approximately 200,000 words of Government traffic, and of approximately 137,000 words of Press traffic. In addition, approximately 2,000,000 paying words were carried between Australia and New Zealand, and between those Dominions and the Pacific Islands—approximately 150,000 words less than during the previous year.

The following are the official figures of revenue and expenditure (including interest, depreciation and all overhead charges) in respect of the Post Office wireless stations for the nine months ended Dec. 31, 1923 :—Cairo : revenue, £6,666 ; expenditure, £33,253. Leafield : revenue, £30,389 ; expenditure, £32,940. Northolt : revenue, £6,557 ; expenditure, £7,427. Stonehaven : revenue, £4,399, expenditure, £11,389.

In this connexion it is useful to quote from the Report of the Imperial Wireless Telegraphy Committee, 1924 (published by H.M. Stationery Office), page 8, para. 35, which reads as follows :—

" We may point out, in comparing the commercial results of a State-owned and a privately-owned enterprise, that the accounts of private wireless companies do not enable us to separate the results of their communication services from their manufacturing and other activities—much less to estimate the results of individual stations."

As I write, before me lies a copy of a financial article from the *Electrical Review* which gives the position of cables and wireless in a nutshell :—

" Amidst the volleys of correspondence that have followed publication of the Imperial Wireless Telegraphy Committee's report, the Stock Exchange view seems to be that the recommendations are likely to be adopted, with slight modifications, and that this will be to the advantage of the Marconi Company, in enabling it to go ahead with its own work, unfettered by complications with the Government. The cable group is firm, with scarcely a movement throughout the catalogue. The Direct Spanish Telegraph Company will pay 10 per cent. free of tax on its ordinary shares."

On Feb. 21 in the little town of Holte, near Copenhagen, says the psychical publication *Light*, there passed away at the age of seventy-four years the famous Danish engineer, scientist, writer and psychist, Mr. Severin Lauritzen. At the age of 23 he invented the now well-known telegraph instrument called the Undulator, and thus began a revolution in long-distance telegraphy. In 1880 he established a central telephone exchange in Copenhagen, the first in Europe, it is believed, and was thus one of the pioneers of telephone organisation.

The new cable ship *Cyrus Field* was recently launched for the Western Union Telegraph & Cable Co., of New York, at the dockyard of Saint-Nazaire-Penhoet, in the presence of a brilliant throng of guests, amongst whom were Captain J. James, attaché of the American Embassy ; Vice-President

Pendleton, of the American Chamber of Commerce in Paris; Mr. S. Goddard, Vice-President of the Western Union Co., London; and many others. The new vessel is stated to be quite a new departure in cable steamers, and is 64.30 m. long, 10.55 m. wide, and 5.64 m. deep, and has a gross tonnage of two thousand tons.

CANADA.—Thus speaks a report of the Department of Marine on radio broadcasting and colonisation in the Dominion:—"Wireless has robbed prairie farm life of its isolation. 100,000 receiving sets are estimated to be in operation throughout the Dominion, more than 60 per cent. are owned on farms. This is especially true in the prairie provinces of Manitoba, Saskatchewan, and Alberta. In Manitoba the provincial government aids broadcasting through its publicly-owned telephone system. Broadcasting stations in Canada number 38, and are located in the principal cities from coast to coast. Investment in receiving sets amounts to more than 2,000,000 dollars."

CAPE VERDE ISLANDS.—The Lisbon correspondent of the London *Times* states that the Portuguese Government has authorised the erection of a cable station in these islands by an Italian company.

CEYLON.—Feb. 22 marked a point in the scientific history of Ceylon's isle for on that day the first broadcasting took place.

FRANCE.—It is possible that the cable linking France with the West Indies may shortly pass into American hands. The Compagnie Française des Cables Té égraphiques is at present negotiating with an American group for the sale of the cable, but no arrangement has as yet been arrived at. The French company points out that if the cession of the cable does in fact take place, the sum thus realised will be employed solely for the carrying out of improvements and extensions of the rest of its cable system. The Compagnie Française des Cables Té égraphiques is controlled by the State, and is subsidised by the State when its receipts are insufficient, but this has not been the case for some years. The State's consent to the proposed transaction, the company affirms, has been obtained.

Reuter's Paris agency says with regard to the proposed cession of the cable linking New York with the West Indies and with certain towns of Central and South America by the Compagnie Française des Cables Té.égraphiques to the All-America Cables (Inc.), that at an extraordinary meeting of the shareholders of the French company the board of directors showed that various conventions concluded with the Colonies and the countries through which the cable passed, giving the company special privileges and monopolies, would lapse in 1924, 1927, and 1929; thus the choice had to be made whether it would be better to carry on an unequal struggle against American competition or hand the system over to an American company. Negotiations were entered into, and a provisional agreement was arrived at, according to which the West Indies cable will be taken over by the All-America Cables as from Jan. 1, 1924, for a price in dollars varying from 2,235,000 to 2,735,000 dollars, according to the rate of exchange, and the American Company will undertake to hand over to the French Company at New York for transmission by its system all the traffic bearing no indication as to route, from the ceded lines formerly exploited without competition by the French Company. The transfer was agreed to by the shareholders, and it is understood that it has the approval of M. Laffont, Under Secretary of State for Posts and Telegraphs. The latter has also, according to a Paris newspaper, obtained the consent of the Departments interested—Foreign Affairs, Colonies, and Marine. The matter has been submitted to the Superior Council of Posts and Telegraphs, and will eventually be submitted to Parliament. M. Laffont has announced that a radio station will be erected on the Island of Martinique. According to the *Quotidien*, the Superior Council of Posts and Telegraphs is not in favour of the abandonment of the cable system, even if the cable had to be worked at a loss. Nevertheless, if such a course were followed it would but be in accord with the Plan *de ré-organisation des Postes, Télégraphes et Téléphones* set forth in the *brochure* of M. Paul Laffont under the above title in 1922.

ITALY.—According to the report of the Italian Ministry of Posts and Telegraphs, many improvements were accomplished and considerable construction work was done during the year 1922-23. New technical material was introduced in some of the more important offices such as Genoa, Milan, Bologna and Naples, and about 3,720 kilometres of telegraph and telephone wire, including new wire and replaced wire, was laid for internal service, and about 1,600 kilometres for international service. Telegraph connexions were provided between Milan and Palermo by means of the Palermo-Naples submarine cable and the Naples-Milan radio service, and a telephone cable was laid in the traits of Messina to connect Rome with Messina and Palermo. Contracts were also made during the year for the construction of subterranean telephone arteries between Genoa and Milan, Genoa and Turin, and Milan and Turin, as well as for the improvement of several of the larger exchanges. Radio communication increased, and the service was greatly improved during the year.

RHODESIA.—The Postmaster-General outlined important Rhodesian radio developments in the shape of communication between Salisbury and Pretoria. The scheme which is waiting the approval of the Rhodesian Government is estimated to cost between £12,000 and £15,000 and should be working by the end of the present year or soon after.

RUSSIA—No less than 200 radio stations are to be established in Soviet Russia in the near future.

SOUTH AFRICA.—In February the Dominion had its first big radio demonstration, when for a fortnight concerts were transmitted from a station installed at Johannesburg by the Western Electric Co. The equipping of the station and the transmission were supervised on the technical side by Mr. F. H. Amiss, B.Sc., who was engineer-in-charge of the Birmingham station up to the date when it was taken over by the B.B.C. The South African concerts were arranged by the Western Electric Co. with the object of raising funds for the South African section of the British Empire Exhibition, and they met with remarkable success.

WEST INDIES.—Submarine cable and Wireless Developments.—It is gathered from several well-informed sources, the *Morning Post*, the *Financier*, the *Manchester Guardian*, &c., that there are schemes on the eve of execution or upon which operations have already been commenced in connexion with extended telegraph communication in and with the West Indies by means of both radio and submarine cables.

These schemes will provide an all-British route (by way of Canada) between Great Britain and the West Indies, the Imperial Government having decided in favour of such a route. The preliminary steps are now being taken to inaugurate the scheme, and Parliament will be asked in due course for legislative sanction. An outlay of about £335,000 is contemplated in connexion with the project, which falls into two parts. The first provides for the laying of an entirely new submarine cable from Turks Island to Barbados, with spurs to Trinidad and British Guiana. At Turks Island the new cable will connect with the Direct West India Cable Co.'s line from Bermuda to Jamaica. The contract for this new cable has been awarded to Messrs. Siemens Brothers & Co. Ltd., whose tender amounted to £242,146.

A memorandum, says a later statement by one of these authorities on a financial resolution, was issued by the British Treasury on March 8. This was proposed in order to enable a Bill to be introduced providing that a sum not exceeding £400,000 may be issued from the Consolidated Fund for the construction of a new submarine cable from Turks Island, where it will join the existing cables of the Direct West India Cable Co. to Barbados, and for the provision of telegraphic communication between Barbados, Trinidad, British Guiana, St. Kitts, Antigua, Dominica, St. Lucia, St. Vincent and Grenada. The amount advanced will be repaid by an annuity for a term not exceeding 30 years. It is anticipated that receipts will normally exceed expenses, other than the annuity, by about £8,000, and the actual charge on the Exchequer is not likely to exceed £5,500 a year. Against this there will be a saving of £8,000 a year, as the subsidy now paid to the West India and Panama Telegraph Co. will cease.

So much for the cable portion of the program! Now, in order to provide for improved communication with and between the Windward and Leeward Islands, seven high-powered radio stations are to be erected respectively at Barbados, St. Kitts, Antigua, Dominica, St. Lucia, St. Vincent, and Grenada. This work will be carried out by the Radio Communication Co., Ltd., whose engineer was due to arrive at Barbados on Feb. 15. The amount of the tender was £62,760. It is being arranged not only that the islands shall be able to communicate with one another, but also with ships. The sites of the stations are to be provided free of cost to the contractors.

Private enterprise is to be confined to the erection, equipment, and initial testing. The stations are to be operated by the Pacific Cable Board and the contract cost is £62,670, which is shared by the Colonies concerned and the Canadian and Imperial Governments. The General Post Office will supervise the execution of both branches of the scheme, and representatives of that Department are proceeding to the West Indies. As regards the erection of the plant, the engineers will be associated with representatives of the Pacific Cable Board. Two Bills have been prepared. One will confer the required power on the Pacific Cable Board, which will operate the scheme when completed. The other Bill will seek Parliamentary authority for the proposed expenditure, which allows £30,000 for contingencies.

I have discussed the difficulties of grouped language, have argued its disadvantages and its possible cause of future financial telegraph losses, but have never been met with the vista of possibilities arising from situations born of Persian psychological views as mentioned in a *Times* article on the history of the Shahs. It was Nasr ed Din who first introduced the telegraph into Persia. "At first this was less useful to commerce than it afterwards became, as tidy Persian clerks thought it necessary to re-arrange the messages which they transmitted, carefully sorting out the consonants and transmitting them all together before following them up with a wealth of vowels."

One of the social, one had almost written "family" events of the C.T.O. last month was the departure from our midst of Mr. Samuel Pearce, Staff Superintendent upon reaching the age limit. Mr. Pearce leaves behind him a trail of good deeds and kindly thoughts, while the benedictions of the sick, the sorrowing, the orphan and the needy, must surely follow him into his retirement.

To Mr. Hiscox sincerest congratulations on his promotion to Superintendent *vice* our old and esteemed friend, "Sammy."

One cannot pass over the retirement of Mr. Boulden also upon reaching the age limit. Though he never reached the higher ranks, the services he rendered to telegraphists in general and to T.S. perhaps in particular, should not pass unacknowledged. To those who *knew* the man in all the fulness of knowing and understanding, Boulden stood for all that was stalwart, and all that comradeship meant in the earlier years of economic struggle.

Nature and Men.—Nature never provides for Man's wants in any direction, bodily, mental, or spiritual, in such a form as that he can simply accept her gifts automatically. She puts all the mechanical powers at his disposal—but he must *make* his lever. She gives him corn, but he must grind it. She elaborates coal, but he must dig for it. Corn is perfect, all the products of Nature are perfect, but he has everything to do to them before he can use them. So with truth; it is perfect, infallible. But he cannot use it as it stands. He must work, think, separate, dissolve, absorb, digest; and most of these he must do for himself and within himself.—"PARASITISM," HENRY DRUMMOND. J. J. T.

IMPERIAL WIRELESS TELEGRAPHY COMMITTEE 1924.

EMPIRE WIRELESS COMMUNICATIONS.

THE importance of rapid and reliable facilities for communication, whether by cable or by wireless, between the Mother Country and the Dominions, Colonies and Protectorates, is obvious, and it is, therefore, perhaps a little incomprehensible to the uninitiated that there are no wireless stations in this country which can communicate direct with Australia, New Zealand, and other distant places. The reason, I think, is that it is only practically within the last year that the science of wireless telegraphy has advanced sufficiently to enable a station to be built which would be likely to give a good commercial service over the distances involved, and that, prior to that, the only means of linking up the Dominions would have been by a chain of stations at shorter intervals. A scheme of this nature was put in hand in 1913, but the advent of War caused the suspense of the project. Two stations, however, were subsequently completed after the war and are now in operation, one in this country at Leafield near Oxford, and the other in Egypt at Abu Zabal near Cairo. The rapid development of the science in recent years, however, enabling much greater distances to be spanned by wireless, resulted in the abandonment of the chain scheme in favour of high power stations which could communicate direct between this country and the Dominions.

Although up to the beginning of 1923 it had been the policy of the Government to undertake the Empire wireless service the Government of that day decided, partly because the Governments of Australia and South Africa had made their own arrangements for the erection of stations in those Dominions capable of communicating direct with this country, to grant licences to private companies for the erection of similar stations in this country, subject "to the conditions necessary to secure British control and suitable arrangements for the working of the traffic." The Marconi Company thereupon applied for a general licence, but the terms proved more difficult of adjustment than had been anticipated, and, after nine months' negotiations, no agreement had been reached. This, in brief, was the position when the Postmaster-General last month appointed the following Committee: Robert Donald, Esq., LL.D. (Chairman); F. J. Brown, Esq., C.B., C.B.E., Assistant Secretary, General Post Office; Prof. W. H. Eccles, D.Sc., F.R.S.; Sir D. Drummond Fraser, K.B.E.; Sir Henry H. Slesser, K.C., H.M. Solicitor-General with W. E. Weston, Esq., as Secretary; "to consider and advise on the policy to be adopted as regards the Imperial Wireless Services so as to protect and facilitate public interests."

Although it was not until 5 p.m. on Thursday, Feb. 7, that the last member of the Committee was appointed at an interview with the Postmaster-General, arrangements were made for the Committee to hold its first meeting on the following afternoon at 3 p.m. On Thursday evening copies of the whole of the correspondence and records of interviews with the Marconi Company, together with an historical summary of the Government's policy as regards Empire wireless communications since 1904, and a number of other documents and records, were circulated to the members of the Committee, in order that they might come to the meeting with a fair knowledge of the situation as it then existed and be prepared to go ahead with the questions referred to them.

It also transpired at the meeting that the Chairman had already mapped out a plan of campaign, under which each member of the Committee was allotted a special task according to his particular qualifications. In this way the various aspects of the question referred to the Committee received simultaneous consideration with a minimum expenditure of time, with the result that the Committee were able to complete their Report within 15 days of their appointment.

The conclusions that the Committee arrived at as a result of their fortnight's unceasing investigations are given below, but before closing mention should be made of the very excellent manner in which the Type Duty of the Secretary's Office responded to the heavy calls made upon them and of the good work of the printers, Messrs. Eyre & Spottiswoode, who never once failed to keep their promise as regards time of delivery of proofs.

Summary of Recommendations.

EMPIRE SERVICES.

(1) That the State through the Post Office should own all wireless stations in Great Britain for communication with the overseas Dominions, Colonies, Protectorates and territories.

(2) That the Post Office should operate directly, under an improved business organisation, all the Empire Stations in Great Britain.

(3) That as an alternative an exception be made to the foregoing recommendations in the case of Canada, for the reasons stated in paragraphs 48 to 51, and that competition between the Post Office and private enterprise in the Anglo-Canadian wireless service, which exists at present, be continued, provided that, in any licence granted for the Anglo-Canadian service, public interests are safeguarded as regards conditions of working and terms of expropriation by the State.

(4) That in any licence granted to a private Company, the State must reserve to itself the right to take possession or exercise control over the working of the licensed stations whenever in the opinion of the Government an emergency requires it.

(5) That the Leafield station should be enlarged as recommended by the Post Office wireless experts and engineers, that the new high-power station, now building at Rugby, should be extended to a 16-mast station, that a second new station of similar capacity be erected, and that these works should be put in hand without delay.

(6) That each of the high-power stations should be of world range and equipped with the latest apparatus, so that the highest degree of efficiency can be attained.

(7) That, if necessity arises, full advantage be taken of the Patents and Designs Act, 1919 (Section 8), under which the Crown can acquire the use of all patented inventions which may be useful for public utility services such as wireless.

(8) That in order that State management and operation of Empire wireless may be carried out in a way to ensure the greatest efficiency, an improved business organisation should be set up by the Post Office, and that the Post Office Advisory Council of business men be consulted on this question.

(9) That the present terminal wireless station near Cairo be removed from the Empire system as soon as the requirements of the Admiralty are met by other stations and the proposed new high-power stations in India, South Africa and Australia are in operation.

(10) That the expert Wireless Telegraphy Commission be requested to report on the extent, and cost, of a wireless system for the Colonies necessary to complete the Empire network of wireless communications.

FOREIGN SERVICES.

(11) That private enterprise be given facilities to develop wireless communication with continental Europe, as with the rest of the world outside the British Empire, subject, in the case of Anglo-Continental services, to suitable terms being arranged for the payment of royalties or otherwise in view of the competition which must exist between wireless and State-owned cables.

(12) That there should be free competition in foreign wireless, subject to the State reserving the right of expropriation and the right to take possession and assume control in case of national emergency.

(13) For the present the existing provisional licences for Continental services should be renewed, and the Post Office should concentrate its Continental traffic as far as possible at Northolt; the station at Stonehaven should be discontinued without avoidable delay; and arrangements should also be made to discontinue the station at Caister as soon as other provision is made for the traffic.

(14) That telegraphic and telephonic broadcasting to the Continent be carried on by the Northolt station.

W. E. W.

AUTOMATIC TELEPHONE DEVELOPMENT IN INDIA.

GREAT improvements have been made in India in telephone communication during the past few years, and the many advantages of the Automatic System have led to its wide adoption by the Government for Public Exchange service and by Administrations for private use.

In the great Indian Empire, more than 150 tongues are spoken, so that the language difficulty is ever present to the native telephonist, but the automatic exchange at once overcomes this not inconsiderable obstacle to efficient manual operating, for it speaks all languages! It would be impossible in India to obtain from a manually operated system such a constantly efficient and quick telephone service as given by the automatic. The fallibility of the human element has been eliminated by substituting for native operators and their errors a scientific and positive automatic electrical operation.

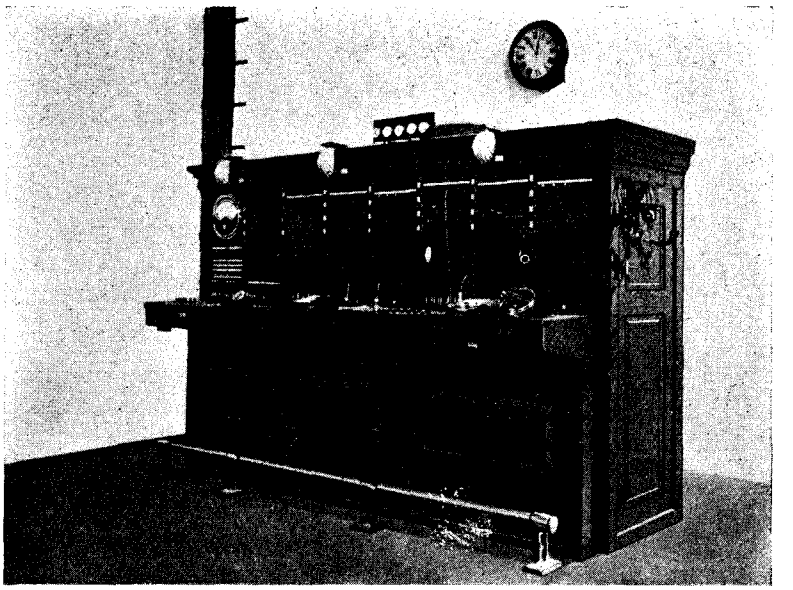
The first Public Automatic Exchange for India was opened in Simla in 1913 and was of the Strowger type. Subsequent to the war, Lahore and Amritsar were equipped with automatic exchanges on the same system.

ALLAHABAD.—THE "RELAY" PUBLIC EXCHANGE IS ACCOMMODATED IN THIS BUNGALOW.

The first "Relay" automatic exchange was erected in India early in 1921 at the Indian Telegraph Department's Telegraph and Telephone Training School at Calcutta; then followed towards the end of the same year the installation of a private automatic branch exchange at the Poona Government House. In July 1922 an exchange was opened at Conoor. On the same day two other "Relay" public exchanges were being cut-over in different parts of the world—one in Fleetwood, England, and the other near Pretoria, South Africa, but the Indian installation gave the first service, as Indian time is five hours ahead of Greenwich.

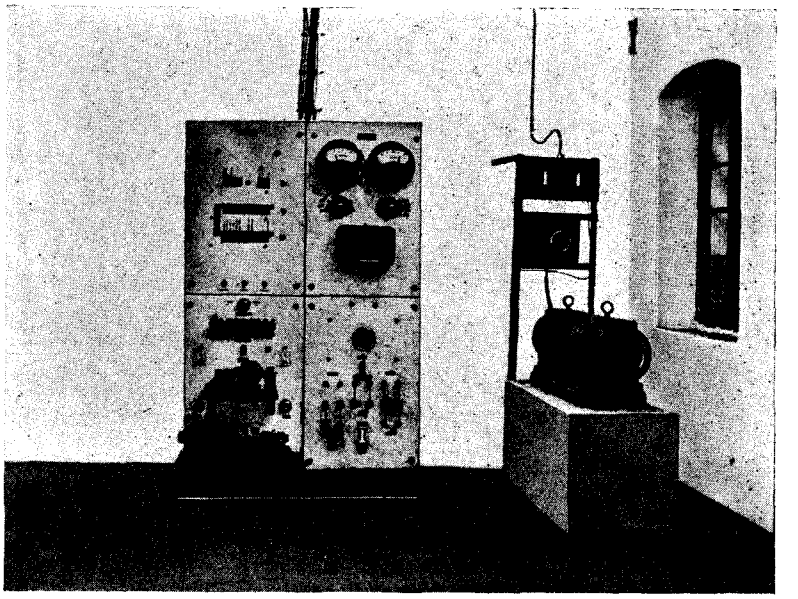
Following Conoor, the 200-line public exchange Board at Ootacamund was opened about the end of October 1922. Ootacamund and Conoor were the first two automatic exchange switchboards in India with automatic junctions working between them. The two boards are about twelve miles apart, and the junctions run across country most of the way.

Ootacamund Exchange, 7,000 feet up on the spur of the Northern slopes of the Nilgiri Hills, is inside the clouds for six months in the year—otherwise it is dry and cool. Conoor is in a warmer climate, about a thousand feet lower down, and on the Southern slopes of the same hills. The apparatus is subjected to the severest test, for the exchange bungalow is built in a ledge cut into the side of the hill with a small irrigation channel on a level with its roof and a few feet from it. This naturally makes the bungalow damp all the year round. These climatic difficulties, however, are met not by providing artificial heating, drying or dust proofing arrangements, but by installing special apparatus which is unaffected by tropical climatic conditions.



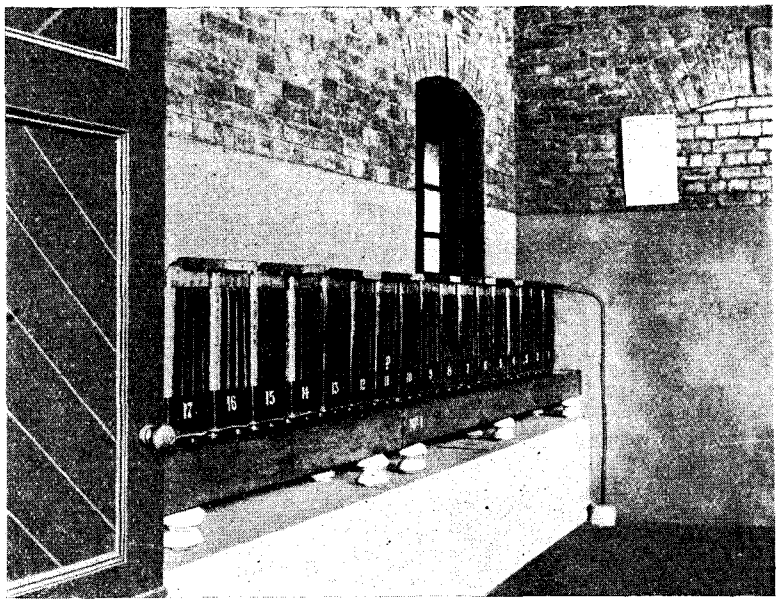
RAWAL PINDI "RELAY" EXCHANGE.—TRUNK AND TEST DESK.

The next public exchange on the Relay system was installed at Allahabad, and was commenced towards the end of 1922. Allahabad was cut-over in the following January, in less than three months from the date installation was commenced. Through dialling is carried on over a bothway trunk junction (of 200-lb. copper wire) between Allahabad and Lucknow, a distance of 129 miles. This was the first trunk so worked in India. During the day switching arrangements are provided to allow the trunk to be worked manually during hours of exceptionally heavy traffic, and during the hours of manual working, a phantom circuit is available for telegraphy.



RAWAL PINDI "RELAY" EXCHANGE.—POWER ROOM.

Rawal Pindi came next, with a 500-line exchange. The experience which the Relay engineers had now gained of Indian conditions greatly influenced the way the work was tackled, and the exchange at Pindi was a tremendous success from the very start. Rawal Pindi, situated on the Grand Trunk Road from Lahore to Peshawur, is one of the largest military centres on the North-West Frontier. It lies on a wide plain, 1,000 feet high, but in spite of its height the heat in summer is exceedingly trying and during the two hottest months of May and June the maximum temperature varies between 112° and 116° in the shade, whilst the minimum even at night never drops below 90°. In winter, however, it swings to the other extreme, and



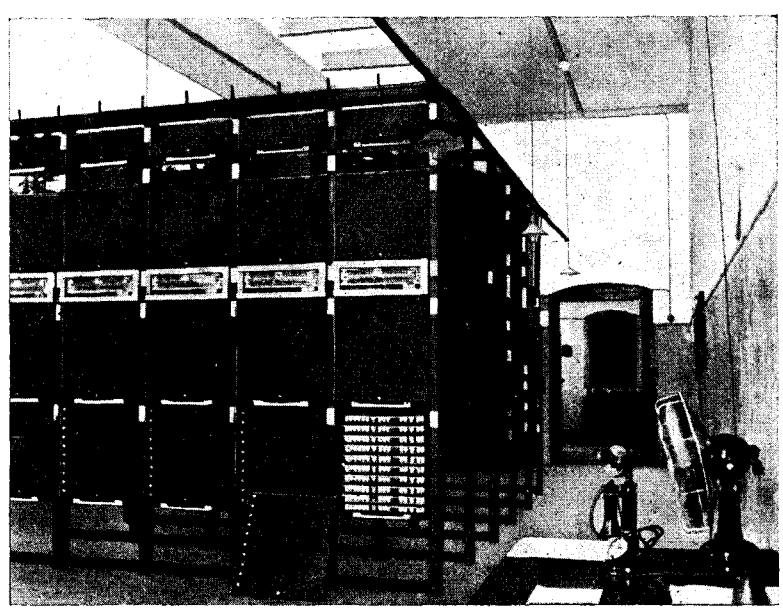
RAWAL PINDI "RELAY" EXCHANGE.—BATTERY ROOM.

though very little snow falls in the town, the surrounding hills experience very heavy falls, and bitterly cold winds blow from their heights and across the Pindi plain. Heavy rains fall in the spring as well as at monsoon time in July.

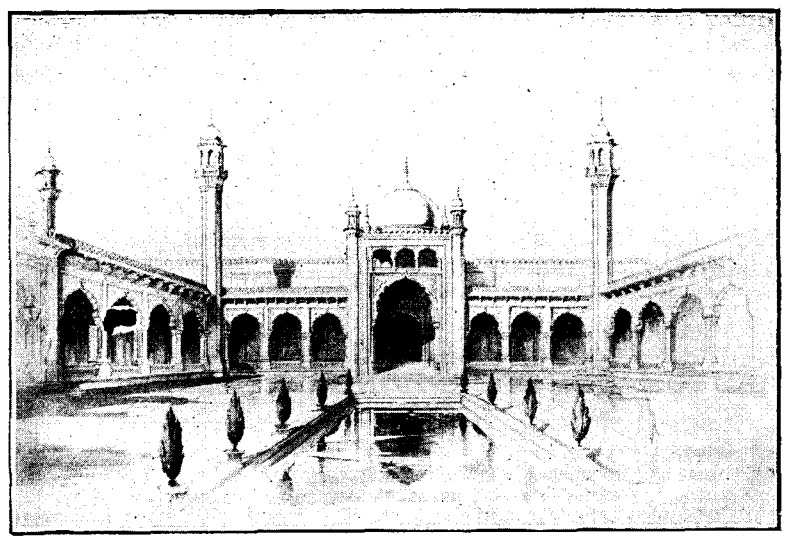
Telephonically, Rawal Pindi is a very important centre, for through here is filtered all traffic to Murree, Peshawur and Kohat, and *via* Lahore to distant towns such as Simla. The original line wire was run overhead, but this has now been completely changed over to the underground system.

Nagpur and Quetta then followed, both with 300 lines, and both were cut over with 210 connexions on Nov. 17 last, work having been started a month later at Quetta than at Nagpur. Both exchanges had the remarkably simple routine test arrangements modelled on those developed at Rawal Pindi put in on site, and both have worked wonderfully well since cutting over.

There are still three more exchanges to be erected in India—a 40-line private automatic branch exchange for the Bombay Government House; a 120-line public exchange for Ajmere; and 1,000-line public exchange for Poona. These are all on the "Relay" System, which will afford the telephone service to the Indian Pavilion at the forthcoming British Empire Exhibition. This Pavilion, which covers three acres of ground, will reproduce the artistic beauties of the famous Taj Mahal at Agra and the Jama Masjid at Delhi. Visitors to the Exhibition will be able to see this system at work in the Engineering Section.



RAWAL PINDI "RELAY" EXCHANGE.—APPARATUS ROOM.



COURTYARD—INDIAN PAVILION, BRITISH EMPIRE EXHIBITION, WEMBLEY.

THE PERSONAL TOUCH.

"I SEND you," writes a correspondent who occupies a particularly responsible position in the Service, "some verses I received from a subscriber, with whom I have been discussing for some time the question of taking an additional exchange line in order to provide properly for his traffic. I found him rather difficult to deal with, and it was necessary to tell him the position plainly. (I need hardly say, of course, that in all such matters I make a point of keeping on good terms with the subscriber.) In the course of our conversation, the subscriber said that I was talking rather unkindly to him, and that he felt that I must think he was a difficult and troublesome man to deal with, but that this was not really so. He said: "Why don't you come down and see me, and shake hands, then I am sure we should each see more of the other's point of view, and no doubt we would come to a happy settlement." He ultimately agreed to a reasonable arrangement, and in writing to confirm it he enclosed the following verses:—

If I knew you and you knew me,
'Tis seldom we would disagree;
But never having yet clasped hands,
Both often fail to understand
That each intends to do what's right,
And trust each other "honour bright."
How little to complain there'd be
If I knew you and you knew me.

With customers ten thousand strong
Occasionally things go wrong—
How quickly these could settled be
If I knew you and you knew me.

Then let no doubting thoughts abide
Of firm good faith on either side;
Confidence to each other give,
Living ourselves, let others live;
But any time you come this way,
That you will call we hope and pray;
Then face to face we each shall see
And I'll know you and you'll know me.*

All those who have to deal with the public know the advantages of personal Meetings, and the above case seems a happy example of the friendly interview prevailing where more formal methods of approach had failed.

* (These verses were published by The Igranic-Electric Co., 174, Queen Victoria Street, London, and are reprinted by their permission.)

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

TELEPHONES.

THE total number of telephone stations working at Jan. 31 last was 1,135,226, a net increase over the December total of 6,914. Compared with recent months the net increase was below the average, but the cessations in January are generally high and the increase of 6,914 stations was 32 per cent. higher than the net growth in January, 1923.

Residence Rate lines increased during the month by 2,345, bringing the total up to 179,971. More than half of the total net increase in Exchange lines in January was in respect of private house circuits.

23 new rural exchanges were opened in January and at the end of the month 389 of the 532 exchanges authorised under the conditions announced in May, 1922, were working.

The total number of public call offices at the end of January was 17,494, the net addition during the month being 90. Call offices installed in kiosks in public thoroughfares numbered 582. The effect of the reduction in July, 1923, of the minimum Call Office fee from 3*d*. to 2*d*. is still more marked in London than in the Provincial Districts, but the fall in revenue is gradually being made good, and a comparison of the receipts for the three months November-January with those for the corresponding period of 1922-23, shows a decline of 15 per cent. in London and 5 per cent. only in the Provinces.

The growth in the volume of telephone traffic noticeable in the later months of 1923 was maintained in January, when the average calling rate per line at the larger exchanges was substantially higher than it was a year ago. The effect of the recent railway strike on telephone traffic may be seen by a comparison of the average calling rate for the first three weeks of January with that for the last week—the strike period—when there was a 7 per cent. increase in London and a 10 per cent. increase in the Provinces.

So far as trunk traffic is concerned each quarter for the past two years has set up a fresh record in the number of calls originated, and as will be seen from the following table, the results for the first three quarters of the current financial year are exceptionally good.

NUMBER OF INLAND TRUNK CALLS ORIGINATED.

	1922-23.	1923-24.	Increase per cent.
June quarter	14,080,196	16,593,806	17.9
September quarter ...	14,752,503	17,169,867	16.4
December quarter ...	14,795,230	17,565,256	18.7

Statistics showing the general development of the service in the current financial year are given in the appended table :—

	At April 30.	At June 30.	At Sept. 30.	At Dec. 31.	At Jan. 31.
EXCHANGES—					
London	99	100	100	101	101
Provinces ...	3,107	3,166	3,270	3,369	3,392
Total ...	3,206	3,266	3,370	3,470	3,493
STATIONS—					
(1) Exchange—					
London ...	367,403	373,845	380,166	388,789	390,678
Provinces ...	657,734	670,068	689,047	709,273	714,561
Total ...	1,025,137	1,043,913	1,069,213	1,098,062	1,105,239
(2) Private—					
London ...	12,149	12,303	12,113	12,276	12,282
Provinces ...	18,753	18,573	18,287	17,974	17,705
Total ...	30,902	30,876	30,400	30,250	29,987
(3) Total Exchange and Private—					
London ...	379,552	386,148	392,279	401,065	402,960
Provinces ...	676,487	688,641	707,334	727,247	732,266
Total ...	1,056,039	1,074,789	1,099,613	1,128,312	1,135,226
PUBLIC CALL OFFICES—					
London	3,808	3,838	3,854	3,906	3,916
Provinces ...	12,766	13,000	13,264	13,498	13,578
Total ...	16,574	16,838	17,118	17,404	17,494
PUBLIC CALL OFFICES IN STREET KIOSKS	432	474	523	568	582
RURAL PARTY LINES	7,038	7,379	7,755	8,076	8,184

Further progress was made during the month of February, 1924, with the development of the local exchange system.

Among the more important exchanges extended were :—

London—East Ham.
Hop.
Palmers Green.

During the month the following additions to the main underground system were completed and brought into use :—

Glasgow—Kirkintilloch—Kilsyth.
Barnet—St. Albans,
Slough—Maidenhead,

while 46 new overhead trunk circuits were completed, and 48 additional circuits were provided by means of spare wires in underground cables.

CITY DAY CONTINUATION SCHOOL.

PRIZE DISTRIBUTION.

THOSE who were fortunate enough to be invited to the Distribution of Prizes at the City Day Continuation School on Feb. 28, found much to interest them, both in the students and the speeches. The large room was filled to capacity with girls and boys of 15-16 years of age, for the most part Post Office Girl Probationers and Boy Messengers. The wholesome, alert, and intelligent appearance of this youthful gathering reflected credit alike on the training of the School and on the Service. The report of the Principal —Mr. A. Law—on the year's work not only detailed successes in Service Competitions and Royal Society of Arts Examinations, but evidenced unmistakably that the School is run on broad and progressive lines, and is particularly fortunate in its Principal and his staff.

The Chair was taken by Sir Charles Sanderson, Controller of the London Postal Service, who takes a keen interest in the work of the School and gives to it much personal encouragement and support.

He revealed himself in his speech as a convinced believer in the value of education, and appealed earnestly and effectively to his hearers to make the most of their excellent opportunities, not merely for the sake of acquiring knowledge, but for building up their character, increasing their usefulness, and adding to their own happiness in later years.

An imposing array of prizes was distributed by Mr. C. J. Ammon, M.P., Parliamentary Secretary to the Admiralty, who at the conclusion of this ceremony, addressed the students. He appealed at once to their sympathy, and interest, by his reference to the time when he, too, wore a Messenger's uniform, and to the difficulties against which he had to contend in his efforts to obtain the education which is given in so much fuller measure to the younger generation. His was a wise and encouraging speech, and must have been an inspiration to many of his listeners, coming as it did from one who, with opportunities so much less favourable than their own, had, by courage and hard work, attained a high position in the State. And perhaps not the least worth remembering were his words to those students who were not prize-winners, that if they had honestly done their best, though they received no tangible reward, they yet had a prize which could not be taken from them.

M. L. H.

The
Telegraph and Telephone Journal.

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

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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MOTOR CARS AND TELEPHONES.

AN editorial in the *Evening Standard* one day last month stated that there were 14,500,000 motor vehicles in the United States and just over one million such vehicles in this country. It will, perhaps, at once strike our readers that, according to the statistics we published last month, there were on Jan. 1, 1923, 14,495,565 telephones in the United States and 1,045,928 in Great Britain. There is a year's difference in the date of these figures, but for the rest, could any analogy possibly be closer than that between the development of the telephone and motor industry in the two countries? What is the moral? We know what it ought to be, namely, that the blighting effect of government monopoly, the menace of State socialism, and the dead hand of the Civil Servant have prevented the vital industry of motor manufacture from reaching in this country the exuberant development which it would have reached in a free and unfettered land. Unfortunately such a moral cannot be drawn in this case, and one is naturally tempted to ask why it should be drawn in the case of the telephones, as it so frequently has been. Why precisely does one American in eight possess a motor vehicle and a telephone, and while only one Briton in 40 is endowed with those outward and visible signs of respectability and progress? The *Evening Standard* contents itself with saying that "men generally rise exactly to the level of their wants. If they desire intensely a certain standard of life they achieve it and they achieve it largely by applying the energy which is wasted, in an unprogressive civilisation, in merely overcoming friction and combating inconvenience. The greater the expenditure of a nation on things that save time and promote comfort the greater the likelihood of its general progress."

No exception can be taken to the last statement nor indeed to the remarks that lead up to it. The question largely turns on the standard of life men set out to achieve. If the possession of a motor car and a telephone is evidence of a high standard of life a large proportion of Americans have achieved it. We in this JOURNAL should be the last to question the usefulness, the comfort and the time-saving properties of the telephone, but we are fain to admit that a considerable number of our countrymen would imagine they had reached a certain standard of comfort even without the telephone. Similarly, others in rising to the level of their wants may not "intensely desire" a motor car, but books and pictures. In fact when we talk of comfort and progress we embark on a question which embraces a much wider field than motor cars and telephones, and the diversities of ideals and requirements in two countries may and does account for much dissimilarity in development. The subject is too wide to develop here, but in it probably lies the solution of a puzzling discrepancy.

HIC ET UBIQUE.

THE annual report of the American Telephone & Telegraph Co. for 1923 shows that 891,342 telephones were added to the system during the year, while 58,194 were added to the systems in connexion with the Bell Companies. The total of these systems is now 15,000,101 or one to every 7 inhabitants of the United States. The increase alone for the year 1923 comprises a greater number of telephones than the total in any other country except Great Britain and Germany. Perhaps we should add Canada for we learn that 52,000 new telephones were installed during that year by the Bell Company of Canada which would make the total for that country about one million.

WE have received the report for 1923 of the Guernsey States Telephone Department. There was an increase of 206 lines making a grand total of 3,215. The number of calls made during the year was 1,958,301.

THE Rev. John Fulton, minister of St. John's United Free Church, Dunoon, Argyllshire, recently had a telephone installed in the church premises.

Prior to that, says the *Daily Mail*, he had not suspected any humour on the part of the Post Office, but since the installation he had changed his opinion. The number allotted to him was Dunoon 128. Hymn No. 128 is: "Hark, how Heaven is calling."

The best hymn story we remember is that referring to a certain Canterbury Cricket Week when the great W. G. Grace failed to come off against Kent, and the cathedral choir-boys sang with especial gusto the line:

"The scanty triumphs Grace hath won."

"HEAVEN preserve us," says the *Manchester Evening News*, "from the suggestion of the Hull Corporation: that telephones should be laid on in all houses in the same manner as the Corporation lay on water, the cost being paid in the rates. For the telephone,

while in many ways a boon, can be a terrible Frankenstein, a monster to hold you in thrall day and night. The thought of a world in which everyone possessed a telephone is an appalling one. It would be the end of Liberty and the Age of Discomfort. It is interesting, by the way, to note which nation has most closely approached this state. According to the most up-to-date statistics the countries having most telephones per thousand of population are: Austria, Sweden, America, Great Britain."

It is interesting to note that what appears to one newspaper a "terrible Frankenstein," appears to another a standard of well-being (*vide* our editorial). Still more interesting is the collocation of countries in the last paragraph described as the "best developed" and especially the order—or lack of order of merit. We should like to see those up-to-date statistics.

A CONCESSION has recently been granted, says the *Electrical Review*, by the Spanish Government for the establishment of an inter-urban telephone line between Salamanca and Matilla de los Canos (Province of Salamanca).

FOLLOWING experiments conducted along the German coast last year, the German telegraph authorities are making preparations to establish radio-telephonic communication between liners at sea and telephone systems in Berlin, Bremen, Hamburg, and other German towns by means of the radio stations at Norddeich, Cuxhaven, Swinemunde. According to the *Daily News*, it was possible, by means of the five-kilowatt transmitter at Norddeich, to send messages which were clearly intercepted by vessels when they were several days' journey south and west of the English Channel.

WE learn from *Commerce Reports* that it is expected that a telephone service will shortly be available between Cape Town and Johannesburg, a distance of about 1,000 miles. At present Cape Town is in telephonic communication with Beaufort West, to the north, a distance of 339 miles, and Oudtshoorn, 387 miles to the east. Johannesburg has connexions with Durban, a distance of 519 miles, and Bloemfontein 290 miles.

THE Brazilian Minister of Transportation and Public Works has, according to *Reuter's Trade Service*, granted to the Companhia Radiotelegrafica a concession to install and use four radio telephone transmitting stations in Sao Paulo, Bello Horizonte, Pernambuco, and Bahia.

According to *Telephony* a petition for an order permitting a temporary increase in telephone rates was filed with the New York Public Service Commission on Feb. 2 by the New York Telephone Co.

"Additional revenues for 1924," the Company states, "are required to provide adequate and sufficient service and to preserve the property of the complainant."

J. S. McCulloh, operating vice-president of the telephone company, made the following statement concerning the action by his company:—

"We are asking for an immediate temporary increase in rates to remain n effect pending the determination by the commission of the rate case recently commenced by the company.

The company disagrees radically with the valuation of its property which the commission has used as a base for its existing rate orders and in the case which the company has started it intends to try out the question and establish the fair and reasonable value of its property devoted to the public service. Upon such fair valuation, the company claims that it is entitled to earn at least an 8 per cent. return and not a 7 per cent. return used by the commission.

Until these questions can be decided, the company by its application for temporary relief is asking that the existing rates be readjusted so as to provide at least the amount of net revenue that the commission intended the rates ordered by it a year ago should produce."

WHAT ARE WE HERE FOR?*

BY H. GORDON SELFRIDGE.

THESE papers or discourses or addresses—or whatever you choose to call them—which are read here are likely to be a littly dry unless some one or two or six come at the end of the effort and ask a few questions which attempt to puzzle the speaker, and which, if I may be pardoned for the slang, give a bit of a "snap" to the evening, and one goes home feeling that the time has not been entirely wasted.

The subject is what we are here for, and by that is not meant what we are in this room for, but what we are trying to do with these days and years which, by the laws of nature, we are all employing, and it seems to me that it is a very important point to decide what really we want, because we do not know quite what we are here for until we conclude what we want.

If every individual or every Municipality or every business or State had the moral courage to sit down and, with pencil and paper, write out exactly what it wanted—what was its aim—there would be very much less drifting than there is at present, and I assume that all of us would applaud that which made for less drifting and for more direct effort in a special direction. At least, it seems then, that our achievement would be more efficient, more effective, and we could show a further step at the end of the short or long life than if we drifted part of the way.

The great house in America, to which your Chairman has referred, was a wonderful organisation, at the head of which was the old merchant, Marshall Field. I became his partner after ten years' service, and was ultimately associated with him for 15 years. He was a wonderfully interesting and brilliant man, and I said to him one day, "What is the thing to strive for? Suppose your son has gone through his school days and he comes to you and says, 'I have tried to do what I can up to now, and now I want to ask what is the thing to strive for?' What would you say?" In America that is a difficult thing to answer. Politics which, in my humble judgment, is not a very desirable trade in any circumstances, is particularly undesirable, and very closely related to acts which are not quite above-board. Politics in America really offers a very meagre and unsatisfactory career.

The young man who has any red blood usually refrains from entering the political field. The professions have largely been absorbed by the businesses and that profession we call law over there, is looked upon there as simply a trade and the large businesses have their lawyer, just as they have their Secretary, to answer questions connected with legal language and decisions.

Mr. Field, in trying to answer my question, said, "Really, Selfridge, I don't know." He was a very rich man—died worth 30 millions sterling, which he made himself. Then he said to me with a sort of sad look, "If one strives only for money he finds in the end it is a very great disappointment"; and that closed the conversation, as Mr. Field did not wish to carry it further.

The question is, what did one want in this world, and if we really seriously think and decide what we want, each one of us, and say "I will achieve a certain thing—at least, I will strive with every drop of blood to accomplish a certain thing," the chances are that one can accomplish it.

If a skipper leaves a port he does not do so with an indefinite idea of where he is going. He does not say, "I want to get to the other side of the ocean." The man says, "I would like to acquire success." The skipper does not say "I want success," which means landing him anywhere, but he says, "I want to arrive at a certain point with the least expenditure of time and effort and money, and I will do so to the best of my ability," and when he gets outside the harbour he makes a direct course as far as the wind and waves will permit him.

We all have our ships which come out of the harbour when we reach maturity, and it seems to me that, instead of putting our ship directly on one course which shall accomplish the point we are anxious to accomplish and determined to accomplish, we drift around and think too much of the immediate moment rather than think out a splendid course and follow it. I am now speaking as one of the public to part of the public, without reference to the posts that you are holding, and simply as one man to another. I say that if we have the moral courage—if we really make up our minds to do it, we can think out what we want to do and achieve it.

Blocking out a course is a good deal like making a will. So many people refrain because it is not exactly an agreeable thing to contemplate. It seems to me that making out a course for ourselves is more important even than making our wills and distributing our small resources when we say good-bye to this earth, but as a member of this community, and as one who comes in close contact with very many of the most admirable people, I urge as strongly as I can the desirability of knowing where we are.

The members of this little company to-night occupy two positions; one is their association with the great service of which they are members. The other is their membership in the community as individuals and as members

* Address given to the Telephone and Telegraph Society of London, Jan. 21, 1924.

of the State. The duty with which you are associated in conducting the affairs of the Post Office is, and can be, extremely interesting, and to me, is that thing which gives interest to the day and to the year and increases the joy of life.

If we remove from what we are doing anything which approaches dulness or tediousness or monotony from our duty, we take away the bitter part and leave the sweeter, and there is nothing that any of us are doing in any branch of your great Department or any other, that cannot be made sweet and interesting by giving it that detailed thought and attention, that study for doing it better—that determination to achieve the result more intelligently, more thoroughly perfectly, if I may use the expression, and more delightfully than has been done before, and it adds to the joy of living and of doing.

I know all about this thing—at least I think I do, because, while not wishing to talk about myself in the slightest way, I may say, in parenthesis, that my business life began when I was ten years old in a little village in the far-away State called Michigan, and it began in earnest at 14. I know all the details, all the sorrows or monotony, and all the joy of the stock-keeper, of the book-keeper, of the cashier, of the salesman, and all those things which all of us in my kind of business must learn, so that I do not talk without knowledge.

As a boy of 10 or 12 my business gave me great joy. Because I constantly tried to discover a new and a better way in which that diminutive little stock of which I was proud of supervising could be done better. Those things can be associated with life—they can remove from us the tediousnesss and the dulness if we choose to make that part of our life as interesting as we can.

The duties connected with the Post Office of course are varied, and most interesting. The three or four great branches of work which this enormous staff of earnest, loyal workers is performing—these various branches are interesting in themselves and it seems to me, as a member of the community, that if I could have my way with this great organisation called the Post Office and the Post Office staff (probably the biggest employer of labour in the Kingdom, carrying on one of the biggest individual businesses in Europe), it seems to me that it would be the utmost joy for each Departmental chief to try and do the work of that section so well that it would be a model for other much smaller businesses.

In business life, one looks to the bigger businesses to set the pace. One thinks the bigger can afford to take the risk and can make the experiment. One takes joy on being in the position to make the experiments to prove their inefficiency or failure. It does not matter if they are failures; it is a great pleasure to set going the wheels of commerce or a business system by proving that something is efficient and effective which has not been thought of before.

Business is a progressive science. You are all engaged in business, because of all the sections of the Government that I know anything about, the Post Office is most purely a business Department. If we men of business who are really the wage-earners of the community (we are the ones that make the money and pay the money and keep the ball rolling), if we do this thing better and better, then we will feel we have done our share towards pushing ahead this comparatively new science.

It is a science from the standpoint of continually discovering better ways to do something, and in your duties I think probably there are many ways of finding out how to do things better than they are being done, because we can, of course, take it for granted that there is nothing in this world that is as well done as it might be. The encouragement which the chief of the small section of the large division gives to his people is just as true in the great undertaking with which you are all associated as it is in any of our undertakings with which we are associated, and one of the joys of business is to see the young man's mind budding out in a resultful line of thought and making him a stronger member of the community.

There are other elements of the Post Office work—the element of human nature. We know that we are approached by people who are sometimes uncouth, unreasonable and so on, but that is quite a detail, and whatever we do, as members of the community, which will add good cheer even to those people who are naturally a bit garrulous—a bit unpleasant—will help to make the lives of everyone a little happier, and is an end for which we should strive.

The brightness of our room, of a house of business, of an office; the good cheer of a large room like this, or of a small room, is something to be applauded.

I do not think that there is quite the element of good cheer and brightness in the branch Post Offices that they are capable of possessing, because the people who are really responsible for the details of those Post Offices are not sufficiently encouraged by that very necessary thing called "a pat on the back."

In the discipline or management of people my judgment is that the pat on the back or the kindly word of encouragement fairly earned, is much more important than the criticism which has also been earned. A pat on the back is like the water to the flower—it makes it bloom and grow more beautifully.

Criticism is like cutting back the flower, and while criticisms are sometimes necessary, as we all know, the pat on the back can be given, and, in this country, where the employee class is so free from that which sometimes exists in the newer countries—namely, an inclination to accept that thing with a certain amount of licence and to feel that it means a certain amount of familiarity or permits "big head"—those things are unpleasant, but we do not discover them in this old civilisation, and they do not exist to anything like the same degree.

I had a scheme in mind which I have talked over with my people, and which in confidence I will venture to suggest. It was the idea of offering a monetary prize to that branch Post Office which could show in one month, or three months the greatest improvement in its physical condition. Such an idea is not a bad one, and we do it in business. We would bring the element of good-cheer and pleasant surroundings and an occasional flower into our branches, and if any of you can think of any way in which that idea can be forwarded and can carry it to the proper official of the Post Office—even the Postmaster-General—I will stand quite ready to make good on the small prize which I should be willing to give every month.

Now there are other things which the members in this room are responsible for, as well as the great Government Department which gives them their occupation and presumably their livelihood, and that is the duty to the State as members of the State. I think that a great many people in every country fail to realise that they owe to the country in which they are living a certain obligation. They seem, however, to assume so often that the country owes *them* an obligation for allowing it the pleasure of their presence, but the truth is that the State is made up of individuals; it is like a great boat with many rowers, trying to attain a certain point of achievement. If many of those rowers insist upon sitting still and doing no rowing, the State will advance that much less rapidly, but it seems to me that every one of us owes to the State a certain obligation of citizenship which must, if we are fair, be made good. The duty which we owe of loyalty, of effort, of achievement, of right living, of dignity, of quality of conversation—all these things we owe to the State in which we are living. It is the same in America. A great many over there do not seem to realise it; they seem to think the country owes them a living and that it is the country's job to keep them going, but the truth is that it is the individual's job to keep the country going in their several degrees.

If everyone in this room by using admirable judgment and wholly good sense, by using words of applause, helps to push on this old country of Great Britain, she is going to profit to just exactly that extent.

I am still an American, but I have been living for 15 or 17 years in this delightful old place and I am extremely fond of it. I have made delightful friends whom I prize very highly, and I feel I owe by obligation as well as by delight and by pleasure, a certain amount of loyalty to the methods and systems and customs and conditions of this country of Great Britain, which is giving me shelter and protection and the opportunity to enjoy my life to the fullest extent; and the amount which I pay in taxes is only the financial part of it. There is a certain loyalty—a certain goodwill which is always owing to the country giving us protection and shelter and giving us an opportunity to bring up our families in peace and happiness.

It is one of the duties we owe that the place in which we live occupies continually a higher and a more exalted position among the nations of the earth—in dignity, in quality, in prestige and in splendid influence, and that is not possible except through the efforts of its individual members. With a certain number of those members indifferent, more must be obtained from the remainder or, alternatively, the results must be less.

This thing called civilization seems to have pretty nearly reached its limit; in other words, man has reached his final ability to think and to create ideas, and that is of a not exactly material nature, but of that nature which refers to civilisation.

A thousand years before Christ, a brilliant prince in India wrote a very long epic poem in which he described what he felt was the highest quality of civilisation, and when one reads those words to-day, one discovers that that prince described, three thousand years ago, the highest range of civilisation which we mortals in this 20th century are capable of conceiving. Therefore, it looks as if we had almost reached our limit. But I object as strongly as I can to the fact that man's mind is finite! While I think it must be true, I object to it.

I can quite understand that a man's physical strength is only so great, but we find ourselves objecting to the idea that he cannot make up his mind to do what he chooses, and I am one of those who think man, possessing health and his faculties, should be able to do any material thing which he desires to do before life is over.

Man surely cannot make a little child love him; he cannot necessarily win the affection of a certain woman. That is sentiment, and sentimental things are different, but material things can be done. And as regards the material things, making progress in life, I feel that man should put his teeth together very tightly and join with society, which has as its slogan "I will." If we decide what we want and then go for it with that "punch" with that virility and indifference to all obstacles, that absolute determination to say "I will do it, and I don't care what happens; I must, I must," it can be done.

Now, one of the pleasant things connected with your business and mine is the influence we can have over the younger people, because while the people in this room are, for the most part, under middle age, still you know that five, ten, or twenty years is a very short time in the history of a nation, and in the history of a great undertaking it is also a very short time. Our duty as men and women of maturity, and our privilege as well, is that of making, or helping to make the younger people who are coming on, and in five or ten years will take our places—to make their minds throb more aggressively and more intelligently and more resultfully. One of the joys of living is to shed an influence of betterment. Without being pedantic, it is nevertheless the fact that the influence of the happy and progressive mind does have its effect on young people.

Very well do I remember influences which affected me when I was very small, and certain words and criticisms—certain marks of approval which help to make character. And with that thought of trying to show to certain young people certain ideas which might improve their lives, we have written a thing called "The Spirit of the House," which I will read. Please do not think I am trying to take up the position of schoolmaster in any way, but it is an honest effort to make the lives of the younger people who are coming along, happier and better and bigger and brighter.

"THE SPIRIT OF THE HOUSE."

"To look upon each minute as precious, to be exchanged only for its full equivalent in progress; to develop continually every faculty which helps to build greater judgment, energy, determination, imagination, morale and good cheer, for each is necessary to the strong and happy individual.

To look upon work during the working hours as a privilege, as a gain, as a requisite of the full, complete life; to look upon idleness with disrespect, as a waste of time, the only commodity of which everyone has an equal amount.

To feel that the waking hours are best used in study, in companionship, in recreation, in those acts which build a stronger character and better health; to strive for higher standards and ideals; to look upon the bright side of things and be optimists in the best meaning of the word; to act quickly and avoid procrastination; to think broad-mindedly, to avoid narrow-mindedness, meanness and jealousy; to punish dishonesty with the utmost effort; to appreciate fully intelligence, originality, loyalty, recognising merit and merit only as a door to advancement; to acknowledge no obstacles as insurmountable which stand in the way of splendid progress."

And so, my friends, while we are doing those things and carrying on and improving by our minutes and days and months and years, with the help of our heads and thought and experience; while we are doing all those things, to appreciate to a finer degree of excellence the duties which we have, whatever they may be.

Thus, it seems to me, the joy comes in the doing rather than the final completion, and so I find myself frequently quoting that delightful sentence or two of Robt. L. Stevenson, in which he says:—

"To travel hopefully is better than to arrive, and all true success is to labour."

CORRESPONDENCE.

METAL STORAGE TRANSMITTERS.

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

SIR,—The article by Mr. Castelli on the Minniotti telegraph in the March number of the "TELEGRAPH AND TELEPHONE JOURNAL" has special interest for me, because I dealt with the subject fully in an illustrated article on "Metal Storage Transmitters," published in the "TELEGRAPH AND TELEPHONE JOURNAL" eight years ago (February, 1916). This article showed what I described as the Ring transmitter and also the Ball transmitter.

So far as I know I was the first to propose the idea and the first to make a machine with steel balls projecting from holes in a container as a means of transmitting telegraph signals. I mentioned in that article a serious difficulty, namely, the tendency of the balls to jam. Judging by the information given by Mr. Castelli in this article, this difficulty seems to have been overcome in the Minniotti machine. The main trouble, however, and the reason for my abandoning both the Ring transmitter and the Ball transmitter, was the question of *speed*. Those who are interested in this matter can easily turn up my article already referred to, and it is not therefore necessary to repeat in detail the arguments there enumerated against Metal Storage Transmitters and in favour of perforated tape. It is sufficient to say that it is impossible to get anything like the speed with a Metal Storage Transmitter that is easily obtainable with keyboard perforators and tape transmitters, paper tape having for all practical purposes no inertia. The speed of a keyboard perforator is without limit so far as the human operator is concerned, and there is no difficulty in reaching as much as 120 words a minute. Operators easily keep up 50 words a minute, and for many minutes at a time they can easily exceed 75 words a minute. Fleet Street newspaper telegraphists habitually maintain speeds of from 50 to 60 words a minute for hours at a time. Metal Storage Transmitters on the other hand impose a limit on the speed of the operator and are, therefore, less efficient than tape transmitters. With a Metal Storage Transmitter it does not seem to be practicable to store more than about 120 letters, or 20 words. In the Minniotti machine, so far as I can make out from the illustration, it is only possible to store about 84 letters, or about 14 words. Even if the Minniotti machine could work satisfactorily at 50 words a minute, a good operator would be constantly overtaking it, with resulting stoppages and confusion and reduced output.

Not only has Mr. Castelli flamboyant opinions about the advantages of Metal Storage Transmitters, but he has also erroneous views about the disadvantages of perforated tape transmission, and his statements prove that he is far from well-informed on this subject. He mentions that the French Baudot, the Siemens and the Morkrum have "now" adopted tape transmission, but he says not a word about the Western Union, the biggest of all users of tape transmission. He also says the tape system of storage "involves drawbacks of such magnitude as to discountenance further adoption." Mr. Castelli had better make himself acquainted with the experience of the Western Union in regard to tape transmission, involving over 2,000 perforators and 2,000 transmitters, before pronouncing so dogmatically against this method of sending signals.

Multiplex perforators and transmitters are not unduly complicated or costly, considering the work they do, and the cost of upkeep is very low, and there is no "rapid deterioration of the mechanism." Murray keyboard perforators and tape transmitters have been used by the *Scotsman* transmitting heavy newspaper traffic for eight to ten hours a day at 45 to 50 words a minute, for three years, and the maintenance cost has been trifling and the machines are in as good order now as when first installed. Even the punches and die-plates, which are the parts most subject to wear in the keyboard perforator, have not been changed and are still giving good service after three years. The cost of the paper tape is small and far over-balanced by the great advantages of tape transmission.

On the Murray Multiplex the operators certainly do not "lose personal contact with each other" through the use of perforated tape; on the contrary, the Western Union has found tape transmission on the Multiplex practically as good as the Morse key for keeping quick touch between the sending and receiving operators. This particular criticism by Mr. Castelli is true in regard to the use of tape by automatic systems, but not by Multiplex systems. The fact that the Western Union gave very careful consideration to Metal Storage Transmitters and, finally, adopted keyboard perforators and has now over 2,000 keyboard perforators and tape transmitters in use in the United States, seems to me to be a proof that Mr. Castelli's pessimistic opinions about the disadvantages of paper tape transmission are not well founded so far as the Multiplex is concerned.

On the other hand, I have no doubt that there will be a field for the Metal Storage Transmitter in cases where high speed and most efficient utilisation of labour is not required. It certainly would not be difficult for the Minniotti machine to excel the Baudot 5-key transmitter at 30 words a minute, and for that reason there should be a good field for it until the Baudot is speeded up to the American rate of 50 words a minute.

In a nutshell, the defects of Metal Storage Transmitters are low storage capacity and inertia which limits the speed of operation. In contrast with this, tape transmission gives big storage and high speed, both of which are essential for efficient operation.

In these days telegraph traffic must be speeded up and the labour employed must be utilised in the most efficient manner possible so that the cost of telegraphy may be reduced. The European telegraphic speed of operation is, at present, much below that prevailing in America; but even now the forces which have compelled the adoption of high speed and high efficiency in America are working in Europe, and a significant paragraph appeared in the newspapers the other day about "Speeding up the Telegraphs" and about enquiries being made by the International Telegraph Union at Berne in regard to neglect of telegraphic communication. Considering the high cost and low efficiency of telegraph operation on the Continent of Europe, it is not surprising that this means of communication is neglected by the public.—Yours truly,

DONALD MURRAY.

MANCHESTER TELEGRAPH AND TELEPHONE SOCIETY.

THIS Society has now completed its first season and the members can look back with pleasure at its inauguration.

Under the presidency of Mr. Jas. G. Maddan, Postmaster Surveyor, assisted by Mr. Archer Smith, District Manager, Mr. F. H. Gibson, Assistant Postmaster, and Mr. G. R. W. Jewell, Chief Superintendent Telegraphs, as Vice-Presidents, two lectures have been given and two social events have been held.

The social events were very enjoyable and were joined in by friends from practically all branches of Manchester P.O., and there is a keen desire on the part of the members for additional functions of this nature.

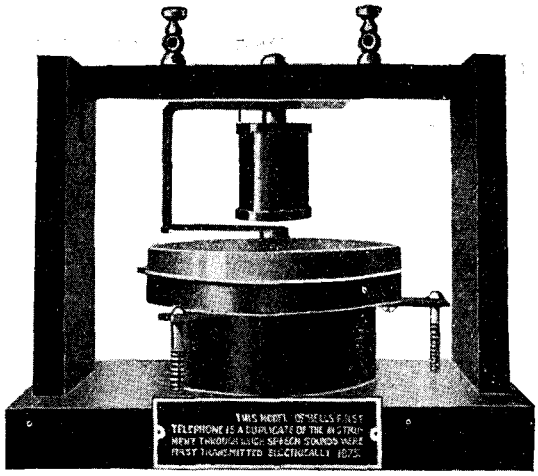
The first paper was given by Mr. J. Scott, M.B.E., Postmaster Surveyor, Birmingham, who, in a breezy talk under the title of "Reminiscences," brought back to his hearers some of the memories of the old National Telephone Co.'s days, with some lively references to past Lancashire telephone history. An interesting discussion took place and it was pleasing to hear, besides the officers and members who took part in this, Mr. W. J. Medlyn, Superintending Engineer, and Messrs. Wallace and Magnall, Sectional Engineers, adding their quota to the evening's enjoyment.

The second paper was given by Major A. A. Jayne, D.S.O., O.B.E., M.C., Assistant Controller, Edinburgh Postal and Telegraph District, who spoke on "Keeping pace with modern ideas." Major Jayne was introduced to his audience in a characteristic welcoming speech by the Chairman of the evening, Mr. Archer Smith, and it was soon evident that the up-to-date ideas of the lecturer as regards "Statistics," and "Publicity" were fully appreciated by his audience. In a delightful touch in opening this subject Major Jayne pointed out that the gathering of statistics is not in itself very new—as we had the outstanding case of William the Conqueror and his Doomsday Book—and incidentally he commented that he very much questioned whether the Anglo-Saxon subjects of that monarch were frightfully keen on the compilation of that book! A good discussion followed, supported by Messrs. Jas. G. Maddan, W. J. Medlyn, F. H. Gibson, G. F. Staite and the Chairman, who contributed views both serious and humorous from varying standpoints, based on their experiences in the preparation, analysis and application of departmental statistics.

REVIEWS.

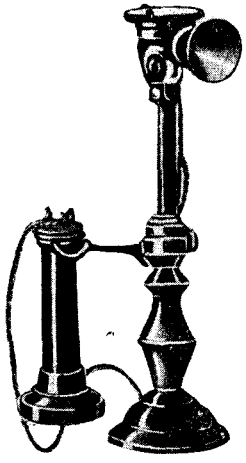
"*The Fortieth Milestone.*" (*Being a record of forty years achievement of the Western Electric Company, Limited, in the advancement of international communication.* 37 pp.)

This is a handsome production. Lavishly illustrated, describing the rise and development of telephony in general and of the Western Electric Co. in particular from its foundation in 1882, when it took over the manufacturing rights of the American Bell Telephone Co. The Company has played no inconsiderable part in the erection of manual exchanges in this country, no fewer than 128 having been

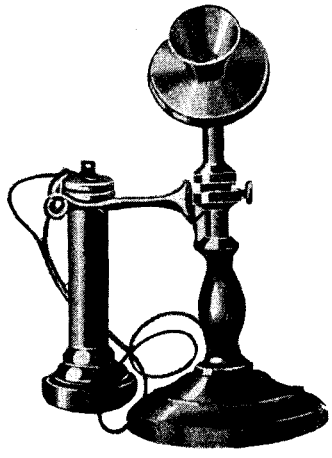


DUPLICATE OF BELL'S FIRST TELEPHONE.

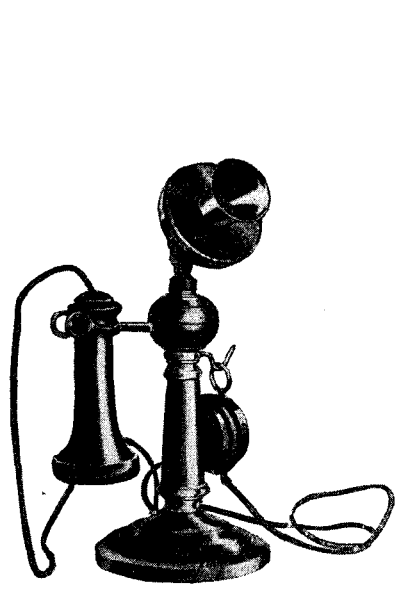
installed with an ultimate capacity of 726,060. We republish some interesting pictures shewing the development of the desk telephone from 1886 to the present time, together with a block depicting Bell's first telephone (1875). Another picture of some historic interest which we reproduce shews the multiple switchboard



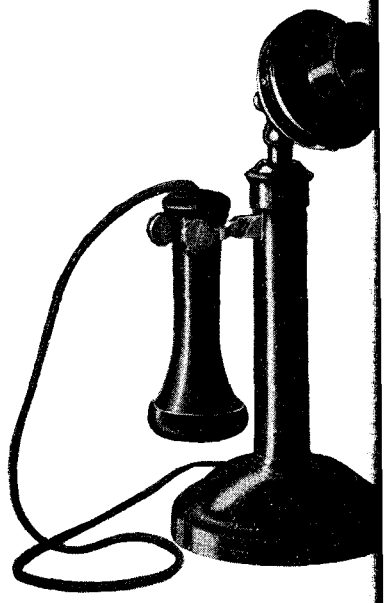
1886.
DESK TELEPHONE.



1898.
FORERUNNER OF THE MODERN DESK TELEPHONE.



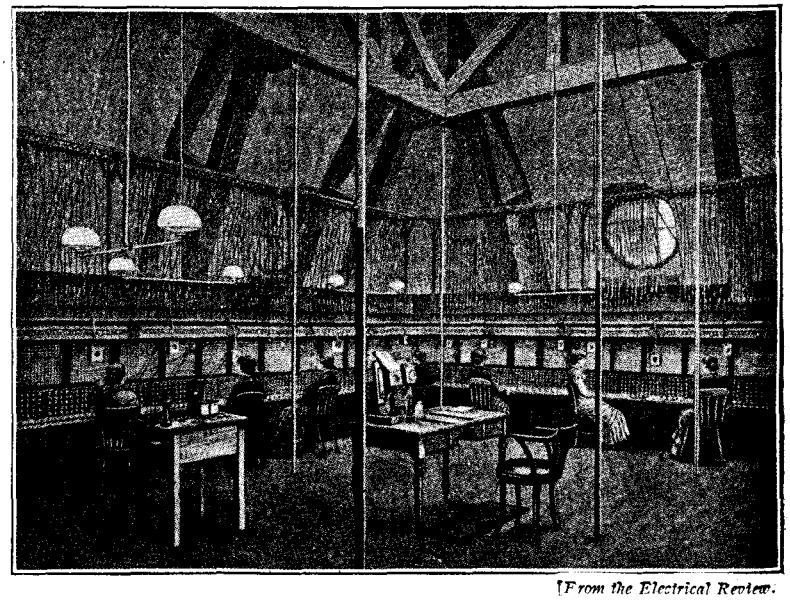
1902.
DESK TELEPHONE.



1923.
DESK TELEPHONE OF TO-DAY.

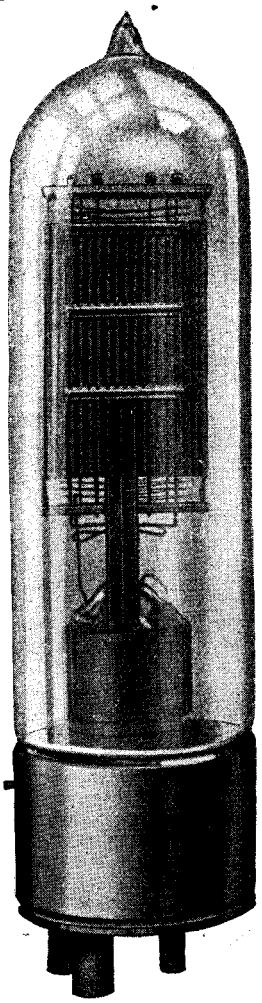
installed at Liverpool in 1884, and will give our readers some idea of the general appearance and lay-out of a telephone exchange in those days.

After some sections dealing with automatic telephony, the work deals with the multiplex printing telegraph system, and describes the equipment installed in 1914 between London and Manchester on this system. Another section describes the improvements effected in dry core cables, and the introduction of Pupin coils on long-distance routes. The important developments in the direction of repeater stations, and the revolution effected by valves in the field of wired and wireless telephony and telegraphy is next dealt with. We reproduce pictures of valves used in general broadcasting and in transatlantic wireless transmission. A fully

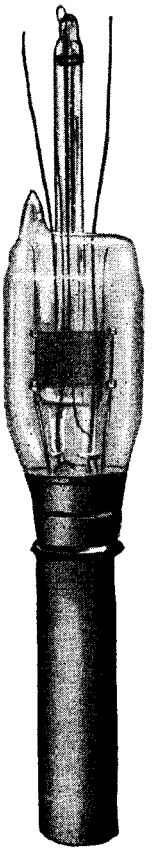


[*From the Electrical Review.*

MULTIPLE SWITCHBOARD, LIVERPOOL, 1884.



250-Watt Power Valve used for Wireless Transmission and Broadcasting and for Public Address System.



10-Kilowatt Power Valve, Water Cooled Anode used in Transoceanic Wireless Transmissions.

illustrated record of the experiment of January, 1915, when speech was obtained with America from the Company's Southgate Works, and some particulars of the Company's war effort concludes an interesting brochure.

LONDON ENGINEERING DISTRICT NOTES.

Overhead Construction.

An instructive paper on the recent developments in the methods of providing overhead telephone wires was read by Major H. Carter, A.R.C.S., B.Sc., A.M.I.E.E., at the February meeting of the Institution of Post Office Electrical Engineers. Major Carter dealt at some length with the question of wind pressure on curved surfaces and exhibited a number of graphs showing the relation between the velocity and pressure of the wind. Much of the previously accepted theory on this point has been modified as a result of research work which has been carried out at the National Physical Laboratory. Some of the results of this valuable work were embodied in the paper. Major Carter dealt with the reasons which have led to the issue of amendments to the standard instructions on overhead construction and there is no doubt that such a course could be followed up with advantage to all concerned. It is one thing to get an order obeyed and it is quite another thing to get an order obeyed intelligently. If officers who are concerned in the execution of an order know precisely the nature of the object aimed at, it is practically certain that there will be intelligent co-operation, and the order will be obeyed in the spirit if not carried out to the actual letter. The result may even be better than would have been the case if the order had been carried out in accordance with the exact detail of the instructions. It is a good thing, therefore, when those responsible for the issue of instructions open their minds, and reveal the working thereof. It is then seen that an idea which may have been tenaciously held by some executive officers to be the one thing required has already been tried experimentally and has failed. On the other hand a statement of the object aimed at, and the difficulties met with may produce fruitful suggestions from those who up to that time may not know that difficulty exists.

In certain parts of the country it has been necessary to erect aerial cables of considerable size owing to the fact that temporary physical reasons prevented the employment of the usual underground methods. This has enabled a careful comparison to be made of the relative cost per circuit in aerial and underground cables when an appreciable number of circuits have to be provided. The financial statement which was furnished showed clearly that when all the facts are taken into consideration the cost per circuit mile in this country of an aerial cable route is considerably greater than that of an underground route. This is not the case in all other countries, but the reasons are not difficult to explain. Much of the additional cost is accounted for by the fact that in Great Britain not only must practically all the poles required be imported, but they must be specially selected in order to lessen objections to their erection. In some other countries the fact that when telephones are required poles must be suffered is recognised and local authorities even publish photographs of a forest of telephone poles in the midst of a few houses to show the amazing business activities of their town. Moreover the poles are obtained locally and symmetry is not regarded as a *sine qua non*.

In the broad unmade roads of new countries mechanical appliances can be used for excavating holes and erecting poles. In the old country, however, positions for poles must often be accepted in hedgebanks and other places where erecting machines cannot be used and if poles are to be erected in the footway strong objection would be taken to the interference with traffic occasioned by the presence of a machine.

It is unfortunate that the hostility to poles in this country is increasing as there is no doubt that when the number of wires is few a pole line with open wires is much cheaper per circuit that an underground route. Moreover it is a curious fact that even in neighbourhoods where objections may have been raised to the use of poles the appearance of a line of poles in a street very frequently results in an immediate increase in the number of applications for telephones from residents in that locality. One wonders, therefore, if it would not be a good thing to use the poles for propaganda purposes and affix bold but neatly designed notices with legends such as the following :—

"You cannot afford the time to go personally. Why not telephone."

"A telephone message will bring what you want to your door."

"Your efficiency is trebled if you can avoid time spent in travelling. Use the telephone.

Cost of time in travelling where you are going	5*s.* 0*d.*
Cost of conveyance	1*s.* 0*d.*
Total	6*s.* 0*d.*
Cost of telephone messages	0*s.* 3*d*
Nett saving	5*s.* 9*d.*"

The Denman Athletic Association (Post Office).

At a general meeting held in the Dining room, Denman Street, on Feb. 18, the incorporation of the London Engineering District C.C. with the Denman Social and Sports Club was confirmed, and it was resolved that the title of the new Club shall be "The Denman Athletic Association."

The proceedings were opened by Mr. A. F. Paddon, who, after expressing pleasure upon being able to state that Mr. R. McIlroy had kindly consented to become President of the new Club, stated briefly the facilities available, which included Cricket, Cycling, Football, Swimming, Tennis (Ladies and Gentlemen), Tug-of-War, etc., and touched upon the necessity for promoting good fellowship and social intercourse between all grades of the staff.

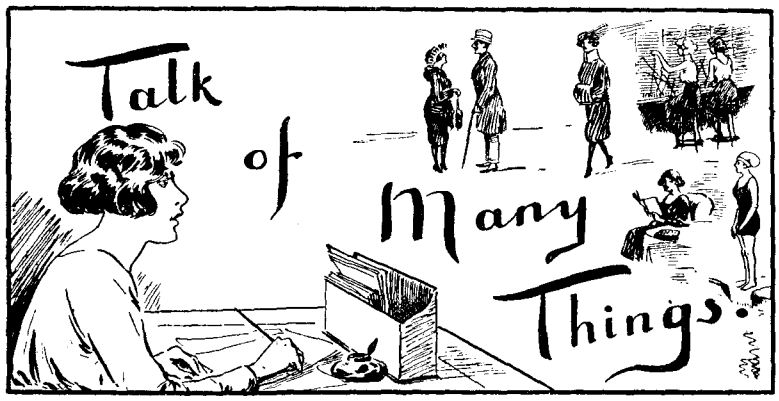
The Chair for the rest of the evening was admirably taken by Mr. W. L. Hart, who has kindly consented to become Vice-President of the Club.

After the election of Officers and Committee of Management, the Rules of the Club were, after slight discussion, agreed upon.

Mr. Hart, in replying to a vote of thanks to the Chair, referred to the fusion of the two Clubs as a good omen of fellowship amongst the staff, and emphasised the moral effect that sport, in all its branches, had upon and lent a different viewpoint to one's official duties.

There are vacancies for membership in most of the sports sections, particulars of which may be obtained from the General Secretary, Mr. A. F. Steers, 26, Thornham Grove, E.15; Mr. R. A. Miles, City External Section; Mr. H. J. Henley, Superintending Engineer's Office, Denman Street; and Mr. H. Marson, South-West External Section.

WE TELEPHONISTS



Where East Beats West.

WE print, with great pleasure, a letter received from Mr. Shinmyo, who recently visited England. We should all feel proud that our Controller has received such a gracefully worded tribute. We feel that we have much to learn from our Eastern friends in the way of courtesy—and in the art of expression, especially in a tongue other than one's own.

Tokyo Central Telephone Office,
Tokyo, Japan.

DEAR MR. VALENTINE,

I beg to acknowledge receipt of your esteemed letter and your name card, together with a huge collection of printed matters in connection with telephone system in your country.

I have, on receipt of same, opened the package and have gone over the precious contents one by one with the heart trembling with joy and gratitude. I was unable for a moment to utter a word when I found there were with greatest possible care corrections, amendments and alteration very kindly made even to a very minute point, so that no single item can be misunderstood and that it may give a correct and unmistakable conception with regard to your real system. This very fact has given me deep impression that this bundle of printed papers is by no means to be taken as a mere collection of valuable data as it appears, but a very crystal of thorough-going kindness, which can hardly be found in any other part of the world.

It is my strong conviction that we Japanese have to learn much out of this fact, if Japan is to be one of the world's greatest powers and to be able to do her part in the cause of the civilisation, welfare and peace of nations at large.

A few years ago, the Naval Yard at Kure pulled down a warship after her many many years' faithful and meritorious career to her country. An officer, who was in charge of the work has found a spirit predominating over all through the workmanship of the vessel, that was as I have just quoted, the thorough-going kindness. The naval man could nowhere find even a slightest defect as far as both the workmanship and materials concerned. Everything was done strictly in accordance with the order sheet, somewhere even better, not a single rivet left unfixed. The ship mentioned, I have the honour to tell you, was the make of no other countries but that of an English works.

The above happy news has ever been my memory since then, and it was my firm belief that what Great Britain is at present, principally due to this noble maintenance of never fading spirit among her people, although of course there may be many other minor reasons interwoven. Now that personally meeting with another instance on the occasion of my receiving the valuable documents, my hithertofore belief has been doubly intensified.

I really do not know how to thank you for such a manifestation of your great kindness, especially it is as such when I try to do so in my borrowed tongue. I do not think even our Department of Communications might be in possession of such a nice complete collection of such treasures as I have now in my hands through your courtesy. I have, therefore, a mind to transfer these invaluables to them after having been taken typewritten copies for myself, if such an act might not be against your good-will in any sense, because these are too good things to be privately kept in my own library while they will do a lot of assistance and guidance towards the betterment of the Japanese telephone organisation, if they are thus only put at other specialists' disposal.

Again thanking you for the thorough-going kindness with touched heart and with kindest regards.—Yours sincerely,

(Signed) N. SHINMYO.

Figuratively Speaking.

Making game of sacred things is not done, I know. It indicates a mental deficiency and a lack of appreciation of the finer side of human conception. It exhibits a heartless disregard of the beliefs of others and a narrow mind. It is, in fact, thoroughly reprehensible and illogical.

Quite often, however, whether consciously or not, the tilt is against the professor rather than against the thing professed. Dickens is sometimes accused of poking fun at religion, whereas in reality all he did was to deride the dishonest Stiggins.

If, therefore, I appear to be laughing at the sacred "statistic," it must be remembered that it is the statistician rather who amuses me. Statistics are intangible things, but statisticians, especially those who believe that truth abides in their "statysterical" evolutions, are solemn, ponderous creatures whom to laugh at is more charitable than to condemn.

I doubt if I should know a statistic if I met one. But I imagine that it is a remarkable figure, living mainly on paper and dates, amenable to discipline, but playing the very devil if it be treated unkindly. Use it reasonably well and it will do whatever you want, even to the third degree of lying. Indeed so far from being an object for mirth, it is fit only for pity. How should we like to be multiplied and divided, added and subtracted from one year's end to another? Should we not be prepared to swear anything as a result?

The creatures who so mangle—and wangle—the unfortunate statistic call themselves statisticians and they ask me to believe all that the unhappy statistic proves after vigorous, preposterous and inhuman treatment. The more serious the statistician waxes, the more laughable he becomes. He tells me, for example, that if all the pennies collected from coin box circuits within the ten-mile circle in one week were placed one on the other, the pile would reach the top of St. Paul's and above it. What rubbish! It would most obviously topple over before it was much more than a foot in height. Even if it didn't topple how would the pile be built? Heath Robinson may know, but I don't. One of these wild fellows once let me into the soul-stirring secret as to the number of hairs per square inch on the human scalp. He was bald. Would'nt you have laughed too? Then, again, he says that at a certain exchange umpteen calls are dealt with per operator-hour, and when I ask what is an operator-hour, I am told that it is the product of operators and hours. Why should operators be multiplied by hours and how is it done? I maintain that it is positively insulting to operators to suggest that they can be multiplied at all.

Why don't statisticians become human and talk like reasonable people? Why can't they leave the statistic to tell its own tale, or, if they must make it say or prove something, why not make that something interesting rather than ludicrous? For example, would it not appeal much more to you and me to be told that in three week's time our wages would be doubled? That would be worth listening to and we would not trouble much if the second decimal place were one out.

Bernard Shaw, I believe, once uttered a remark to the effect that the temperance cause would prosper if it were not for the temperance advocate. The statistic would be a charming and interesting fellow if it were not for the statistician.

PERCY FLAGE.

"The Found Cord."

I sat in the Hall and I listened
To the words of the great and the wise,
Who wrote of the "Wrong Number Trouble"
And the action that each did advise.

What steps could be taken to stop it,
Or reduce it as far as might be,
And my mind was appalled at the power
That devolves, through my work, upon me.

A caller who gets a wrong number,
Or whose telephone calls him in vain,
May suffer all day from bad temper,
Which is caused by the shock to his brain.

And this in its turn affects others;
The poison spreads far and spreads wide,
And I can avert or unloose it.
Now do I feel shame, or feel pride?

They tell me that seven of these horrors
Occur in each two hundred calls,
And millions of wrong ways are open
That lead to Telephonists' falls.

While only one way is the right one—
Why! it's clever of me to select
In one ninety-three, of two hundred,
From the millions of ways incorrect.

The one and the only correct one
And yet—seven's rather a lot.
If it happened with postcards or letters
We'd think it a terrible blot.

So I'll do what I can to reduce it
And very clear speech will employ,
And work hand in hand with the others
Till wrong numbers cease to annoy.

"HANWELL."

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.

ANOTHER VIEW OF TELEGRAPHS.

[During a recent discussion of Telegraph problems at the London Telephone and Telegraph Society, Mr. F. Kemp of the Secretary's Office made a contribution of such value that we invited him to reconstruct it for these columns. Mr. Kemp had a long experience as a telegraphist before coming to the Secretary's Office. We give space to his paper with appreciation of its merits, but we must not be identified with all the opinions that he expresses.—ED.]

THE answer to a hypothetical question, whether anything is wrong with Telegraphs, takes its form from the particular school of thought which claims our adherence. To the individual whose economic doctrine is still enshrined in the ancient policy of *laissez faire* everything is wrong. From the point of view of the student of industrial history who sees in State ownership the only hope of social salvation, little or nothing is wrong. I confess to a definite allegiance to the latter school, and, before daring to criticise certain aspects of the service I would prefer to indicate in what directions the Telegraph industry is successful. I have no intention of setting up an Aunt Sally for the doubtful fun of knocking it down. It is merely that, surveyed as a whole from the elevation of the social reformer, the Telegraphs are a definite and successful experiment in a hitherto practically untravelled economic direction. Viewed from the experience gained through many years of work in a busy Telegraph office, several more or less serious failings become apparent. The two points of view are, at one and the same time, possible and compatible, and do not prove obliquity of vision in the writer.

When acquired by the State in 1870 the properties of the different Telegraph companies formed a skeletonised service, with many competing lines on the "fat" routes and few or none to districts regarded as unremunerative. A large proportion of the population had no telegraph facilities at all. Within three years of State purchase, Metropolitan London had 334 telegraph offices instead of only 95, an additional 8,000 miles of posts and 46,000 miles of wire had been erected, and the telegraph had been extended to some hundreds of places where previously it had been unknown. At the present time the service is a vast and well-nigh perfect organisation by which the remotest corners of the kingdom are linked together, created by men who popularly are supposed to possess neither energy, initiative, nor enterprise.

The fact of a recurring deficit is often hurled at Telegraphs. The taunt may be countered by the assertion that "service" and not "dividend" is the corner stone of State enterprise, and that, in any event, the loss is incurred largely because—unlike most public utility companies—service is not confined to main lines of traffic where business is plentiful and profitable, but is given freely to rural districts where the telegraphs do little more than wait for an occasional customer. Telegraphs have assisted in the building of a huge trade in the home market, and, by maintaining easy access to the network of international communications, have played no inconsiderable part in the development of overseas markets which have poured wealth into this country. To the extent of the facilities offered by the Telegraph Service for the expansion of the national wealth, any deficit made up from public funds is productive expenditure in the economic sense just as much as the money spent on lighthouses, arterial roads, and compulsory education.

The present penny-a-word tariff for any distance is probably responsible for more adverse criticism than any other aspect of the service. There are two alternatives: one is an "economic charge" for telegrams; the other is a subsidy. The present charge is not profitable. It was not profitable even to a privately owned Telegraph Company whose lines connected only large towns, and when wages were much less than now. In 1865 the directors of the United Kingdom Electric Telegraph Company decided to abandon the shilling tariff (20 words) in view of the fact that, after working four years under the greatest possible advantages the company had been unable to earn a dividend. The company joined forces with two of its competitors and the tariff became one shilling for distances up to 100 miles (20 words, addresses free), 1*s.* 6*d.* between 100 and 200 miles, and 2*s.* for distances over 200 miles. There are no grounds for believing that present telegraph charges would be reduced if the service were in the hands of private enterprise.

The fatuous charge of lack of efficiency of Post Office methods can be disposed of with a passing reference to the untiring efforts towards improved apparatus revealed by a visit to the Engineer-in-Chief's Research Department; by the revelation of telegraphic wizardry seen in the C.T.O. and Cable Room, and by the soundness and symmetry of the construction work of the British State Telegraphs. It would, perhaps, be unkind to mention in the same breath the quality of construction—by very private enterprise—of the adjuncts of wireless reception defacing every suburb. My own interpretation of efficiency, as far as the Telegraph Service is concerned, is that, if the word means anything at all, it means good service rendered to the whole community, rich and poor alike; freedom from disastrous interruptions of service by strikes which threaten the safety of the whole industrial machine; continuity of employment and security from the dread of penniless old age; payment during sickness and holidays for its workers; and a service offered to the public without taint of exorbitant private gain, and without taking advantage of greater public needs to increase profits behind shelter of the iniquitous "law" of supply and demand. This, as I understand the term, is efficiency of service, and judged by this standard the efficiency of Telegraphs is immeasurably greater than that attained by other and privately owned essential factors of production, *i.e.*, the coal and transport services.

I am afraid much of this will be regarded as irrelevant. I write it because the solid efficiency (relative, rather than absolute) of the Telegraphs is almost entirely disregarded by the Press, unknown to the public, and nearly forgotten—or taken for granted—by the personnel of the Service. Recapitulation of the points on which the service deserves more praise than it gets will serve a useful purpose, even if it be only that of throwing into greater relief the aspects in which failure is apparent. I have spoken of relative efficiency, but viewing the subject from the higher plane of absolute—or 100 per cent.—efficiency, I say with the confidence of personal experience that a closer adjustment to the desired 100 per cent. can be secured.

Statistics may prove that less complaints of delayed telegrams are received from the public than ever before. They do not prove that delay is as uncommon an occurrence as half a century of accumulated experience of telegraph working should have made it. Fortunately for the Post Office the time occupied in transmission and delivery of telegrams is usually regarded with an uncritical mind by the public, who in the mass still associate distance with a time factor. For instance, a telegram handed in at Aberdeen for Penzance and delivered within two hours would excite no comment. Seven hundred miles in two hours. Wonderful! Yes, wonderful if telegraphy were still in its infancy, but in view of the developments in machine telegraphy, coupled with the increased carrying capacity of wires, such a performance calls for enquiry. The subject of delay will probably be faced with sterner criticism in future when broadcasting has forced home the fact that electricity has annihilated distance. The endorsement of every telegram with the cause of any delay exceeding ten minutes in a particular office gave excellent results many years ago by its perpetual reminder that delay was serious, inexcusable, criminal. The practice was abandoned. Without rapidity and accuracy any telegraph system is useless. If a fish merchant, after quoting prices to his customers early in the morning receives their orders late in the afternoon when the last fish train has departed, and if, in addition, his prices have been mutilated in transmission through non-repetition of figures, he becomes an unwilling supporter of the Telegraphs as well as a profane one.

A detail which impresses the public unfavourably is the apparent sang-froid with which telegrams are often regarded at the counter. To the counter assistant—I speak especially of the grocer-shop type—a telegram is one transaction amongst multifarious others. To the would-be sender his telegram at the moment is one of the outstanding facts of the universe. This matter should be looked at through the eyes of the customer. A small space railed off for "Telegrams only," and priority of service, would give the impression that the Post Office invested a telegram with as much importance as the sender does. Possibly if the customer could see the subsequent operations of transmission he would be satisfied. But he does not see them. Standing in a crowd of 16 at 6.30 p.m. recently in a suburban stationer's Post Office, and watching two assistants deal with Savings Bank deposits, registered letters, payment of pensions, and sale of insurance and postage stamps, whilst a third nonchalently entered her Postal Orders, I reflected on the futility of any attempt to telegraph to an address served by a 7 o'clock terminal office. Others reason on similar lines, then buy a penny stamp, send a postcard, and telegraph traffic is one less than it should be.

Delivery by messenger from a Head Office outside a very limited area is slow and costly. Delivery by messenger from a town sub-office in which a final transmission *via* a concentrator switch has been effected is invariably slower and more costly. The delay at a concentrator switch is often sufficient to make a conscientious telegraphist see red. Possibly the idea has been exploited but delivery by telephone would perhaps be encouraged by allowing free, subject to the minimum charge of 1*s.*, the telephone address of the addressee. A courteous request, when the message was telephoned, for the address to which the confirmatory copy should be posted would avoid reference to the telephone directory by the telephonist.

The most amazing phase of modern industrialism is the success of publicity as a means of creating a demand for a particular commodity. The most amazing phase of Telegraph administration is its dependence on its legal monopoly for obtaining its traffic. Intelligent and attractive publicity methods should not be ignored as potential sources of business for a State undertaking. If a matutinal health salt habit can be induced by confronting the public at every twist and turn with a picture envisaging its miraculous properties it is also probable that a telegraphing habit may be developed in the people by placing before them in the Press and in every Post Office the infinite possibilities of the telegraph for business and social purposes. Men and women are not in the present stage of their evolution creatures of pure reason. If they were their logically-thought-out systems of living would brook no interference by alluring posters. Being as they are they are susceptible to external influences in the shape of "Timely talks about the Telegraphs," especially if accompanied by pictures. The public's impressions of telegraphy are moulded by what they see or hear, usually a sounder in the corner of a shop. Paid newspaper advertisements, attractively designed and couched in the language of the people, would assist a realisation of the vastness and efficiency of the industry, and the convenience of the service which has been built up for their use. A telegram to most people is still a harbinger of disaster. A telegram should become a familiar occurrence, a necessity of social life and a means of promoting business, which, by being thrust on the retina in some place or other every day of their lives jumps into prominence whenever the slightest pretext for its use arises. Publicity has benefited

the Telephones. It has brought business to the Imperial cable. When our Micawber-like attitude towards traffic is abandoned it will bring business to the Telegraphs.

Assuming that a revival of trade plus the telegraphing habit increased the last annual total of 52 millions of telegrams by 50 per cent., could the increased traffic be disposed of rapidly and satisfactorily without increases of staff? In other words, would a greater output per telegraphist be given? It must be given willingly. It cannot be coerced. Staffing standards will not produce it. It will be a useless expenditure of money to encourage traffic if the Administration be unable "to deliver the goods." Is there any justification for believing the staff would respond to the greater demand on them. I must explain that by increased output I do not mean a tightening up of speed on the Morse and "rushing" methods to get big totals. Any attempt to secure increase in this way is to condemn a telegraphist to a life of penal servitude. My meaning of the term is that of exploitation of machine telegraphy to the full without regard to an arbitrary average per hour, and with the sole object of disposing of the telegrams on hand with the minimum of delay. There are difficulties. Between the Administration and the staff there is a gulf which, if anything, tends to widen. There is insufficient co-operation for the benefit of the public. The trouble is deep-seated and can only be adequately realised by tracing its development through many years.

(To be continued.)

GOLF.

SECRETARY'S OFFICE *v.* ACCOUNTANT-GENERAL'S DEPT.

Played over the West Essex course, Chingford, March 17, 1924.

RESULT.

Secretary's Office	11½	Accountant-General's Dept.	6½

SINGLES.

Secretary's Office.		*Accountant-General's Office.*	
R. A. Little, 2 up	1	G. E. Pitcairn	0
C. L. K. Peel, 5/3	1	C. Cross	0
H. W. Hardcastle	0	R. W. Woodford, 3/2 ...	1
F. Hardwick, 3/1	1	L. R. Andow	0
R. W. Roadknight, 7/6 ...	1	A. E. Day	0
De G. Gavey...	½	A. C. Smith	½
E. L. A. Foakes	0	S. W. Briggs, 5/4	1
T. A. Prout, 3/2	1	H. Buckland	0
H. H. Kilby, 5/4	1	H. E. Eckford	0
A. Gordon, 6/5	1	J. Hardie	0
H. E. Gallaher	0	A. J. Ratcliff, 2/1	1
E. R. Davis	0	R. Sellers, 1 up	1
	7½		4½

FOURSOMES.

Little & Peel, 5/3	1	Pitcairn & Cross	0
Hardcastle & Roadknight, 4/3	1	Woodford & Day	0
Hardwick & Gavey, 1 up ...	1	Andow & Smith	0
Foakes & Prout	0	Briggs & Buckland, 6/4 ...	1
Kilby & Gordon	0	Eckford & Hardie, 3/1 ...	1
Gallaher & Davis, 2/1 ...	1	Ratcliff & Sellers	0
	4		2

THE C.T.O. LIBRARY.

THE Annual Report and Balance Sheet of the Central Telegraph Office Library for 1923, whether judged by membership figures, subscriptions, number of books added, presented or rebound, or the number of transactions, all items show increases.

The Committee are to be congratulated upon the results achieved which have been in no small measure due to the amount of work performed by the librarian, Mr. A. Pethurst. When the fact is mentioned that no less than 23,881 exchanges of books were made during the year, some idea may be obtained of the amount of time which must have been devoted to the comfort and convenience of the members by the energetic Committee of ladies and gentlemen. 35 volumes on various subjects were bequeathed to the library by the late W. G. Gould, a former Assistant Controller of T.S.F., and an old and respected member of the library which were suitably acknowledged to the family.

J. J. T.

LONDON TELEPHONE SERVICE NOTES.

THE London Telephonists' Society held the final meeting of the Session in the Y.M.C.A. Lecture Hall, Aldersgate Street, E.C., on Friday, the 14th inst. There was a good attendance and the members were particularly glad to have the Controller with them on this occasion. The proceedings of the evening were commenced with the usual half-hour concert which was highly appreciated, the items being contributed by members of the Traffic staff at 32, St. Bride Street.

The first two prize papers to be read were on the subject of the "Wrong Number Trouble." Miss D. M. H. Bott's paper was well read by her colleague, Miss A. Price, in consequence of Miss Bott's serious illness, which was much regretted by all present. It dealt with the subject seriously, raised a number of interesting points and received considerable commendation in the subsequent discussion, while Miss J. M. McMillan's paper, written in the form of an operetta, was delightfully read in—as Mr. Valentine expressed it—her own inimitable way. Another speaker suggested that it could only have been improved had she sung the verses instead of reading them. Mr. Valentine, Mr. Benham and Mr. Dive contributed to the discussion which followed these papers, Mr. Dive adding interest to his observations by making good use of the blackboard and chalk.

Miss W. M. Etheridge then read her paper entitled "Every Day Work as a Sport," which was written as a sequel to the paper recently read by Mr. E. A. Pounds, but owing to the lateness of the hour at this stage it was generally regretted there was no time for expressions of opinion on this subject.

The Controller after distributing the prizes awarded in connexion with the "Papers Competitions" congratulated the Society on the work that had been done in the past and wished it success in the future. Before the meeting closed very hearty votes of thanks were accorded to the Controller for so kindly presenting the prizes, to Miss Cox the retiring President, and to the ladies and gentlemen who had entertained the meeting with the musical items.

Members of the Society will be interested to learn that Mr. P. W. H. Maycock has accepted the Committee's invitation to become President during the next Session.

Culled from the Exchanges.

Avenue.

A Bazaar in aid of the Westminster & Shadwell Childrens' Hospitals was held at the Avenue Exchange on Saturday, Feb. 16, and was opened at 3 p.m. by the Controller supported by the Chief Supervisor. The rest-room was crowded to the limit of its capacity with visitors and friends of the staff, who were also invited to visit the switchroom.

Mr. Valentine opened the proceedings with a crisp and comprehensive speech, explaining the object of the Bazaar, and making special reference to the work of the two Hospitals in the interests of which it had been organised. He concluded by commending the contents of the various stalls to the notice of all present, expressing the hope that all the pretty things displayed would be speedily bought up, and then declared the Bazaar open. A vote of thanks to the Controller was subsequently proposed by Miss Ashmead, and carried with acclamation.

A busy time followed for all and sundry. The refreshment room suffered acutely from congestion at intervals, but thanks to its staff of willing helpers, no serious complication arose, and the casualties were comparatively few. The various side-shows were well patronised, the Houp-La being a conspicuous success, to say nothing of the gipsy fortune-teller, whose caravan rested close by. As a result of the Bazaar £117 will be divided between the Hospitals above mentioned. The organisers take this opportunity of thanking all who in any way contributed to the splendid success of this effort.

We regret to state that our spring poet (who is incarcerated on the premises) has again broken out, and contrary to official instructions, insists on submitting *his* version of the proceedings, which we herewith append (with apologies to the Shade of Longfellow!):—

Tell me not, in mournful accents,
That you have missed our Great Bazaar!
For 'twould indicate you lack sense,
Or mislaid your "lucky star."

We were there and thought it charming,
As we wandered to and fro—
Though the stairs were most alarming,
And the crowds *did* overflow!

All the stalls were dreams of beauty,
Draped with bunting, red and white—
With their contents sweet or fruity,
And the flowers—a lovely sight!

Useful goods, both plain and fancy,
Occupied a goodly space;
Underwear to suit Aunt Nancy—
Other wear of silk and lace.

WHERE TO STAY.

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

Not a stall but drew our money,
Strive to pass them as we might,
Little pots of jam and honey,
Charmed our odd pence out of sight.

Woollen goods and toys in plenty,
Cheered the sight and claimed the purse;
Gifts for bairns from two to twenty—
So we went from bad to worse!

Music, books and stationery,
With their Vendors, caught our eye,
They became persuasive—very!
Urging us to stop and buy.

They were keen and they were pressing,
But the Houp-la was our goal—
So, not waiting for their blessing,
Swiftly down the stairs we stole.

Had we heard the gipsy's warning,
'Twould have saved us ere too late—
But, all thought of failure scorning,
We rushed blindly to our fate!

Later, we emerged, lamenting
(Not a single prize we'd won!)
All our reckless haste repenting,
O'er two coffees and a bun!

These disasters all remind us,
We must pay to make a "splash!"
Glad, we left our wealth behind us—
Hospitals will get the cash!

Let us then, be "done" and doing,
And not leave the funds to fate,
Still our work of love pursuing,
For the patients at the gate.

C. A. S.

Children's Tea.

On Saturday, March 8, a long postponed tea was given to the little patients in the Shadwell Children's Hospital, by the staff of the Avenue Exchange. It was originally intended as a "Christmas Tea" to be given on Jan. 5, but owing to an infectious outbreak this had to be cancelled.

The matron invited members of the staff to the Hospital, and escorted them to the wards, where they distributed toys and bon bons amongst the children, who seemed delighted to have so many visitors. They were especially pleased with little "Joey"—the ventriloquist's model who spent twenty minutes in each ward after tea. Miss Evans who followed "Joey" from ward to ward and danced to gramophone music, also gave great pleasure, if one could judge by the faces of the little invalids.

The nurses were very kind and worked hard moving their small patients from bed to bed in order to give them a better view of the entertainment. The helpers although glad to give their services and see the happiness given to the children, were nevertheless saddened by the sight of so much suffering, and are hoping to give them a similar treat at Easter.

Aven Swimming Club.

A grand evening Concert in connexion with the above, was held in King George's Hall, Caroline Street, W., on Wednesday, March 12. A very excellent programme was arranged, and although the audience was scarcely so large as expected, the various items were enthusiastically received.

Miss F. Blair-Street's very fine rendering of "O Flower of all the World" and "One Fine day" (from Madame Butterfly) was much appreciated, and her duet with Mr. Hugh Williams, "Miserere" (from "Il Trovatore") won a well-deserved encore. A duologue, "The Crystal Gazer" by the Misses O. Hoskins and E. Syrett was extremely entertaining, and Miss Phyllis Evans' unique and graceful dancing won for her tributes of flowers and chocolates. Also we must not forget Miss Winifred Hyde, who so charmingly filled the gap in the programme, caused by the regrettable absence of Miss Nancye Mitchell. Her two songs, "My task" and "The Butterfly and the Rose" were very sweetly rendered.

Mr. J. R. Jacob, whose fine baritone is well known to most of us, was at his best in "The Fortune Hunter," and "Youth" and "Barty," all of which were enthusiastically applauded. Mr. Hugh Williams also, well deserved the cordial reception which greeted his melodious rendering of "Drink to me only with thine eyes" and "Take a pair of sparkling eyes," and Mr. Roland Honor, elocutionist, made a decided hit with "The Highwayman" and "Education," the latter gaining an encore, "Seeing Things at Night." Mr. Cyril Sharpe's 'cello solos were really excellent, and were also encored, whilst Mr. Reg. Edyvean, upon whom devolved the office of accompanist, acquitted himself with the utmost distinction.

Last, but by no means least deserving of mention, was the very amusing sketch, "The Mere Man" (by Herbert Swears) the various characters being very spiritedly played by Misses N. Elliott, F. Brinsdon, M. Dansie, R. Edyvean, V. MacNab, R. Nicholson, B. Parker, and D. Smith. The whole performance richly merited the tornado of applause with which it was received.

The Club Committee desire to extend their warmest thanks to all the artistes who so generously gave their services, and provided us with such a very enjoyable evening.

North.

The third Saturday in January was the occasion of the North Exchange tea and entertainment to 156 children of the neighbourhood, when a very enjoyable evening was spent by all. "Cinderella" was performed by members of the staff, and a fund of talent was discovered among us. A Christmas tree was one of the features of the evening, prettily decorated by the exchange staff and illuminated by the kindness of the engineering staff with coloured electric bulbs, and twinkling round the dainty fairy hanging high on the top-most bough. At 4 p.m. punctually came eager arrivals, and soon the tables were filled and paper-hatted attendants and guests gave attention to the piles of good cheer which looked very inviting. It was noticeable the smaller the child the more solemn and decorous was its deportment.

After tea the entertained sang during the short interval before the pantomine commenced, our pianist skilfully playing an accompaniment suited to the requirements of each artist, one, a small singer of four years, joining heartily in the applause for himself. We then settled down to enjoy Cinderella and only the glow of the footlights remained and the coming of the fairies. We are all at some time Cinderellas and long for transformation, and so we watched a fair lady dance a minuet with Prince Charming, and be lost and found again, and crowned for ever afterwards, until the lights were turned on once more, and the children's cheers echoed to the rafters. Then came the distribution of toys, and general excitement when received from Father Christmas in the most Christmassy of robes and snowy beard, after which our visitors went home, questioned eagerly by less fortunate companions outside, who, alas! possessed no ticket which gave the welcome "open Sesame!"

DUNDEE AUTOMATIC EXCHANGES.

Two automatic telephone exchanges were opened in the Dundee area on March 15, one in Dundee and one in Broughty Ferry, to replace the manual equipments which have been in use for many years. The Dundee Automatic Exchange is equipped for 3,340 lines and the Broughty Ferry Exchange for 550 lines, and the equipment can be extended.

Complete automatic intercommunication is provided between the subscribers on the two exchanges; a Dundee subscriber is able to obtain direct automatic connexion with a Broughty Ferry subscriber and *vice versa*, without the intervention of a telephonist. The subscribers on these exchanges are also able to "dial" direct to the telephonists at the other manual exchanges in the Dundee area, such calls being handled manually only once, instead of twice, as hitherto.

There is no manual switchboard for Trunk, Junction, or Call Office calls at Broughty Ferry Exchange, as the Dundee switchboard serves the two exchanges. Broughty Ferry is therefore practically an unattended exchange.

THE WONDERS OF "WIRELESS."

A spoken address and selections of music broadcasted from America, 4,000 miles away, have recently been listened to by a student of the wonders of "wireless" at Canterbury. Special demonstrations had been arranged by the *Wireless World* to enable amateurs in this country to pick up communications from the General Electric Company's Station, W.G.Y., at Schenectady, U.S.A., and to enable them to do this it became necessary for the English students to be on the *qui vive* during the half-hour following 3 a.m. on one of the early mornings in December. It was, no doubt, somewhat of a "test" in more senses than one, but we are glad to learn that the vigil of Lieut. F. J. Frost, of Nunnery Road, Canterbury, was rewarded by excellent results. He was not only able to hear quite clearly the whole of the message sent out by the American demonstrator, but also the subsequent music, which concluded with a rendering of "God Save the King." Mr. Frost used a 3-valve wireless set of his own construction, 1 H.F., rectifier, 1 L.F., telephone transformer and low resistance telephones. It is an interesting point to note, as showing the excellence of some of the pre-war telephonic apparatus that some of the receivers connected with the set were actually in use on the instruments of telephone subscribers in London over 30 years ago.—(*Kentish Gazette & Canterbury Press.*)

RETIREMENT OF MR. JOHN MEWBURN, DISTRICT MANAGER, COVENTRY.

THE Coventry Telephone staff at a largely attended social gathering held at the Co-operative Cafe on Tuesday, Feb. 12, presented two oil paintings to their late chief. Captain R. S. Ferguson presided, and after referring to the absence of several from a distance, called upon Mr. W. H. Oliver, who had been associated with Mr. Mewburn for 24 years to make the presentation. Mr. Oliver in a well-thought out speech dealt with the opening of Coventry Exchange in 1892 and the appointment of Mr. Mewburn as District Manager in 1896, relating several features of his administration and of the steady growth of telephone business in the district, and concluded by asking him to accept the pictures as a small token of regard and along with the acceptance the best wishes of the staff that he may long be spared to spend a happy time in retirement.

Mr. A. C. Haley, District Manager, Leicester, then presented on behalf of the Surveyor, Assistant Surveyors, and all the other District Managers in the country two water colours by Miss Elizabeth Whitehouse.

Mr. H. H. Mears, Postmaster of Coventry, said that he wished on behalf of the Postal staff to express his appreciation of Mr. Mewburn's courtesy, kindness and tactfulness in the many problems that both staffs had from time to time to face.

Miss Hilda Thompson tendered on behalf of the staff a suede fitted bag to Mrs. Mewburn wishing her the best of happiness during the remaining years of her life.

Mrs. Mewburn briefly returned thanks for the gift and of being invited to the farewell gathering to her husband.

Mr. Mewburn, upon rising to accept the gifts, was received with a loud ring of applause. He said that the presentation had entirely knocked the bottom out of his heart for he never expected anything like the costly gifts they had presented him with. He feelingly expressed his gratitude and then proceeded to relate a series of incidents which he had encountered since he joined the Telephone Service at Blackburn in 1881 as an Inspector; of his transfer to Torquay as Superintendent in 1886, Local Manager at Lincoln in 1889, District Manager, Henley, 1893, and of his selection for a post of District Manager of the newly formed Coventry District in 1896. During the early part of his career he stated that a tremendous amount of prejudice against having any wires or poles anywhere near premises and of the difficulties experienced in getting subscribers' lines through to the exchange.

He concluded by referring to the severance of himself from the service through having reached the age limit of 60 years and of the decision of Headquarters to close down Coventry as a separate district. He thought there was no need for the staff to worry and trusted they would have every happiness wherever their lot might be cast.

Once more he thanked the staff for the gifts and of the pleasure the social gathering had given him.

The rest of the evening was given up to a Whist Drive, Mr. W. H. Oliver acting as M.C. Mrs. Mewburn distributed the prizes at the close of the evening to the winners:

First Lady's, Miss E. B. Cox; Second Lady's, Mrs. E. A. Mansfield; Mystery, Miss Partridge.

First Gentleman's, Mr. E. M. Royle; Second Gentleman's, Mr. G. R. Parsons; Mystery, Mr. F. Alcock.

PERSONALIA.

LONDON TELEPHONE STAFF.

PROMOTIONS.

Miss J. MORGAN, of Hammersmith Exchange, promoted to Assistant Supervisor, Class II, at Paddington Exchange.

Miss H. B. NOBLE, of Bishopsgate Exchange, promoted to Assistant Supervisor, Class II, at Clerkenwell Exchange.

Miss A. M. KAY, of Trunk Exchange, promoted to Assistant Supervisor, Class II, at Trunk Exchange.

Miss E. PHILLIPS, of East Exchange, promoted to Assistant Superviors, Class II, at Bishopsgate Exchange.

Miss D. E. OAKLEY, of London Wall Exchange, promoted to Assistant Supervisor, Class II, at Regent Exchange.

Miss E. B. APTED, of Regent Exchange, promoted to Assistant Supervisor, Class II, at Grosvenor Exchange.

Miss E. M. CORNISH, of Hop Exchange, promoted to Assistant Supervisor, Class II, at Regent Exchange.

Miss B. M. HOWLETT, of Maryland Exchange, promoted to Assistant Supervisor, Class II, at East Exchange.

Miss E. FERRARI, of Victoria Exchange, promoted to Assistant Supervisor, Class II, at Mayfair Exchange.

Resignations on account of marriage:—

Miss L. E. LOVEGROVE, Telephonist, of Holborn Exchange.
Miss D. HERBERT, Telephonist, of Holborn Exchange.
Miss F. E. GEMSONf Telephonist, of London Wall Exchange.
Miss F. BUCK, Telephonist, of Finchley Exchange.
Miss E. A. M. WESTON, Telephonist, of Wimbledon Exchange.
Miss R. J. ANDREWS, Telephonist, of Victoria Exchange.
Miss D. F. GRADY, Telephonist-on-Allowance, Reigate Exchange.
Miss A. CONWAY, Telephonist, of Paddington Exchange.
Miss M. L. THOMPSON, Telephonist, of Museum Exchange.
Miss A. E. FINCH, Telephonist, of Holborn Exchange.
Miss E. K. WALDEN, Telephonist, of Victoria Exchange.
Miss G. M. FUNNELL, Telephonist, of Victoria Exchange.

CENTRAL TELEGRAPH OFFICE.

The following promotions have taken place:—

Mr. S. K. HISCOX, Assistant Superintendent, to Superintendent (Lower Grade), March 11, 1924.
Mr. T. J. MANSFALD, Overseer, to Assistant Superintendent, March 13, 1924.
Mr. A. H. RUDDERHAM, Telegraphist, to Overseer, March 13, 1924.
Mrs. A. L. ALLSHORN, Telegraphist, to Assistant Supervisor, Jan. 6, 1924.
Mr. A. E. BOWDEN, Overseer, to Assistant Superintendent.
Mr. G. FRANCIS, Telegraphist, to Overseer.

OBITUARY.

Mr. W. R. Beeston.

We regret to announce the death at Bournemouth on Tuesday, March 18, of Mr. W. R. Beeston, late Chief Superintendent, Telegraphs, Manchester.

Mr. Beeston, who became Chief Superintendent on the retirement in 1913 of Mr. W. Pickthall, has resided at Bournemouth since he was superannuated in August, 1916. He was one of the most efficient officers who ever occupied the post of Chief Superintendent, and it is safe to say that, but for the handicap of ill-health, he would have held a more important appointment at the time of his retirement.

Mr. Beeston was one of the pioneers of Post Office Trunk Telephone development. He was in charge of the Trunk Department at Manchester for a long number of years, and in that capacity rendered invaluable service in the formation of trunk operating practice.

Compelled by ill-health to lead a quiet and retired life, Mr. Beeston was a great student of affairs and was, in his modest way, an authority on European politics. He was a splendid servant of the Department, and an excellent chief, possessing wide sympathies and a wonderful knowledge of humanity. Generous in his praise and ready as he always was to help subordinates who came up to his standard, he was not insensible to the fact that every man could not be a super-man. Many instances could be given of his kindliness and generosity. Possessed of a ready wit and much dry humour, he was a rare character amongst men, a friend to everyone who was fortunate enough to secure his confidence, and unselfish and tolerant to a degree. His many friends will miss him and our deepest sympathy goes out to Mrs. Beeston who survives him.

Mr. Richard Hardy.

The death occurred on Feb. 2, at the age of 68 years, of Mr. Richard Hardy, of Bromley, who will be remembered by many as formerly connected with the National Telephone Company in Bromley. Mr. Hardy was formerly at Torquay, but he came to Bromley on the opening of the Bromley Exchange when it was in East Street, of which he became manager. A former chief writes of him:—There are few men I have met whose character and disposition compel admiration and respect as did Mr. Hardy's. When I first met him at Torquay, more than 30 years ago, his energy and zeal appealed to me very strongly. Later on, when I transferred to London, Mr. Hardy soon joined the Metropolitan staff of the Company, and again was very soon promoted to Local Manager of the National Telephone Company at Bromley. It was a great blow to us all on the staff when ill-health compelled Mr. Hardy's resignation, now nearly 20 years ago. All his friends in the old National Telephone Company will deeply regret to hear of the loss of their old friend.

Col. C. B. Clay writes: "Perhaps it would be interesting to mention that he was the man who put up the span over the River Dart.

This span was, for many years, the longest in the country. I cannot remember accurately the length, but it was over half a mile.

Another point of interest in connexion with Mr. Hardy was his mechanical turn of mind. When he was stationed at Torquay he was frequently required to put up 60 ft. or 65 ft. poles, and there was difficulty in getting together a sufficient number of men, as they could only be borrowed from the adjoining districts. Mr. Hardy, however, made a truck in which was embodied a winch, and with this tool he often put up 60 ft. or 65 ft. poles with only himself and his three men."

THE

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CONTENTS.

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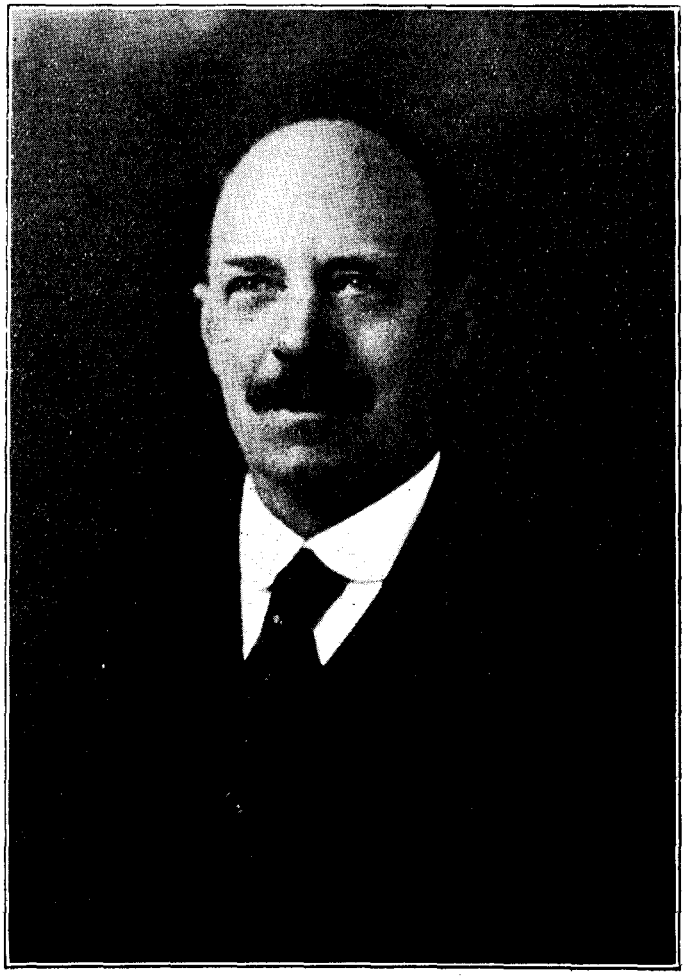
TELEGRAPH AND TELEPHONE MEN.

IV.—ALFRED WILLIAM EDWARDS.



MR. A. W. EDWARDS has spent his official lifetime in the Central Telegraph Office. He has had experience of every branch of actual telegraph work. Having passed through the practical stages he came on the clerical and administrative side and was for some time confidential Secretary to Sir H. C. Fischer, the first Controller of the Central Telegraph Office. He passed through all the grades of the clerical work until he reached a Principal Clerkship, then he became in quick succession Chief Superintendent, Assistant Controller, and Deputy Controller. It is in respect of his detailed practical knowledge of telegraphy, of the work of the Central Telegraph Office, of the history and development of the work of that office, and also of his unusual genial and helpful temperament that he has become so much to us all at the Central Telegraph Office. He has an enviable gift of seeing the way out of difficulties and invariably of seeing a cheerful way. He is not only a genius in the encouragement of sport, but he has the gift of being a sportsman himself and it is a great joy to see him winning prizes at swimming or at bowls or at golf with the same zest and eagerness and spirit of sportsmanship in which he encourages us all in our day-by-day work. The photographer has caught him on a day when perhaps difficulties were not at their worst, but his genial optimism would not have been less easy to discover if it had been taken on a day when the telegraphic stars seemed to be fighting against Sisera.

J.L.

THE PROBLEM OF THE TELEGRAPHS.*

BY T. E. HERBERT, M.I.E.E., *Assistant Superintending Engineer.*

IL S'AGIT DE FAIRE PENSER.

A FEW years ago the British telegraph system was generally regarded as a model service. In every old telegraph man there is an affection for the art which I venture to think will last whilst consciousness remains. And so, it is a real grief to many of us to see telegraphs falling on evil days, and not only so, but to fear that there may be worse in store. This may be pessimistic, but a time always comes when it is essential to look facts squarely in the face and then do a little constructive thinking. This time is *overdue*. The object of this address is not to propound a ready-made solution of the problem, but to indicate in general terms the factors concerned and to suggest correct lines of "thinking"; for, from careful and dispassionate examination of the fundamental facts there must emerge the solution of the problem. The following is a short article culled from the *Daily News* of Feb. 26. It is headed :—

SPEEDING UP THE TELEGRAPHS.

RIVALRY OF WIRELESS AND AIR MAILS.

"It is announced here that the International Telegraph Union at Berne is proposing a world inquiry into the growing neglect of the telegraph in internal and international communications.

In some countries, such as the United States and Scandinavia, the telegraph now contributes hardly more than 1 per cent. of the total number of electric communications, and in France, where lack of enterprise still leaves over 40 per cent. of the 36,000 communes unserved by the telephone, the proportion is only about 10 per cent.

The air mail is mentioned as becoming a powerful rival to the telegraph wire. A letter posted in Paris at 7.50 p.m. is now delivered at Casablanca, in Morocco, on the following morning but one, which is not always, but is sometimes, as rapid as the telegraph, and has other advantages.

In a single month last year 200,000 communications were sent by air route. The use of wireless telegraphy is growing very rapidly. The great station near Bordeaux sends messages as far as Saigon. Saint Assise serves America and Lyons, Moscow and Central Europe.

It is suggested here that if the plant and cables of the old system representing hundreds of millions are not gradually to be scrapped, tariffs will have to be reduced, and the service everywhere speeded up. In France it still often takes five hours to telegraph between Paris and Nice, and this is only an instance of the wide margin left for reform."

So it will be seen that we are not the only people who are in trouble. Samuel Butler remarks in *Erewhon* that "an art is like a living organism, better dead than dying," but my conviction is that telegraphs only suffer from a severe chill.

Stated in its most general terms the problem is that the telegraphs are not a paying proposition, and there is, moreover, a shrinkage of business, which is usually ascribed to competition with telephones. Some people contend that the telegraphs never were really remunerative; and that the taxpayer generally should *still* continue to foot the bill. Personally I cannot accept this proposition, and I prophesy that the problem can and will be solved by telegraph men. The solution does not lie in minor economies nor in introducing the conditions of a sweated industry, but it *does* lie in producing the utmost economy of *human effort* and in precise fulfilment of the needs of the community. If there is anything which admits of no possibility of controversy it is that the measure by which civilisation has advanced is in the progressive harnessing of the forces of nature to substitute human labour. Think of the method by which the Pyramids were built and the appalling cruelty with which the people were treated. And so, on general principles it may be said that *nothing* should be done by human labour or effort which can be done by machinery—using that term in its most general significance. Obviously enough, it is not good for anyone to be engaged in an industry which is in a decadent state. Clearly the material prosperity of the individuals engaged in the industry necessarily depends on the prosperity of that industry. Success, growth, and the general well-being of the telegraphs is the immediate *personal* concern of every telegraph man. The man who has no interest in his job whether he is a premier or a scavenger is worth little to himself or to others and futility is the badge of all that tribe. If you can make telegraphs go, there will be more higher appointments and better conditions, and terms of service for all concerned. Then, too, there is the inward satisfaction of forming part of a concern to which you are proud to belong. One can conceive nothing more deadening mentally and morally than to spend one's days hopelessly, helplessly, from day to day with no glimpse of a brighter future. But, need it be so ? I think not.

Now let us take a bird's eye view of what has been happening during the past twenty years. We have seen the advent of the motor car, the growth of the telephonic system and the advent of the aeroplane; our main roads have been vastly improved, and long prior to the war were carrying a volume of traffic greater than they carried immediately prior to the introduction of railways. And so, the means of communication have become more and more rapid. In London, this problem led to the introduction of the inter-communication switch by means of which telegrams across London were signalled by the office of origin direct to the delivering office. The time occupied occupied in circulation and re-transmission was thereby saved, but this is not enough. It is, I think common knowledge that the inter-communication switch system has not done *all* that was hoped for. The difficulty which is at present insuperable lies in what happens when two inexpert operators are connected together. Morse is accurate and rapid enough in the hands of skilled telegraphists, but there is a wide difference between the highly skilled and the unskilled operator. The time taken by the switching clerk to receive the call and to make the connexion with pegs and cords can be saved by the introduction of automatic switching operated in a manner somewhat similar to automatic telephone exchanges. Such an arrangement is not only possible, but has actually been worked out. By substituting some simple form of printing telegraphs with a typewriter keyboard for the Morse sounder, a most serious difficulty can be surmounted. There will also result a material saving of labour and consequently this development would tend in the right direction, viz., economy of human effort. The only case in which an automatic switching system is actually being installed is at Leicester, but this switch does not provide for putting the stations through to one another. It would, therefore, be more accurately described as an automatic concentrator or traffic distributor designed to save the switch clerk.

The suggestions adumbrated are only a possible partial solution of a small portion of the problem. The best line of attack on the main problem is to obtain definite replies to the three questions which follow :—

1. What do you want to do ?
2.—What is the good of it when you have done it ?
3.—What is the simplest and most direct way of doing it ?

What we want to do is to deliver a written message in much less time than it can be conveyed between the points concerned in any other way, and this time must be continually reduced as the means of mechanical transport become quicker. The telegraph service must, therefore, be expeditious; that it must also be accurate goes without saying. The system must be of good report, sound, solid and absolutely reliable. Most of the large towns in the Kingdom are served by underground cables which are safe from the elements, and in the event of a telephone breakdown these cables give an alternative service for business interests. The burning down of a large telephone exchange constitutes a disaster which will at the best take weeks to repair, whereas emergency telegraph arrangements can be made without much delay. Then, too, in time of war, our telegraph system becomes vital to our existence. We should desire, too, that people living in remote districts shall be able to send and to receive messages in cases of emergency. The day *may* dawn when everybody has a telephone and a motor car, but we are dealing with the conditions of to-day. Even so, if every house had its telephone there is still a field for the older art. The use of a long trunk line for a telephone conversation means that the speakers hire this plant for more than twice the period of their call. This is necessarily expensive—not so expensive as in the United States—but still very costly. By using telegraphs a single wire is occupied for a tithe of the time, and it may, therefore, be claimed that telegraphs should be the cheap and democratic method for communications which cannot suffer the delay of mechanical transport by post. The problem is more difficult here than in America, because our distances are so much shorter, and consequently we have so much less time for our telegraph operation to beat other means. In general, we live at a greater speed than did earlier generations, and so, rapidity is a vital factor, and increasing rapidity at that ! One might speculate that as time goes on, a large amount of business ordinarily entrusted to the post may be carried by telegraph message, provided the service is speeded up by the elimination of all delays. Much of the stock exchange work is at present so conducted. In America the use of telegraphs to speed up business transactions is much more general than it is here (probably because the distances are so much greater), many large concerns having private telegraph wires to their factories and branches. The wires are usually leased to the concern and the work is carried on very much as our newspaper private wires are to-day; this development in America is merely mentioned to indicate a possible field of telegraph development here, but one trusts it may come in the direction of increased traffic on our own lines operated by the State.

Now, as to the good of a quick telegraph system if we have it, and we must consider also in what directions the telephone service does not fill the requirements. Are both services necessary ? Both services are essential, but if a choice had to be made between them the balance appears to lie with the older art which provides a written record. Speech *can* be recorded and there would be no particular difficulty in setting up suitable arrangements to accomplish this, but the record would be troublesome to handle and to file, and there has never been any serious demand for the facility. The discussion of business matters by telephone is, of course, a feature of every business or profession, but over long distances this method is costly and decisions taken or bargains made require written confirmation, for it must not be forgotten that mistakes can be made when using the telephone. The value of the telegraph to the general community lies in the quick delivery of urgent messages from and to relatively remote places, the quick confirmation or urgent inquiries demanded by the ever-increasing stress of business operations,

* A paper read before the Institution of P.O. Electrical Engineers at Manchester on March 3, 1924. The Chief Superintendent of Telegraphs and a goodly gathering of the telegraph staff were present and took part in the discussion.

Improvements in or relating to Party-line Telephone Systems.

No. 168,338.

The owner of the above patent is desirous of arranging by license or otherwise on reasonable terms for the manufacture and commercial development of the invention.

For particulars address :—

HERBERT HADDAN & CO., *Chartered Patent Agents,* 31 & 32, Bedford Street, Strand, W.C.2, London.

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EXTRACT
from
THE EVENING TELEGRAPH,
DUNDEE,
MONDAY, MARCH 17, 1924.

BIG 'PHONE RUSH AT DUNDEE.

Offices Test the New System.

Installation Surpasses All Expectations.

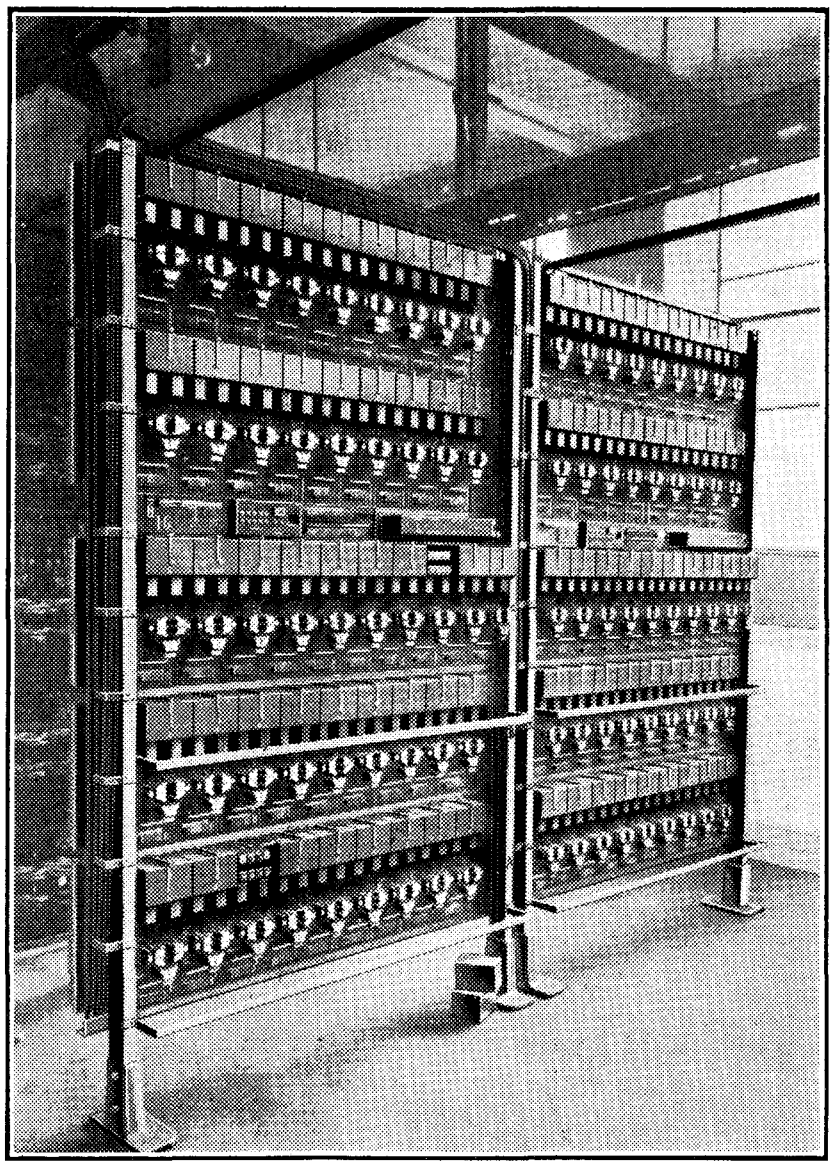
Dundee automatic telephone system had a thorough try-out this forenoon.

Private subscribers had had their innings during the week-end, as an observation shows that practically every householder possessing a telephone had "rung up" or been "rung up" by friends.

When offices opened this morning the new system was immediately put to a thorough test. Business friends were "dialled" in succession, and the traffic in the early part of the day was exceedingly heavy.

The official view is that the system had come through to-day's tests in a highly satisfactory manner, and had indeed exceeded in this respect the highest expectations.

It was to be expected that such



G.P.O. AUTOMATIC TELEPHONE EXCHANGE, DUNDEE.

TWO BAYS OF FIRST SELECTORS

Another view in the Dundee Automatic Exchange appeared on this page in the April number of this journal.

its value as an alternative in the event of telephone interruptions, and its strategic value in case of war. Hence, a sufficient case has been made for the absolute necessity of the continued existence and development of telegraphs.

The most difficult part of the problem remains for consideration. For many years I have been deeply interested in scientific management—the system invented and introduced by the late Dr. Taylor. Everyone is using part of the system—many nearly all of it. It was this system which produced all the war material, and which to-day is in operation in every great works in the world. The detailed application of the system is complex, but its essential principles are capable of explanation in a few words, and will be useful in analysing telegraph processes. Its main feature is the "motion study" by which it is ascertained what is the simplest and most direct method of executing a particular piece of work. Precise and detailed instructions are given as to how the task is to be performed. By eliminating all waste effort and by ensuring that the work is done in the most efficient manner, the economy of the process is enormously increased.

During a certain year the total receipts were inadequate to cover the cost of wages of the telegraph staff, and to-day there still is a huge deficit on the working of the telegraphs. Since the bulk of the expenditure falls under wages, this is where economy must be effected. Not in rates of pay, for, if one thing has been made clear it is that given efficiency in the processes adopted, *i.e.*, if all superfluous human effort is eliminated, wages are of little consequence. It is then in economy of human effort where we must look for our savings. Here there are two aspects which require study. Firstly there is the avoidance of re-transmission; the ideal being reached when the single signalling of the message produces the record at the delivering office. Secondly, there is the actual delivery of the telegram.

Taking first the avoidance of re-transmission, something has been done in this direction in endeavouring to establish zones somewhat on the lines of the telephone trunk zones; this tends in the right direction. Then, too, we have the phonogram traffic, and firms are encouraged to send and receive telegrams over their telephone circuits. This traffic seems to be growing.

Let us now take a glance over the systems in use at the moment. Recently the Morkrum teletype has been introduced from America. This machine has a typewriter keyboard and prints the message on a tape. It can, of course, be duplexed and so comparison can be made with an ordinary keyworked circuit. It is quicker and requires less human effort than Morse to operate, but it requires a power supply to run the motor. This makes its use in out of the way places somewhat difficult, and there is, too, the necessity for skilled maintenance attention. But this difficulty is not insuperable; for example, secondary cells and a Ford van to make a circuit of a number of offices each day is a possible solution.

Another suggestion is that all remote places should send and receive their telegrams over relatively short telephone circuits to the nearest transmitting centre. The sphere of the teletype would then be on less busy inter-zone lines. Hand-worked Morse need not be used at all if telephone circuits are provided to the transmitting centres. The question here raised needs careful exploration on economics.

Many authorities agree with Mr. H. H. Harrison in his conclusion that, but for the Creed additions, the Wheatstone system would have disappeared long ago in favour of the Multiplex working. An automatic system necessarily involves delay in collecting the punched slip, and requires the services of a key clerk. Creed's receiving perforator enables us either to re-transmit or, by passing the slip through a printer, to have the message printed in Roman characters either on a tape or, by his latest machine, in page form. This apparatus has been developed, and instead of the pneumatic plant formerly necessary, all that is now required is a power supply to work the electric motor. This constitutes a notable advance. Recently a Creed Quadruplex has been devised which gives a working speed of 120 words per minute on both the A and the B sides working simultaneously. The new Creed keyboard perforator is operated by an electric motor and is said to be much simpler in construction than any of the existing types.

The Baudot multiplex was, as everyone knows, duplexed by Lt.-Col. Booth. Plain Baudot working involves the observance of the cadence, and consequently there is considerable strain on the operator—a strain which can readily be avoided—and working speed can consequently be increased. A keyboard perforator is employed to perforate the transmitting tape.

This tape passes through a transmitter which mechanically obeys the cadence, thus leaving the keyboard quite free—various devices for the storage of the signals have been devised to avoid the use of the tape, but so far not one of them has come into practical use. Indeed, it is very questionable whether such a device is worth while, for the tape constitutes a record and enables errors to be corrected by pulling back the tape and punching 5 holes. This eliminates the character wrongly punched, and does not effect the receiving printer. At the distant end the signals may be received on the ordinary Baudot printer, or on a page printer. In passing it is perhaps interesting to remark that the first combiner or printer devised by Baudot was an electrical one as is the W.E. Co. Printer to-day. Murray, on the other hand, follows the mechanical methods of Baudot. The utmost economy of line plant results from multiplex working, and ultimately it will probably supersede other methods. Donald Murray was the first person to set out quite clearly the theoretical essentials of the problem of printing telegraphs, and his booklet, *Press the Button Telegraphy*, will well repay careful reading by everyone interested. Anyone who takes up the problem of the telegraphs seriously can scarcely afford to overlook any of Donald Murray's writings.

If we have all our main line traffic sent over circuits by the best apparatus yet devised and with the minimum of human effort, we still have one or more re-transmissions at each end in most cases.

A system has been suggested by the Creed Co. which involves the provision of transmitting apparatus at the sub-offices for operating a receiving perforator at the H.P.O., and for receiving messages either in Morse code or a slip or on a printer at the larger sub-offices where a power supply is available. The received perforated slip at the Head Office is labelled for the circuit on which it is to be transmitted and passed through a transmitter there. Curiously enough, a somewhat similar idea was suggested some years ago, but a circular sheet of paper holed in the form of a volute was proposed. The machine at the sub-office was worked C.B., and was a fairly simple type of printer. This is not suggested as the solution, but no idea should be dropped on the ground that it is impossible of execution until it has been examined by a telegraph engineer.

The first exchange consisted of A.B.C. telegraphs instruments and a main line switching system was introduced in the very early days of telegraphy. Is it possible that some such system operated automatically is the solution we seek? As to circuits necessary, there appears to be no problem. Telephone circuits can be composited and telegraphs worked on each leg of the loop. But given all this, viz., a switching system which would enable the sub-office to get the distant station, there ensues the difficulty of locating the correct delivery office. This might be arrived at by dividing up the larger towns into numbered areas which would have to be included in the address or to recover the cost of the extra transmission by imposing an extra fee. For very remote places where one could not contemplate the installation of even the simplest telegraph, the message would perhaps be transmitted by telephone.

Turning now to the phonogram traffic, it seems possible that very large firms might be willing to have similar apparatus to the larger sub-offices and to transmit their messages direct with some metering device; or their typewriter keyboard apparatus might provide a perforated tape at their H.P.O. Their received messages could be printed direct on to their own machines. These printers might be worked either on their telephone exchange lines or on special wires. If the volume of traffic was great and the use of this rapid service extended one would begin to see the dawn of a brighter future for our telegraphs.

Some possible lines of investigation as to how labour can be saved have been dealt with, but we are not at the end of our troubles. The actual delivery of telegrams is by no means an inexpensive process. Where the messages cannot be sent over the addressee's telephone circuit and delivery by hand is therefore necessary, it is essential to consider two divergent requirements—expedition and economy. At country offices with few messages, little can be done, but in large towns one wonders whether, say, half-hourly deliveries on more or less organised journeys by motor cycle would be possible. Surely there is some better solution than our present method. For example, does any firm or company run any service over the ground to be covered? The tramway parcel system is, of course, too slow, but is there any other possibility?

There are one or two other matters which naturally arise on which a few brief remarks are called for. First, there is the question as to what will happen if large labour savings can be effected. Surely, there are ample opportunities for displaced staff as, for example, as clerical officers or assistant traffic superintendents, in the Post Office and there are, of course, many other Government departments which could help. What the selected ex-telegraphist might lack in educational attainments would be made up for by the fact that his personal equation had been tried and proved, whereas, with the outside candidate it is, at best, problematical.

Next, there is the question of efficiency and co-operation generally. To rescue the telegraphs means that it is essential that the best and ablest men shall have the chance to utilise their abilities in the best interest of the telegraphs. In the present condition of affairs the sentimental luxury of promoting men of long and faithful service but of mediocre ability in preference to your best men is a luxury the staff cannot afford. By *best* is meant men best fitted for the vacant position. If the differences between two men are fractional, then, bearing in mind the fallibility of human judgment, there can be no objection to the promotion of the senior. The most anxious work which higher officials undertake is in the selection of men for promotion and it is always the subject of most careful and most anxious thought. Everyone charged with responsibility for an action or a decision which sometimes sours a man's life must necessarily take that duty with solemnity and everyone should believe that the duty has been honestly performed without fear and without favour.

The ideal to be aimed at is a staff which from top to bottom all pull together for the common good of the art. Nature itself has two methods; the law of the sharpest tooth and claw and the co-operative, mutually helpful, method, of the ant. The latter method always wins.

The problem you have to face and solve is one you must solve for yourselves. No committee of so-called business men can or will help you because of the detailed traffic and technical knowledge required. Some of my audience who are closely in touch with the requirements, will, I hope, tackle the problem and ultimately find a solution. There is, of course, the Telegraph and Telephone Society in Manchester which will be useful in general in stimulating thought, but this alone will not do what is necessary. Formal papers and discussion at long intervals cannot take the place of a *study circle* and *that* is what I want to suggest to you. You know the necessities and

conditions of the problem and I am sure that if you select your ablest man to study it, it will not be very long before the British Telegraphs will once more be a pattern for the emulation of the rest of the world.

The discussion which followed the paper was on a remarkably high level and many lines of useful constructive suggestion were indicated by the various speakers. In calling upon Mr. C. J. Mercer to open the discussion, the chairman (Mr. W. J. Medlyn) emphasized the importance of the well-known engineering maxim that the cost of perfection is often prohibitive; that the correst or economic solution is one which approaches this ideal and provides a reasonably good service adequate to the needs at a reasonable cost.

Mr. Mercer was disposed to think that even closer co-operation between Engineers and Traffic staffs was necessary to further progress. Superposing had been developed in America to a far greater extent than in this country, and from considerations of economy he believed there was much which could be done here. He advocated a closer connection between telegraphs and telephones and would like to see every telephone exchange also a telegraph office. Together with other speakers Mr. Mercer was emphatic as to the absolute necessity for adequate publicity. It is the fact that all the facilities provided by our telegraph system are by no means well known to the general public. In addition to the ordinary methods of advertisement, it was suggested by a later speaker that the counter staff who come into direct contact with the public should make a point of giving such information on every possible occasion. In fact, the ordinary methods of salesmanship should form part of the training of these specially selected officers.

Mr. G. Jewell (Chief Superintendent, Telegraphs) expressed very strongly the view that the tariff must be reduced and the service accelerated. Given this he was optimistic as to the result. He, too, emphasized the need for adequate publicity and alluded to the surprise expressed by a party of Pressmen who recently visited the Instrument Room that so large and highly organized a system was in operation. With regard to machine telegraphs, Mr. Jewell explained the necessity for absolute reliability and the difficulties which ensued from stoppages. At a later stage Mr. Vernon discussed some of the difficulties which occur in practice, and expressed the view that the system of training dirigeurs was by no means adequate for the responsibilities which fall upon their shoulders.

A particularly thoughtful speech was made by Mr. Gates of the telegraphs, in which he claimed that Morse craft must persist because of its use in war, for he could not visualize a machine telegraph in the trenches. Mr. Gates was equally emphatic as to the undesirability of political interference such as resulted in giving the unremunerative Press rates in the early days of state telegraphy. He deplored the handing over of the Press work to private enterprise, and suggested that this was due to the fact that no political party dared to face the consequences which would result from raising the rates to a price commensurate with the services rendered. But, perhaps the most revolutionary suggestion was that a wrong policy had been adopted in arranging a host of delivery offices, and that economy and expedition could be effected by much larger concentrations serving relatively wide areas. This suggestion constituted a direct reply to the lecturer's request for exploration of the delivery problem, for, as Mr. Jewell had earlier remarked, it is not much use speeding up your main line service so that the message is received 200 miles away within 15 minutes of the time of handing in, if it then takes an hour to deliver to the addressee.

Mr. Gates accepted the lecturer's remarks on the subject of promotion—indeed he may be said to have emphasized them. The subject is indeed difficult, and Mr. Jewell told the meeting that these problems had caused him many and many an anxious and sleepless night. Mr. Gates realized fully that the telegraphs needed, in its period of adversity, the best brains that could be obtained, and so even if the system was all that it could be, a defective personnel was fatal. On the other hand, a good personnel would achieve results even in the face of serious difficulty. He agreed that it was in the best interests of the staff—taking a long view—that promotion should be given to the officer best fitted for the position, although he realized fully the tragedy which so often followed disappointed hopes.

It was unfortunate that the discussion had to be closed since there were many other gentlemen who desired to take part in it. This account fails to do justice to the sustained interest with which the audience followed the lecturer's remarks, the very live discussion, and his final reply. In this Mr. Herbert expressed his thanks for the reception of his address and commented very briefly on the points raised. He reiterated his original statement that he wanted telegraph men to do some solid thinking, and the various suggestions made were avenues to be explored.

The following cutting reproduced from the *Liverpool Echo* of Feb. 6, on the subject of Publicity, is of interest in view of the various speakers' remarks :—

PUBLICITY FOR THE POST OFFICE.

THINGS THE PUBLIC OUGHT TO KNOW.

"In an article on the Labour Government and the Post Office in the current issue of the *Labour Magazine*, Mr. Walter Baker, M.P., advocates the abolition of Treasury control of the Post Office and the setting up of a publicity department properly to bring before the public the many services which the Post Office performs, and which are at present unknown to the public.

Such a department, he says, would inform the public of many things. The public would discover that letters can be sent by any particular passenger train and delivered immediately on arrival; that a telegram can be posted in a letter-box; that it is possible to telegraph from an office after the closing hour; that there are services for night telegraph letters and weather forecasts; that life insurances can be taken out and annuities purchased; that there is a multiple address system for telegrams; that by means of a deposit account large quantities of letters may be posted without immediate payment or the trouble of affixing stamps; and that there are scores of other services undertaken by the Post Office."

RESOURCEFULNESS OF OPERATORS.

THIS is a subject which often engages the attention of American telephone periodicals, and we are glad to print the two following communications (which came into our hands within 10 days of each other) testifying to the fact that the British telephonist is not to be outdone in this connexion when occasion requires.

The first is a letter from a subscriber in South London :—

I am afraid that in their attitude to the telephone service the many-headed usually pose as a "terror to evil doers" rather than "a praise to them that do well."

But I am straitly charged by my better-half to testify to the good deeds of the male supervisor at our Sydenham Exchange early yesterday morning.

We had got up at 6.30 a.m., on account of the departure of two friends staying with us who had arranged by the 8.55 a.m. from Victoria (South-Eastern) for Brussels.

Suddenly the thought struck me like Archimedes in the Bath, that I seemed to have seen in some paper that Continental trains were to be advanced one hour in leaving London on account of the earlier adoption of summer-time in France and Belgium. At that hour the ordinary railway enquiry offices were not open, and the only course was to throw ourselves on the tender mercies of the Sydenham Exchange, where the Supervisor proved to be a guide, philosopher and friend. About half-an-hour was spent in attempts to get on to Victoria (South-Eastern), in getting into communication with the Victoria Station (Brighton) switch, then to the Stationmaster's office (Brighton) who referred us to the Stationmaster's office of the South-Eastern, which did not answer. The Supervisor took up the matter with interest and pointed out that the Brighton Company had a service to Newhaven and Dieppe so that the Stationmaster ought to know whether the Continental trains were altered. Back again to the Stationmaster of the Brighton, who said the time for the Newhaven train was *not* altered although he rather thought the times for the South-Eastern services, both to France and Belgium, *had* been altered. Still no reply from Victoria (South Eastern), and finally the Brighton Stationmaster kindly agreed to send some one round to enquire at the South-Eastern station who brought back the information that from that morning the train for Dover—Ostend was starting at 7.55 instead of 8.55.

It was now 7.0 a.m., and we had to get into touch with the garage, from which a car had been ordered to come to the house after 8.0 a.m. No reply from the garage, and in desperation we routed out our youngest boy who tore along on his bicycle, but meanwhile my wife had asked the Supervisor (who entered into the spirit of the thing as if it was a steeple-chase) to keep on ringing up the garage which he did so effectually that the driver had been roused a minute or so before the boy arrived. More lightning work at the garage and a final rush to Victoria, in the spirit of John Gilpin or Dick Turpin, where the car finally drew up in triumph 10 minutes before the train started at 7.55 a.m.

I am afraid I have been rather jocular, but in all seriousness it would be difficult to speak too highly of the patience, persistence, quickness and resourcefulness of the Supervisor to show we are much indebted for success in dealing with an unexpected emergency.

The second is a report from the Supervisor of Paddington Exchange :—

Not long since a subscriber asked the D.Q. officer if it were possible to give him the telephone number of a Doctor who lived a twopenny tram-car ride from Aldersgate Street. He was unable to furnish either the name of the Doctor, his address, or the district in which he resided.

The officer who received the enquiry (Miss A. C. Mayling, telephonist), having some knowledge of the districts served by tram-car from Aldersgate Street, suggested that Dalston might be the required district, and the enquirer thought this might be correct.

The Buff Book was then consulted and several Doctors names and addresses were quoted, until the subscriber eventually recognised the one he required. The telephone number was then furnished and the caller expressed his gratitude stating that the call was a most important one.

WRONG NUMBER TROUBLE: ITS CAUSES AND REMEDIES.

AN OPERETTA FOR ANY NUMBER OF MODULATED VOICES. IN ONE ACT; AND AN APPROPRIATE NUMBER OF "SCENES."

BY J. M. MCMILLAN.

Dramatis Personae.

THE CHIEF OF STAFF.	"A" AND "B" TELEPHONISTS.
TRAFFIC SUPERINTENDENTS.	A SUBSCRIBER (ON).
AN EXECUTIVE OFFICER.	A SUBSCRIBER (OFF).
SUPERVISORS.	A MESSENGER.

Time—The Present Day.

FIRST "SCENE."

A Traffic Officers' Meeting.

Chorus of Superintendents.
Twenty Superintendents we
Meeting here in unity;
Looking for a cure (*per se*),
Searching for a remedy;
Some way out there's sure to be—
Hopeful Superintendents we.

1st Superintendent.
We seek a cure from each enlightened member.

2nd Superintendent (aside.)
(My sudden laugh a strangled cough must seem).

3rd Superintendent.
A cure for what, I *wish* I could remember.

Chief of Staff. Digital difficulty was our theme.

Chorus of Superintendents.
Ah, misery! ah, misery!
No panacea can we see,
No cure, no certain remedy;
Ah, misery! ah, misery!

1st Superintendent.
Digital difficulty! Phrase outrageous;
What it may mean none but the learned know.

Chief of Staff. Numeral deviations now engage us—
Wrong Number trouble—if you'd have it so.

Chorus of Superintendents.
Ah, gaiety! ah, gaiety!
At length a ray of light we see.
A simpler phraseology—
Ah, gaiety! ah, gaiety!

(*A subscriber enters.*

1st Superintendent.
Here comes the source of half our woes—address him with solemnity—

3rd Superintendent.
"I doff to you—hats off to you,"
And that's what I shall say.

1st Superintendent (continuing).
"We'd like to know what you propose to pay us as indemnity."

3rd Superintendent.
"I bow to you—kow-tow to you,"
And that's what I shall say.

1st Superintendent.
"You do not seem to care at all for tactful reciprocity;
Our leaflets leave you cold, aloof—you spurn our generosity;
And we are quite unmanned by your unbending animosity;"

3rd Superintendent (offering hand to subscriber).
"My palm to you—salaam to you,"
And that's what I shall say.

Chorus of Superintendents.
"I doff to you, hats off to you,
I bow to you, kow-kow to you.
My palm to you, salaam to you,"
And that's what he will say.

Subscriber (plaintively).
Your pardon I crave
As your portals I brave,
Believe me (though sorry to trouble you),
My accent is pure—
I could not endure—
To say WUN if not spelt with a double-you.

I put it to you
That the way I stress TWOO
Would soften e'en hearts super-stony;
And to hear my rolled "r"
Folks arrive from afar—
So I'm broadcasting soon for Marconi.

I always say FOER,
Nor would I e'er lower
My standards by calling FIFE "five."
My SIX and my SEV-EN
Keep people from Heav-en,
They hear me—and then stay alive.

My EIGH-TT, if you please,
Ends in well-pronounced "t's"
Which shake ev'ry core of my fibre;
Long vowels in NINE
Have always been mine—
In short, I'm a model subscriber.

Chorus of Superintendents.
He *says* he's a model subscriber.

Subscriber.
You doubt me, I fear,
Ah, forgive this brief tear,
But my troubles are really gigantic;
I pronounce with such care,
Yet am spurned by the fair,
Who are pleased to pronounce *me* pedantic.

My numbers are fated—
When once I awaited
A call from a *very* dear friend;
They told her "engaged,"
She was justly enraged,
And my dream had a premature end.

(*Supervisors enter.*

Subscriber (admiringly).
I cannot believe
They intend to deceive,
Their mien is demurely inspiring;
Oh, lovely of face!
(*aside*) (I'll enlist their good grace,
If they'll pardon my glances admiring).

I'm a shy, modest lad,
But I'd just like to add
You may sail from the Thames to the Tiber,
Yet, though harshly maligned,
You never will find
(*Entre nous*) such a model subscriber.

(*An "A" and a "B" Telephonist enter.*

Subscriber (aside).
How happy could I be with either,
Were t'other dear charmer away.
Together, I'm valued by neither,
Alone, I'd know *just* what to say;
Oh, tol de rol rubble, the wrong number trouble,
Would very soon vanish away.

Telephonists.
Oh, tol de rol rubble, the wrong number trouble,
Would very soon vanish away.

Subscriber.
How happy could I be with either,
Not both—but with "A" or with "B,"
Together, I'm welcome to neither,
Alone, we'd be *sure* to agree.
Oh, tol de rol rubble, the wrong number trouble
Would soon commit *felo de se.*

Telephonists.
Oh, tol de rol rubble, the wrong number trouble
Would soon commit *felo de se.*

Subscriber.
Give thee good-day
Oh, maidens gay.

Telephonists.
With joy we greet you,
We're pleased to meet you.

Subscriber (to "A" Operator).
May I ask a question, please,
Re the Order Wire—and Keys.
Pray, forgive me if I blunder,
But I very often wonder,
When your day has been a long one,
If you sometimes touch the wrong one.

"A" Telephonist (reproachfully).
Oh, base ingratitude,
Unpleasing attitude,
Hearts to dissever—
Oh, never, never!

Subscriber (to "B" Telephonist).
May I ask, please, for *your* views,
Re a phrase I'm told you use;
(Oh, absolve me if I err),
Can you truthfully aver,
When the word "Repeat" you mention,
It's not due to inattention?

"B" Telephonist (indignantly).
Ignorant minion!
Your base opinion
Expressed, or thought,
To me is naught.

Subscriber (mournfully). "Wanstead," "Hampstead," "Richmond," "Brixton,"
Clearly to pronounce I'm fixed on.
"Hop" and "Park" I *always* say
In a most pellucid way—
Someone puts an awkward name on,
But it's *me* they put the blame on.

Telephonist. Someone puts an awkward name on,
But its *us* they put the blame on.

Subscriber (joyfully). I knew you'd see my point of view.

Supervisors and Telephonist. But *we* possess a viewpoint, too.

Subscriber (with determination). But mine's the *only* point of view.

Supervisor and Telephonists (obstinately). *Ours* is the only viewpoint, too.

Subscriber, Supervisors and Telephonists. Harsh shock
From fate;
Deadlock;
Stalemate.
What *can* we do?

Chief of Staff (pianissimo). Co-operate.

Subscriber, Supervisors, and Telephonists. What *shall* we do?

Chief of Staff (pianissimo). Articulate.

Susbcriber, Supervisors, and Telephonists. In vain
We prate;
Our brain
Inflate.
What *can* we do?

Traffic Superintendents (fortissimo). CO-OPERATE!

Subscriber, Supervisor, and Telephonists. What *shall* we do?

Traffic Superintendents (fortissimo). ARTICULATE!

Subscriber, Supervisors, and Telephonists. Oh, kindly fate,
Adjudicate;
We will, we will co-operate;
We will, we will articulate.

SECOND "SCENE."

British Subject (singing through keyhole). Ach! Donner und Blitzen,
Mein Karl und mein Fritzen
Can shpoke lofly Englisch—vell, rader;
Dey don't gif no droubles,
Dey say goot deir doubles,
Though not kvide so vell as deir fader.

Messenger. The gentleman's from Golders Green,
Induced (by force) to stay unseen.

Executive Officer (jumping up). As an officer appointed as Executive,
I make the decree, he *shall* not live
If you listen you will hear him mutter all
His sentences in accents guttural.
Off with his head, he *shall* not live,
And I'll gladly do the deed—as an Executive.
(Rushes out with Official knife.

Telephonists (to first subscriber). Ah, do not shrink,
We always think
Kind thoughts of *you*,
Indeed we do.

Subscriber. Give, of your charity,
A tuneful clarity
With no disparity
In word or act.
And thus my mind at ease,
I'll hear your "Number, please"?
And strive my cue to seize,
With kindly tact.

Telephonists.. We, of our charity,
Will give you clarity,
With no disparity
In word or act.
And when, your mind at ease,
You hear our "Number, please"?
You'll strive your cue to seize,
With kindly tact,

Subscriber (tenderly). I'll think of each telephonist as young, demure and slender,
And speak close to the mouthpiece with an accent strong yet tender,
Then list with concentration to the number she will render.

Telephonists. Oh, do not deem the period of waiting quinquagesimal,
But when we've said it back we'll pause the fraction of a decimal;
And all our troubles soon will cease—or be infinitesimal.

Subscriber. Oh, voices sweet;
In measures meet
Your praise I'll sing
Like anything.

Telephonists. Our voices sweet
In measures meet
He'll praise, and sing
Like anything.

Trio ("A" and "B" Telephonists and Subscriber). If I'm distinct
And you're distinct,
And $\frac{he's}{she's}$ distinct in speaking,
Each troubled mind
Will quickly find
The remedy it's seeking.
We will not shirk
The hardest work,
No grievances will cherish;
But ever be
In unity
And may all traitors perish!

Chief of Staff. The Wrong Number Trouble (its Causes and its Cures;
Its Reasons and its Remedies) no longer joy obscures.
With clear articulation,
And keen co-operation,
All need for lamentation
Is gone, while life endures.

Superintendents. With clear articulation
And keen co-operation
All need for lamentation,
Is gone, while life endures.

Telephonists. Instructions
Cause ructions,
Letters to *Punch* and quite uninformed deductions.

All (Grand Finale). Articulation
Tell the Nation,
Is the Key to the Whole Telephonic Situation.

CURTAIN.

CORRESPONDENCE.

DIRECT TYPE KEYBOARDS *V.* TAPE STORAGE PERFORATORS.

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

SIR,—The Minniotti method of direct sending with 5-unit code, as presented by Mr. Castelli, compels interest. The saving of the tape is in itself a small detail, but one which matters a lot. That brilliant and respected genius, Mr. Murray, in your April issue, is enthusiastic over the 2,000 tape perforators using the Murray code in America, but he does not give the "Direct column printer" a mention. It was these "Direct Column Printers" which made this astounding success of tape storage methods. The Murray code, which was invented for typewriter Multiplex working, contributed the lion's share towards that success. Mr. Castelli's arguments against tape storage at the sending end when there is also tape storage at the receiving end (gumming) cannot be disputed. Heavy delay occurs on R.Q.S. The acid test is when the inevitable whole or partial multiplex stoppages occur. The difficulty at the two ends of the circuit is to find out what the other end has received, in order to give the belated traffic another chance. This means congestion due to delayed diverted traffics, and delay to current traffic. Also there is a tendency to confusion and failure of telegrams. The Minniotti method is a sign that the Baudot Multiplex has passed its hey-day, and will have to give way in its turn to more simple, stable methods which are the inexorable demands of time.

For instance, simplex working on Phantom circuits with direct type keyboard sending and tape receiving is one method.—

J. W. TEARE, *Dirigeur.*

TELEGRAPHIC MEMORABILIA.

Two interesting items come to this column from the columns of the *Adelaide Register* of Feb. 24. The first has a personal touch across the wide seas that divide us from "Down Under" in the fact that we obtain a glimpse of the difficulties with which our friend and late colleague, Mr. H. P. Brown, is at the moment endeavouring to combat. The Melbourne correspondent of the *Register* reports that :—

"Owing to the difficulty of obtaining adequate supplies of material, the Postal Department is unable to keep pace with the large number of applications received each month for telephones. During January, 3,567 telephones were connected in the Commonwealth, and the number of applications reached 3,969. On Jan. 31, the number of telephone applications outstanding was 13,154.

Commenting on the failure of the department to overtake arrears in telephone construction work, the Secretary (Mr. H. P. Brown) said to-day that the difficulties were very great, as a result of the shortage of material and, in addition, there were many works in hand, such as the erection of exchanges, which delayed the granting of many telephone applications. It was hoped to connect at least 5,000 telephones a month, but this could not be done until the supplies of material increased. The department was unable to obtain sufficient supplies by cable. The engineering staff of the department now totalled 10,600, representing an increase of 22 per cent. for a period of six months. This total did not include the men employed by contractors engaged by the department.

'I am optimistic,' said Mr. Brown, 'that we will eventually meet the position. We have already placed our contracts for next year. The contracts for copper wire amount to £500,000. Included in this amount is an order for 3,000 tons from Port Kembla (N.S.W.). The department has ordered insulators by the million, and the output in Australia is not sufficient for our needs. During January we erected 40 miles of new poles, and 4,836 miles of wire for trunk telegraph and public telephone lines. This does not include the amount of wire erected for new subscribers.' "

The second is the following advertisement from the same journal announcing the inauguration of the Eastern Telegraph Coy.'s direct cable between London and Germany, as already mentioned in the pages of our own journal, characteristically indicative of the enterprise of the All-British company above-mentioned :—

CABLEGRAMS TO GERMANY "VIA EASTERN."

The above Company begs to announce that direct cable communication between the Company's Office in London and Emden (Germany) was established on the 12th instant, which will considerably inprove the times of transmission on Cablegrams, "VIA EASTERN," between Australasia and Germany.

Among the telegraphic curiosities which have passed into my hands is the following attempt of a certain Continental office to put into English an advice of the re-direction of a telegram by post to Hamburg. It reads :—

"Service Shipley Bradford, from———Yours 188 twenty-seven Castell sended after twenty-seventh epistolary to Hamburg."

It was duly reduced to the more conventional phraseology of our craft by the English handing-over office, but remains as a more or less successful attempt at transferring foreign thought into another tongue with the sole aid of a dictionary. Should there be any readers who question this comment let them attempt to put this same telegram as given above into any European tongue—German, let us say !

It was a pity that it was not possible for a discussion to follow the reading of a recent paper entitled "Everyday Work as Sport," as thereby the telephonist audience missed a splendid opportunity for the play of the wits. To the more or less humble writer the title is an inviting, though, at the same time so it would appear a rather dangerous, one. The daily press also appears to have missed a good opportunity, and it is fortunate indeed that our sister service has now found more favour in the sight of the Fourth Estate or the scribes and caricaturists of Fleet Street would have been unleashed with a vengeance !

The C.T.O. recently subscribed the sum of £35 to the Adair Fund for the war-wounded of whom there are still some thousands in our hospitals. As many of our readers are aware, the "Adair" Fund provides regular Sunday entertainments for the maimed and blinded. Everyone concerned in the organisation contributes gratis towards the physical or mental recreation of the guests either in kind, money or service. Thus, for example, charabancs are freely loaned by certain firms while the drivers give up their Sunday afternoon to conveying the guests to and fro. Mr. and Miss Edwards were present on this occasion at the Palladium as representing the C.T.O.

A friend of the writer, at the moment in New York on business, recently wrote home deploring the muddle accompanying the broadcasting in that city, and expressing the desire to be in England once more if only to hear the well-ordered program of 2LO and to listen-in without "a jargon and jumble of noise" at every seance.

The London *Westminster Gazette* quite recently added a side-light to what is going on there when it said :—

"In the United States municipalities may propose wireless broadcasting activities, but the American Telephone and Telegraph Company *disposes* by virtue of holding a practical monopoly of the manufacture of broadcasting apparatus.

Some time ago New York City planned to erect a broadcasting station on top of the Municipal Building. When, however, the Telephone Company was approached for the purchase of a transmitting set, difficulties were created which prevented this. Now a violent storm has arisen against the A. T. and T. Company, which is charged with maintaining an objectionable 'monopoly of the air.'"

A recent number of the *Electrical Review* also reports that a strike is threatened in the U.S.A. by the broadcasters "as the result of numerous obstacles placed in the way of broadcasting. The threat is the result partly of suits for alleged infringement of patent rights brought against several companies engaged in broadcasting, and partly by the demand made by publishers for royalties on all copyright music used in wireless concerts. Broadcasters declare that, owing to this attitude, they are unable to vary their programmes sufficiently, and they argue that the only way to arouse public opinion in favour of the clarification by the Government of the broadcasting situation is to organise a temporary cessation of broadcasting."

Mr. Herbert Hoover, Secretary of Commerce, however, has emphasised the fact that the American Government will never allow broadcasting to become monopolised. This statement was made on the issue raised by the Radio Corporation of America and other companies which complained that stations were using their devices without having secured a licence to do so.

And so the controversy proceeds while listeners-in complain of pandemonium in the ether.

The Westinghouse Electric Coy. are in the meantime waiting for the word to install their 1,000 watt set which was built for demonstration purposes at the Rio de Janeiro Exhibition in 1922. As the range of this set has already been tested to 7,000 miles, the New York popular song of some short time ago which pictured a love-lorn sailor devoting the whole of a month's pay for a single call to Hawaii may become possible of realisation. It ran something like this :—

"Hello, Hawaii ! how are you ?
Put me through to Honolulu
Just to ask her this to give me a kiss, by wireless."

As the charge for the call is so high the caller is unable to pay for an extension of time while the attention of the damsel of his heart is obtained, so he has to ring off moaning that he cannot afford to wait to hear her reply,—

"For I've had to pawn just everything I own
To talk from New York on the wireless telephone,
So, hello, Hawaii !—How are you ?—Good-bye !"

(N.B.)—I hope the editor will forgive such frivolity in this column, but as I write comes the news that they are about to start the broadcasting of an English program in Honolulu.

Congratulations to Mr. W. I. Wood of the Superintendents Class, C.T.O., upon the perfectly fit condition in which he retired upon reaching the age-limit. Asked as to what was the secret, he replied :—"I have always believed in plenty of fresh air and open sky, and I have always left all my office worries at the office."

Also to "Dick" Furness, of the same rank, who also quitted the telegraph service upon attaining his 60th birthday. Of Mr. Furness it could with perfect truth be held that "Nature might stand up and say, behold a *man*." The mean, the paltry, the underhanded had no part in his dealings with friend or foe. Out into his retirement he is followed by a shoal of good wishes from the many who have experienced his kindly fellowship.

Less well known in the C.T.O. because of the restricted area in which his duties were confined, is the figure of Mr. H. Greenfield. The last of a moribund class it is regrettable that his health has not been of the best these last few years, the strain of the war having told somewhat severely upon himself and his partner. Nevertheless, Cableites are glad that he has been able to complete his full period with high hopes of renewed health and strength once he is able to settle down in the Sussex fishing district of his heart. There, both Mr. and Mrs. Greenfield may follow the pastime of Isaak Walton to their heart's content, we trust for many a day, knowing full well that "Copper" left the Cable Room behind with never a word or deed to rankle.

The American magazine *Science Service* is authority for the statement that the nickel-iron alloy invented last year in the laboratories of the Western Electric Co. is to be used in the construction of the new cable to be laid by the Western Union Telegraph Co. from New York to the Azores. The order followed the success of tests made with 120 miles of experimental permalloy cable off Bermuda last summer. The new cable differs from the old form only in having a thin permalloy tape wrapped around the copper wire beneath the gutta-percha insulation. It is expected to have a traffic capacity four times that of existing cables of the same size. The invention of permalloy loaded cable has unusual significance, for it is the first radical change in cable construction in more than fifty years, and may mean the laying of direct cables of a length hitherto impossible on account of cost or limit of traffic capacity. The new metal is composed of about 80 per cent. pure nickel and 20 per cent. pure iron. It is the most easily magnetised and de-magnetised of all metals, which is of peculiar value in submarine cable work where large magnetic effects are desired from small currents.

The cable ship *T. Dellwood* of the U.S. Signal Service, after taking on board submarine cable manufactured in this country, left Woolwich for America at the end of March. The cable is intended to replace that at present

existing between Seattle and Alaska on account of the unsatisfactory condition of the latter.

The Times states that during 1923 over 82,000 wireless messages, comprising 1,824,000 words, were received and sent by the steamers *Majestic*, *Olympic*, and *Homeric*, engaged in the White Star Line's mail service between Southampton, Cherbourg and New York. This is a large advance on the previous year's figures, passengers now making increasing use of wireless both for business and social purposes.

Quite a little flutter appears to have been caused by the announcement in the London Press last month that telephonic communication between this country and Germany was shortly to be inaugurated by means of a new submarine telephone cable *via* Emden and thence to Berlin.

There are, of course, technical difficulties in the way of telephonic communication over so long a distance when so great a portion of that distance is composed of under-sea cable. Although these difficulties are well within sight of being surmounted and careful calculations have been made which prove the practicability of the scheme, the primary barrier would appear to be a financial one, at least, at the present juncture of European affairs. The solid fact, therefore, remains that no such cable has been laid, and telephonic communication between the British and German capitals is still a matter for the future. Nevertheless, that future is possibly much nearer than some folks may deem possible. There is another way round !

Mr. Herbert Parker, Secretary of the C.T.M.S.A., writing in last month's *Supervising*, on Mr. Stuart Jones' paper on the position of the Telegraphs, made the following interesting remarks on the subject and incidentally a very flattering reference to the author of that much discussed subject " The Present State of Telegraph Traffic and the Future Outlook." Mr. Parker says :—

" I had a very great wish to attend the reading of the paper by Mr. Stuart Jones, so much so that I broke a spell of sick leave to come on duty ; but without avail, as I soon had to turn homewards again. I have now had the pleasure of reading the paper, and I am glad to find there is someone who is not prepared to cry that all is lost. The subject is one of too much importance to be dealt with in a few words, and I hope to return to the subject. For the moment I will just touch on a remark in the paper that is one of my sore spots : the heavy loss on the Telegraph Service is to be deplored. It may be that there is a loss, and a heavy one, but a committee reported in 1908 that it is not satisfactory that, in the case of a business like the telegraphs, it should be impracticable to state with any approach to accuracy the present value of the capital assets engaged in the Service, or to compile accounts in such a manner as to show its financial results as a commercial undertaking. Presumably, as a result of that report, accounts are prepared on a different basis, but the fact then was that for many years there had been no line of demarcation between expenditure which would be classed as capital, and expenditure which would be regarded as chargeable against revenue, and this brings us back to the unanswered question ' What is the capital value of the telegraphs to-day ? ' "

AUSTRALIA.—The Broadcasting Co. of Australia Proprietary, Ltd., has started operations in Melbourne, and will operate in various States other than New South Wales. The Melbourne aerials will be probably 300 ft. in height, and will operate on 5 kW. It will be recalled that Farmer & Co.'s service in Sydney controls the entire area of New South Wales, so that it has been arranged, according to the *Industrial Australian & Mining Standard*, that the Melbourne and Sydney stations will have a working arrangement by which subscribers in either city may be linked up with both stations with a multi-wave receiver. Similar arrangements will probably be made between the capital cities of Victoria and South Australia. Smaller services, operating on a ½ kW. are also to be established in Sydney and Melbourne.

The Australian Minister of Education has launched a scheme to enable *out-back* students to hear the lectures delivered in the Universities, by means of radio broadcasting.

AUSTRIA.—*Commerce Reports* says that the formation of a company called " Broadcasting A.G." is being undertaken by the Austrian Government. Applications for concessions from the German Telefunken Gesellschaft, the E. Schrack Radio Werke, and other companies had been pending, but it was decided not to grant a radio monopoly to any privately-owned concern. A majority of the shares of stock of the new company will be held by the Austrian State. This would appear to be a strange turn to events after the concessions for a wireless long-distance service to the Marconi group only a few months ago.

BRAZIL.—The same authority has it that under the auspices of the Instituto de Engenharia de S. Paulo, there has been organised the Sociedade Radio de S. Paulo. Its principal purpose is the broadcasting of information, &c. It is planned to install a transmission station with sufficient power to be heard at a range of from 1,000 to 1,500 kilometres. This information broadcast will probably be worked telegraphically.

CANADA.—Reuter's Montreal correspondent gives the interesting information that the Canadian National Railways have completed arrangements for the establishment of a chain of seven radio broadcasting stations across Canada, namely, at Montreal, Ottawa, Winnipeg, Saskatoon, Regina, Edmonton, and Calgary. Broadcast programmes will be given twice weekly, including concerts and talks by officials of the system to the employés who have been furnished with receiving sets at 20 per cent. less than cost.

Further advices state that the latest train to be equipped with radio receiving sets is the International, Ltd., running daily between Montreal and Chicago. In the observation car, in addition to the loud speaker, eight pairs of headphones are attached to the set. This style of equipment will be standardised throughout the system. The transcontinental trains of the Canadian National Railways are now equipped with radio receiving sets, and all the important passenger trains will be similarly equipped as early as possible. The Canadian National Railways, in addition to utilising independent broadcasting stations, have a powerful broadcasting station of their own in Ottawa.

CHINA.—China has its broadcast discussions, difficulties and, according to the *Daily Mail*, its quarrels of which the three-cornered controversy between China, Japan and the United States over radio-telegraph rights in China is an interesting type. On March 25 the announcement was made that the Japanese Mitsui Co.'s station, 15 miles east of Peking, had been finally perfected and would shortly be prepared to offer direct communication between Peking and London, New York, Berlin, Copenhagen, and other world capitals with a faster and cheaper service than that of the cables. Representatives of the United States Federal Wireless Co. are said to be proceeding to Peking to take up the situation with the Chinese Government, which, after granting exclusive privileges in China to Japan, declared that delays had abrogated the contract, and later granted privileges to the American company.

The business publication, *Commerce Reports*, adds a sidelight to the situation by stating that the purchase or operation by Chinese citizens of radio sets has been prohibited by order of the Ministry of Communications. Foreigners living in Chinese territory come under this order, and steps are being taken to prevent the sale of radio apparatus or its installation by Chinese living in the foreign settlements.

FINLAND.—From Helsingfors comes the information that Prof. George von Wendt has submitted a memorandum to the Government proposing the erection of three Government radio stations for the purpose of carrying on a broadcasting service and for relaying foreign, particularly British, broadcast programmes. The amount required for putting the scheme into operation should, the Professor recommends, be included in the supplementary Budget for this year.

FRANCE.—A radio-telegraph service has been inaugurated between France and Norway.

GERMANY.—A Berlin organisation known as the Ullstein Service is broadcasting a lesson in English twice a week. Special leaflets are being issued to enable pupils to perfect their knowledge.

A very interesting experiment in connexion with long-distance radio-telegraphy in Germany is mentioned by the *Manchester Guardian Commercial* of which the following is an abridged account. This high power station is being erected at the present time by Messrs. Lorenz on the Herzostand, near the Walchen Lake power station. The station is first to be used for experiments on a large scale, in order eventually to be employed for long-distance radio telegraphy, mainly for communication with the Far East. *The absence of any antenna mast* is its main distinctive feature. Electrical energy will be derived from the near-by power station, under especially easy conditions and at relatively low rates. A Poulsen-Lorenz arc transmitter of about 2,000 kW., side by side with a Schmidt high-frequency transmitter of the same output, will be used, the high frequency being at will either produced direct in the transmitter or stepped up by frequency transformers. The plant will, it is thought, afford means of comparing the two types of generator in actual service. The mountain antenna comprises five wire cables extending fan-like from the Stein, a mountain about 940 metres high near the Kochel Lake, to the Herzogstand mountain, 1,732 metres high.

GREENLAND.—The Cophenagen correspondent of Reuter's Agency understands that the materials and plant for the four radio stations which the Danish Government is to erect in Greenland will be transported to the chosen areas between May and July. It is anticipated that the stations will be in working order by the early autumn.

LONDON.—The Council Education Committee has decided to permit the reception in its schools of six experimental wireless talks. The experiments will terminate at the end of the present month when the matter will receive further consideration.

SWITZERLAND.—The plan for a national broadcasting station has been abandoned, and a system of decentralised stations is now proposed. In view of the fact that there are only about 4,000,000 people in Switzerland, it is quite obvious that broadcasting must be kept within modest bounds. It is reported that stations will be located at Lausanne, Geneva, Zurich, and Basel. The Swiss Federal Government is to place at the disposal of the four stations the larger part of the revenue derived from licences, and other interested bodies are being urged to subscribe to the scheme.

TURKEY.—A concession for the establishment of a low-power broadcasting station at Constantinople has been applied for by German radio apparatus manufacturers.

UNITED STATES.—A new broadcasting station has been opened by the *Chicago Tribune*. The wave length is 370 metres and the call signal WGN.

Commerce Reports is responsible for the statement that negotiations between the Greek and Turkish Governments have finally resulted in an agreement to re-establish telegraphic communication between the two countries. Dispatches follow the line from Adrianople to Saloniki, from which they are distributed to their destination. Telegraphic communication between Greece and Smyrna, through Mytilene, is also to be resumed.

The Government at Montevideo recently introduced a Bill into Parliament granting a postponement of four years for the laying of the French cables connecting Rio de Janeiro, Montevideo and Buenos Aires with France, but

a recent Reuter's telegram declares that a final decision has been made to refuse the extension of time. There does not appear to have been a counter-plan.

The Money Resolution in connexion with the West Indian Islands Telegraphs moved by Mr. J. H. Thomas, the Colonial Secretary, on March 31, and agreed to by the House of Commons may have escaped many of our telegraph readers, and the following paragraph, though somewhat belated, may not be without considerable interest to those who follow closely the development of Empire communications.

The Resolution authorises the issue out of the Consolidated Fund of £400,000 for providing a system of telegraphic communication in and with the West Indian Islands and British Guiana, by means of submarine cables and radio-telegraph stations. Mr. Thomas explained that at present the Government was under a ten years' contract with the West India and Panama Telegraph Company, which expired this year. There were certain objections of a fundamental character to the existing system, but in any case the fact that the contract expired this year enabled the Government to reconsider the whole position. So unsatisfactory had been the service that, notwithstanding a yearly subsidy of £26,000, there was at present a deficit on the working. The object of the Bill, which would be founded on the resolution. was to provide a new scheme. He believed that, viewed from the most unfavourable point of view, the maximum deficit under the new scheme would be £20,000 per annum. The Marconi Company had nothing to do with the scheme. The whole of the cables would be working in June and the principal radio station would be at Barbados.

Science Service gives an account of a proposed Inter-American Electrical Communications Conference which was fixed to meet in Mexico City on March 27, but no confirmation of the actual meeting of such a conference has yet come to hand. The strangest feature about the matter is that no official recognition of the proposal had been made by the United States Government, although the proposal was made by a committee of experts who recently met in Geneva. One sincerely hopes that whatever may be the fate of the scheme none but practical telegraph men will be allowed to deal with purely telegraph regulations, be they wire, cable or radio. It is only due to political issues in Europe that a new International Telegraph Convention has not been sealed and signed by this time. It is long, very long, overdue. In any case, here is the information as given by our American contemporary :

"Rules for the regulation of radio throughout the Western Hemisphere were to be formulated at the Inter-American Electrical Communications Conference which was to meet in Mexico City on March 27. The United States was to be represented, and all Latin-American countries, and Canada, were expected to send delegates. The conference was proposed at the meeting of the Pan American Congress at Santiago, Chile, last year; and the place of meeting was decided at a meeting of Latin-American representatives at the Pan American Union in Washington. All forms of electrical communication were to be discussed, but radio was to be the principal topic, the general purpose of the conference being to bring up to date the regulations adopted at the London radio conference in 1912, and to amend them to fit conditions in the Western Hemisphere."

Negative Good.—He that does good, having the unlimited power to do evil, deserves praise not only for the good which he performs, but for the evil which he forbears to do.—Sir WALTER SCOTT, "Ivanhoe."

J. J. T.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

TELEPHONES.

THE new business in February was again exceptionally good, the net increase of 11,532 stations being the highest on record. The number of stations working at the end of the month was 1,146,758, of which 407,172 were connected with London exchanges and 739,586 with Provincial exchanges.

Residence rate lines added during February totalled to 3,518, just 50 per cent. of the total increase in exchange lines for the month. At Feb. 29 there were 183,489 private house circuits, compared with 152,555 at the end of February, 1923, a net growth during the twelve months of 30,934, or 20 per cent.

At the end of February, 550 exchanges had been authorised under the special conditions announced in May, 1922, and of these 409 were working, 20 being opened during the month.

The net addition to the number of call offices during February was 85 bringing the total up to 17,579. Of this number 5,415 are situated in rural areas. The total also includes 600 call offices installed in kiosks in public thoroughfares, in which type of call office there has been a substantial increase in the past year, the total at Feb. 28, 1923, being 401. The efforts to establish call offices in street kiosks have been much more successful in some parts of the country than in others, and the telephone districts having the greatest number working at the present time are Birmingham with 75, Bristol with 73, Liverpool with 72, and Sheffield with 66.

The half-yearly record of calls, which this year was postponed until February in consequence of the railway strike, shews that the average calling rate per line at all exchanges throughout the country was 4 per cent. higher than in January, 1923. This must be considered highly satisfactory in view of the addition to the system of a large number of new subscribers whose use of the service at the outset is probably much less than that of the well-established subscriber. In the period under review the number of direct exchange lines increased by over 75,000, or 12 per cent., whilst a comparison of the traffic as ascertained from the two records shews that in February, 1924, there was a 17 per cent. increase in the number of originated calls.

So far as the trunk service is concerned all previous records were exceeded in January last, when approximately 6,400,000 calls were dealt with.

Statistics shewing the general development of the service in the current financial year are given in the appended table :—

	At April 30	At June 30	At Sept. 30	At Dec. 31	At Jan. 31	At Feb. 29
EXCHANGES—						
London	99	100	100	101	101	101
Provinces	3,107	3,166	3,270	3,369	3,392	3,414
Total	3,206	3,266	3,370	3,470	3,493	3,515
STATIONS—						
(1) Exchange—						
London	367,403	373,845	380,166	388,789	390,678	394,808
Provinces	657,734	670,068	689,047	709,273	714,561	721,925
Total	1,025,137	1,043,913	1,069,213	1,098,062	1,105,239	1,116,733
(2) Private—						
London	12,149	12,303	12,113	12,276	12,282	12,364
Provinces	18,753	18,573	18,287	17,974	17,705	17,661
Total	30,902	30,876	30,400	30,250	29,987	30,025
(3) Total Exchange and Private—						
London	379,552	386,148	392,279	401,065	402,960	407,172
Provinces	676,487	688,641	707,334	727,247	732,266	739,586
Total	1,056,039	1,074,789	1,099,613	1,128,312	1,135,226	1,146,758
PUBLIC CALL OFFICES—						
London	3,808	3,838	3,854	3,906	3,916	3,942
Provinces	12,766	13,000	13,264	13,498	13,578	13,637
Total	16,574	16,838	17,118	17,404	17,494	17,579
PUBLIC CALL OFFICES IN STREET KIOSKS	432	474	523	568	582	600
RURAL PARTY LINES	7,038	7,379	7,755	8,076	8,184	8,258

Further progress was made during the month of March with the development of the local exchange system. New automatic exchanges opened included the following :—

PROVINCES—Dundee,
Broughty Ferry,

and among the more important manual exchanges extended were :—

LONDON—Dalston, Maida Vale, Maryland, Purley, Wembley.
PROVINCES—Belfast, Bristol, Colchester.

During the month the following additions to the main underground system were completed and brought into use :—

Nottingham—Newark,
Bradford—Halifax,

while 85 new overhead trunk circuits were completed, and 93 additional circuits were provided by means of spare wires in underground cables.

The
Telegraph and Telephone Journal.

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

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. X. MAY, 1924. No. 110.

OLD AND NEW LONDON TELEPHONE DIRECTORIES.

THE recently-published issue of the London Telephone Directory is a formidable affair, with its 1,126 large, closely-printed pages, without superfluous trimmings and, necessarily, entirely devoid of cross references. One cannot help wondering what sort of problem it will present, at the present rate of growth, to its compilers in ten years' time. It is perhaps doing no violence to language to call the book portable in its present form, but, nevertheless, one would not carry it about gladly. A few years hence it will be altogether unwieldy, and the alternative of publishing it in sections or suppressing as far as possible all descriptions and addresses not necessary for purposes of discrimination, may have to be considered.

It is interesting to compare this issue with one for the year 1895 which lies before us. The latter comprises 173 pages with rather less than 60 names on each; the former contains 2,252 columns with about 100 names in each. And yet the older book does not give professions, trades and addresses; it does not even give the name of the exchange to which the subscriber is connected. There was no need to call for "Gerrard" or "Avenue" in those days; you simply asked for a number. Yet in 1895 there were over 11,000 subscribers' lines in London served by 36 exchanges. There are several cross references or double entries of names, and subscribers have on an average nearly one entry each. At present, owing to the large number of private branch exchanges, for which one entry serves for several lines, subscribers have on an average about half an entry each. The family of Smith had but 70 entries in the list for 1895; to-day it has about 1,800; and 20 Joneses have increased to over 800. Even a cursory glance at the columns of the old directory shews how the telephone habit has grown; above all it shews how it has invaded the sacred privacy of the home—a development still the subject of occasional jeremiads from the old fashioned. What is evident from such a glance—for we do not pretend to have made a scientific analysis of the book—is that the telephone was chiefly a convenience of business men. Stockbrokers, manufacturers, agents, wholesale dealers, solicitors, publishers, carriers, clubs, hotels, theatres, and such like, are assembled in force. All the best-known names in the city are probably there; but the West-end is thinly represented. Peers' and baronets' names would hardly fill a couple of pages. There is a goodly number of Members of Parliament, but we suspect that they are mostly those members who were directors of city companies. Lord Randolph Churchill, and the Duke of Devonshire are the only statesmen we have discovered there; and, indeed, the names of men of note, authors, artists, and even actors, are almost entirely lacking. We find Sir Arthur Sullivan and Sir Augustus Harris (of Drury Lane fame), while Miss May Yohé may stand for the musical comedy of those days. A Count Zborowski lends a certain colour to the Z's. A long list of Vestries shews that the London Boroughs had not been created, and the Victoria Steamboat Association is evidence that the Thames was not steamerless in the nineties. Indeed, it is surprising how this mere list of names throws many a sidelight on the social conditions of 1895. We imagine that our present directory is too vast and general to afford any similar instruction to the curious thirty years hence. But it is notoriously dangerous to attempt prophecy.

HIC ET UBIQUE.

THE Postmaster-General has been notified by the Russian Post Office that Petrograd, late St. Petersburg, is now to be known as Leningrad. The cities of the former "Baltic Provinces" in Russia are becoming quite unrecognisable to those who learned their geography before the War. Riga, Reval, Dorpat and other places have assumed Lettish and Esthonian names, and now Petersburg has undergone a second disguise.

THE following exuberant outpouring appeared in a daily paper:—

"More than a thousand of London's prettiest women work every day in the large telephone building near St. Paul's. . . . Hundreds of women of five feet in height, with good teeth, acute hearing, perfect eyesight, perfect respiratory systems and normal digestive powers were seen in the telephone exchange by a woman representative yesterday. . . . There were rows of large angelic grey eyes, sparkling brown eyes, unsuspicious blue eyes and fascinating green eyes. Most of the girls had bobbed hair, but beneath the switchboard lights it gleamed honey, russet and raven."

There was more, but *Punch*, mercifully quoting that sufficiency, was moved to comment on it, under the title "Beauty and the Beasts," as follows:—

The sensational revelations regarding telephone operators quoted above will, I hope, do a lot of quiet good.

I have always considered it one of the gravest defects of the telephone system in this country that the subscriber cannot see the operator. If this reform cannot be arranged meantime, the next best thing is to have something like the foregoing details on which the imagination can work.

In the absence of such information a worried subscriber is apt to lose his head and behave abominably. I myself have overheard a man in the City flatly tell an operator that he didn't believe her when she said a number was engaged. Now, if he had known that the young woman to whom he was talking had a perfect respiratory system (enabling her to say "Newington, ninety-nine" without the suspicion of a wheeze), angelic grey eyes and bobbed hair which gleamed honey, he would never have lost control of himself like that. Instead, he would probably have said politely, "Really? Then I'm *so* sorry to have troubled you. Good morning."

Again, no man in his senses talks to a girl with good teeth, normal digestive powers and fascinating green eyes as if she were less than the dust upon his telephone directory. And as for saying to a sweet young thing with acute hearing and unsuspicious blue eyes, "How many more times must I tell you—six, four, th-r-ree, *fife*, Bayswater. And *do* hurry up! Do you think I have all morning to wait?"—the idea is preposterous.

My only regret is that the representative of this public-spirited newspaper hadn't had a little more time on her hands. After concluding her investigations into digestive and respiratory systems, she might have made a few tactful inquiries concerning the girls' tastes in ideal men. It would be distinctly useful to know whether, for instance, there is a predilection for the strong silent subscriber, or whether a pleading winsomeness cuts more ice.

However, I think on the whole, the Press has done its bit. It is now up to the Post Office, and I commend to the Postmaster-General the inclusion of a suitable appendix in the next issue of the Telephone Directory. Besides brightening the Directory still further it would improve the relations between subscribers and operators enormously.

I imagine it might even be possible to group the operators in the various exchanges according to type. In that case I should like the green-eyed ones on my exchange, please.

WE have received the following official information with regard to the development of radio-telephony in Canada :—

Revived interest in radio in Canada is revealed in figures issued here recently by the Federal Government Department of Marine. Since December last 11 licences for broadcasting stations have been issued by the department, making a total of 45 broadcasting stations in Canada. The new stations are, by provinces, located as follows: Ontario 5; Nova Scotia 1; Quebec 1; British Columbia 2 and Alberta 2.

Montreal leads in the number of receiving licences issued to amateurs with 6,600, while in Toronto 3,400 have paid, and the work of collecting the licence fees is not nearly completed. Approximately 29,039 radio licences have been issued to amateurs in Canada up to Jan. 31, according to the records of the Department of Marine.

Radio is playing an important part in the colonisation of Canada. What were regarded before the advent of radio as isolated farmsteads in parts of the country some distance from railways and settlements, are now linked with half the continent by the mystic and cheering bond of radio-telephony so that isolation and distance appear to be, in many respects, only meaningless terms.

WE learn from the *Electrical Review* that telephonic communication between Haparanda (in Sweden) and Leipzig (in Germany), a distance of about 1,900 miles, will be possible over a line which the Swedish State Telegraph Department tested last week.

ACCORDING to *Reuter's Trade Service* (Paris) the Paris Chamber of Commerce has passed a resolution urging the Government to introduce immediately a Bill in the Chambers for the transference of the telephone service to private French companies. Our readers will remember that a similar proposal has already been put forward and negatived. French capitalists are still lacking their Mussolini.

WE also learn from the *Electrical Review* that in connexion with the decision to convert the Chile Telephone Co. from a British into a national organisation with a largely-increased capital and Chilean stockholders, a substantial amount of new money will be spent on new installations in Valparaiso, Santiago, Vina-del-Mar, Antofagasta, Iquique, Concepcion, Talca, Temuco, and other towns. In the capital, Santiago, a new and larger building will be erected for use in conjunction with the present quarters, while in the service between Santiago and Valparaiso 16 new underground lines will be added to the existing 18. Others will be laid between Santiago, Rancagua, and the more important towns.

FROM an official report received from Poland we are able to correct the estimate of the telephonic development of that country which we published in March. We then put the number of telephones at 79,000. There are, in fact, 57,638 belonging to the State system and 38,964 belonging to a private company operating in Warsaw, Lodz, Leopol (Lemberg), Lublin and other cities, or 96,602 in all. The principal development of the State system is in Poznan (Posen), Bydgoszcz (Bromberg), Cracow and Katowice. These figures refer to the end of 1922.

THE KING'S MESSAGE TO THE EMPIRE.

A TELEGRAPH RECORD.

WHAT may be described with the strictest accuracy as the greatest telegraphic feat on record was performed in connexion with the King's opening of the Wembley Exhibition. It was arranged that immediately after having opened the Exhibition the King should hand in a telegram conveying his announcement of the fact to the whole Empire. In order that this message might be conveyed, throughout the Empire with the utmost celerity negotiations were set on foot between the Post Office, the Pacific Cable Board, and the Eastern and Associated Telegraph Companies. At first the idea was that the precedent of the Diamond Jubilee should be followed, and that a press button should be arranged which the King would use to convey the signal throughout the Empire. On further consideration it was thought that it would be much more of a telegraphic feat if an actual message with the King's own words were transmitted and not merely an indicative sign or symbol releasing the message. A wire was joined up from Wembley Exhibition, the Stadium Office, to the Central Telegraph Office, and placed at that office in close proximity to the Imperial Cables. A second line was joined up by the side of it to the Eastern and Associated Telegraph Company's office in Moorgate Street. After consideration it was decided that the message should be sent round the Empire from west to east. Thus the route was Wembley; Central Telegraph Office; Halifax, Nova Scotia; Montreal; Bamfield, Vancouver; Fanning Island; Fiji; Auckland, New Zealand, and Sydney. At that point the work of the Post Office, the Imperial Cable, the Canadian Pacific Railway, and the Pacific Cable Board, came to an end. The message was then to be telephoned across Sydney to the offices of the Eastern and Associated Telegraph Companies and on the homeward journey it came by three routes simultaneously and for portion of its journey by four routes. It touched Cocos, Rodriguez, Durban, Cape Town, St. Helena, Ascension, St. Vincent, Madeira, and also from Sydney to Singapore, Madras, Bombay, Aden, Suez, Alexandria, Malta, Gibraltar. Thus it came home by a triple route to England, and the office of the Eastern and Associated Telegraph Companies had the curious experience of receiving the message almost simultaneously to a second by four different routes.

Probably the most dramatic event of the whole proceeding was at the Stadium office at Wembley. Here the prominent Post Office officials, who were in charge of that section of the work, had the curious experience of watching two telegraph instruments. On one of them the message went out immediately the flags were unfurled, and at the other in the space of 80 seconds the message was received having gone round the world. Then, carefully written on an Eastern Company's telegraph form, it was delivered by a

Post Office messenger and a map of the route was enclosed for the information of the King. The dramatic scene when the boy walked with appropriate dignity along the passage and saluted, and passed up the steps and again saluted, has been noticed by most of the correspondents on the spot, but what perhaps they have not heard is the fact that the King remarked—"That boy did his work well." It is not at all inappropriate to widen the interpretation of the King's phrase to include the whole of the telegraph workers on the route.

It is desirable to explain how the message was conveyed. Practically the whole route with 17 transmissions on the direct journey was worked by Wheatstone or by adaptations of Wheatstone to syphon working still using the Wheatstone transmitter. The exact wording of the message was—"I have this moment opened the British Empire Exhibition.—GEORGE R. & I." That message was punched at Wembley with the simple prefix CQ and without any other preliminary indication. Immediately the letter "I" was reached at the Central Telegraph Office the punched slip was put on the Halifax transmitter and this was followed throughout the whole route. An ingenious calculation has shewn that before the last word was received in the Central Telegraph Office the first word was being telegraphed to Capetown. A very interesting point may be mentioned in connexion with a second telegram. In order that the whole of the route might know the transit-time of this historic message a second slip was punched "CQ, for publication, transit-time King's message 80 seconds." This message had not been pre-arranged and it reached Australia inside two minutes, so that not only the King's message but the knowledge of the speed with which it had been transmitted had been broadcasted over the Empire within 3½ minutes from the unfurling of the flag. Including the act of delivery and the boy's celebrated walk along the track in the eyes of 100,000 people the total time which elapsed from the unfurling of the flag to handing the telegram to the King was 2 minutes 20 seconds.

THE WESTERN ELECTRIC COMPANY'S PUBLIC ADDRESS SYSTEM AND THE WEMBLEY EXHIBITION.

THE use of the Public Address System, for the opening ceremony of the British Empire Exhibition, has focussed the eyes of technical and non-technical people upon this recent development of scientific engineering. Such a development was made possible when the thermionic valve or vacuum tube was invented and developed in its function of amplifying small currents. It has since become possible to transmit speech and music by telephone to almost any required distance, and then to reproduce the original sounds with sufficient power to be heard simultaneously by audiences that may number 700,000 or more.

The primary essentials of a satisfactory Public Address System are naturalness of reproduction and wide ranges of output volume. Distortion must, therefore, be eliminated in every part of the complete equipment. This equipment consists of three main sections, the "picking-up" apparatus or transmitter which converts a speaker's words into undulatory electric currents, a vacuum tube amplifier for amplifying these currents, and a "receiver projector" for reconverting the currents into sound waves and distributing the sound over the whole audience.

At the British Empire Exhibition the King spoke into a transmitter suspended from the roof of the Royal Pavilion, and the weak speech currents were led through shielded leads to the amplifiers in the control room beneath the dais on which His Majesty sat. The amplified currents were led out to the receiver projectors, carefully arranged in the pavilion roof to deliver the sound to the huge audience in the Stadium.

The Western Electric Company ask us to point out, in view of the many misleading statements in the Daily Press, that the only apparatus used for the broadcasting of the speeches and music to the 150,000 people in the Stadium was designed, manufactured, and installed by that Company, and no apparatus of any other manufacture was used.

POST WAR TRUNK TELEPHONE DEVELOPMENT.*

BY H. G. TRAYFOOT.

1.—AMALGAMATION OF TRUNK AND LOCAL EXCHANGES.

WHEN war broke out in August, 1914, there were still in existence 103 of the 293 separate trunk exchanges in which the trunk working was centralised prior to the acquisition of the National Telephone Company's system by the State. Most of you are aware that the National Company's operations were confined to specified areas, and that all inter-area, or trunk, traffic, as it was called, was collected at one or more exchanges, known as Trunk Centres, in each area, and circulated over the trunk lines owned by the Post Office. The existence of separate exchanges for trunk working in every area, necessary as it was under the system in operation prior to 1912, constituted one of the greatest obstacles to the provision of a really satisfactory trunk service.

A great deal of the preliminary work in connection with the amalgamation of the trunk and local exchanges was taken in hand well before 1912, and it was largely because of this foresight that it was found possible to close no less than 190 trunk exchanges in the 2½ years which elapsed between the date of the transfer and that of the outbreak of war. The general suspension of telephone development during the war retarded the work of amalgamation, but nevertheless 42 amalgamation schemes were actually completed while the war was in progress and 36 amalgamations have taken place since.

There are now 25 separate trunk exchanges, and schemes which will involve the closing 12 of these are actually in hand. When this work is complete 13 only of the 293 trunk exchanges which existed at the transfer will remain and these will probably be permanent features of the Telephone system.

2.—GENERAL ARRANGEMENT AND GROUPING OF LONG DISTANCE CIRCUITS.

For general working purposes, Great Britain has for many years been divided into zones, with centres which act as clearing houses for the miscellaneous long distance traffic. There were originally 27 such zone areas, but in 1914 a more centralised scheme was decided on tentatively by agreement between the engineering and traffic sides, each of which had approached the matter from its own standpoint. Under the revised scheme there were to be only 8 zone centres—London, Birmingham, Bristol, Cardiff, Cambridge, Leeds, Manchester and Glasgow. The underlying idea of the revised scheme was the economy in plant provision which would be brought about by the concentration of the heavy gauge trunk lines in a few centres, selected mainly by geographical considerations.

The scheme was, however, appreciably modified at a later stage. It was found that more zone centres were required for the successful handling of the long distance traffic, and also that some sub-division of the zone was required in order that a satisfactory "step by step" system of dealing with trunk traffic might be introduced. It was decided to call these sub-divisions groups, each with a centre for collecting traffic from the smaller exchanges and handing the longer distance calls over to the zone centres.

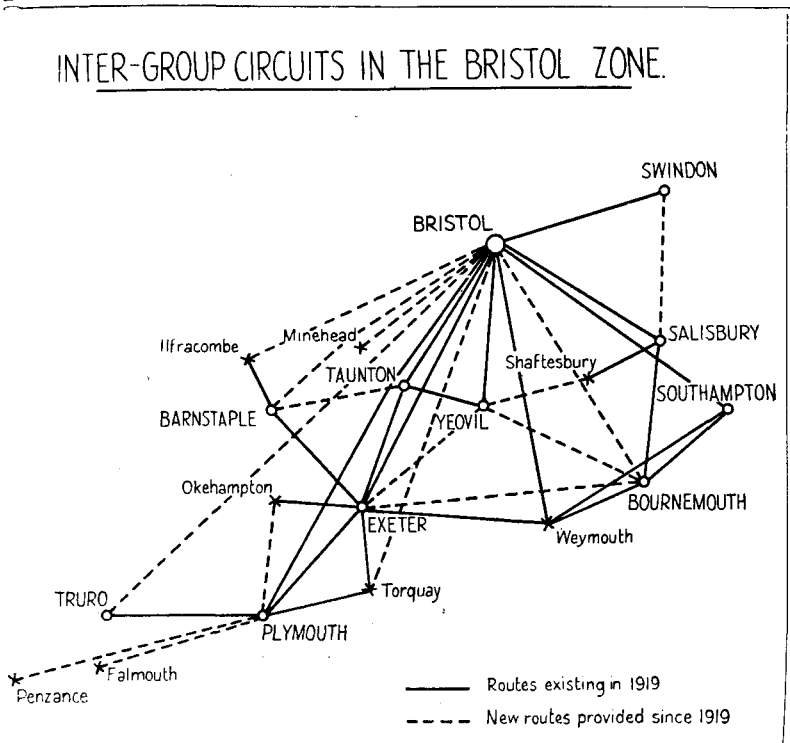
The group system also facilitated the elaboration of a more satisfactory system of handling such cross country traffic as it seemed desirable to keep out of the zone centres. Incidentally also it helped to solve the problem of deciding the limits of junction or no delay working, to which I shall refer later. The new scheme was introduced in 1919, and has since been modified to meet new conditions.

There are now 14 zone centres, 5 subsidiary zone centres and 84 group centres. The subsidiary zone centres are group centres which have a liberal provision of lines to distant zone centres but which have nevertheless to hand over to their own zone centres for control a considerable amount of miscellaneous long distance traffic. Additional groups will be created from time to time as the development of the rural districts necessitates the creation of additional collecting centres for the traffic.

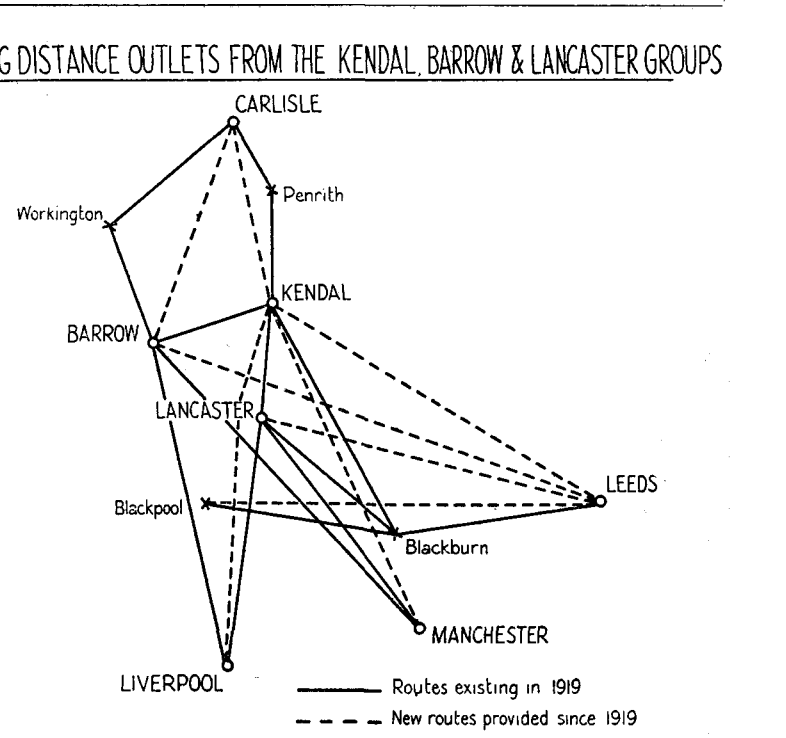
The group centre is an important feature in the working of the long distance system, because it not only acts as a collecting and distributing point for long distance traffic handled at its own zone centre, as well as for the less important traffic to and from other districts in the same zone, but it also facilitates the institution of a more extended system of inter-zone working than was originally contemplated, under which zone centres can work directly to outlying districts in other zones. Some of these outlying districts have been formed into groups for this purpose, because they are either important commercial centres, *e.g.*, Barrow-in-Furness, or holiday resorts, *e.g.*, the Lake district, and as such have a considerable number of miscellaneous long distance calls.

Diagram No. 1 illustrates the method of inter-group circuit provision which has been developed during the last few years. It will be observed that, in addition to the liberal provision of direct circuits between the group centres themselves, direct lines have been established in certain cases between group centres and minor exchanges in other groups, *e.g.*, Bristol—Torquay (a minor exchange in the Exeter Group), Plymouth—Penzance (a minor exchange in the Truro group).

* Paper read before the London Telephone and Telegraph Society.



No. 1.



No. 2.

Diagram No. 2 illustrates the development of direct line provision between group centres and two or more zone centres. The Barrow, Lancaster and Kendal groups are in the Manchester zone, but direct communication has been (or will shortly be) established between these groups and Liverpool and Leeds, which are zone centres, while the provision of direct circuits to Carlisle (a group centre in the Newcastle zone, has greatly improved communication with the Glasgow and Newcastle zones.

The group system also facilitates the rearrangement of zones with a minimum of disturbance to the general routing arrangements. For example, the King's Lynn group of exchanges was originally in the Cambridge zone, as the development was in that direction. With the growth of long distance traffic to and from King's Lynn and district, the necessity for providing a more direct route to the Midlands and North of England became apparent, and a direct King's Lynn—Nottingham circuit was erected. The King's Lynn group was then transferred to the Nottingham zone and the circulation of miscellaneous long distance traffic was automatically transferred from Cambridge to Nottingham.

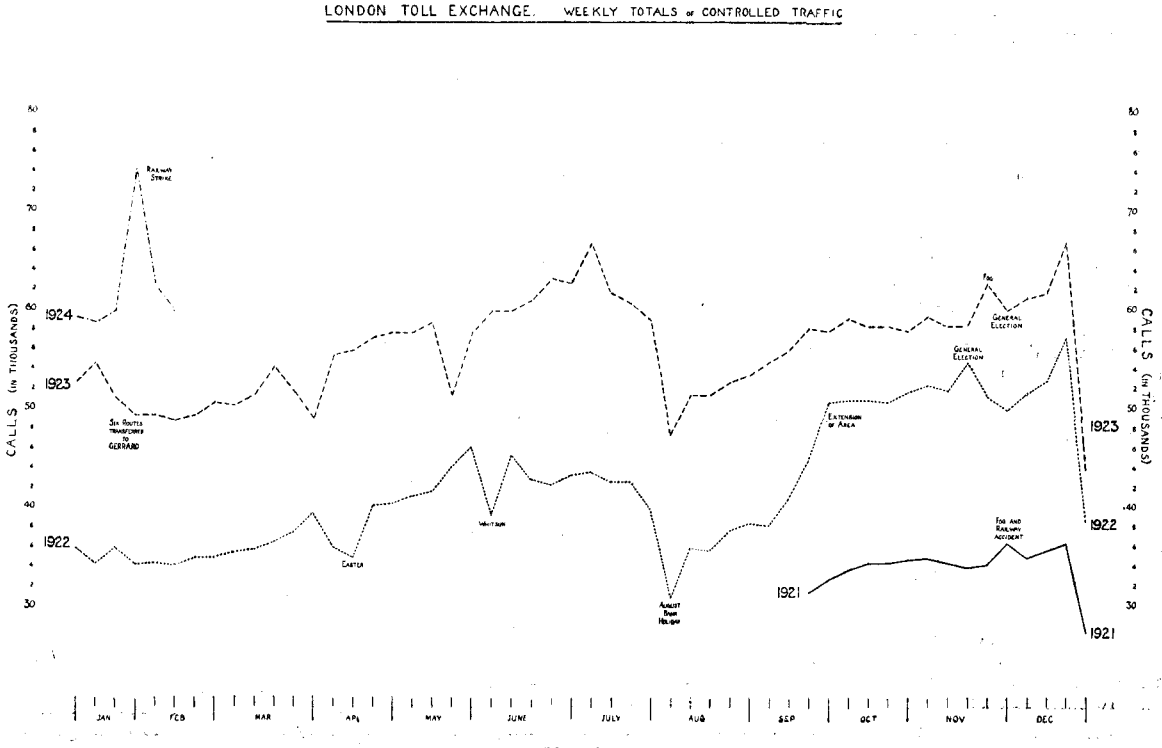
3—JUNCTION, OR NO DELAY, SERVICES.

Before the transfer of the National Telephone Company's undertaking to the State, "junction" or "no delay" services were given in all the areas worked by the Company, but the use of a trunk line between one area and another involved a break in the connexion, as the subscriber had to pass his call to a record operator, hang up his receiver and wait for the call to mature on the trunk line. In many cases, especially during the slack hours of the day, when trunk lines were lying idle, this wait was merely the time occupied in the transfer of the ticket from the record operator to the trunk line operator, and the system involved in the aggregate an enormous waste of labour.

Immediately it became possible to amalgamate trunk and local exchanges the range of junction services increased as it became possible to multiple the shorter trunk lines on the local switchboard. No precise limit was fixed for such working, but it was generally recognised that at least all circuits within 25 miles should be regarded as suitable for junction working.

An important extension of the scheme beyond the ordinary limits was, however, suggested in a paper which Mr. Stuart Jones read at a District Managers' Conference in May, 1912, viz., the transfer of the Manchester—Liverpool trunk lines to the local exchanges in those cities. This scheme was successfully carried out in February, 1914, and at a later date the Leeds—Bradford and Glasgow—Edinburgh routes were dealt with in a similar manner, while the outgoing lines from Brighton to London were multipled on the local switchboards at Brighton and Hove and worked as junctions.

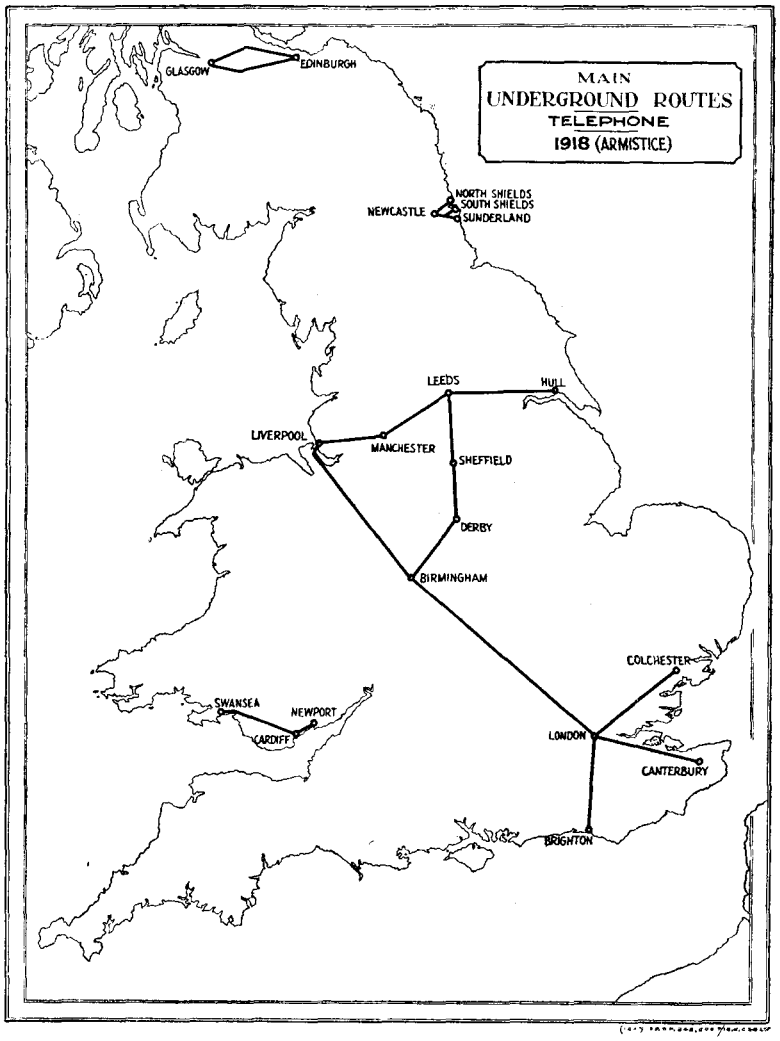
The London problem was more complicated, because there was no local exchange in which the trunk work could be centralised and it was quite impossible to consider a scheme which involved the division of the trunk lines on a particular route between the various London exchanges. It was accordingly decided to concentrate all the short trunk lines in London in a special exchange to be known as the "Toll" Exchange. A building was acquired for the purpose of housing such an exchange, the equipment was designed and a cabling scheme prepared, but the outbreak of war made it necessary to defer the scheme. After the war the scheme was pursued and the Toll Exchange was opened in September, 1921. At the outset the scheme was confined to the circuits serving exchanges within 25 miles of London, but at



No. 3.

later stage further lines were transferred from the Trunk to the Toll Exchange.

The scheme has been remarkably successful notwithstanding the fact that when the exchange was opened none of the trunk cables specially designed for the exchange had been completed, and for a considerable time the working had to be conducted with far fewer circuits than were required for the traffic



No. 4.

then existing. In spite of this obstacle, which made it necessary for some measure of special control to be maintained for a time on certain routes, the general body of subscribers expressed their appreciation of the new exchange in terms which testify to the remarkably skilful way in which the traffic was managed by the exchange staff. The greatest testimony to the success of the scheme was the receipt of numerous applications from subscribers in various parts of the Home Counties for their own districts to be included in the scheme. Diagram No. 3 shows the development of traffic in the Toll Exchange.

It would not be right to dismiss this scheme without some mention of the share of the London Engineering Staff in the success of the arrangement. Unforeseen difficulties prevented the completion of the cable specially designed for connecting the Trunk and Toll Exchanges, but notwithstanding this, not only were other arrangements of a temporary nature successfully carried out, but it was found possible to adhere to the date fixed for the opening, a very important matter from the traffic point of view, owing to the congestion in the Trunk Exchange.

A scheme for an extension of toll working in the home counties is at present being worked out, and it is hoped that by 1926 it will be found possible to establish on demand calls between London and all exchanges within 60 miles of the metropolis. With this object an entirely new toll exchange is being designed, and to this will be transferred not only the routes working in the present exchange and also the routes (now in the Trunk Exchange) to more distant exchanges in the extended toll area, but also ultimately the circuits (now known as junctions) serving Metropolitan exchanges outside the 10 mile radius.

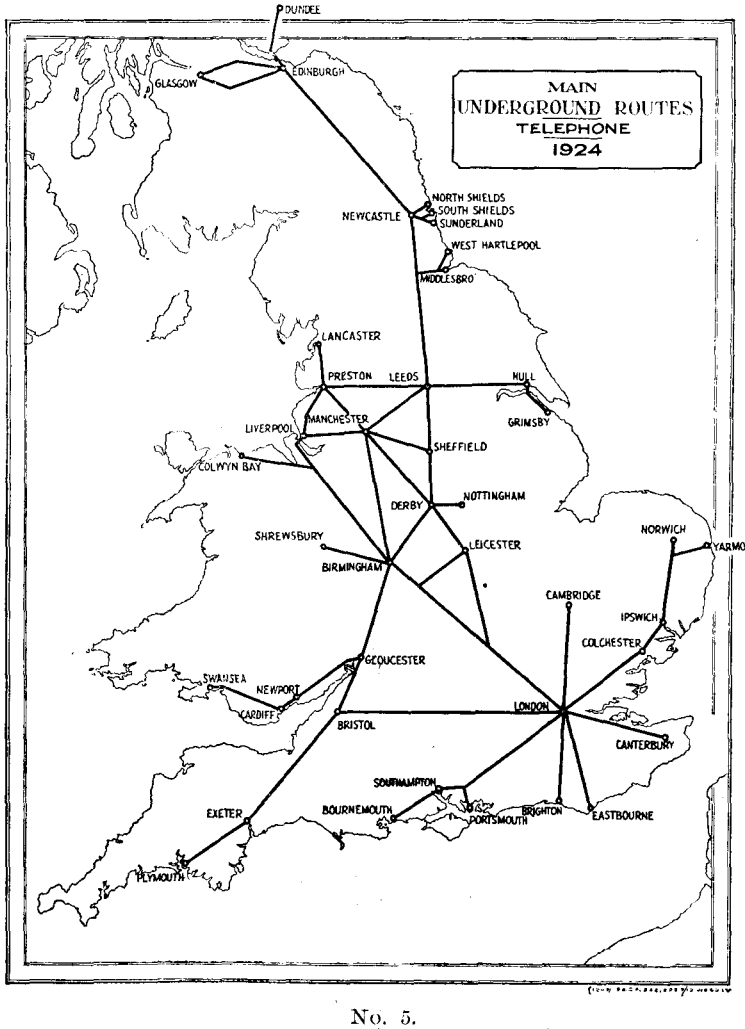
One other toll exchange has been established in this country since the war, viz., that at Hull In that city the local exchange system is in the hands of the Corporation, and it was impracticable to associate the short distance trunk lines with the local exchange system, in accordance with the usual practice in provincial cities. It was accordingly decided in 1919 to provide a special exchange on the lines of that then being provided for London, and this exchange was opened early last year. The working has been remarkably successful, and the short distance traffic in the Hull district has since developed rapidly.

In other provincial cities the short distance trunk work is still associated with the local switchboards. These services have been enormously developed since the war, and as a result of the improved services such far-reaching proposals for the extension of junction services were made that it became essential to draw up a scheme defining more or less rigidly the limits of junction working. This was necessary, not only because of the growing complexity of the controlling and switching arrangements, but also because of the engineering difficulties, more particularly in connexion with transmission.

The group system already mentioned was of considerable service in this respect as it provided areas of convenient size for meeting the problem. It was decided that junction working should not generally extend beyond the exchanges in the same group, but that in no case should it extend beyond the exchanges in two adjacent groups. This arrangement has, however, since been modified in the case of the London toll area, but the amount of traffic in which more than 2 groups are involved is extremely small.

It is the intention that each exchange should have direct communication with its group centre at the earliest possible moment, and constant effort is made to provide circuits with this object in view.

It has become apparent that in many provincial centres we have reached the practical limits of junction working in connexion with local exchange systems, and the construction of toll exchanges is in contemplation in the more important provincial cities.



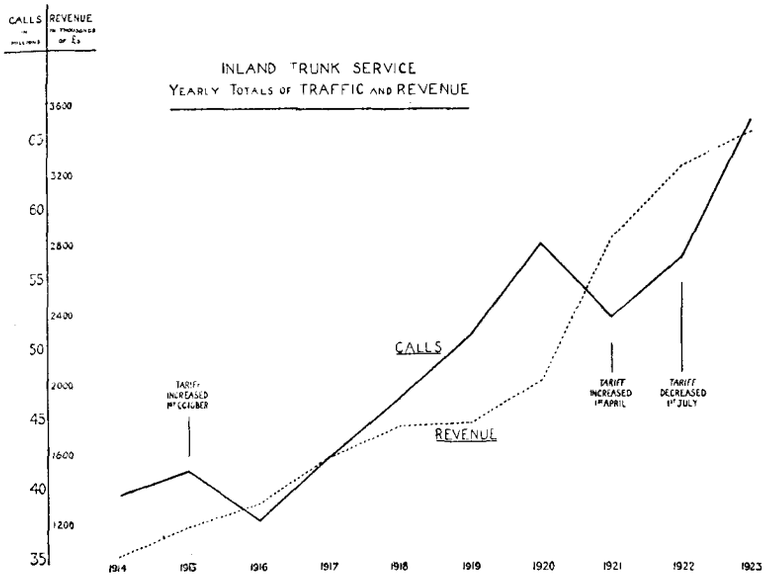
No. 5.

4.—Traffic Development and Trunk Line Provision.

During the first 5 or 6 years of this century when the Post Office system in London and in certain provincial districts was being rapidly extended, the rate of growth of the trunk traffic was as high as 15 per cent. per annum, but the annual rate of increase fell somewhat in later years to about 12 per cent. The rate of increase in the revenue derived from the trunk lines was slightly higher, as the average value of a trunk call increased from about 5½*d.* in 1901 to 6¼*d.* in 1914.

During the second year of the war, the traffic began to drop away, only to rise again rapidly in 1917 and 1918 owing to the impetus given by the enormous development of the manufacture of war material. The new State Departments were responsible for a considerable amount of the increased traffic.

In order to keep pace with the rapid increase of traffic, the programmes of trunk line construction became more and more extensive, but until about 1911 the circuits were provided mainly by means of overhead construction. The pole lines along roads, railways and canals became so congested that it became difficult to find new routes, but fortunately improvements in the design of underground telephone cables enabled this difficulty to be overcome.



No. 6.

A very full description of the development of the underground telephone system in this country in recent years is given in the paper which Sir W. Noble read before the Institution of Electrical Engineers in March, 1921, and which is published in the Journal of the Institution issued in the following month.

The first long distance underground telephone cable laid in this country (it was in reality a composite telegraph and telephone cable) was that between Leeds and Hull, which was handed over for traffic in November, 1913.

In the meantime the question of providing a cable between London and Birmingham was raised, but it was subsequently decided to extend the underground route to Liverpool. The duct line was authorised in 1913, and the cable in the following year, and the work was completed just before the extraordinary storm of March, 1916, when the overhead routes passing through the Midland Counties were literally swept away. It was at that time of the most vital importance that telephonic communication should be maintained with the great towns of the North, and the new cable was completed only just in time to permit of this being done.

This cable at present provides 36 circuits between London and Birmingham, 32 circuits between London and Liverpool, and 23 circuits between Birmingham and Liverpool, the revenue obtained from these circuits being about £5,000 a week. The cable has worked excellently, and its success would, in itself, have justified the Post Office in extending its trunk underground system, but the revolution caused by the perfection of the telephone repeater made it obvious that all trunk lines on the more important routes would in future be provided by means of wires in underground cables.

The first trunk line programme prepared after the war provided for the laying of cables from London to Manchester (serving also Northampton, Leicester, Nottingham and Derby), London to Bristol (serving also South Wales) and London to Southampton and Portsmouth. In the following year the underground system was extended from Derby to Sheffield and Leeds, and in 1921 a new Birmingham—Derby cable was authorised to link up at Derby with the backbone scheme.

In 1922 a very important step was taken in the development of the underground scheme, for not only was an extension from Leeds to Edinburgh authorised, completing an underground route from London to Glasgow, but a route from Birmingham to Gloucester and Bristol linked up the backbone system with the South-West of England and South Wales. In connexion with this extensive scheme, a large number of repeater stations will be required; on the London—Glasgow route alone there will be as many as 7 such stations, *i.e.*, Fenny Stratford, Derby, Leeds, Catterick, Newcastle, Jedburgh, Edinburgh, and I understand that some of the London—Glasgow circuits will require, in addition, terminal repeaters, making 9 in all. The Derby repeater station, which occupies a very important place in the scheme, by reason of its geographical situation, will ultimately contain no less than 1,500 repeaters.

Each of the post-war programmes has included a large number of less important cables, mainly for the purpose of developing the junction services in the neighbourhood of the big cities. Thus, in 1919, provision was made for new cables in Lancashire, Yorkshire and in the Glasgow district, in 1920 for an extensive underground system in the neighbourhood of Birmingham and for 14 new cables in the area covered by the London toll scheme. Incidentally also provision has been made for direct cable routes from London to more distant places, not on the back bone routes, *e.g.*, Margate, Ramsgate, Southend, Eastbourne, Hastings, Worthing, Cambridge, Ipswich, Bournemouth, Oxford and Bedford, sometimes by means of entirely new routes, sometimes by extending cable routes provided for the toll scheme.

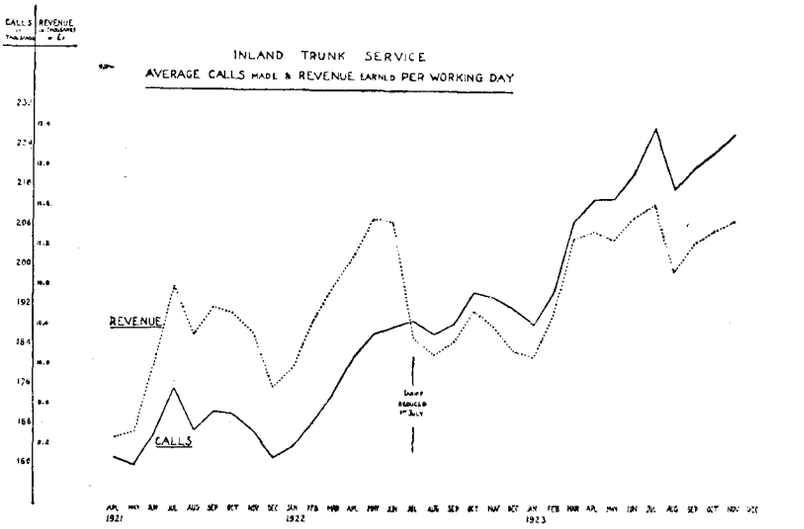
Moreover, notwithstanding the number of cables provided, an extensive programme of overhead work has been carried out each year since 1919. Diagram No. 4 shows the main line underground system in 1919, and Diagram No. 5 the routes existing and authorised at the present time.

The trunk traffic has responded to the increase of facilities. The accompanying Diagram, No. 6, shows the growth in total trunk traffic and revenue, year by year, from 1914 to 1923, and Diagram No. 7 the growth (as indicated by averages per working day) month by month since the new rates were introduced in April, 1921.

It will be seen that during 1921 the introduction of greatly increased rates, combined with the acute trade depression which had by then developed, caused for a time a drop in the traffic. But during the great boom of 1919 and 1920 the trunk lines were congested with calls, and as the resumption of line and cable construction had not during those years provided an appreciable number of additional circuits, the delays were very heavy. The sudden drop in traffic in April, 1921, automatically improved the service, on many routes it wiped out delay, and towards the end of 1921 the traffic began to increase rapidly. The improvement has been more than maintained, notwithstanding the continued trade depression, since the completion of a large number of cables and overhead circuits has enabled the service in many directions to be still further accelerated.

The traffic during 1923 represents an increase of over 17 per cent. as compared with that for the previous year, the biggest annual increase of trunk traffic for 18 years.

During 1923 the average number of trunk calls per exchange line (subscribers and call office lines) worked out at 100 (approx.) compared with a figure of 92 during the previous year. This indicates a marked increase in trunk user, seeing that there was during the year a very considerable increase in the number of exchange lines, and new lines are not generally used much for trunk calls when first joined up.



No. 7.

It should be stated that the traffic increase has been very largely in the short distance services, and the following table will explain why this is the case :—

	Total Number of Trunk Circuits.		
	At March 31, 1922.	At March 31, 1923.	At Dec. 31, 1923.
7½— 25 miles	6,170	6,744	7,452
25 — 50 „ ...	1,330	1,406	1,538
50 —100 „ ...	502	512	571
100 —200 „ ...	266	283	297
over 200 „ ...	20	24	25
Total ...	8,288	8,969	9,883

It will be seen that, while there has been an enormous increase in the number of short distance lines provided, the number of additional long distance lines provided is inappreciable. In order to develop a really satisfactory long distance service such direct routes as the following are badly needed :—

London—Belfast.	Bristol—Newcastle.
„ Aberdeen.	„ Glasgow.
„ Edinburgh.	Cardiff—Newcastle.
„ Plymouth.	„ Glasgow.
	Liverpool—Belfast.

The only long distance routes on which it has been possible to provide additional lines since 1914, to keep pace to an appreciable degree with the increase of traffic, are those served by cable routes. In 1914 there were 21 London—Birmingham circuits ; there are now 46, and the traffic is over 2½ times that handled on this route before the war. Between London and Liverpool there were 21 circuits in 1914, and there are now 42, and the traffic is 2½ times the pre-war figure. The number of London—Manchester has increased from 20 to 34 in the same period, but the additional circuits have been available only since May, 1922, and the traffic is already up 50 per cent. In each case, moreover, the service is greatly improved. On the other hand, practically nothing has been possible on the routes from London to Newcastle, Middlesbrough, Bristol, Cardiff, Hull, &c. It is true that 4 additional London—Glasgow circuits have been formed, but 2 of these were made up by circuits taken from other routes, and 2 were formed by superposition, a notable engineering achievement.

One can readily imagine what is likely to happen to the traffic when the backbone scheme of underground cables is completed and when, in addition, trade revives.

Before leaving this section of the paper, it should perhaps be mentioned that the official procedure in connexion with the provision of trunk lines has been considerably simplified. All circuits up to 25 miles in length are now provided as required under advice notes issued locally after the provision of the circuits has been authorised at Headquarters. This has reduced very considerably the length of the annual programme and has expedited the provision of circuits.

(To be continued.)

ANOTHER VIEW OF TELEGRAPHS.

(*Continued from page* 122.)

[During a recent discussion of Telegraph problems at the London Telephone and Telegraph Society, Mr. F. Kemp of the Secretary's Office made a contribution of such value that we invited him to reconstruct it for these columns. Mr. Kemp had a long experience as a telegraphist before coming to the Secretary's Office. We give space to his paper with appreciation of its merits but we must not be identified with all the opinions that he expresses.—ED.]

Twenty years ago the morale of the Telegraph staff was excellent. Men and women worked hard and worked with marvellous accuracy. Poor operating was rare. A telegraphist sending on a duplexed Morse keyed his messages at full speed, confident that his distant colleague was able and willing to take everything. The rhythm of the Wheatstone perforator in the hands of an expert stick puncher was music to the supervising staff. Pride in the skill of their craft and willingness to rise to the occasion when busy hour or spasmodic blocks occurred contributed to the making of a body of workers of which any Administration could be proud.

The introduction of quadruplex working commenced the destruction of the craft pride. Totals of 50 and 60 per hour became history. On the " B " side an operator was considered lucky if he could disentangle 24 per hour from the mass of splitting, incoherent rubbish masquerading as Morse. And if the straight quad was bad, the split quad was infinitely worse. The result on traffic was lamentable, and the impression inevitably forced on the staff was that if the Administration cared nothing for public messages there was no need for telegraphists to worry. A pitiful state of affairs, but unfortunately true. Systematic cutting of staff below minimum requirements, with the corollary of chronic casual overtime played havoc with a man's home life and reduced his opportunities of social amenities to negligible proportions. An attempt to remedy matters by the introduction of semi-skilled casual labour caused further irritation.

Whereas formerly a man would work at top speed with the happy certainty of a respite when his circuit was " clear," under the new regime he was hounded from circuit to circuit by a distracted Overseer. If by any accident of circumstance no other stations were calling and no other piles of telegrams were waiting when a telegraphist became " clear," his sigh of relief as he straightened his back was interrupted by an Overseer standing behind him with a Morse slip to be written. Obviously, and in self-defence against nervous breakdown, the telegraphist adapted himself to altered conditions.

Even in face of the greatest discouragement the telegraph staff—to its everlasting credit—has always risen to the occasion when storms have devastated the system, and when " special events " and race meetings have necessitated abnormal output. The miracles of mobilisation and early preparations for war in 1914 were possible only because the telegraphist made them possible. Racing staffs with a phenomenal capacity for working long periods without a rest or meal relief have given themselves magnificently in the service of the public. They have found their efforts unappreciated and unrewarded.

Two other phases in the evolution of a discontent which is anything but divine may be noted. They are significant because they are more modern. Prior to 1914 the conditions under which the staff lived were not perhaps realised to their full extent owing to the restricted opportunities of comparison with the outer world. The war crystallised a more or less unanalysed state of dissatisfaction into a definite condition of mind. Exchange of ideas with men in every walk of life, men of all types, temperaments and abilities, brought a dawning consciousness that Post Office employment was not the Garden of Eden that fond parents had imagined or Civil Service coaching institutions had pictured. The staff even realised that the majority of other men earned a living without irregular hours and without a discipline savouring of Army methods, and enjoyed ample opportunities for sport and recreation. Demobilisation freed a mass of men determined to resist all further encroachments on their perfectly natural desire of securing a measure of happiness in life. I would like to chronicle something nobler but I am merely recording facts.

Finally, it must be remembered that the bulk of telegraphists are doomed to be telegraphists for the whole of their official careers. Promotion is a remote possibility which may occur in the evening of their lives. Avenues of advancement to other branches of the Civil Service are practically closed. Those still open are hedged with examination syllabuses with which, in consequence of restricted opportunities of study through irregular duties, they cannot cope. To say the least this is unfortunate. It is unfortunate because the enthusiasm and ambition of the youthful S.C. & T. are bound to die when life affords a vista only of drudgery from starting-pay to pension. It is unfortunate because the Post Office, after recruiting excellent material, fails to use it to the best advantage. The experience gained by a ten years' apprenticeship in the Telegraphs is valuable. The nature of his vocation gives the telegraphist a sound training in the habits of punctuality, precision, and attention to detail, concentrated attention to business for long periods, and a thorough knowledge of commercial methods. In effect the Post Office system produces able men, and having produced them loses the maximum benefit of their training and matured experience, because, with a blank wall confronting them, their real interests are diverted into other channels. That the manipulative classes, given the opportunity, can provide more than their quota of first-class brains is illustrated by the fact that many of the highest positions in the Post Office have been filled by men who the telegraphist and S.C. & T. grades claim with justifiable pride as their own. The revelation in the " Staff List " that a contemporary Assistant Secretary of the Post Office, Engineer-in-Chief, Controller and Vice-Controller of Stores, Controller of the London Postal Service, Controller of the Central Telegraph Office, a host of others prominent in the Post Office service, and the bulk of the admirable and efficient ex-supplementary class, have been drawn from the manipulative grades surely proves the existence in the past of ability of a very high order. There is no evidence that the present generation is less able than its predecessors. Providing the standard of recruiting be maintained a mass of the best material will always be available, and no Administration can afford, in its own interests as well as those of the public, to ignore it.

In an endeavour to survey the service from all angles one is compelled to an attempt to see the point of view of the Administration. " Headquarters" is in the supremely important strategic position of seeing the service as a whole. It is able to collate and compare results from every Telegraph Office in the Kingdom, and draw conclusions on which to base a policy essentially sound when the service is regarded as a unit even if seemingly unwise from the standpoint of a particular section. Economy in working the service, providing its efficiency be not endangered, is a paramount obligation to the public.

Cases of hardship to the staff are probably considered more humanely—within the limitations imposed by Treasury circulars—than is usually thought, but obviously decentralisation in details is unavoidable, and injustice may be caused by a too literal interpretation of instructions by a local official. The staff Unions provide the machinery by which local grievances may be brought to the notice of " Headquarters."

Staff must be adjusted as closely as possible to actual requirements and in endeavouring to place this matter on a business-like basis of adequacy without wastage the Administration is pursuing a policy the soundness of which must be admitted by everyone taking a broad view of the service. The definition of the word " adequacy " is a difficulty which should not be impossible of solution.

Night duties are being reduced by diversion of Press work to the private wire systems of the Press agencies, but a service existing purely for the convenience of the public must unavoidably often work whilst others play. Irksome conditions must be considered in conjunction with the undoubted advantages of State employment, of which not the least is the freedom from the vicissitudes often attendant on commercial life.

" Headquarters" can justly claim that the present personnel of the Telegraph Traffic Section, composed almost entirely of men with practical experience of telegraph working and keenly aware of the difficulties and grievances of the staff, approaches its problems from the pyschological as well as the " official " standpoint.

My impression of the Administrative point of view may be inaccurate, and the Administration may repudiate parental responsibility. The outstanding fact is, however, that there is an Administrative—as well as a staff—viewpoint. Cannot common ground be found, then, from which the Telegraphs may be surveyed with a common ideal of service? Administration and staff are both integral parts of the Service. Each is dependent on the other in the joint effort of providing service for the public. If there be dissatisfaction amongst the staff the facts—however unpalatable—should be faced with a view to the formation of more harmonious relationships. The pressing need is for a frank recognition of each other's point of view, and free discussion of all matters tending to clog progress; in short, the placing by both parties of the cards on the table in an effort to secure the fullest measure of co-operation for the well-being of the service.

The reservation of 50 per cent. of the vacancies on the clerical establishment of the Post Office would be symptomatic of a desire for co-operation. The obstacle of the educational examination—a very real one to men performing irregular duties—could be overcome if the certificates of the London City and Guilds, Society of Arts, and the Board of Education in the different subjects of the syllabus were accepted as qualifying standards. The youthful aspirant to a better position would then be enabled to extend his studies over a period of years. The steady absorption of knowledge, and the broadened mental horizon following the thorough study of several successive subjects would incidentally produce better educated men than a process of cramming. The present system of examination in several subjects on a specified date or dates would merely be replaced by an extension of the admirable practice already in vogue of publishing educational successes in the Post Office Circular. Providing ample opportunities existed for advancement from the clerical to the administrative class, a progressive and selective process would be initiated which, whilst securing excellent men for the intermediate grades, would bring the best of them to the highest positions in the Service.

It is regrettable that the grading of huge bodies of men as one unit appears to be a necessity of the big industrial organisation. A cast-iron scale of pay which rewards the minimum output and poor intelligence and character equally with the best, and a grading which enforces the same irregular duties and monotonous work on the man grown old in service as on callow youth, cannot give the best results simply because the incentive to effort is destroyed. Some improvement may be effected by dividing telegraphists into two distinct bodies in which the better duties, *i.e.*, Counter, Dirigeur, Writing, Intelligence, &c., would be performed by Telegraphists, Class I, with a higher maximum than Class II, which would be responsible for the bulk of the actual manipulative work. The factors governing promotion from Class II to Class I, apart from the necessary technical and other qualifications for performing the higher duties, should be a consistent excellence of output and the exercise of intelligence under varying conditions. This may appear a weird conception of a basis for promotion, but every Telegraph Superintendent and every Overseer knows his "live" men as though they were labelled. I emphasise excellence of output, or, in other words, the willingness always to pull full weight. A spotless conduct sheet is not sufficient to justify promotion. A "clean" record too often means nothing beyond punctuality added to an infinite capacity for dodging responsibility.

The telegraph system of the future will possibly be as different from that of to-day as modern man is from his Paleolithic ancestor. But whatever the form it assumes in its adaptation to altered circumstances, there can be no question that the co-operation and goodwill of the manipulative staff must be secured.

Mr. Stuart Jones, in his recent excellent paper, struck a much needed note of optimism in respect to telegraph traffic which must have jarred the senses of those who believe the service is only awaiting a decent burial. The telephone, instead of being responsible for the death of the senior service, may, on the contrary, be the means of its rejuvenation by collecting and delivering its telegrams and by supplanting the Morse circuit in all the small, remote, or unremunerative telegraph offices. Freed from the deadweight of loss in these directions, and enabled to concentrate its efforts on the more important lines of traffic, the service would have an opportunity—which it has never yet been given—of furnishing a satisfactory balance sheet and enjoying a prestige equal to that of its telephonic relative.

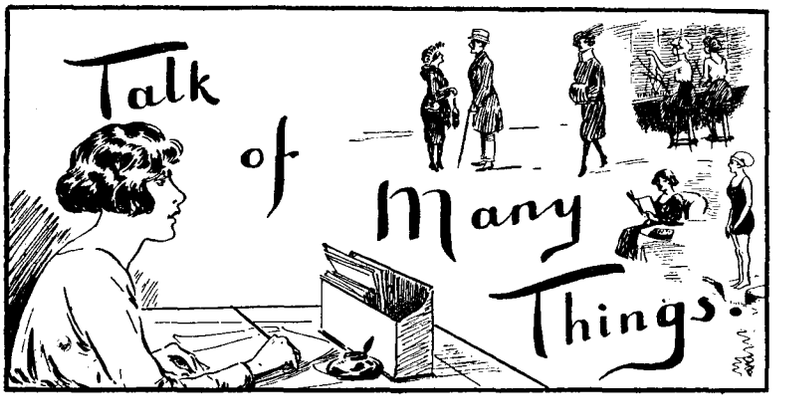
I must express my appreciation of the Editorial Committee's courtesy in giving space to a somewhat free criticism which, I hope, is not altogether lacking in constructiveness. Whilst pointing out its shortcomings I have been conscious of its merits, and I have written impelled only by a sense of loyalty to a department which, I am convinced, has by no means exhausted its possibilities of usefulness in the service of the public.

WEST YORKS TELEPHONE CIRCLE.

The final meeting of the West Yorkshire Telephones Discussion, Recreation and Social Circle was held on the 4th instant, when an interesting paper was read by a telephonist from Leeds Exchange.

As a matter of interest the recent Bazaar, held for the purpose of raising a nucleus of £500 to form a Benovolent Fund was very successful, and it is hoped to start the fund (which is for all members of the telephone staff in the district) with an amount of at least £450.

WE TELEPHONISTS



A Letter from West Africa.

WE have pleasure in giving below extracts from a letter received from a reader in West Africa. In her exceptionally attractive name, which we hope to get permission to publish, and in her concluding paragraph which (naturally) we publish in full, can be heard "The music of the spheres." May we ask our contributors to endeavour to deserve her tribute as there is usually considerable dearth of these bright articles during the summer months:—

"As telephone exchange Superintendent, I frequently have very amusing experiences, which perhaps only telephonists can really appreciate. The whole of the staff is comprised of natives—girl operators in the exchanges, and male telephone attendants at call offices and small stations. The following is a West African negro's definition of a trunk call. He tried to get a free call from his Post Office to Accra, the fee for which is 2*s.* 6*d.* for three minutes, but was caught in the act—before having spoken—and fined the trunk fee as punishment. This is his reply:

'The Postmaster.'

'Only the process I know for collecting 2*s.* 6*d.* on a telephone is—the booking clerk books, likewise the other at the end, and the addressees exchange voices which yield a crop of 2*s.* 6*d.* for three minutes' talk.'

'Mine is not in anyway akind of this. I didn't exchange voices with any individual and why must I pay? I don't see my course clearly to follow and to afix the 2*s.* 6*d.*'

But he paid!

With congratulations on the brightness of your articles, which I always enjoy." M.B.

Familiar Terms.

On the parade of a certain south-coast resort there was a goat and chaise. In the junior mind there is a peculiar indivisibility about a goat and chaise at the seaside just as in the senior mind there is an inevitable association between Gilbert and Sullivan and sausage and mashed. It is inconceivable that one can exist as a separate entity from the other. The ordinary child cannot imagine a seaside goat divorced from a seaside chaise, and even a grown-up would find it difficult to justify the existence of either apart from the other.

Now I knew the man who owned that goat and chaise. This may not appear very remarkable, but at the time it endowed me with local reputation and a decided superiority among the diminutive frequenters of parade and beach. My acquaintance did not originate as a result of the volume of business I transacted with the proprietor, for a Saturday penny, bestowed with parental injunction as to wise investment and economy, did not permit frequent indulgence in the exhilarating sport of "goshay" driving. I come to know him because he was the brother of the lady who "did for us" once a week—not fatally that is, but domestically. Nevertheless the fact that I was on familiar terms with a man of such tremendous importance did engender respect. Imagine the feeling of pride which flooded the whole of my forty inches when I could stroll up casually with one hand in my only pocket and say loudly (to impress urchins in the offing) "Good morning Mr. Hopkins." How big I felt to hear him condescend his gruff "Mornin' littleun," and with what a nonchalant air I would rest my hand on the chaise or stroke Rufus, the goat. On occasion I would even resort to the boldness of saying to the goat "Hullo, Roof," and then a green envy would envelope my fellows.

It may be that this early experience influenced my character or it may be that the desire to be known knowing public men is a common, though secret male, vanity. I think it is the latter, for I have found that others of my acquaintance, when caught in unguarded moments, have admitted similar desires.

How grand it would be to live next door to a policeman so that, having established familiarity with him over the garden fence, one might nod or even chat to him in the street in full view of the passers-by. I have never realised

SORRY YOU HAVE BEEN TROUBLED ! ! !

(With acknowledgments to a Calendar published by Messrs. Forman & Sons, Nottingham.)

this joy. Once indeed I was in a policeman's company but the circumstances were unfavourable to light conversation. He was unfriendly and uncommunicative—except for the words "Come along quietly." Some men can chat to policemen with impunity, some prefer to be caught in flowery conference with park-keepers, while others aspire to be heard calling the goal-keeper of the Upshire Coldfeet by his christian name.

Why are we thus, and why is our little dignity increased because we are known as knowing those whom to know is to be known? Is it because the solemn importance of man's estate is childish?

PERCY FLAGE.

The members of the Kingsway Swimming Club recently organised a dance at the Stationer's Hall. The evening was a very successful one from all points of view, and now everyone is clamouring for another. We shall see!

HOLBORN.

Telephone Rhymes.

No. 1.

Sing a song of switchrooms,
A switchroom full of girls;
Four and twenty "bobbed" heads,
The rest with "buns" and curls!

When they came on duty
The Subs began to "glow,"
The girls plugged in and worked all day,
Until 'twas time to go.

The Supervisors watched their flocks
With faces grave or sunny,
Observing well the Coin Box calls,
To hear them count the money.

And if some erring damsel
Forgot the opal red,
Down came a stern rebuke
Upon her thoughtless head!

If all our staff were careful
And asked for every fee,
There'd be no more discrepancies,
And oh! the "change" we'd see!

C.A.S.

A Notable Achievement.

THE staff of the London telephone service have this year achieved the remarkable distinction of being at the head of the list of contributors to the Hospital collections. The amount subscribed by them was £2,110, other Post Office Departments coming second with £1,975, and the London and North-Eastern Railway third with £1,541. Victoria Exchange heads the list of the staff collections.

It is a pity that the contributors cannot sometimes follow their subscriptions into the various channels into which they flow—the children's wards, the crippled, the paralysed, the blind, the epileptic—and many others; but it needs only a little imagination to realise what a large amount of misery is alleviated each year by these and kindred collections. Members of Committees can tell of numberless letters received, telling in simple but poignant words of tragedies narrowly averted by the kindly hand of help, and of the joy felt when dear ones are restored to health; and expressing heart-felt gratitude for the willing aid given.

With the memory of these before us, let us strive this year to pass our own high standard, and to head the list next year with £3,000.

J. McM.

Contributions to this column should be addressed: THE EDITRESS, "Talk of many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.

BOOTH-BAUDOT AWARD.

THE Council of the Institution of Post Office Electrical Engineers calls the attention of its Members to the "Booth-Baudot Duplex Award," which is offered annually for the best improvement in telegraph land-line apparatus or systems. The award for the year 1923 is governed by the following conditions:—

1. British subjects employed by Public Telegraph Administrations throughout the world will be eligible to compete for the award.

2. Applications for the award should be received before April 30, 1924, and such applications should refer to improvements made or suggested during the twelve months ending Dec. 31, 1923.

3. At the discretion of the Council of the Institution of Post Office Electrical Engineers the award may be withheld if, in the opinion of the adjudicators appointed by the Council, after full consideration of the applications received, no award is warranted.

4. Applications for the award accompanied by full details of the improvement, should be addressed to the Secretary, The Institution of Post Office Electrical Engineers, G.P.O. (West.) London, E.C.1.

OBITUARY.

Mr. W. T. Smith.

ON Monday, April 7, at Ladywell Cemetery, Lewisham, a number of us gathered to pay our last tribute of respect to Mr. W. T. Smith, formerly of the Central Telegraph Office, then Superintendent of Special Events, and then Traffic Manager. For some time Mr. Smith had been rather below his general good health, and on the morning of April 3 he died in his sleep. He was one of the remaining figures of the older régime. By reason of the many years in which he travelled up and down the country he was well known at almost every office. He was kindly, quick at making friends, and strong in holding them. Among those at the graveside, paying their last tribute, were Mr. Mansell and Mr. Sanderson, Superintendent of the Central Telegraph Office, and Mr, Stuart Jones of the Traffic Section, together with a number of officers who themselves had been pensioned from the telegraph service for a number of years and had been contemporary with Mr. Smith.

HOLIDAYS IN SWITZERLAND.

THOSE wishing to join the Horsley Party on the occasion of its 29th annual visit to the Bernese Oberland should send in their names without delay to Mr. J. W. Fewtrell, Lines Section E in C.O., G.P.O., West. Leave London 2 p.m. on Whit Monday, June 9. Cost for 16 days, £15 2*s.* 6*d.*, 23 days £19 2*s.* 6*d.*

LONDON ENGINEERING DISTRICT NOTES.

Institution of Post Office Electrical Engineers.

A PRESENTATION was made to Mr. A. J. Allison of the South East Internal Section on Friday April 11, by the Sectional Engineer, Mr. A. Wright, on behalf of the Council of the Institution of Post Office Electrical Engineers. The recipient was successful in gaining one of the Council's awards of a certificate and cheque for his essay entitled "The Merits and Demerits of the C.B. System."

Five prizes were offered for the five most meritorious essays submitted by workmen of the Engineering Department. Two of these prizes were awarded to men in the London Engineering District.

Mr. Wright expressed the feelings of Mr. Allison's colleagues in congratulating him on his success.

New Exchange.

The number of public telephone exchanges is steadily growing. The latest addition is the Speedwell Exchange, which was opened on April 5, and which will serve the Golders Green area. The exchange is accommodated in a building which has been specially designed for the purpose and all the plant can therefore be used to the utmost advantage. The switchroom is light and airy and the apparatus is laid out so as to be easily accessible. The exchange is of the C.B. No. 1 type, and has been constructed by Messrs. The Peel Connor Telephone Co., to the specification of the Post Office Engineering Department. The nominal capacity of the exchange is now 3,700 lines and provision has been made for extension to approximately 8,300 lines. Not many years ago the construction and opening of such an exchange would have been regarded as something of an event. The Engineering Department has, however, been so accustomed to big works that the knowledge of the work in hand is hardly known to anyone but those engaged in its execution.

Wembley Exhibition.

By the time that these notes appear in print no doubt the Exhibition will have been opened and most of our readers will have become acquainted with its wonders. The telephone has proved to be one of the most essential features in the construction and management of the Exhibition. Everyone knows of the race against time that took place in order to be in readiness for the opening and no one, least of all those engaged in the undertaking, will fail to appreciate what an important part was played by the telephone. When exhibitors first arrived and found it almost impossible to get to the place where their stands were to be erected, on account of the debris, they wished to telephone about it and seemed quite to expect that when no one else could get things done the Telephone Department could be relied upon. Their expectations were a tribute to the Engineering Department, generally speaking they were not disappointed. The requirements necessitated the provision of two 800 pair cables from the Exhibition to the Wembley public exchange, and a full-size junction cable (loaded) from Wembley to Gerrard. These were all completed in readiness for the opening. Although this is being written some time before date fixed for the opening the number of orders for exchange lines received have exhausted one cable and inroads are being made into the second.

Extensions of internal equipment have also been made at the Wembley public exchange to cope with the expected traffic.

A special battery has been installed by the Post Office in the exchange grounds to supply current to the P.B.X.'s, of which there will be a large number.

C.B. Clay Football Challenge Cup.

The results of 1st round matches of the above competition resulted as follows :—

West External Section ...	6	West Internal Section ...	1
City Internal Fitting ...	0	City External Section ...	2
C.T.O. ...	1	S.W. External Section ...	2
East External Section ...	1	North External Section ...	3
Centre Internal Section ...	0	S.E. External Section ...	3
L.T.S. Accts. Branch ...	1	City Internal Section ...	2

Headquarters L.E.D. and South Internal Section drew byes.

The 2nd round results proved as follows :—

Headquarters L.E.D. ...	0	South East External ...	1
City Internal ...	0	City External ...	3
North External ...	0	South West External ...	1
West External ...	4	South Internal ...	1

The above matches were very keenly contested, as will be seen by the results; the semi-final resulted as follows :—

South East External ...	3	South West External ...	0
West External ...	1	City External ...	5

The final between South East External *versus* City External will be played on the "The Valley" Charlton Athletic ground on May 10, at 3.30 p.m. when a very keen game is anticipated.

The referee for the above match will be J. W. Hankin, L.T.S.

The proceeds of this match will be given to the Rowland Hill Benevolent Fund, when a good attendance is expected, also a very good game. There is no doubt that the revival of this contest, "The Clay Cup," has created great enthusiasm.

It is hoped to have the pleasure of Mr. C. B. Clay's presence at the Cup Final on May 10 to present the winners with the cup and medals at the conclusion of the match.

Golf.

ENGINEER-IN-CHIEFS DEPT. v. CENTRAL TELEGRAPH OFFICE.

Played at Wanstead, April 16, 1924.

SINGLES.

R. A. Weaver, 1 up ...	1	E. Woods ...	0
E. N. Towle, 3/1 ...	1	R. Hain ...	0
H. Wager, 3/2 ...	1	J. B. Menhennick ...	0
E. J. Rathbone ...	0	A. W. Edwards, 2/1 ...	1
S. J. Husband, 1 up ...	1	A. T. Jacobs ...	0
J. S. Thomson, 5/4 ...	1	J. Deacon ...	0
G. Cowling, 8/6 ...	1	A. Avery ...	0
H. S. Thompson... ...	0	H. Sainsbury, 4/2 ...	1
	6		2

FOURSOMES.

Weaver and Wager, 3/1 ...	1	Woods and Menhennick ...	0
Towle and Rathbone ...	0	Hain and Edwards, 4/2 ...	1
Husband and Cowling 5/4 ...	1	Jacobs and Avery ...	0
Thomson and Thompson, 4/3 ...	1	Deacon and Sainsbury ...	0
	3		1

RESULT.

Engineer-in-Chiefs Dept. ...	9	Central Telegraph Office ...	3

On the occasion of the retirement of Mr. Brian Gifford from the Contract Branch, London Telephone Service, he was presented with a handsome clock and a purse of money by his colleagues. Mr. Gifford has had a long experience, both at Brighton and London, and he has done excellent work in obtaining subscribers in connexion with his duties as Contract Officer. The hearty good wishes of the staff follow him for his continued success and prosperity.

LONDON TELEPHONE SERVICE NOTES.

Telephone Directory.

AT the time of writing, the April issue of the London Telephone Directory is being distributed, and as one would expect it is bigger than the issue it supersedes.

It is rarely that the directory makes a fresh appearance without a new feature and this time it takes the form of an addenda containing a list of about 2,500 entries received after the main part went to press, and several hundred corrections relating to changed numbers, names and addresses.

The directory is, of course, of vital necessity to the telephone subscriber and to the telephoning public generally, but its usefulness apparently extends further for it is frequently referred to for names and addresses, such is the faith reposed in it by the public at large.

It is with a considerable amount of pride that those within the service regard the directory because it puts within reach of all who use it the opportunity of calling any one of the quarter of a million entries and it is the rapid completion and the absolute perfection of the individual call that is our constant aim. By means of the directory we put into the hands of all who choose to use it an instrument for testing the efficiency of the service. It matters not to the telephonist which numbers are called for, they can be selected by the caller at random from any page of the book (there are 1,126 pages) each number called for can be got with equal facility and it is of interest to reflect that connexion can be made between any two numbers in about the same space of time that it takes to look up two numbers at random in the directory.

Strike Traffic.

As was to be expected telephone traffic made a spurt during the week of the tram and bus strike, the number of originated calls within the London area rising to approximately 8½ million compared with a little above 8 million calls made during the preceding week. The largest proportionate increase was experienced at exchanges outside the main business area within a radius of five miles from Oxford Circus, and it would appear from this that suburban shoppers being prevented from going to the West End used the ever-ready telephone to bring the West End to them. We should like them to cultivate the habit.

The telephone staff, as usual, made special efforts to be in the exchange up to time and succeeded admirably.

MISS HAWKINS.

Two Tragedies.

It is with regret that we record the deaths, in tragic circumstances, of two of our telephonists.

Miss Hawkins, a member of the Park staff, whilst practising gymnastics on the rings at the Campden Technical Institute on March 4, apparently became faint and consequently fell. She was taken to St. Mary's Hospital, Paddington, and passed away the following day. Miss Hawkins was one of the most popular members of the staff. She was captain of the Exchange Swimming Club and taught a number of her colleagues the art of swimming. She had a pleasing personality, besides being very capable, and is very much missed by all.

The second case was that of Miss Hilda Sear, of the Hornsey Exchange, who on Saturday, April 5, was drowned in a well at Cheshunt while attempting to take a photograph. Miss Sear was a most efficient telephonist, highly regarded by her superior officers, and also very popular with the staff. Her sudden and tragic end came as a great shock to all her colleagues. All grades were represented in the flowers sent.

More Broadcasting.

On Monday, April 14, Miss A. E. Cox, Superintendent of Female Exchange Staff, spoke to listeners during the Woman's Hour on the subject of "The Work of the Telephonist." This is the third telephone talk broadcast by the B.B.C. and could not fail to be of great interest to those who wish to know what happens at the other end of the wire.

EDINBURGH TELEGRAPH AND TELEPHONE SOCIETY, 1923-1924.

IT is considered that a brief report of the activities of the above Society may be of some interest to readers of the JOURNAL who are members of similar office Societies elsewhere. The arrangements of the Society were carried through by a Sub-Committee of the local Telegraph Whitley Council, and it functions in addition as Education Sub-Committee. The Sub-Committee were indebted to all the speakers and critics who added to the success and interest of the meetings.

A syllabus comprising six subjects was prepared, but it is regretted that unforeseen circumstances necessitated the abandonment of the last two lectures of the series. The subjects and speakers for the Session were :—

"University Courses and their Application to Post Office Personnel."—Major Jayne, D.S.O., O.B.E., M.C.

"The Post Office and Business Principles."—Jas. Dow, Esq. (Accounts Branch).

"Advantages and Disadvantages of the Baudot System."—G. Dickson, Esq.

"Power (Telegraph and Telephone)"—J. H. Couch, Esq., (Suptg. Engineer's Office).

"The Development of the Telegraph Service."—R. J. Phillips, Esq.

"Public Criticism. Right and Wrong."—R. M. Hendrie, Esq.

The high standard of previous years was fully maintained, and the subsequent animated discussions demonstrated the close interest with which the papers had been followed. Under the heading of "Education," arrangements were made with the Edinburgh Educational Authority to hold a special class for girl probationers, and special encouragement is given to boy messengers to continue their studies even though the general examination is passed already. The facilities granted were fully taken advantage of, and the reports received up to the present are considered satisfactory.

Under the auspices of the School of Social Study and Training, Edinburgh University, two courses were arranged on public administration for the benefit of Civil Servants. The inaugural address of "Theories of Government," was delivered by Viscount Haldane, F.R.S., K.T., O.M., President of the Institute of Public Administration. Six lectures were subsequently delivered on "The Business of Government," followed by the second series comprising six lectures on "The Principles and Methods of Financial Control." A lecturer of University rank introduced the subject on each occasion, spoke for about 40 minutes, and the remainder of the time was spent in discussion. A fair number of the telegraph staff took advantage of the facilities.

PERSONALIA.

Resignations on account of marriage :—

Miss D. K. BUGGY, Assistant Supervisor, Class II, of Regent Exchange.
Miss K. M. READ, Telephonist, of Victoria Exchange.
Miss M. LETCHFIELD, Telephonist, of Victoria Exchange.
Miss R. HAROLD, Telephonist, Trunk Exchange.
Miss H. F. DEAR, Telephonist, Trunk Exchange.
Miss G. M. BAKER, Telephonist, Park Exchange.
Miss E. L. FARDON, Telephonist, Park Exchange.
Miss M. E. WITTE, Telephonist, Paddington Exchange.
Miss W. R. BOND, Telephonist, Finchley Exchange.

PROMOTIONS.

Miss H. M. HAWES, Telephonist of Museum Exchange, has been promoted to Assistant Supervisor, Class II, at Victoria.

THE

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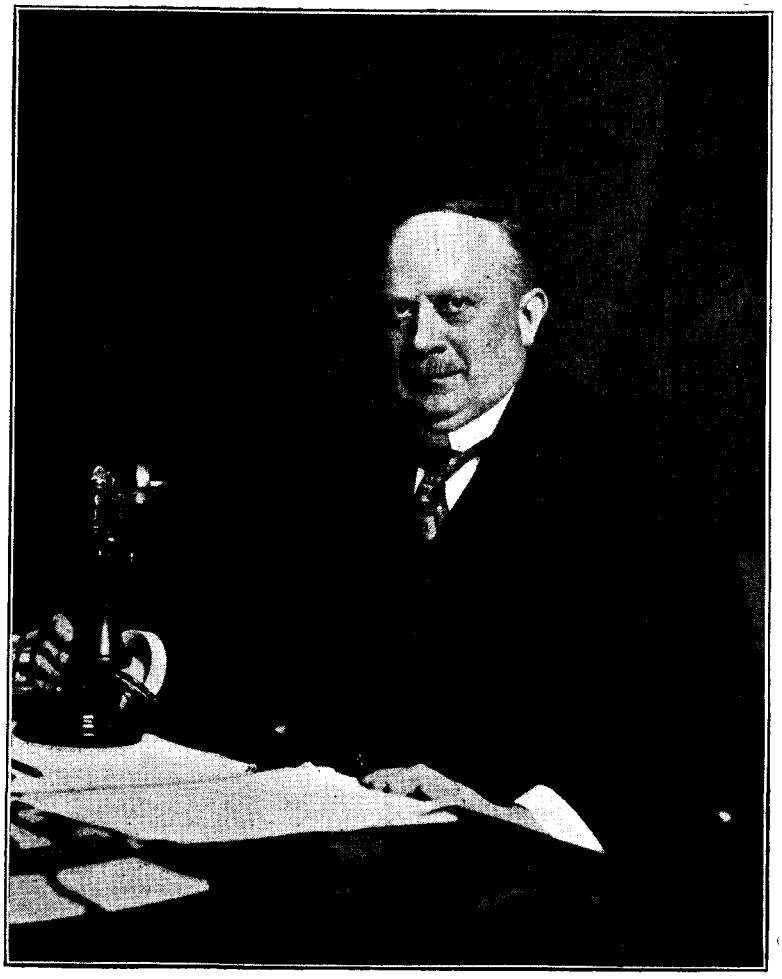
All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.*4.

TELEGRAPH AND TELEPHONE MEN.

V. ARTHUR EDGAR COTTERELL.



To those who have known Arthur Cotterell since 1879 when he first joined the telephone service at Birmingham, and to the bigger company of men and women who have become acquainted with him during the 44 intervening years, the mention of his name conjures up a vision of a real man of ample proportions radiating geniality in a wide circle and of the great capital city of the Midlands in which he spent the first 44 years of his life. In 1879, before the days of telephone exchanges in provincial cities, young Cotterell formed the entire telephone clerical staff for the Midlands, but was amply supervised by a Managing Director, Secretary and a Consulting Electrician. This trinity of exemplars to guide his early steps may account for some of the admirable qualities he has displayed in later life.

In 1886 Mr. Cotterell became the first Manager of the Potteries district and within a few months was promoted to Birmingham in a similar position. When the National Telephone Company divided the United Kingdom into provinces in 1893, Mr. Cotterell was made the first Assistant Provincial Superintendent for the Midlands, and in 1898 was called to London to fill a similar position in the Southern province, in which there were at that time over 320 exchanges and a need for the services of an active and experienced telephone organiser to cover the wide area comprised in that province.

Since the transfer of the telephones to the State in 1912, Mr. Cotterell has been at headquarters, and for several years past has been in charge of the very varied duties comprised in the Correspondence Section of the telephone branch of the Secretary's Office.

The fact that on reaching the Civil Service "Hill 60" he closes his active service in the General Post Office will not prevent the continuance of the happy relations which exist between him and all those with whom he has been brought into contact, and, having the happy capacity of keeping his

friendships in good repair, he has a host of friends. He retires full of health and intellectual vigour. His stock of reminiscences is inexhaustible, but he is not content to rest on the past, and his interest in the further development of science is as keen as ever.

Of hobbies Astronomy is his favourite, and no member of the British Astronomical Society is a more regular attendant at the monthly meeting at Zion College. On the sports side his achievements are, however, negative. He regards himself as too young to begin Golf, and although he has lived for many years near a county cricket ground, he is credited with never having heard of such persons as Jack Hobbs and Fender.

On leaving the Post Office his London and provincial friends will unite to present him with a somewhat unique Autograph Album, containing an etching by Mr. Henry J. Howard, an officer in the Mails branch, and a number of charming sketches by that gentleman's daughter, Miss Margaret Maitland Howard, whose picture, "The Return of Persephone," "hangs on the line" at the Royal Academy. Mr. R. A. Dalzell, Director of Telegraphs and Telephones, will, on Monday afternoon, June 2, present Mr. Cotterell on behalf of his colleagues with a 2-valve Wireless set fitted with a special circuit, together with a fountain pen, two things which, strange to say, Mr. Cotterell, notwithstanding his intimate knowledge of wireless science, and his frequent excursions in the realm of literary composition, has never before possessed.

THE WRONG NUMBER TROUBLE.*

BY D. H. M. BOTT.

"Good Morning, girls," said an I. D. officer to her colleagues, adding in an amused tone, "Have you seen the London Telephonists' Society's programme of the subjects and classes for the Competition Papers this year and the special prize offered for a paper on 'The Wrong Number Trouble.'" Loud groans from the girls thus addressed, followed by remarks as "Oh! what a subject!!" also, "How, what could anyone say on that subject and worry, other than what has been said before, in every conceivable way and form imaginable," and from an extremely pessimistic voice, "To my mind, whatever you say or do like the poor 'twill always be with us!!"

However, thinking things over, it seems very disheartening and appalling that nothing further could be done to remedy, if not completely annihilate, this old monster—"The Wrong Number Trouble." If once it could be overcome, just think of the joyous existence of Monitors and Supervisors (to mention only one section of the staff), to whom the wail and complaints of subscribers, *re* being given wrong numbers, was not known, to quote a parody:

"A Desk, an Instrument,
No wrong number trouble,—I vow,
An I.D. officer's existence
Were a paradise enow!!!—
With, ahem!! reservations!!!—

The Wrong Number question has been the butt and jibe of every wag, cartoonist, stage comedian and such like for so long and to such an extent, that those who are employed in the London telephone service, and who are, so to speak, behind the scenes are heartily tired of the subject. Funnily enough, one doesn't hear of the cut-off trouble, faulty connexions, and the numerous other types of complaints and trials a subscriber meets with, to any such extent, yet they exist, and are just as annoying. To my mind, the worst aspect of the Wrong Number Trouble is that it always necessarily affects two subscribers,—both the called in error, and the calling, very often resulting in two complaints, when one complaining subscriber is quite bad enough! especially when the Monitor can only offer an apology. Apart from the cut-off cases the Wrong Number Trouble, causes more complaints and annoyance and more irritability from the public than any other type of irregularity.

Unfortunately, it must be admitted that the greater proportion of wrong numbers received are due to the Departmental side, either from operating irregularities, weak tone and repetition of the telephonists, faulty apparatus, faint transmission on order wires, or indistinct multiple-marking cases. The Department and its staff, working together in harmony, and unity, are the great factors necessary to success, in overcoming the Wrong Number Trouble, and every effort should be made to conscientiously try and give of their best, then they can confidently rest assured that, no matter how exasperated or exaggerating, or exacting a member of the public may be, the officer dealing with the case can in all truthfulness stand up for the Department in all its aspects, and in its competence to give a good, reliable, accurate service.

* Paper read before the London Telephonists' Society.

Unfortunately, in such a big concern as the London telephone service, you are bound to get types, who, though they cannot be classed as inefficient, are nevertheless unconscientious, and careless of the subscriber's point of view, and to whom the pride of excelling and competence in small details as well as in greater issues, are as nothing, and who plod along in the easiest groove they happen to meet, and never exert themselves to become more efficient and more helpful to the public generally.

Apropos of this, the following passage from John Buchan's book *Half-hearted*, seems very apt—the two men characters are talking:—

"What would you call the highest happiness?" asks one, "The sense of Competence" was the answer given without hesitation. What do we mean by Competence? not success! God knows it is something very different from success. Any fool may be successful if the Gods wish to hurt him. Competence means that splendid joy in your own powers and the approval of your own heart, which great mean feel always, and lesser men now and again at greater intervals. There are a certain number of things in the world to be done, and we have got to do them. We may fail,—it doesn't in the least matter. We may get killed in the attempt,—it matters still less. The things may not altogether even be worth doing,—it is of very little importance. It is ourselves we have got to judge by. If we are playing our part well and know it, then we can thank God and go on. That is what I call happiness."

To be conscientious and keen on giving the best service possible cannot be too strongly instilled into the junior's mind. What one learns, and the impressions then gained at the start of your career in the Service, does, to a great extent remain with you always, and has an invisible yet ruling force on your work afterwards. An old maxim, which is excellent and fine, and which I would always try and encourage all staff to try and bear in mind, especially as all of us are in such a position that we are strictly on our honour, is:—

"'Tis better to have done your best and lost,
Than to have done your worst and won."

Also a quotation from Emerson:

"Nothing can bring you peace but yourself,
Nothing but the triumph of principles."

Apart from the type of officer previously mentioned, I think it must be agreed that were the London telephone service compared as a whole with any business or organisation of the same size, the comparison would be wholly in favour of our staff, for sheer loyalty, conscientiousness and competence. The annoying point in the controversy *re* the Wrong Number Trouble is that the Department generally on the whole allow the subscriber to lay all the blame on the Service, which is unfair,—there are hundreds of cases where the subscriber is 90 per cent., if not entirely, to blame for the number he receives. but it is only in very rare cases that a subscriber will acknowledge this, or an officer be permitted to advise him of this aspect of the case.

The conflicting and exasperating side about the Wrong Number Trouble is that there are so many causes, reason and explanations, which can partially if not wholly account for it, such as:—

(*a*) Erroneous and indecipherable junction and multiple markings.

(*b*) Weak and faint transmission on order wires.

(*c*) Worn out and out-of-date equipment.

(*d*) Members of the public speaking with pronounced or foreign accent.

(*e*) The subscriber who either guesses the required number, or who with all the confidence in the world will say, "Try one with a six four something in it!"

(*f*) The errors of juniors.

(*g*) The inefficient and careless operating of private P.B.X. telephonists.

(*h*) The carelessness of B telephonists in allotting engaged junctions, and of the A telephonists in picking up the same, and careless operating generally.

(*i*) Bad attention on signalling junctions from small exchanges.

(*j*) Subscribers who habitually adopt peculiarity of tone.

&c., &c.

To get all these, and many more such reasons into one concrete whole and find a permanent effective remedy, is a task that only a "Super-man" could achieve, but here are a few suggestions conned from practical experience, which might be introduced with probably a measure of success:

(*a*) A great percentage of the written complaints received from subscribers when speaking of Wrong Number Trouble, invariably quote it as "General Wrong Number Trouble," and do not give an isolated case. It is noticed that the Press also speak of this as "General Trouble," therefore, I suggest that a scheme of observations be planned to show at which part of the day the greater percentage of wrong numbers are received—par example, from

8 a.m. to 10 a.m.
10 a.m. to 12 noon
12 noon to 2 p.m.
2 p.m. to 6 p.m.
6 p.m. to 8 p.m.
8 p.m. to 8 a.m.

Arriving at these resulting figures, I think it would be found, that the slacker periods result in more wrong numbers on the average. It is an acknowledged but somewhat unexplainable fact, that the average telephonist works much better and more accurately when handling a full load—personally, it is thought,

WHERE TO STAY.

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

DEAN FOREST.—Severn-Wye Valleys. Beautiful Holiday Home (600 ft. up). 60 rooms, Electric light, extensive grounds, motors, golf, billiards, tennis, bowls, croquet, dancing. Boarders 47*s.* 6*d.* to 63*s.*—Prospectus: Littledean House, Littledean, Glos.

HASTINGS AND ST. LEONARDS—"THE WALDORF," 58, Warrior Square, overlooking sea. Board Residence from £2 2*s.* 0*d.* Highly Recommended, Tennis (free). Separate Tables. Special terms parties sharing large bedrooms.—Phone 609, Proprietress.

HERNE BAY.—"Cleddau" faces pier. Balcony, Roof Garden and reception rooms overlook sea. Central for amusements. Board Residence. Dinner 6.30. Terms Moderate. Every Comfort.—Miss Peters.

SHANKLIN.—Glenavon Private Hotel. Comfortable Brd.-res. Electric light and gas fires all bedrooms. Free billiards, splendid cuisine (separate tables). Highest recommendations.—T. Geere. 'Phone 37

because she then, of necessity, brings more acute concentrative powers into force. If the figures prove, as I anticipate, that the highest percentage of wrong numbers are given in slack periods, well, then, the Supervisors should give every attention possible at these times to the " B " telephonists especially. If, however, the figures prove the trouble to be at some other period, the busy hour, the evening hours, &c., well, then, some reason could perhaps be arrived at.

(*b*) The very indistinct marking both in the " B " side multiple, the outgoing junction multiple, and the junction number plates generally, is responsible for hundreds of wrong numbers. I would suggest that, instead of the line of white lead which is now inserted between the groups of hundreds in the multiple, a permanent strip of some non-conductive metal or alloy, or wood with a white enamelled hard surface be introduced. The white lead is constantly breaking away, and if an engineer has to remove one of the strips, for example, the 800 to 899 strip, he breaks the existing white lead into fragments. This often results in a telephonist failing to notice the lead is missing and giving the lower hundred for the required 800.

(*c*) That all groups of junctions should start from one upwards. I once experienced a group of out-going junctions to an exchange which started from 40 upwards.—there was no indication anywhere that they did so, and, unfortunately, it was an exchange where a large percentage of its Sunday staff were loaned, and many were the wrangles between " A " telephonists having wrong junctions allotted to them or else delay in picking up such obscure junctions.

(*d*) That the number plates of the " B " side junctions be kept strictly up to date, and the engineers be informed, that a good stock of such should always be to hand. Many times have I asked for one to be replaced only to be told it could not be done for a week or two, as the Stores hadn't any, we even came down to gumming on the positions pieces of paper to guide the junction telephonists !

(*e*) That a greater effort be made to abolish the prefixing and ending of allotted junctions with er . . par example, " 10 er "—" er 10," it is merely an idiosyncrasy of speech, and often results in wrong numbers. I think if for the purpose of listening records, it was counted as great an irregularity as the allotting of an engaged junction, much of this habit would disappear.

(*f*) That the telephonists be instructed that if a subscriber complains of having had a wrong number she should get the second number on a separate cord, and thus prevent the subscriber getting a second wrong number, which is, unfortunately, very often the case, resulting in a complaint, whereas he might not have complained at the first one.

(*g*) That steps be taken to make the public more conversant with the names of the exchanges in the London area. You very often come across a subscriber who does not comprehend the name of an exchange, such as Langham, Grosvenor Park, &c. Invariably the person speaking is not very conversant with the telephone, yet you will hear the same subscriber comprehend quite easily a certain Tube Station for an appointment with a friend. I think it is because the Tube stations names are shewn and advertised more, and people see the names of them daily, especially outside the Tube stations notices stating " Trains from here to," and then a detailed list beneath. I suggest that in all Post Offices a big plainly marked list of all the London telephone exchanges be exhibited, with the heading : " The following are the telephone exchanges in London." Subscribers very, very often ask for the wrong exchange, or take it down in error, and thus a wrong number is the result.

(*d*) That all private branch exchange lines work on one " A " position. The inattention of P.B.X. telephonists results in many wrong numbers—innumerable cases come under notice where the P.B.X. telephonist will ask for the required number on one line, say on position 70, and put the calling extension on another line, say on position 8. The line on position 8 may already have been engaged outgoing, and no clear received from P.B.X. telephonist, the " A " telephonist goes in circuit with, " Have they answered ?" receives a reply in the negative, and so re-rings some subscriber who has already finished. If the P.B.X. lines were on one position the " A " telephonist would be able to remember and avoid errors of this sort.

(*e*) That better transmission and more lines be arranged for before the smaller outlying exchanges are brought into the London area. The poor transmission and lack of junctions to some of those latterly joined up, such as Edgware, Bushey Heath, &c., has accounted for many wrong numbers and complaints.

(*f*) That the Department should inform the public that they cannot hold themselves responsible for any wrong number given, when the person asking for the number speaks with a pronounced foreign accent, is quite unfamiliar with the telephone, or has any idiosyncrasy of speech, such as merely whispering the required number. I think the telephonist should be allowed to say, " What number please ? " until the subscriber does speak distinctly, instead of as now trying to guess the required number.

(*g*) That some definite steps be taken to improve the order wire transmission, to outlying exchanges, and that all order wires reported faint for three days in succession should be reported to the Chief Supervisor, and something definite be done to improve the transmission at once.

(*h*) That more signwriters be employed and thus the multiple marking of auxiliary lines be kept more up to date.

(*i*) That telephonists who are employed wholly on clerical and catering duties should have at least two hours operating practice in the week. These telephonists are listed for Sunday and Bank Holidays, and very often are noticeably out of practice.

(*j*) That telephonists should be chosen for the " B " side for their special ability in reading of the multiple quickly, and for their clarity of enunciation and speech. Some " B " telephonists I have known had none of these attributes to any great extent, but were put there because they were of such and such a seniority. On the other hand, you come across cases where the telephonist, although quite junior, has a special aptitude for the junction working.

(*k*) That the new method of cutting out the subscriber, when going on the order wire, although the speaking key is thrown, such as the type introduced on the Hammersmith Olympia positions, be installed at *all* " A " positions, as this would prevent the many cases which now occur of the telephonist failing to throw the key and thus test the junction allotted, and if an engaged line, thus resulting in a wrong number, also a third subscriber connected.

Although the subscribers do have just cause very often in regard to the Wrong Number Trouble, the service they receive on the whole is quite up to the average of the service given elsewhere. Apropos of this, the following is a quotation from a recent speech made by Mr. Eugene White, Assistant Postmaster-General, U.S.A. : " As for your telephone work, America has nothing to teach you." This remark coming from a man who is particularly qualified to criticise is very gratifying.

If we all try and do our very utmost, so that " when we die, even the Undertaker will be sorry," to quote an American saying, that is the very best thing to overcome the Wrong Number Trouble.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

TELEPHONES.

NEW business continues to be satisfactory, and the net addition of 11,734 stations in March brought the total increase for the quarter up to 30,180, or about 1,500 more than in the December quarter when the previous best quarterly increase was recorded.

The total number of stations in use at March 31 last was 1,158,492, compared with 1,050,672 at March 31 1923, an increase during the year—when allowance is made for the transfer of the Jersey system to the Jersey States—of 109,459 stations or 10.4 per cent. The net increase in 1923-24 represents a big advance compared with 1922-23, and is by far the best in the history of the service. For 1913-14 and for the five years following the end of the War the figures were :—

	Net Increase in Stations.	
	No.	Per Cent.
1913-14	44,058	6.0
1919-20	66,948	7.9
1920-21	64,628	7.1
1921-22	15,802	1.6
1922-23	74,356	7.6
1923-24	109,459	10.4

At March 31, 1924, the stations in the London telephone area numbered 410,861, and those in the Provinces 747,631. Of the Provincial districts Manchester, with 62,981 stations, takes the premier position ; Liverpool comes next with 51,488, and then follow West Yorks (Leeds) with 49,166, Glasgow with 48,293 and Birmingham with 43,174.

The lower tariff for circuits to private residences has contributed materially towards the growth of the system during the past financial year. The number of Residence rate circuits increased from 154,628 to 186,684, a net growth of 32,056 or 21 per cent. In the same period the increase in the number of business rate subscribers was 40,800 or 9 per cent. The residence rate subscribers now represent 28.2 per cent. of the total subscribers.

The number of public call offices in use on March 31 last was 17,675, of which 5,500 serve rural districts. The corresponding totals a year earlier were 16,509 and 4,829 respectively. Included

in the total are 634 call offices established in kiosks in public thoroughfares, the addition to this type of call office during the year being 214, or 51 per cent.

In March, 1924, 22 exchanges were opened under the rural exchange development scheme, and at the end of the month 431 of the 571 exchanges authorised to date were working. The more favourable terms applicable to the opening of exchanges in rural areas were announced in connexion with the Budget concessions in May, 1922, and by the end of the financial year 1922-23, 304 exchanges had been authorised. A further 267 exchanges were authorised in 1923-24, whilst 346 exchanges were completed and opened for service.

The number of Rural Party line stations increased during the year from 6,916 to 8,404, a growth of 1,488 or 22 per cent. This increase falls short considerably of that obtained in the preceding year, the decline being due, no doubt, to the preference for exclusive lines connected with the many new exchanges opened in rural areas.

As regards the general development in rural areas it will be seen from the following table that, although the circuits connected with rural exchanges form but a small part of the system, the percentage growth in 1923-24 for those exchanges was relatively much better than in the case of the urban exchanges :—

STATIONS.

	Urban Exchanges.		Rural Exchanges.	
	Total.	% Increase for year.	Total.	% Increase for year.
March 31, 1923	1,000,842	—	49,830	—
March 31, 1924	1,094,718	9.4	63,774	28.0

EXCHANGE LINES.

	Urban Exchanges.		Rural Exchanges.	
	Total.	% Increase for year.	Total.	% Increase for year.
March 31, 1923	605,884	—	39,190	—
March 31, 1924	670,226	10.6	50,396	28.6

Notwithstanding the addition during the year of so large a number of new subscribers, whose use of the service at the outset is generally less than that of the well-established subscriber, there was an improvement in the average calling rate per line, and in the aggregate there was a substantial increase in traffic, the number of originated effective calls in 1923-24 being 832 millions, an increase of 102 millions or 14 per cent. as compared with 1922-23. The total for the London telephone service—326 millions—exceeds the previous best by 19 millions, and although in the Provinces the total of 506 millions was about 10 per cent. lower than the highest total attained in the pre-revision period, there was a satisfactory increase as compared with 1922-23, when 443 million calls were dealt with.

So far as trunk calls are concerned the total for 1923-24 exceeds all previous records, the number of calls dealt with, 69½ millions, being 18 per cent. higher than the total for 1922-23, hitherto the best year.

Further progress was made during the month of April with the development of the local exchange system. New exchanges opened included the following :—

LONDON—Speedwell,
PROVINCES.—Stirling,

and among the more important exchanges extended were :—

LONDON.—Ilford.
PROVINCES.—Preston (Lancs), Chatham, Jarrow, Bedford.

During the month the following additions to the main underground system were completed and brought into use :—

Luton—Bedford,
Swansea—Pontardawe,

while 88 new overhead trunk circuits were completed and 79 additional circuits were provided by means of spare wires in underground cables.

INTERNATIONAL TELEPHONE CONFERENCE.

THE first meeting of the Advisory Committee on long distance telephone in Europe was held at Paris from April 28 to May 3.

The following countries were represented :—France, Great Britain, Germany, Austria, Belgium, Denmark, Spain, Finland, Hungary, Italy, Luxembourg, Latvia, Norway, Holland, Poland, Roumania, Kingdom of the Serbs, Croats and Slovenes, Sweden, Switzerland, Czecho-Slovakia.

The immediate business of the Conference was the consideration of the report of the preliminary conference held in Paris in March, 1923, at which only France, Great Britain, Belgium, Italy, Spain and Switzerland were represented.

M. Milon, Director of the French telephone service, was elected President of the Conference.

The recommendations of the 1923 Committee were discussed in the first instance by 3 Sub-committees and subsequently by the full Conference.

DELEGATES AT THE INTERNATIONAL TELEPHONE CONFERENCE AT PARIS.
(Col. Purves had unfortunately left for England before the group was photographed.)

The more important modifications of the 1923 report were :—

1.—*Permanent Sub-Committee.*

It was agreed that this Committee should consist for the first year of the principal delegates of the following administrations :—Austria, Belgium, France, Great Britain, Germany, Holland, Italy, Kingdom of the Serbs, Croats and Slovenes, Sweden, Switzerland, Czecho-Slovakia.

The delegate may nominate a substitute to represent him at meetings of the Committee, and he or his substitute may be accompanied by experts.

M. Milon was appointed Chairman for the year.

2.—*Permanent Secretary.*

The allowance to cover the expenses of the Secretariat was fixed, and a scheme for apportioning the allowance between the various countries represented was drawn up.

M. Valensi, of the French Administration, was appointed Secretary for the ensuing year.

3.—*Apportionment of Revenue.*

A scheme was prepared for consideration by the various administrations.

4.—*Transmission Questions.*

(*a*) Alternative standards of reference for subscribers' apparatus were included.

(*b*) A frequency of 400 cycles per second for signalling on long circuits was adopted provisionally.

(*c*) It was agreed that transmission equivalents of circuits may be expressed in terms of the unit Beta as an alternative to the use of "Miles of Standard Cable."

(*d*) The report was amplified so as to make provision for alternative methods of circuit loading, spacing of repeaters, types of loading coils.

5.—*Traffic Questions.*

(*a*) It was decided, in view of the wide variations in the traffic conditions in different countries to abandon, for the present, circuit loads as the basis for the provision of additional circuits.

It was recommended merely that a sufficient number of circuits should be provided to enable the quality of service specified to be maintained.

(*b*) It was recommended that a period of one minute should be the unit for payment after the expiration of the first period of 3 minutes.

(*c*) The question of differential tariffs for various periods of the day was left over for further discussion.

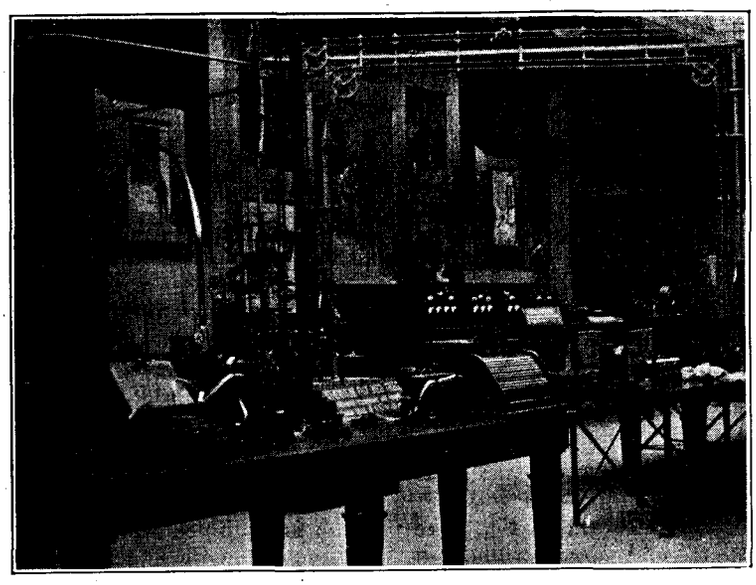
(*d*) The method of taking statistics was revised and provision was made for observation results to be included.

THE POST OFFICE EXHIBIT AT WEMBLEY.

INTO the Post Office Court in the Government Pavilion at the British Empire Exhibition there wandered one evening early last month a respectable-looking, well-dressed and seemingly educated gentleman. On the long table near the entrance were distributed some half-dozen telephones, each on its bell box, their transmitters fitted at the proper angle to secure maximum speaking efficiency. Our friend advanced towards the table, stood looking at the 'phones for a minute or two, then leaned forward and glued his eye to the mouthpiece of the nearest transmitter. He could see nothing; he moved to the next and tried that with the same result; he gazed into the third but still no picture met his eye. Disgusted with the entertainment he turned on his heel and walked sadly out of the Court, and into the Department of Tropical Health where there is at least something one can see and no peep-shows that are not working in the evening. The officer in charge of the P.O. exhibit was too astonished to explain the position, too blasé to appreciate the fact that there are folk living in England to-day who do not recognise a telephone and know nothing of its working.

It has been long agreed among telephone men that the best way to sweeten the acidity of subscribers' complaints about the service is to invite the users to inspect the exchange and to witness for themselves the actual method of completing calls. At the exhibition the Department has gone further and has practically laid all its cards on the table for the public to see and to appraise. As far as can be judged the result is highly satisfactory; the court is filled day after day by interested crowds who, after a preliminary inspection in which awe is perhaps the most pronounced expression, follow the operations keenly and marvel at the exposition which is so different from what they had led themselves to believe.

Even those whose duties are closely associated with telegraphs and telephones will find the Post Office exhibit at Wembley an interesting one, as the items shown are right up-to-date and present the latest Post Office practice. On the telegraph side, a Quadruple Baudot circuit is in operation across the Court, a bright copper wire suspended from two miniature poles carrying a card announcing the fact that the wire is transmitting eight telegrams at the same time. The public are invited to send telegrams, for which special souvenir forms are provided, and good totals are being obtained by the enthusiastic staff. The circuit is operated on Baudot keyboards at one end and automatic transmitters at the other with change over switches to show how readily the mechanical senders can be changed to manual, and *vice versa*. On one arm Mr. Donald Murray's latest transmitter is working, the receiver on that arm being fitted with a suitable type wheel. Mr. Murray's latest form of distributor and driving reed and a transmitter tester are also shown in operation alongside the working set. The Messrs. Morton, the inventors and controllers of the Morkrum Teletype apparatus, paid a visit to the exhibition the other day and admitted that the exhibit was a very fine one. A second circuit of interest comprises a Wheatstone fast speed duplex, with a Gell perforator at one end, and alternatively at the other either ordinary Wheatstone reception or Creed electrical receiver and printer. Intermediate on this circuit is fitted a duplex repeater.

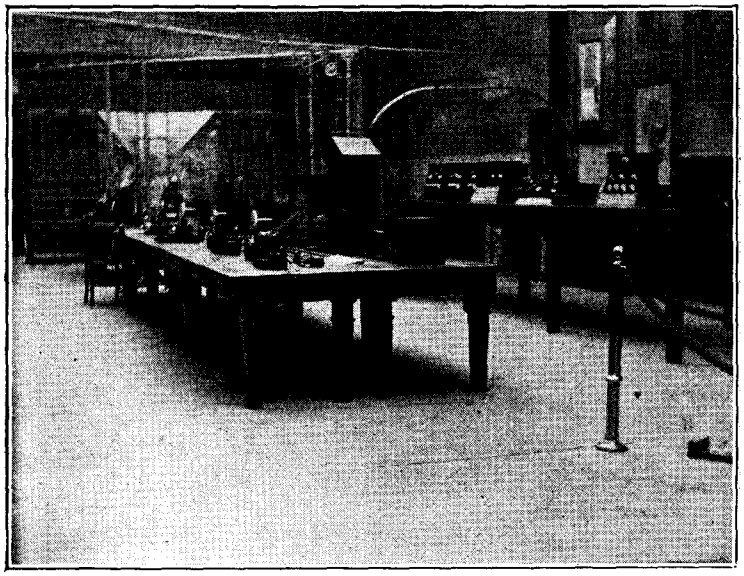


TELEGRAPH ROOM, SHOWING WHEATSTONE CIRCUIT, TUBE, LAMSON CARRIER, AND BAUDOT DISTRIBUTOR. WIRELESS SETS IN BACKGROUND.

A 2-way Lamson carrier and a pneumatic tube, a section of which is of glass to show the carriers passing, are items of great interest to the school children and also, we may add, to the grown-ups. In this room are shown also replicas of the Leafield wireless receiving set and the shore-end of a ship-and-shore station. Although the latter is merely for show, the engineer in charge has fitted an aerial, and the staff can listen to 2 L.O in the evenings when the attendance falls off. A model of one of the sixteen lofty masts now being erected at Rugby for the first station of the Imperial chain attracts much attention. The masts are of steel girder construction and will rear their heads 820 feet in the air; the model shown is 12 feet high and in front of it stands a model of the Nelson Column in Trafalgar Square, complete with lions, to indicate the relative heights; the column to the same scale as the mast is only two feet high. A model of the Rugby station with aerial in position on a scale of 100 inches to the mile stands on a table adjacent to the mast. Two small railway sorting carriages on a thirty-foot track are shown to illustrate how mail bags can be picked up by and delivered from express trains running at full speed. Sundry items of historical interest, such as a 5-needle telegraph set, a double needle, &c., complete the exhibit in the telegraph room.

In the room devoted to the telephone side is assembled a combination of apparatus in full working order, which represents we are safe to say, the most complex telephone system in the world. A mere enumeration of the list of plant, which is all inter-connected, will give some idea of the extent and variety of the show. Beginning on the right side of the open doorway, we see a Western Electric Company's automatic P.B.X. with manual board alongside for incoming calls from the exchange. Then comes a similar equipment as supplied by the Relay Automatic Company. Siemens Brothers' system is represented by a complete automatic unit for a 3-figure exchange, which, incidentally, is serving some ten inter-communicating lines for the administrative staff throughout the

building, in addition to the exhibition sets working on the tables. Facing down the room on the front of the building are installed four Automatic exchange units of the Automatic Telephone Company's manufacture. These exchanges are called respectively North, South, East and Mechanical Tandem, and are intended to demonstrate how London and other large multi-office areas will be served by automatic equipment in the immediate future. Associated with the Mechanical Tandem exchange is a Cordless B. Manual position which serves as a link to connect manual exchange



TELEGRAPH ROOM. BAUDOT RECEIVER.

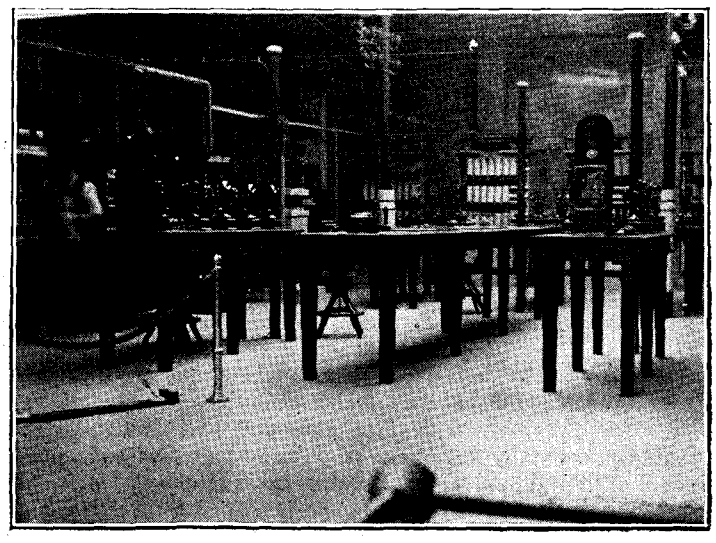
subscribers to automatic. The position is equipped with a "key sender" and two incoming junctions come from the other manual positions in the exhibit. West exchange includes an A position on which Trunks, jack-ended junctions and subscribers' lines are terminated, a B position with 3 incoming junctions from another local exchange called City, and a Coder Call Indicator with five operating cords. The incoming junctions are controlled by order wire from "City Exchange"; on the Coder Call Indicator the calls incoming from the automatic exchanges appear in the form of illuminated digits below a frosted glass on the keyboard. Any of the five cords may be used for the purpose of extending the call to the subscribers' multiple. The insertion of a plug in the multiple extinguishes the call then showing, and allows the next one to come up. It is possible to store five calls in the associated apparatus and to show one. Between the A board of West exchange and the City exchange, which are of the Peel-Conner Company's manufacture and are connected by two Trunk lines and two jack-ended junctions, stands a Peel-Conner telephone repeater unit equipped with two repeater units for the Trunk lines, a "gain set" to illustrate the magnification obtained by the repeater and an oscillating circuit for use on the gain set. The trunk position is fitted with time checks and calculagraph, and the public are shown how trunk calls are timed and recorded. The time checks are individual units of the latest McKichan type, driven from a master clock, which also drives the standard 2-dial switchroom clock mounted on the West Exchange A board. A main distributing frame and relay rack are installed behind the sections.

The power for the installation is obtained from a motor generator which charges two batteries of secondary cells, each consisting of 30 cells. Voltage taps of 60 volts, 48 volts, 36 volts, 24 volts, 18 volts and 14 volts, are required for the various contractors' systems, for the telegraph negative leads, and for the grids and filaments of the repeater. A dry cell battery provides for the positive booster voltage for the A.T.M. metering system and for the telegraph positive leads; a second dry cell battery of smaller capacity is fitted to supply the high tension voltage on the valve anodes. It will be seen that the charging arrangements are rather complex, as the varying discharge loads on the batteries have to be equalised. Not only have these to be closely observed, but the P.O. authorities are acting as general providers for several other departments exhibiting in the building. It may be said that wherever small lamps are seen shining throughout the Government pavilion, and they are very numerous, the energy comes from the P.O. Court.

On the lower ground floor immediately below the steps of the main entrance, a large working model of the Post Office Tube Railway is shown in operation. The trains are controlled from a central point, which represents the G.P.O. Station in King Edward Building, and can be operated either by hand press buttons or automatically from a drum switch driven by an electric motor. An illuminated indicator board shows the position occupied by the trains, and another board indicates the destination and routing of the trains. The model was manufactured by Messrs. Basset Lowke, of Northampton, and attracts very much attention and favourable comment.

The activities and ramifications of the Savings Bank are illustrated by a series of large pictures in gold-gilt frames mounted on the wall facing the entrances to the P.O. Court.

The whole exhibit is under the charge of Mr. W. Cruickshank, executive engineer, of the Engineer-in-Chief's staff, assisted by two probationary assistant engineers in training, Messrs. Ray and Hudson, and with a maintenance staff of five men from the London district and one from the Met. Power district. Two dirigeurs, Messrs. Leathern and Ridley, and four female telegraphists, Misses Foxell, Reilly, Grant and James, are on loan from the C.T.O., and four telephonists, Misses Boyer, Hyatt, Foster and Milner, have been supplied from the Wembley Exchange by the L.T.S. The exhibit is in operation from 10 a.m. till 10 p.m., and has proved itself to be one of the most popular in the Government pavilion, if not in the whole exhibition. Lord Rothermere expressed himself in the *Daily Mail* the other day as highly pleased with the Post Office display. The installation of the plant was carried out in some six weeks under most severe and rushed conditions—bad weather, no roads, building delays and assaults by wind, snow and rain, falling scaffolding, and dropping concrete blocks—but practically everything was ready on the opening day, and we think the staff on the job deserve credit for the result. The engineer



THE TELEPHONE ROOM.

in charge is worrying now only about one thing, and that is, however is he going to get the plant out again? The work has been carried out so solidly and substantially—even the lines from the 'phones to the exchanges are carried in lead cables suspended from real poles, and the racks and units are concreted in—that he is afraid dynamite will have to be used in the end. Most of the specification and detail work at headquarters was carried out by Mr. W. Hollinghurst, of the Engineer-in-Chief's Equipment Section, while Messrs. Ogilvie and Booker gave valuable advice on the traffic side.

TELEGRAPHIC MEMORABILIA.

THE final meeting of the P.O. Telephone and Telegraph Society of London held on April 28, was one of the most successful gatherings of the 1923-4 session, when Mr. T. Kelly, C.M.G. (Surveyor, G.P.O.), read an extremely interesting and informative paper on "Administration and Control of Telegraphs and Telephones from a Surveyor's point of view."

The title of the paper may not have looked too alluring or exhilarating, nevertheless the discussion never flagged and went with a swing until the chairman, Mr. R. A. Dalzell, C.B.E. (acting on behalf of Col. Purves who was absent on official business abroad) rose to close the meeting. It may have been the sprightliness of the spring air, or was it the knowledge that the end of the session had been reached and that the members were looking forward to tennis and cricket ? I cannot say, but the truth must be recorded that however uninviting the title of the paper may have *appeared*, the discussion which followed, though followed up by the very élite of the engineering, traffic, administrative and controlling branches, resulted in a merry battle of banter and wit. Out of it all emerged conflicting views and opinions clearly and definitely expressed for the most part, yet none the less comprehensible or comprehended for the thread of humour which ran through the discourse of speaker after speaker. Mr. Kelly's opening challenge to the effect that he was there to be criticised and hoped that his audience would not spare him was taken up most heartily. All of the criticisms the lecturer took in excellent part. It requires forbearance indeed to hear that the official class to which you belong is the "fifth wheel of the coach," but then the neatness with which the attack led up to these five crucial words took out all their sting, leaving Mr. Kelly looking well pleased with life and more confident than ever of the absolute necessity of the two-century old institution.

The Belgian telegraph administration is about to copy the American telegraph companies' special telegram *de luxe* for the announcement of marriages and births, the transmission of congratulations, condolences, &c. These telegrams are printed on specially fine paper for which a small supplementary charge is made. In the case of Belgium the proceeds of this charge are to be devoted to the relief of orphans and invalids of the war and the campaign against tuberculosis.

CHIMNEY SWEEPS AND WIRELESS.—The German chimney sweep, like those who contract for the cleansing of our own Central Telegraph Office chimneys, carry out their duties from the exterior of the building by *lowering* a weighted broom instead of pushing the tool upwards from the interior. The German wireless department has struck the happy idea of utilising their services for the detection of unlicensed sets. These roof wanderers have received strict instructions to report all wireless apparatus which may come under their notice to the authorities. There may soon be a rush to install indoor aerials !

L'Interligilo de l' P.T.T., the Esperanto organ of the posts, telegraphs and telephones, published in Paris, has this month published a translation from the April number of our own T. AND T. JOURNAL of the article on the development of automatic telephones in India. The editor, in several very appreciative letters to my humble self, pays tribute to the excellence of our own production. We, in our turn, are only too pleased if we have proved of any small service to these our editorial colleagues in their courageous struggle to unite the telegraphists and telephonists of all nations in the scientific study of our craft.

Congratulations to Mr. S. C. Bartholomew, M.I.E.E., of the Post Office Engineering staff, who has been awarded the Webber Premium of £10 from the I.E.E. on account of his paper read before the members of the Institute in March of this year on "Power Circuit Interference with Telegraphs and Telephones." It is hoped that it may be possible to publish some of the more salient features of this paper. Judging from the thoroughness of Mr. Bartholomew's treatment of the subject, the amount of studious research involved must represent many months of labour. British, French, American, German, Italian and Scandinavian authorities have all been successively exploited in order to perfect the work.

Congratulations also to Mr. F. W. Cook of the Cable Room upon his promotion. Our readers will probably recall the excellent article by Mr. Cook on the Baudot Governor, and from that will be able to judge something of the scientific calibre of our contributor.

Old Cableites will hear with regret of the unexpected death of Mr. W. Hyett at the age of 73 years. Recollections of "Billy" Hyett were such as one loves to linger over as the list of those who have passed over the Border grows longer. An affectionate and devoted husband and father, an earnest and honest servant of the State, a trusty colleague, one who hated all that was not straight and above board. To his son, well known in the C.T.O., and to his sorrowing family, is offered this sincere token of esteem.

Television is drawing nearer and nearer as a practical proposition, and according to Mr. William Le Queux, M.I.R.E., "Moving shadowgraphs are now being successfully transmitted by wireless between two totally disconnected machines." Mr. J. L. Baird in England has recently succeeded in overcoming what has for a long time proved a stumbling-block to success by solving the problem of complete synchronism between the transmitting and receiving apparatus. Mr. Le Queux in the *Radio Times* gives a brief but remarkably clear description of the apparatus as follows :—"The transmitting apparatus consists of a large serrated disc revolving at very high speed. Behind this is a moving shutter, by means of which light from every part of the picture is directed in turn upon a selenium cell, the varying current from the cell in question being transmitted to the receiving station.

The receiving station consists of a large disc provided with small lamps arranged in lines sloping from the circumference to the centre, each lamp being connected to a section of a commutator fixed to the disc. The receiving disc is electrically controlled to run at exactly the same speed as the transmitting disc, and the lamps, as the dics revolves, are supplied in turn by the commutator with current from the selenium cell at the transmitting station, and are bright, or dark, corresponding to light or dark sections of the image. The revolutions of the disc are too rapid for the eye to follow, and persistence of vision causes the whole image to appear instantaneously."

Sketches over a stretch of a thousand miles by means of perfected apparatus of this type aided by radio emissions is likely soon to be a *fait accompli*.

There has been an interesting contest in Germany concerning the question of "What is a radio installation ?" reminding one of a similar legal, problem in our own country over the term "telegraph." In April of 1921 a German engineer, Herr L——— of Braunschweig, installed wireless apparatus in a room of his house with an aerial on the roof. The Director of Telegraphs issued an order for the dismantling of the apparatus which order, however, was disregarded by Engineer L———, whereupon the set was seized and a summons was issued. The magistrate, however, acquitted the accused. This judgment was not upheld because the culpability presumed by Article 9 of the Telegraph Regulations was that not only of *fitting up* a set, but of *working it and although the apparatus had been seized, no one apparently* had been able to prove that our engineer friend had used it ! The Minister, however, appealed, but this action was rendered abortive by a freak of the law, and the engineer once more walked out of the court unscathed.

The following year Engineer L——— installed another set in his rooms capable of receiving broadcast news, &c., all complete with aerial except that, although the latter was provided with a connecting wire, it was not actually joined to the set although means existed for doing so at any moment ! The old plea was put forward that he had only *erected* the set, but had not *used* it ! This time he was found guilty on all counts as now all the legal forces were arrayed against him and all the archives had been well searched for definitions of "telegraphy" which, according to documents published by the *Oberlandesgericht* of Braunschweig in April of last year, were held to cover that of wireless transmission and reception, and therefore of apparatus which made these possible. Thus :—

(1) The Penal Register of the *Reichsgericht*, Feb. 28 1889 : "Telegraphy is that which consists in provoking at a distant place pre-determined signals, with the end to make something directly known to a person in that place." The law on telegraphs, April 6, 1892, confirmed this definition and gave further the following (2) "By telegraphic installations it is to be understood all transmission of news in such manner that thought expressed in one place in a manner perceptible by any one of the senses, may be reproduced in another place in a manner equally perceptible by any one of the senses.

This precise definition swept away any vestige of a case for the view that "telegraphs" was only intended to refer to that which transmitted "news" as did also that of a later date as recorded in the proceedings of the Reichstag. March 7, 1908, No. 560, page 5, in which the phrase was used "the transmission of news without the aid of metal wires" showing that radio transmission had also been considered as a possible means of communicating at a distance and that it was therefore to be classed under the generic term of "telegraphs." The case was fought to a finish, the defendant finally falling back on the plea that he had throughout acted in good faith in breaking the law. The entire case appears in No. 10 of the *Archiv fuer Post und Telegraphie* for October, 1923, and may one day form an interesting chapter in some historian's work on the Legal History of Telegraphy !

L'Antenne, an excellent wireless publication in the interest of radio-telegraphy and telephony, in reporting some of the proceedings of the International Wireless Conference, held during April at the Eynard Palace, Geneva, particularly stresses the movement towards the introduction of some international language as supplementary to the languages indigenous to the many countries now concerned in inter-communication amongst the nations by means of telephony radio or wire. The discussion on the question was a most interesting one, several of the delegates paying tribute to the efficiency of Esperanto. *L'Antenne* quoted our own Mr. Edmonds who is reported as saying that, according to enquiries he had made, no less than fourteen broadcast transmissions had recently been heard from no less than seven countries, the U.S.A., Russia, Canada, Great Britain, Czecho-Slovakia, France and Switzerland.

There was other evidence in the pages of our French contemporary of an equally entertaining nature regarding the use of the artificial language mentioned, all of which tended to prove the practicability of Esperanto. Certainly Ido was mentioned, but only as an aristocrat for the elect, and Volapuk was altogether omitted from the discussion. It seems very certain that in certain countries the need for an International vocal medium in a tongue which, by its universal pronunciation, could not only be read but could be heard and understood with ease, is fast becoming a distinct need. International telephony is likely to increase that desire. *L'Antenne* is a lively little journal, but the writer has only one suggestion to offer, and one hope to express, and that is for a change in the colour of the paper upon which our radio friends insist upon printing it,—a bilious yellow !

From *La Revue Générale de l'Electricité* we learn that all arrangements have been made by the Under-Secretary of Posts and Telegraphs for the erection of an aerial cable between Paris and Lille as a temporary measure until the larger scheme of underground lines can be inaugurated. Over sixty circuits (telegraph and telephone) will thus become available. Twenty circuits, of which six will be additional, are to be affected to the Roubaix-Tourcoing district.

The *Electrical Review*, in a recent leaderette on "Telegraphic Traffic," makes the following interesting comment upon present day developments and the future. "In some cases (of the reports of submarine cable companies) decreased revenue has been offset, in part by stringent economy, but it would appear that the large sums expended for new cables will require a considerable amount of new traffic to provide interest on and redemption of new capital. How far this can be accomplished remains to be seen, particularly in view of the efforts of new undertakings providing telegraphic communication entirely free of existing interests. Thus, an Italian company is to lay cables from Italy *via* Spain to North and South America, although it would appear that the new cable to be laid by the Western Union Telegraph Co. from New York to the Azores will provide the connexion of the Italian cable at those islands. The Italian company also contemplates laying cables eastwards.

The Commercial Cable Co. and the Western Union are laying cables to the Azores, and the German company will lay cables from Emden to those islands. If the establishment of direct wireless telegraphic connexions between various countries be also taken into consideration, it would appear that competition between various telegraphic interests is to be of a very lively nature in the future. Telegraph rates are likely to become less and the speed of transmission greater, but this may be regarded as of advantage to the commercial community and likely to cement international relations."

Yet one reads repeatedly in "Stocks and Shares" articles such crisp sentences as "Cable Stocks keep steady!"

CEYLON.—Continuous-wave transmission was recently introduced at the Colombo radio station, and ships fitted for valve reception will thus be enabled to receive traffic from Colombo at much longer distances than at present. It is also proposed, with effect from July 1, 1924, to broadcast time signals and weather reports both on the continuous-wave and the normal spark systems.

GERMANY.—The report and accounts for the year 1923, recently presented to the shareholders of the Transradio Aktiengesellschaft für Drahtlosen Ubersee-Verkehr, show that the volume of telegraphic business from the Nauen and Eilvese stations was maintained during the year. Direct communication was opened with Egypt, and is being well supported, while extensions to the Nauen and Eilvese stations will be completed this year, and will enable the company to communicate with any part of the world. On Dec. 20, 1923, the Eilvese station was being worked direct from Hamburg in order to cater efficiently for telegrams to and from that city and Bremen. A new receiving station has been erected on the Island of Sylt, and is working well. Direct communication has also been opened with the Buenos Aires station jointly owned by the American, English, French, and German companies, and it is expected soon to open up direct communication with Rio de Janeiro and Pernambuco. Negotiations are in hand for sharing concessions in South and Central America. The erection of stations for the Dutch Government at Kootwijk (Holland) and Bandoeng (Java) was completed, thus facilitating direct radio communication between Europe and East India. Tests between the big station at Peking and Nauen were successful, and plans exist for the erection of other stations in East Asia. It is also stated that the Russian Government is planning the erection of a set of large stations between Moscow and Vladivostock, and reference is made to the contemplated Imperial chain and French plans for connecting up their Colonies. The total receipts for the year were 444,715,487,670,906,023 marks!

IRISH FREE STATE.—The chief recommendations of the Dail Committee on broadcasting are that broadcasting in the Irish Free State shall be a purely Government affair and shall be controlled absolutely by the General Post Office. It recommends, further, that one transmission station should be established in the neighbourhood of Dublin. The Committee is of the opinion that there would be about 4,000 crystal sets in use in the Dublin district, and that the initial number of valve sets throughout the country would be about 1,000.

INDIA.—According to the *Daily Mail* a test has shown that, under a new transmitting system, the Madras and Rangoon radio stations are workable from Bombay by a connected landline without rehandling. This has an important bearing on the Imperial link station in India. When direct working from London to Sydney is impossible, the operator in London will be able to transmit through India to Sydney without rehandling in India. The message will come to the Indian radio receiver and be automatically transferred by landline to the India-Australia transmitter and thence sent by radio to the Australian receiver, whence it will be automatically transferred to landline to be decoded at the Sydney telegraph office, a tape machine printing the message in full.—*There is, however, nothing very new in this idea.*—ED., T. & T. JOURNAL.

NORWAY.—The most northerly radio station is now completed and in commission at the town of Vardoe. For the present only a day service will be maintained. The station, while being of moderate power, is fitted with most up-to-date instruments, including a wireless telephone. The antennæ are stretched between two masts each over 150 ft. high. The power will be supplied from the Vardoe electricity works. Final transmission trials revealed that, in addition to the other Norwegian stations, Helsingfors, Spitzbergen, and Jan Mayen (300 miles east of Greenland) could also be reached. The station's weather and other reports are likely to be of immense service to British and other trawlers fishing in Arctic waters, says a report from Reuter's correspondent at Christiania.

POLAND.—There is much discontent amongst the Poles on account of the total prohibition of all private wireless apparatus, and they look with envy at the peoples of other European countries who are nightly revelling in broadcast programs and home-made sets.

WEST INDIAN CABLES.—The British Colonial Secretary, in reply to questions in the House of Commons, said that the new cable would connect at Turks Island with the system of the Direct West India Cable Co. and the Halifax and Bermudas Cable Co. The cables of both these companies landed only in British territory, and in time of war would therefore be under the control of British administrations. The companies, though a large proportion of their capital was understood to be owned in the United States, were managed from the London offices, whose staff was entirely composed of British subjects.

The capital of these companies was at present held approximately in the following proportions: 45 per cent. by British subjects in their own right, 35 per cent. by British subjects as nominees of the Commercial Cable Co., and the remaining 20 per cent. by United States nationals. Arrangements had, however, been made for the transfer of certain stock now held by the Commercial Cable Co. to the chairman of the board of the Bermuda companies, who was a British subject, so as to increase the proportion held by British subjects to 55 per cent. in the case of both companies.

U.S.A.—The possibility of operating a broadcasting station at Philadelphia by the Pennsylvania Railroad for communicating with other divisions in emergency, says the *T. and T. Age*, which was discussed by railroad officials as a result of recent storms, has been abandoned, at least for the time. It was found that the Federal Radio Bill passed in 1912 prohibited the operation of a commercial broadcasting station of a stronger power than 500 watts within five miles of a Government station. In the meantime the railroad has made arrangements with amateur members of the American Radio Relay League to send railroad messages in emergency.

The difficulties which have attended past American efforts to hear wireless concerts from England may be eliminated by a plan outlined by Mr. S. P. Davis, vice-president of the Westinghouse Electric Co., which operates the broadcasting station KDKA at Pittsburgh. Mr. Davis, according to the daily Press, has revealed that experiments have been successfully made in using inaudible high-frequency waves through repeating stations without interference. By using inaudible waves of a length of 100 metres or less the transmission does not interfere with local broadcasting on so-called audible waves of between 250 and 600 metres. The inaudible waves can be amplified and re-broadcast locally on audible waves. Mr. Davis said that only details of organisation remained to be perfected before listeners could hear speeches and musical programmes from any part of the world.

In the course of experiments designed to perfect methods for the establishment of radio communication between persons entombed in mine disasters and rescue workers on the surface, conducted by the Department of the Interior at the experimental coal mine of the Bureau of Mines, near Pittsburgh, Pa., signals have been transmitted obliquely through a distance of 800 ft. of rock by the use of the T.P.S., or ground conduction system, developed by the Army Signal Corps. Signals were also transmitted with little difficulty by using compressed air piping, car rails, and other similar conductors. The intervention of such poor conductors as water, coal, and mud, and the substitution of wooden for steel rails, did not interfere with the transmission of signals. The T.P.S. method of ground telegraphy requires no wire connexion between the sending and receiving stations; it differs from radio-telegraphy in that the transfer of electrical energy from the transmitting to the receiving apparatus takes place mainly by conduction and, to a much less extent, induction through the ground, instead of through the air. The method cannot be used for speech transmission.

Our American contemporary *Science Service* reports that a new directive radio beacon which will be of great use to navigators of the air or water has been perfected by the U.S. Bureau of Standards in co-operation with the Signal Corps and Air Service of the Army. It will make direction finders on shipboard less necessary. The beacon consists of two coil antennæ so placed as to cross each other at an angle of 135 deg. The transmitting set is automatically connected first to one and then to the other, one letter of the signal being sent over each. The intensity of the signal from an antenna of this type varies from a maximum in the plane of the coil to almost zero at right angles. A receiving set placed along the line bisecting the angle between the coils will, therefore, receive signals of equal intensity from both. A ship or aeroplane receiving the signals will be able, by first proceeding to the point where the two signals are of equal intensity, to steer directly for or away from the beacon without regard to conditions of visibility. The signals may be received by the most ordinary receiving set. It has already been tested successfully along the Potomac River and Chesapeake Bay by the Lighthouse Service, and may be used on the Mississippi River in lighthouses but not on lightships, since they are continually shifting their directions with wind and tide.

The affairs of the Radio Corporation of America are forging ahead. Two additional radio communication circuits were opened for commercial service during the year, connecting the United States with Italy and Poland, making in all nine channels of international message traffic. Nine radio circuits

are now in operation to Great Britain, Norway, Germany, France, Italy, Poland, Japan, Hawaii, and Hawaii to Japan. Plans for high-powered trans-oceanic stations in Brazil have been approved. Service to the Argentine, on a deferred rate basis, through the medium of the high-power station at Buenos Aires, was inaugurated in February of the present year. The exchange of traffic with China is expected to prove profitable. Preliminary surveys for the erection of stations in China have already begun. In this enterprise the Federal Telegraph Co. of California invited the participation of the Radio Corporation, and the Federal Telegraph Co. of Delaware was formed. The operation of transatlantic circuits indicates that competition with the cables on even terms is being successfully met, and by a rearrangement of the central radio office in New York it is now possible to handle overseas message traffic by twelve distinct circuits.

The Radio Corporation operates five marine coastal stations which communicate with ships at sea. The traffic through coastal stations in 1923 was 36 per cent. greater than in 1922, and free medical service made available on ships at sea in co-operation with the U.S. Public Health Service and the Seamen's Church Institute of New York has rendered urgent emergency aid on many occasions during the year. Approximately 75 passenger vessels are now regular subscribers to the nightly Press service maintained through coastal stations At the beginning of the year the Corporation furnished radio apparatus on a rental and service basis to 705 ships. By the close of the year these had increased to 759. Distribution of Radio Corporation products is accomplished through 116 distributors with 57 branches, making 173 wholesale outlet points. Gross sales of radio receiving apparatus amounted to $22,465,090.

It was, I think, through the medium of the London *Times* that my first information regarding the Conversion of Light into Sound. General Ferrié and the professors of the French Military Wireless Centre have devoted much study to this matter. They have now produced an instrument, which has been described before the French Academy of Science by M. Jonast and Commandant Mesuy, with the aid of which luminous signals can be greatly amplified and transformed into sound. By means of a high-potential 4-electrode valve the faint electric current produced by a selenium cell under the influence of light has been greatly magnified and, working in the Paris observatory, the inventors have obtained from the rays of the star Capella variations of current of 3.5 micro-amperes. By charging for ten seconds a small condenser, by means of the photo-electric cell, and immediately discharging the condenser, a tenfold amplification is obtained. By increasing the number of discharges to the valve from 10 to 15, and even more, per second, oscillations are established which produce sound, and in this manner optical signals can be conveyed by the telephone and the "chant des étoiles" becomes a reality. General Ferrié informed the Academy that experiments with this invention were being actively pursued in the laboratories of Les Invalides.

The following cutting from a Service paper in South Africa has a rather homely touch about it. It is to be hoped that when making the Mother country their model, the Colonies will copy the Homeland,—with discrimination !

CAPE TOWN (C.T.O.)

"We are constantly being introduced to different forms of telegraph pads, not one of which—as yet—fulfils the need of an up-to-date telegraph office. It is a matter for wonder as to why the Department does not consult the Association, instead of blindly groping in the darkness of inexperience. The effect of the latter is both annoying and costly. Take, for instance, the A form contained in the duplicate books. We have not yet come across one in use where the postage stamps or the date stamp did not overlap the "sent" column.

The present supply of pencils is also most unsatisfactory and a change would be most welcome."

If the Radio Corporation of America is making excellent progress, there is no less a buoyant note in the report of the Western Union Cable Coy. Ltd., for the year ended December, 1923. Noteworthy improvements were made by the replacement of heavily-loaded aerial lines in congested centres with underground conduits and cables ; the substitution of copper wire for iron wire ; and the installation and extension of pneumatic tube systems for conveying messages between main and branch offices. The net operating return from land line operation was, for the year 1923, 6.7 per cent. of the book value of the land line property ; the average for the past ten years was 5.9 per cent. Transatlantic cable rates were reduced about 20 per cent. in April, 1923, but in spite of this, cable system revenues for 1923 declined less than 10 per cent., as compared with 1922.

All seven Western Union transatlantic cables have now been equipped with the recently developed apparatus for direct working between American and European termini. A two-conductor cable was laid between Valentia, Ireland, and Sennen Cove, near Penzance, England. The cable stations at Canso, N.S., and Duxbury, Mass., were refitted and modernised. The new cable between New York and Horta in the Azores and that between the Azores and Italy will probably provide, for the first time, direct telegraphic communication between Italy and the U.S.A. It is expected that this through route will be working by the autumn of the present year.

In April last, the transatlantic radio rates were generally raised and the corresponding cable rates reduced, resulting in approximate equality. The elimination of the rate differential, on the basis of which radio traffic had been developed, resulted in immediate and sustained additions to Western Union cable business. The effect of radio competition upon ocean cable traffic has been closely observed for several years. It is the company's experience that where cables can be assured efficient land line connexions, as, for example, in Great Britain, France, Italy, Germany, The Netherlands, and Belgium, the cables will hold the business as against wireless competition.

It is also gratifying to note that the Indo-European Telegraph Company also struck the optimistic note despite the very real struggles of reconstruction after nine years of entire suspension of their system.

The annual report of the P.M.G. of Australia shows a loss on the telegraph branch of some £78,000 on the year 1922-23. Out there as here the speedier delivery of telegrams is a problem not yet solved. It is, however, noted that a distinct promise of an acceleration in that direction has been made.

The cable steamer *Faraday* left the Woolwich works of Siemens Brothers & Co., Ltd., on May 7, laden with a large quantity of submarine cable manufactured by the company and destined to form the extension of the Imperial telegraph system connecting Turk's Island with Barbados, Demerara and Trinidad. The whole of the work is expected to be completed in June.

In this connexion as we go to press, we hear that the Pacific Cable Board Extension of Powers Bill has passed the second reading in the House of Commons. It has been framed to enable the Board, subject to the approval of each of the Governments represented on it, to undertake as agents for and at the expense of the Governments of any parts of the Dominions any work in connexion with telegraphic communication, whether by means of cables or radio telegraphy, without any restriction as to the geographical limit of their operations. Any work undertaken by the Board as agents for His Majesty's Government before the Bill becomes an Act in connexion with any transatlantic cable worked by that Government shall be deemed to have been within the powers of the Board. The Board, in the event of its undertaking work in connexion with telegraphic communication in the West Indies, shall have power to provide and supply to the West Indies a news service similar to that supplied by telegraph companies at the time this Bill becomes an Act.

Sayings of a Saint.—"Intuition like the tip of a finger is so sensitive that it at once feels the presence of reality by its touch." "Men, like small kettles, boil quickly with wrath at the least wrong. Not so God!"—SADHU SUNDAR SINGH.

J. J. T.

PRIVATE AUTOMATIC TELEPHONE EXCHANGE AT BRITANNIC HOUSE.

At Britannic House in the City, the newly-erected steel frame building of ten storeys, designed by Sir Edwin Lutyens, and built for the Anglo-Persian Oil Co., there has recently been brought into service the largest private automatic telephone exchange yet erected in England. The installation is of the "Relay" type, but is a new departure in respect of arrangement and voltage.

The "Relay" switchboard and batteries, together with the P.O. manual switchboard, are housed in a large room in the upper basement floor, the charging panel and generator being in the lower basement. The subscribers' equipment is arranged for 240 lines, which have been already allocated, with an ultimate capacity of 400. The frame-work which is 8 feet 9 inches high, is divided into two racks, No. 1 having six, and No. 2 two bays all fully equipped. The main distributing frame and intermediate distributing frame are of the combined type comprising three verticals of frame work.

The planning of the groups &c., is of quite novel character. Bay A contains ringing machine with its accompanying groups, marker group for 300 lines, key and marker lamp group, two fuse panels, recorder group and a feed and connecting group containing trunk connecting relays and 2 ringing units. Bays B, C, and D each contain one recorder group, a feed and connecting group and three groups of 10 subs. each. Bays E and F, a feed and connecting group and four groups of 10 subs. each. The two Bays on Rack No. 2 are identical with Bays E and F. The Bays E and F are the standard equipment of subsequent additional bays which carry the equipment for 40 subscribers and their necessary feed and connecting group.

The run of the switchboard cables is also a distinct departure from usual standard practice, one set being midway across the racks just above the feed and connecting groups, and providing for commoning the in-trunks, recorder connexions, busy-back, number unobtainable, tone and ringing current, 16 trunks being provided initially on the squared principle, the ultimate being 32. The power plant consists of a D.C. Motor generator driven direct from Supply Company's mains and having an output of 20 amps. The charging panel is designed on P.O. lines, but has in addition to the usual switches a circuit breaker which releases on overload or reverse current. Each battery consists of 16 cells of 76 amp. hour capacity. The wiring of the huge building was a considerable task in itself, consisting as it does of 6-100 pair paper core lead covered cables supported by iron racks and tailed off at the switchboard end with silk and cotton covered cables, and at the other ends 12-50 pair silk and cotton covered cables by means of potheads, and thence to their respective junction boxes on each floor. The single pair cables are maconite run in concealed conduit. The telephones are of the usual P.O. standard pattern fitted with the "Relay" dial switch.

In conclusion it may be mentioned that the whole of the work, including the testing of the installation, was carried out in spite of various unexpected and unavoidable interruptions in the space of eight weeks, which may be regarded under all circumstances as being a highly satisfactory achievement.

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Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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INTERNATIONAL TELEPHONE COMMUNICATIONS.

LAST month an important conference was held at Paris to consider the furtherance of inter-European telephone communication. We publish an outline of its proceedings in another column from which our readers will see that, unlike last year's preliminary conference, which was confined to the Western States of Europe, it included delegates from Holland, Scandinavia, Germany, Austria, Poland, Czecho-Slovakia, and other countries, numbering twenty in all. It is almost superfluous to say that the presence of experts from these countries invested this Conference with a more representative character and that their varied experience was of great value to its deliberations.

After discussing last year's proceedings and confirming most of its recommendations, the Conference confined its activities chiefly to the consideration of certain important questions of detail, such as the apportionment of the revenue derived from calls between the various countries through which such calls would pass, standards of transmission to be adopted, the loads which international lines ought to bear, differential tariffs for various periods of the day, and other problems which must arise if the inter-European telephone system is to become a closely-linked and co-ordinated whole. The special investigation of each subject was entrusted to a separate group of delegates, different subjects being allotted to the delegates from different States or groups of States.

As we have had occasion to remark before, this country's present part in inter-European telephone communication is limited to connexion with its neighbours, France, Belgium and Holland,—together with an unsatisfactory service to Switzerland which awaits the provision of direct circuits before it becomes worthy of the name. Extension of Anglo-Continental facilities has been put back at least eight or nine years by the European War, but the prospect opened by some fruitful discussions during the latter stage of the Conference have widened the horizon perceptibly. We can envisage telephonic communication with Germany sooner perhaps than was expected, and though foreign political considerations render it vain to forecast this development with any precision, we are not without hope that much may be achieved by international goodwill and co-operation. The possibilities of direct communication with Scandinavia are being actively explored, and communication with countries in Central and Southern Europe will receive due consideration all in good time. The greatest cordiality prevailed at the Conference, and the prospects of attainment of a really inter-European network are considerably brighter.

HIC ET UBIQUE.

THE *Daily Chronicle* recently drew attention to a warm eulogy of the London telephone system which appeared in a German paper. By the courtesy of the *Chronicle* we are in possession of a copy of the *Vossische Zeitung*, in which the article appeared. It is headed " What does the Telephone cost Abroad ? " and after giving a comparative table of telephone rates in the principal European cities, goes on :—

" The picture obtained from this comparison shows that the telephone charges in all the States mentioned are cheaper than in Germany. This applies in the first place to Paris, Rome, Vienna, Budapest and Copenhagen. In the Danish capital there is an especially extraordinary development of the telephone in relation to the number of inhabitants, which is there actually an attainable means of communication for everyone. As for the London figures they are lower than ours only in the case of the heavy user, whilst for the smaller user the charges are higher than ours. It must be remarked, in reference to London, in what exuberant language of praise our correspondent lauds the superiority of the London telephone service. He styles it the best organised, politest, most conciliatory, most regardful of the technical needs of subscribers of any State service in the world, and praises it beyond all measure. Especially outstanding is the regard for and understanding of the caller. During a whole year, writes Dr. Edwards from London, he has not suffered so much trouble and annoyance from his telephone as in a single day in Germany, where in Berlin he once had to make six enquiries for the *Vossische Zeitung*.

Making due allowance for the axiomatic superiority of all other telephone systems to one's own, we are, nevertheless, pleased to see so high—and, we think, deserving—a tribute paid to the London service.

THE Jamaican Government, says the *Manchester Guardian*, has invited tenders for the construction and operation of a modern telephone system in the city of Kingston and its environs. The existing system, owned and operated by a local company whose authorised capital is £8,500, and which, on a paid-up capital of £8,250, has paid a dividend of 12 per cent. per annum for the past 16 years, is antiquated and inefficient, mainly on account of the directors' unwillingness to spend money on improvements, the company having been restricted to a ten-year lease by the Government. The company has 915 telephones installed, with 495 miles of wire, 9¼ miles of aerial cable, and 37 miles of pole route. Their lease will expire on Feb. 1, 1926, by which date, it is hoped, the new system will have been inaugurated.

ACCORDING to *Commerce Reports* arrangements have been made for a loan of 5,000,000 lire by the city of Milan to the Italian Ministry of Posts and Telegraphs to complete the work already commenced of installing 14,000 automatic telephones in two important districts in the city. The Ministry had granted concessions for this work to private interests, which were unable to complete the installation because the Ministry could not make partial payments as the work progressed. All revenue obtained from the telephones in question will be taken by the city of Milan until the loan has been paid. The arrangement is not incompatible with the general scheme under consideration by the Italian Government to re-lease all Government-owned telephone systems to private enterprise.

"EVERYBODY is wondering how liars keep in practice during the winter months, when there is no fishing and little golf," says a writer. The *Telegraph and Telephone Age* (New York) suggests that "wireless is providing an excellent substitute." Perhaps [redacted] accounts for the tall stories we hear about reception from America on sets composed merely of odds and ends from the nearest rubbish tip.

FROM evidence given by H. C. Carpenter, general manager, New York Telephone Co., before a Rate Commission, it appears that there were now 12 automatic exchanges working in the greater New York, and that 11 more such exchanges would be placed in operation in 1924 to meet the City's telephone growth. The present investment in machine switching exchanges, he said, was about $25,000,000.

The fact that machine switching operation has not done away with the need for telephone operators was disclosed by R. E. Walker, general supervisor of traffic, who testified that the Company was making preparations to train between 8,000 and 10,000 new exchange operators during the current year. This only bears out what we have always said that the operation of "abolishing the hello-girl," of which one hears so much, will always proceed by imperceptible stages.

ACCORDING to the *Financier* a financial syndicate, composed of several leading Madrid institutions and supported by prominent American industrial interests, is to develop the Spanish telephone system. For this purpose a new company has been constituted, under the above auspices. It is negotiating at present with the municipal authorities for the concession of the Barcelona system, and pourparlers are pending with the Government respecting the extension of the company's network throughout Spain. The whole of the existing system is to be overhauled and automatic services are to be introduced. The management will be under American control and the material used of American origin, but a portion of the capital will be raised in Spain in the shape of an issue of debentures.

A DRIVER was lately fined at Kingston for being drunk whilst in charge of a motor car. The test of his condition seems to have been that he read the telephone directory upside down at the police station. This adds one more to the secondary uses of telephone directories. In parts of America, as we know, it takes the place of the stocking as a receptacle for thrift in the form of bank notes.

I see, says a writer in the *Evening Standard*, that telephone operators are complaining of requests from persons with bedside instruments to wake them by ringing at a fixed hour every morning.

I find this not a little mysterious. Surely the simple alarm clock would have been as effective, besides being cheaper and more reliable. In the second place, do not people who can afford bedside telephones usually have servants whose duty it is to call them ?

We agree with the penultimate sentence, but, as regards the last, we must remark that the writer does not seem to know that there is a Servant Question. A bedside telephone is not the extravagant luxury he imagines; there must be hundreds of thousands who can afford one who would never dream of indulging in a valet or lady's maid.

"ARE you a telephone biter ?" asks the *Bristol Evening News*. "According to the appearance of much used telephones they have not only been bitten but violently banged, biffed or otherwise maltreated."

He is moved to make this enquiry by a London journalist who wrote in reference to some difficulty in telephoning: As I am a philosopher about telephones, I never blame the operators, but I chewed, in my rage, a large piece out of the, as I say, transmitter.

O thou who bitest thy transmitter
In token of experience bitter,
How wilt thou for thy deed atone
When served well by the telephone ?
Canst thou replace the bitten bits
When loaded by its benefits ?

(*Fruit-garden of Learning for the Nourishment of the Discerning.*)

POST WAR TRUNK TELEPHONE DEVELOPMENT.*

BY H. G. TRAYFOOT.

(*Continued from page* 140.)

5.—ANGLO-CONTINENTAL TELEPHONE SERVICE.

A detailed history of the development of the Anglo-Continental telephone service is given in a series of articles which Mr. Gunston contributed to the TELEGRAPH AND TELEPHONE JOURNAL in 1921. With Mr. Gunston's permission I have incorporated in this paper a few of the leading features in the history of this highly important service.

The Anglo-French service was brought into operation by the opening of 2 London—Paris circuits on April 1, 1891. On the first day there were 22 calls. In the following month the traffic was about 130 calls a day, and 4 years later it reached 200 calls a day. In July, 1914, the month before the outbreak of war, there were 9 Anglo-French circuits carrying about 800 calls a day.

The Anglo-Belgian service was opened in June, 1903, with 2 London—Brussels circuits, and in July, 1914, there were 4 circuits carrying about 250 calls a day.

During the war several new cables were laid for military purposes, under more or less hazardous conditions, and at the termination of the war there were no less than 22 circuits working between England and France. Nine were direct circuits between London and Paris, and the remainder were terminated at various posts of military importance. It is worthy of remark that one of these circuits worked for a time as a direct London—Cologne circuit.

The Anglo-Continental circuits were not restored for public service until October, 1919, and since that time the traffic has developed as shown in Diagram No. 8.

A service between England and Holland commenced in September, 1922, with the opening of 2 circuits, a third circuit being formed subsequently by superposing. Two of these circuits work between London and Amsterdam, and one between London and Rotterdam. These circuits are loaded to their utmost capacity during business hours, the total traffic exceeding 300 calls a day, while the "paid time" obtained is remarkably high.

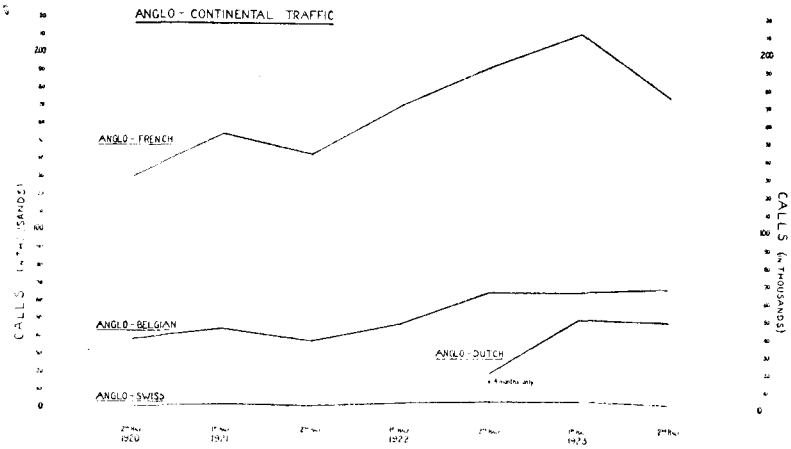
Communication between England and Switzerland *via* France is practicable and transmission is good, but, owing to the extreme pressure on the circuits between France and Switzerland, the number of calls effected daily is comparatively small. A high percentage of the calls booked are cancelled, and there can be no doubt that if direct Anglo-Swiss circuits were available the traffic would develop rapidly.

A new interest was given to long distance telephony in Europe as the outcome of an important paper read before the Institution of Electrical Engineers in November, 1922, by Mr. Gill, who drew attention to the enormously increased possibilities as the result of technical improvements and suggested, *inter alia*, that representatives of the various telephone administrations in Europe should get together and work out some scheme of co-operation by means of which full advantage might be taken of the possibilities.

In March, 1923, a preliminary conference with this object was held in Paris, by invitation of the French Administration, between representatives of Belgium, France, Great Britain, Italy, Spain and Switzerland. The results of this conference cannot fail to be of considerable importance. Unanimous

* Paper read before the London Telephone and Telegraph Society.

agreement was reached with regard to the constitution of a permanent technical committee to plan and work a scheme of centralised control, to consider the application of technical improvements to the European long distance service, to collect statistics, and to introduce standardised methods of working.



No. 8.

A large number of recommendations with regard to standardisation of apparatus of all descriptions, methods of maintenance, methods of operating, &c., was drawn up and the delegates discussed with one another programmes of work to be undertaken during the next 10 years. The recommendations made at this preliminary conference will be considered in the near future by another conference at which nearly all the European nations will be represented.

The question of laying additional cables to both France and Belgium to provide the additional circuits agreed on at the Paris Conference is at present under discussion. It is hoped within 5 years to increase the number of London—Paris circuits from 13 to 36, the number of London—Brussels circuits from 4 to 12, and the number of London—Antwerp circuits from 3 to 7. It is also hoped to provide 2 circuits from London to Basle, Zurich and Geneva respectively, and one circuit from London to Milan. At present there are no direct Anglo-Swiss circuits, and there is no service between England and Italy.

A second cable between England and Holland is at present being constructed. This cable will contain 8 physical circuits and it is hoped that it may be found possible to form 4 phantom circuits in addition. It will be reserved at the outset for the development of the Anglo-Dutch service.

It has been suggested that the Anglo-German service should be provided *via* Holland, at any rate in the first instance, by means of a third Anglo-Dutch cable, and it is possible that the service will be available in 1925. If this proposal matures, direct communication will probably be established between London and Berlin, Hamburg, Cologne, Düsseldorf and Frankfurt.

6.—Direct Dialling over Trunk Lines to Automatic Exchanges.

The introduction of automatic telephone apparatus has not so far affected to any material extent the working of the long distance system, although such apparatus is being employed in connexion with many of the short distance trunk lines. At Leeds, Portsmouth, Southampton, Newport and other places where automatic exchanges have been installed, many of the exchanges served from these places by means of trunk lines worked on a "no delay" basis can dial subscribers on the automatic exchanges. Thus, the Cardiff Exchange can obtain Newport subscribers by direct dialling; the Southampton Exchange can dial Portsmouth subscribers, and the Portsmouth Exchange Southampton subscribers.

Apart from the saving due to the elimination of the manual operation at the incoming end, direct dialling over routes such as these enables long distance calls for the whole of a particular group of exchanges to be effectively concentrated in a trunk exchange without an increase in the number of switching operations or without impairing the transmission, when otherwise it might be found more generally satisfactory to terminate long distance lines in one of the minor exchanges of the group.

For example, Grimsby is a very important exchange for long distance traffic, and some years ago it was given direct communication with London, Nottingham and Leeds, although its normal centre for long distance traffic is Hull. Comparatively recently, however, it has been found possible to multiple on the Hull Trunk Exchange switchboard a group of direct circuits of high efficiency to the Grimsby Automatic Exchange and the Hull trunk operators can obtain Grimsby subscribers as readily as the operators at the Grimsby manual board. The Grimsby long distance lines can now be transferred with advantage to Hull.

Similarly Chesterfield was given long distance lines not so much, however, for its own traffic as because it was the natural centre for a number of important mining villages, Clay Cross, Staveley, &c. Under the Chesterfield automatic scheme, all these exchanges will be converted to automatic working, and the subscribers can be dialled direct from the Sheffield Trunk Exchange, the normal centre for the long distance traffic to and from Chesterfield.

There are, however, a few cases in which the long distance lines are used for automatic working. Thus, Manchester, Sheffield and Hull, which are connected to Leeds by means of circuits worked on the long distance boards can obtain Leeds subscribers automatically, and a similar procedure has been introduced in connexion with calls from the Liverpool Trunk Exchange to Blackburn and Accrington, where automatic exchanges exist. This method of working has been remarkably successful. The controlling operator can obtain the distant subscriber rapidly without the intervention of another exchange at the most convenient moment. She can, therefore, devote correspondingly more attention to the calling subscriber, and retain him on the line while she is actually dialling to obtain the distant subscriber's attention. Generally speaking, the calling subscriber is waiting on the line at the moment the distant subscriber replies, and little or no time is lost in the commencement of conversation.

The difficulty in making more extended use of this method of working in connexion with the long distance lines arises from the fact that within a short time practically all the long distance circuits serving places where automatic working has been, or will be, installed will be provided by means of wires in cables of the latest type, and suitable arrangements cannot at present be made for dialling over such wires.

7.—Quality of Service and Circuit Loads.

There is a very close connexion between quality of service and circuit loads. High loads are acceptable enough from a financial standpoint, but exceptionally high loads are usually obtained at the expense of the service. Each of the Anglo-Dutch circuits carries on an average over 100 unit calls a day (as compared with a general average for inter-zone lines of 50-60), but the probable delay during the busy hours is officially quoted to enquiring subscribers as "indefinite," *i.e.*, it cannot be estimated with any degree of accuracy.

Quality of service must, broadly speaking, be the determining factor, but the effect of a high-grade service on the economic aspect of a telephone undertaking cannot be lost sight of, and a time may come at no distant date when it will be necessary for the Administration to decide between a reduced tariff and a very appreciable improvement in the standard of long distance service. It would not, I suggest, be wise to reduce the charges for long distance calls until a decision has been reached as to the standards of service ultimately to be aimed at and the cost of giving such a service has been ascertained.

We have not yet been able to ascertain with any degree of accuracy the increased annual charges which would result from a step by step improvement in the average standard trunk service given during the busy hours. That is to say, we cannot at the moment give a reliable estimate of the cost of substituting an average delay of, say, 20 minutes, or 15 minutes, or 10 minutes, for the average delay of 30 minutes which is at present the official standard for inter-zone routes. There are many factors to be considered in connexion with such a study. Some figures bearing on this point are, however, available from American sources, and we were told, not so long ago, in sufficiently impressive language, how many million dollars would be involved if the average standard delay during the busy hours on long distance lines were fixed at 3.5 instead of 4.5 minutes. It will be a happy day for telephone users in this country when the cost of giving even a 4.5 minutes standard during the busy hours becomes a practical question for the British Administration, and when they get it it is to be hoped that they will not object to pay for it.

Our present standards of trunk service are as follows:—

(*a*) No delay between exchanges in the same group or in two adjacent groups where the circuits between the group centres are definitely scheduled for junction working (*e.g.*, Manchester and Liverpool).

(*b*) An average delay not in excess of 15 minutes between exchanges in different groups in the same zone.

(*c*) An average delay not in excess of 30 minutes between exchanges in different zones.

At the present time the normal delays on the majority of the trunk routes are well within these standards, but there is little or no margin for traffic increase, and a sudden revival of trade would quickly send the delays on most of the inter-zone routes beyond even the present standard.

When the underground cables now under construction are completed we hope to be in a position to fix far more suitable standards. We should like to aim at a standard delay not exceeding 10 minutes on calls between the more important commercial centres, with a maximum of 30 minutes on calls between any two exchanges in Great Britain. We cannot, however, fully estimate the "hidden demand" and it is quite likely that traffic development will be so rapid when additional facilities and a more stable service are available that more, and still more, underground plant will be needed to enable these standards to be realised.

The provision of line plant on such a scale as this will make it imperative to reduce to a minimum during the busy hours the time during which trunk circuits are held for individual calls. The subscriber should have as much time as he pays for, and no more, and the time during which the lines are held for operating purposes should be closely cut.

In cases where trunk circuits are multipled over a number of positions in a local exchange it is imperative that the service should be as nearly as possible a "no delay" service. Under such conditions the circuit loads on a particular group of circuits during the busy hours can be determined mathematically, and the loads which a group can carry are dependent largely on the number of circuits in that group, always assuming that the operating loads are properly adjusted, that the transmission is good, and that there is a thoroughly satisfactory system of supervisory signals. Under these conditions the amount of time during which the trunk line is held for operating purposes is very small indeed, as the supervisory signals enable the operator readily to follow the stages of the call.

When, however, a group of circuits is worked admittedly on a delay basis, the number of circuits in the group may be an important factor if the amount of delay permitted is relatively small, but when the delay is so considerable that there is always a batch of tickets, however small, waiting, the number of circuits in the group ceases to have a material effect on the load of individual circuits. Experience tends to show that the loads depend to a very considerable extent on the amount of operating staff employed, and on a circuit layout which provides for the circuits to be staffed in a precisely similar manner at each end of the route, so that the operators at each end are in constant touch with one another during the busy hours.

Close supervision of calls is a factor of the greatest importance in long line operating and the staffing must be such as to ensure that the trunk line operator can give the greatest possible attention to the subscriber. The conditions under which delayed traffic is operated demand that the subscriber should be kept constantly advised of what is going on, *e.g.*, if some trouble arises at the distant end, he should be told immediately what has happened, otherwise the greatest difficulty will be experienced in getting him into a suitable frame of mind to start conversation when his correspondent is ready to talk.

Close supervision is all the more necessary, because improvements in the design of telephone cables, vastly important in other directions, have unfortunately brought in their train an appreciable reduction in the signalling arrangements which one would like to see available on long lines.

Another point in which trunk working differs very considerably from the working in a local exchange is that the trunk operator is responsible for the completion of calls which cannot be effected at the first attempt, because the subscriber does not reply, or is engaged, &c. These additional attempts are a very disturbing feature in the work at a trunk position.

The ideal method of working to ensure close supervision would appear to be to give each trunk operator but one trunk line to work, but experience tends to show that this is not necessarily the case. For even supervision of calls will not give us the best results unless we have a thoroughly satisfactory method of "preparing" (to use a Continental phrase) the call which is to follow that actually in progress on each trunk line. And it is not an easy matter to prepare the next call if the operator has at her command but one channel to the distant exchange, and observations tend to show that if an operator has 2, or even sometimes 3, lines to the other exchange, she can by skilful manipulation of overlapping operations, obtain results almost, in some cases quite, as good as if she has but one line, without appreciable interference with the work of supervision. In cases where there is but one line between two zone centres, it is standard practice to make the working of the circuit the sole duty of one operator at each end, the Glasgow—Birmingham route is a case in point. There is, however, room for still further investigation with regard to this particular aspect of trunk working, and it is hoped to obtain much useful information from the observations to which reference will be made later.

On the Continent there are still many advocates of the use of a superposed Morse circuit for passing forward particulars of calls, not, as used to be in practice in this country, by the employment of a special operator for telegraphing the necessary details, but by giving a trunk line operator the Morse circuit to work in addition to the operation of calls on one or two trunk lines. Telegraph call wire working, as it was called here, was abandoned entirely some years ago, because it was found that, on the whole, equally good results were obtained by increasing the trunk line operating staff and by passing forward on the trunk lines themselves details of calls to follow those actually in progress.

It has recently been found possible to increase very appreciably the amount of trunk line observation work and to remodel the methods of obtaining the results of the working, and it is hoped that by the employment of specialised staff for the purpose of studying the observation results and by discussing these results with the people who do the work, the operating methods can be improved, and more reliable statistical evidence obtained for the purpose of fixing loads. The Headquarters Traffic Staff is greatly indebted to the observation staff of the London Telephone Service for assistance, very readily and freely given, in working out the details of the general scheme. The observations already taken tend to throw some doubt on the efficacy of our timing devices and the question of improving the latter is being discussed.

One very interesting point has been brought out by these observations. It is found that the average time occupied in obtaining the attendance at the telephone of the particular person required is about 50 seconds, and this figure has actually reached 80 seconds in the case of certain routes. This loss of time should not be borne by the Post Office, but unless the arrangements are such as to ensure close supervision by the operating staff, it is impossible for the latter to ascertain the real cause of the delay in such cases, and time lost in subscribers' offices not infrequently counts as time occupied in trunk line operating.

It should be mentioned that the most successful methods of working now in operation on the trunk lines appear to be :—

(1) The method of direct dialling to automatic exchanges, which has already been referred to, and

(2) The method in use on the London—Liverpool and Birmingham routes under which the trunk lines are multipled at the outgoing end over a limited number of trunk positions and are terminated at the distant end in a local exchange on plug ended B positions (specially fitted with keys to facilitate the supervision of calls), the working being controlled by means of an order wire.

Such methods as these can, however, be employed only on routes carrying very simple traffic, in practice calls between the local exchanges immediately associated with the trunk exchanges at each end.

8.—TRANSMISSION.

(*a*) The elaboration of a general scheme by means of which engineering plant can be adjusted more precisely to the actual requirements of the traffic, from the point of view of transmission, has received a great deal of consideration during the past few years.

The discussion originated in the Engineer-in-Chief's desire to reduce the cost of underground plant, and it is worthy of record that the first meeting took place on Nov. 12, 1918. The Engineering representatives pointed out that, the war having terminated, it became necessary to consider the question of preparing a large number of schemes of underground construction and that it seemed desirable at once to consider whether conductors of lighter gauge than had previously been employed for trunk working could be introduced and reserved for special classes of traffic.

During the course of the investigation, however, another question came into prominence, and it was recognised that in many cases circuits of greater efficiency than those actually in use were needed for the disposal of long distance traffic. The trouble had really arisen with the amalgamation of trunk and local exchanges, the transfer of groups of short distance circuits to local exchanges and the wiping out of the old area boundaries.

So long as separate trunk exchanges existed and local working was carried on in well defined areas, it was a comparatively simple matter to segregate the plant suitable for long distance working. But under the new conditions many difficulties arose, although some time elapsed before the full extent of the trouble was realised. A group of local junctions was amalgamated with a group of trunk junctions, and the combined group was multipled over all positions with the result that a number of circuits of low efficiency were being used for long distance traffic. The transfer of trunk lines from a trunk to a local exchange impaired the efficiency of the long service by the introduction of additional exchange losses.

As the result of discussion a general transmission scheme was evolved. This scheme was dealt with at length by Mr. Elston in a paper which he read before the Institution of Post Office Engineers in October, 1922, and as the paper has been published it is unnecessary for me now to do more than make a very brief reference to the chief features of the scheme.

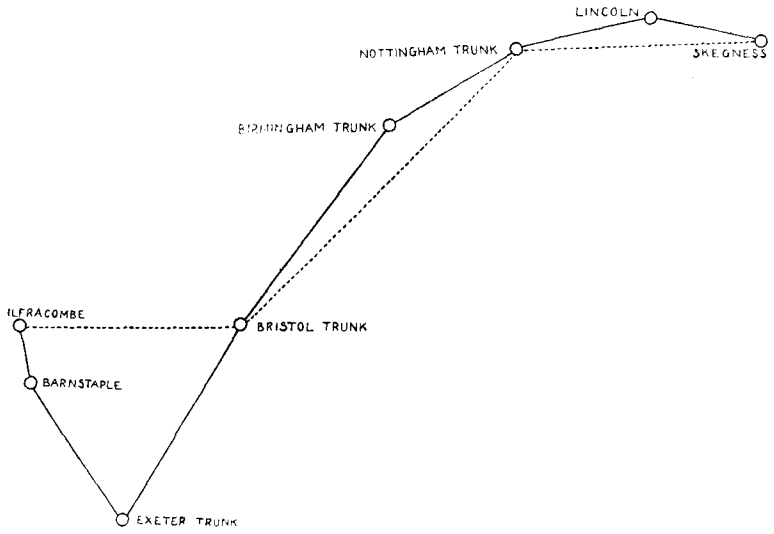
It introduces an entirely new nomenclature for transmission purposes, and the new definitions have reference solely to the character of the traffic which will pass over the circuits in each grade. Thus, a Z circuit is one which is suitable for use in connexion with miscellaneous long distance traffic. It may be 10 miles long, or it may be 400 miles long, but it is not a Z circuit unless it is capable of carrying calls between any two exchanges in the Kingdom.

The scheme is of universal application and it covers all trunk and junction lines, old or new, whether underground or overhead, irrespective of length, and it supplies a basis for determining the number of circuits of each type which will be required. Thus it is provided that at least 3 of the circuits serving any individual exchange shall be Z circuits, and that unless the circumstances are altogether exceptional, no circuits of the lowest type shall be introduced until there are 6 circuits of other types. The scheme provides for the segregation of the traffic of a more simple character even on inter-zone circuits, and defines the traffic to be dealt with on the segregated groups. It provides in certain cases for the use of code words on order wires to enable the B telephonists to allot circuits of the type referred, and it describes the switchboard markings for the various types.

(*b*) There is little need to enlarge on the effect which the valve repeater has already had, and must have still more, on the development of the long distance service. Reference has already been made to its effect on cable design and on the extension of the range of long distance telephony. But the introduction of the repeater into cord circuits specially provided on trunk switchboards in order to improve the transmission on long distance calls is a feature which needs mention.

There are now in the London Trunk Exchange 2 positions fitted with repeater cord circuits, and these are used to improve the quality of the transmission on specially difficult calls passing over selected routes. The selected circuits are led through break jacks at the repeater positions and thence to the normal trunk operating positions. The repeater position telephonist can by plugging into the relative break jack, pick up as required any one of the selected circuits and associate with it a cord circuit repeater for the purpose of a particular call. After the call has been disposed of, the trunk circuit is used again at the position on which it normally terminates. In London these positions are used almost entirely for Continental traffic.

At Bristol cord circuits have been installed on a few of the ordinary positions to facilitate the disposal of traffic to and from Cornwall, and at Glasgow similar apparatus has been provided for traffic to and from the far North of Scotland. Cord circuit repeater positions will, however, be installed in due course at all the more important long distance switching centres.



No. 9.

(*c*) The policy of direct line provision on an extended scale to which reference has already been made cannot but have a beneficial effect on the general transmission conditions.

New exchanges are being opened at the rate of 6 a week mainly in the rural districts and the majority of these exchanges must, at the outset, obtain communication with the general exchange system by means of circuits to other comparatively small exchanges. The long distance traffic originated at these small exchanges is in the aggregate considerable and it appears clear that unless a system of direct lines on a fairly extensive scale from the more important switching points is built up, it will be extremely difficult to maintain satisfactory transmission conditions, even with the aid of cord circuit repeaters.

The accompanying Diagram No. 9 indicates the route (black line) which a call from Ilfracombe to Skegness would have followed a few years ago, and the route (dotted line) which it will follow when all authorised circuits are completed.

9.—Fixed Time Calls.

The question of introducing a system of appointment or "fixed time" calls in order to permit a subscriber to book some time in advance a trunk call to mature at a specified time, was discussed from time to time before the war, and a scheme was actually under consideration in 1914. The question was taken up again soon after the termination of the war, but, owing to the extremely heavy loads on the trunk circuits in 1919 and 1920, it was considered inadvisable to take any steps likely to prejudice the general service.

A scheme, was, however, introduced in April, 1922. It provided that a subscriber could obtain a call at a specified time subject to prior notice, on payment of an additional fee equal to 25 per cent. of the ordinary charge. If, however, the subscriber contracted to take the call for at least 5 consecutive days in a week, the additional fee was reduced to 12½ per cent. of the ordinary charge. It was specifically provided that the call should be deemed effective if connexion were made within 10 minutes after the time for which it was booked, and steps were taken to ensure that ordinary calls already booked should not be prejudiced by "fixed time" calls booked subsequently.

The scheme has been remarkably successful and the fixed time traffic has developed very rapidly.

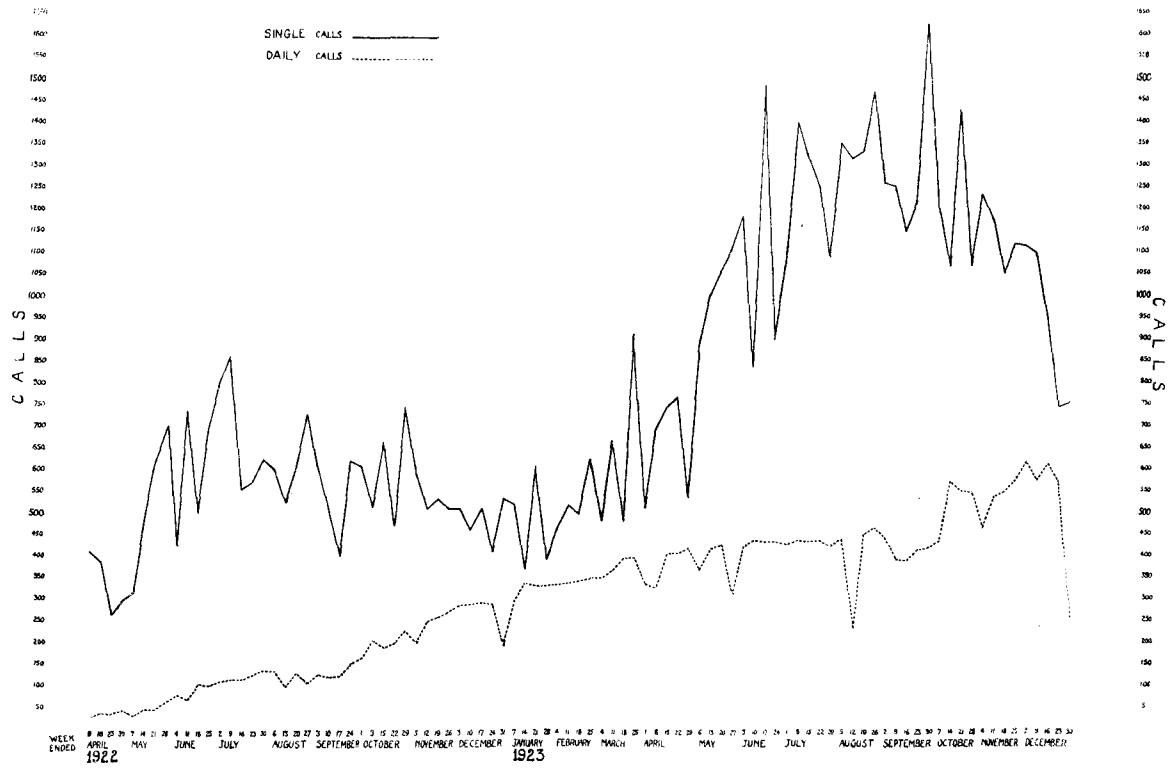
Diagrams Nos. 10 and 11 show respectively:—

(*a*) The growth of fixed time traffic controlled in the London Trunk Exchange.

(*b*) A comparison of the development of such traffic in the Liverpool and Hull Trunk Exchanges, indicating the effect which the character of the industries of these cities has on the traffic. It will be seen that the contract calls at Hull are very much heavier than at Liverpool, and that the number of such calls at Hull has recently actually exceeded the single calls made at Liverpool. The Hull contract calls are made mainly by the fish merchants who find that the fixed time call system permits them to get into touch at the same time, day after day, with their more important customers, and so to ensure the sale of a considerable portion of their produce.

In April, 1922, the Leeds Trunk Exchange dealt with about 400 fixed time calls; in October last the number of such calls dealt with at Leeds exceeded 6,000.

CHART SHOWING THE WEEKLY TOTALS OF FIXED TIME CALLS CONTROLLED IN THE LONDON TRUNK EXCHANGE



No. 10.

It has already been stated that a fixed time call is deemed to have been effected satisfactorily if it is completed within 10 minutes of the specified time, and I have made some special enquiries in order to ascertain what percentage of the fixed time traffic actually booked is effected within that period. The traffic staff are unanimous in asserting that the success of the scheme at the outset was due to the fact that calls were connected "on the stroke" of time, that subscribers have regulated their business accordingly, and that it would now be impossible to take any appreciable advantage of the 10 minutes' grace period allowed for in the regulations.

In London the percentage of fixed time calls effected at the specified time is 98 in the case of daily calls and 96 in the case of single calls. In the Bristol Trunk Exchange over 30,000 fixed time calls have been controlled since the scheme was originated, 98 per cent have been effected at the specified time and the remainder within the 10 minutes allowed. Not a single call has been cancelled on account of the failure of the Post Office to fulfil its contract.

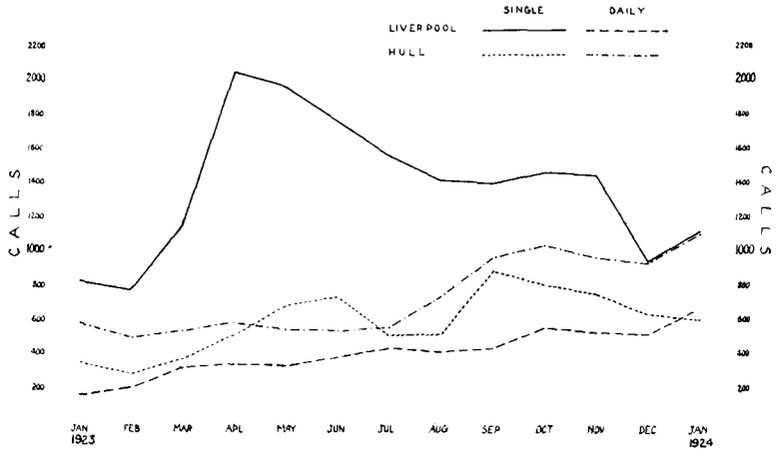
At a number of the centres the percentage of calls effected at the specified time is over 95 per cent., and the number of calls cancelled owing to failure on the part of the Post Office is negligible.

When one considers that, in order to ensure the complete success of a new scheme such as this, not only must the general organisation of an Exchange

be thoroughly efficient, but that in the case of every call the co-operation of several telephonists is necessary in order to ensure that all circuits required are available simultaneously, we can, I think, be satisfied that whatever other defects there may be in the system there is nothing wrong with the spirit of the staff.

This increase of fixed time traffic, has moreover, taken place during a period when the ordinary service has been steadily improving, notwithstanding the bad patches which still exist, and it seems fairly evident that, no matter how the service improves, there will still be a demand for "fixed time" calls.

FIXED TIME CALLS DEALT WITH AT LIVERPOOL AND HULL TRUNK EXCHANGES



No. 11.

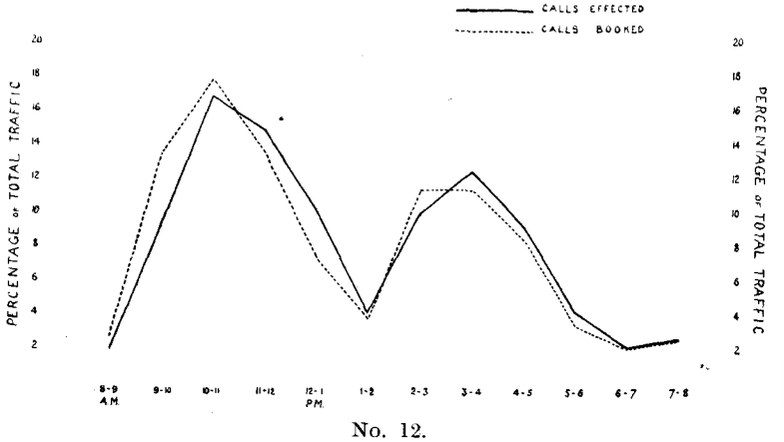
10.—NEW CHARGING SYSTEM AND EXTENSION OF DIFFERENTIAL RATING.

Under the area system in force during the existence of the National Telephone Company, trunk charges were based on the radial distance between the trunk centres of the respective areas, the remaining exchanges in each area taking the charges applicable to the area centre. Under this method of charging, there were, needless to say, many striking anomalies, although some of the worst of them were removed from time to time by the introduction of a special rate for exchanges not in the same area, but in close proximity to one another.

This system had, however, one satisfactory feature from the working standpoint—it was comparatively straightforward and the records of charges were of a simple character.

In April, 1921, an entirely new system of charging, based on radial measurement, was introduced, and for the purpose of this scheme the country was divided into blocks, one mile square, each block bearing 2 index numbers. Charges for calls between exchanges within 15 miles of each other are based upon actual measurements of the direct radial distance in each case. All other charges are based upon conventional approximate mileages, deduced from the index numbers of the blocks to which reference has already been made. In order to ascertain the charge for a call between any two exchanges

CHART SHOWING DISTRIBUTION OF TRUNK TRAFFIC THROUGHOUT DAY
(TRUNK EXCHANGES ONLY)



No. 12.

more than 15 miles apart, the index numbers of each exchange have first to be ascertained from a book. These numbers are written down and two elementary arithmetical calculations are then carried out by using the digits of these numbers, the resultant figures being used, with the aid of an index, to ascertain the charge. As each charge is calculated it is written in the charge book provided for use in each exchange.

This may sound a little complicated, but in practice the actual calculation of the charge is a simple matter. The change in the system involved, however, an enormous amount of work in the district offices and exchanges, especially at the zone centres, which are called upon to account for the traffic which they control on behalf of other exchanges in the zone. Thus the London Trunk Exchange are compelled to keep, under the present system of accounting, not only the charges for calls from London exchanges, but also a portion of the charges for calls from about 500 other exchanges.

Several experiments were necessary before the most suitable forms of charge index for small and large exchanges could be ascertained, but all the records have now been standardised and the system appears to be working quite well.

One of the most unsatisfactory features of telephone traffic (in fact, of almost any form of traffic) is its uneven flow, and in cases where very costly plant is involved it is highly desirable to even out the traffic as much as possible.

About one-sixth of the long distance telephone traffic on a normal working day is handled during the busiest hour, and in July, 1922, a reduced rate was introduced for calls dealt with between 2 and 7 p.m. in order to attract traffic during those hours, and, if possible, to secure the transfer of the traffic from the morning to the afternoon. Little success has so far attended the change, which has accordingly resulted in a big drop in the total revenue. The accompanying Diagram No. 12 shows the present distribution of the trunk traffic at the trunk exchanges, which is practically identical with the distribution before the reduction of rates.

It will be noticed that a distinct rise of traffic occurs when the night rates come in operation at 7 p.m., but it was a good many years after the introduction of these rates before this rise took place. So perhaps there is still hope for the afternoon rates.

I have attempted, as far as possible, to make this paper a general record of the work carried out by the Administration in connexion with the trunk system since 1919, but there is, of course, an enormous amount of engineering and other work to which it is impossible to make any reference in a paper such as this. The provision of a long distance cable, for example, involves research and other work which can be dealt with only by an engineer, and I would suggest that next session a member of the engineering staff should describe what actually happens from the time the traffic particulars for a new cable are received by the Engineer-in-Chief, until that cable is handed over for working.

TRANSATLANTIC WIRELESS TELEPHONY.

THE recent advances in the science of wireless telegraphy, including more particularly the invention of the thermionic valve, have brought within the bounds of possibility the linking up of the American and European telephonic systems by wireless, which is impracticable with existing types of submarine cable. The first step in this direction was made during the war, in 1915, when speech was transmitted by the American Telephone & Telegraph Company from the United States Naval Wireless Station at Arlington to the Eiffel Tower at Paris.

Since that date the Research Departments of the American Telephone & Telegraph Company and of the Radio Corporation of America have been at work upon the subject. This work culminated in the second attempt to bridge the Atlantic telephonically, which was successfully made in January, 1923. On this occasion, officials of the American Telephone & Telegraph Company, speaking in New York, were heard clearly by a large audience at the Western Electric Company's works at New Southgate. The speech from New York was passed on a telephone line to the Radio Corporation's Wireless Station at Long Island, whence it was transmitted by wireless to New Southgate.

At this date the speech was too weak to be reliably received in hours when there was daylight in both countries, but was quite clear and loud at night and in the early morning. The

demonstration was so successful that the Postmaster-General appointed a Committee under the Chairmanship of Admiral of the Fleet Sir H. B. Jackson, G.C.B., to investigate the possibility of Transatlantic Wireless Telephony on a reliable commercial scale. This committeee has been at work since April, 1923.

The American Telephone & Telegraph Company and the Radio Corporation had in the meantime continued their experiments in conjunction with the Western Electric Company in this country, and the committee instituted a fresh set of experiments, which were carried out on their behalf by the Post Office Engineering Department, with a view to securing data on which a more powerful system could be built up. Transmissions of Wireless Telephony have taken place weekly from the Long Island Station, which have been received and measured in this country by the Post Office and by the Western Electric Company. In the January 1923 demonstration a simple loop frame aerial was employed at the receiving end. A special receiving antenna was built by the Post Office, and tests showed that reception on this antenna was more powerful and more free from atmospherics than on older systems of reception. During the winter months, when conditions were favourable, the speech was occasionally distributed during the daytime over the land lines to a number of telephone subscribers at their homes in London and other parts of the country. The improvement gained was, therefore, the possibility of communication during certain hours when there is daylight in both countries, which under the previous reception conditions were in general unsatisfactory.

The success of these one-way experiments has encouraged the committee to recommend to the Postmaster General the installation of an experimental 200 K.W. telephony valve transmitting plant at the new Post Office Station at Rugby, of a similar type to that in use for the experiments in America, so as to enable two-way conversations to be carried out. It is hoped that these experiments will show that it is possible to connect telephone subscribers in London to subscribers in New York during favourable atmospheric conditions, particularly during the winter months. The experiments will also provide the data necessary for determining to what extent it is possible to establish a reliable commercial telephone service between the two countries. They will also give information on the best operating methods to be employed, the attitude of the public, and many other factors necessary to be determined before any regular commercial service could be undertaken.

It should not be overlooked that there is a very wide gap between a system which is only capable of connecting the telephone services of the two countries under favourable conditions and a system which will give a reliable and continuous service.

THE ADMINISTRATION AND CONTROL OF TELEGRAPHS AND TELEPHONES FROM A SURVEYOR'S POINT OF VIEW.*

BY T. KELLY, C.M.G.

WHEN our respected Secretary of the Telegraph and Telephone Society sent me the Committee's invitation to read a paper about the Surveyor's relations to the telegraph and telephone services, I naturally felt very honoured. At the same time a lingering doubt came into my mind whether a matter of fact paper, such as might be expected from me dealing almost entirely with provincial organisation, would arouse much interest amongst the members of a London society, but the warmth of the assurances from Mr. Thomson amply persuaded me that I had under-estimated the professional zeal and the thirst for knowledge of our London colleagues of the telegraph and telephone services, and I promised to do my best. Although the subject may lack the direct appeal to London members which attached to so many of the papers I have had the pleasure of hearing in this lecture hall—from the other side of the limelight—I do not doubt that our London friends, aided by provincial colleagues I am glad to see present this evening, will deal faithfully with any heresies I may attempt to enunciate.

It will, of course, be understood that any opinions I may express are personal and in no sense official, and criticism of them will be warmly welcomed in the interests of the great service whose welfare we all equally have at heart.

The main lines that my subject will follow are firstly that a provincial district administration intermediate between the Secretariat and the local control of telegraphs and telephones is sound organisation, and that the Surveyor's district fills the gap most conveniently and efficiently.

Secondly, that the merger of three large and more or less dissimilar services, posts, telegraphs and telephones, under the Post Office makes co-ordination in management imperative, and that the natural point for main co-ordination lies in the Surveyor's district organisation.

And thirdly, that the comparative dissimilarity of the services, the high degree of specialisation of technical staff necessary for each, the wide field of operations, the control of the large number of widely scattered persons employed, and last, but by no means least, the peculiar and exacting conditions attaching to Government management, require not only a specialised technical district staff, but also a specialised administrative staff such as the Surveyor and his Assistant Surveyors should be.

As most of you are aware a Surveyor is not concerned in State policy with regard to telegraphs and telephones: he has no voice in fixing charges to the public or in any of the prominent issues which excite popular interest. He is simply responsible to the Postmaster-General and Secretary for the efficiency of the joint services within his district, and his duty broadly speaking is to see that posts, telegraphs and telephones, are carried on with maximum benefit to the public at minimum expediture to the State and under conditions satisfactory to the employees.

This paper, therefore, will not concern itself with any large questions of public interest, but will be domestic in character and will appeal only to servants of the department interested in official organisation.

Speaking to a London society it is perhaps necessary for me to explain at the outset who and what a Post Office Surveyor is, seeing that none is to be found within metropolitan limits.

In the Post Office service Surveyors and their title date back to 1715, when officials to be known as Surveyors were appointed by Treasury warrant on the recommendation of the then joint Postmasters-General to measure up the post roads for the primary purpose of fixing accurately the mileage on which postage charges at that time were based, and in conjunction therewith to inspect post offices and postal routes in order to detect and prevent frauds on the revenue then prevalent arising from illicit conveyance of unpaid letters or from falsification of postage accounts. To each Surveyor was assigned the responsibility for certain main and bye-post routes or ridings. Incidentally I might mention that to this day the district record of postal, telegraph and telephone services is known as the "Riding Work," a description which would be unintelligible were its origin unknown. The primary duty of the new officials warranted their title of Surveyor; but the primary duty was soon fulfilled and dwindled into minor importance and ultimately petered out, leaving the second duty—that of inspection—the principal *raison d'etre* of the Surveyor. The title was still not altogether inappropriate, as to survey is literally to oversee, and to oversee implies inspection.

In course of time, however, inspection developed into management, the routes or ridings became geographical districts, and the Surveyors found themselves in the position of district controllers acting as headquarters representatives with delegated authority and responsible to the Postmaster-General and Secretary for all branches of the department's activities within their bailiwick.

Before the days of telegraphs and telephones, and when railways were yet in their infancy and staff associations unborn, the position of Surveyor if not a lucrative one, carrried much personal power and many privileges—not the least of which tradition says was that of "dammin' and cussin'" on appropriate occasions without fear of remonstrance from above or below.

The history of the Surveyors is practically the history of the department in the provinces. The district system of administration proved so satisfactory, and the department's interests were so well protected and promoted by the Surveyors, and the basic principles of the organisation stood practical and theoretical tests so satisfactorily that, at the end of two centuries, both Surveyors and their district organisation continue in being, and able to meet foursquare the inevitable criticism which is the lot of long-established institutions.

Every addition to the department's undertakings—money orders in 1792, savings banks in 1861, telegraphs in 1870, postal orders in 1881, parcel post in 1883, and telephones in 1896 and 1912, has each, in turn, been incorporated, digested and assimilated under the district organisation. From his early position of postal inspector concerned principally with postal routes, charges and revenue, the Surveyor has by the evolution of two centuries, and more especially of the last sixty years, gradually inherited control of posts, telegraphs, telephones, and the dependent and supplemental services associated with them.

The district organisation has expanded, developed and kept pace with growth of business and varying conditions. In 1870 when the telegraphs were transferred to the Post Office and engineering services came into prominence, the engineering department was founded as a separate branch and took control of engineering work with a district organisation. In 1888

* Paper read before the London Telephone and Telegraph Society.

certain postmasters of the largest towns commenced to act as their own Surveyors; in 1904 an additional grade of independent postmaster was created and detached from the Surveyor's jurisdiction; in 1912 Postmaster-Surveyors as we know them to-day came into existence and replaced and extinguished the independent postmasters.

All provincial postmasters now fall under the jurisdiction of either the Surveyors, who, for the sake of distinction, I will describe as District Surveyors, or the Postmaster-Surveyors.

The District Surveyor has control over territory covering three or more counties, though the district boundary has more relation to railway main lines than to county limits; whilst the Postmaster-Surveyor has rule in the very large centres of population and towns adjacent. There are now in Great Britain 12 District Surveyors and 8 Postmaster-Surveyors. The functions and powers of District Surveyors and Postmaster-Surveyors are identical within their respective spheres of action, but their surveying organisation and staff, by an anomaly that the department has not yet found time or opportunity to rectify, are widely different. The District Surveyor is equipped with a carefully-selected and highly-trained staff of Assistant-Surveyors, skilled in administration, and has an office establishment of executive and clerical officers matching the duties they are expected to perform. He is equipped also with specialised experts for telephones, but at present his normal staff contains no similarly trained traffic experts for posts or telegraphs. The Postmaster-Surveyor, on the other hand, has no travelling staff of Assistant-Surveyors trained in surveying and administration, and no special clerical establishment, but (excepting for telephones) is dependent on his postmasters' establishment of superintendents, overseers, and sorting clerks and telegraphists, for his surveying staff both travelling and clerical. This, however, incidentally enables him to get most of his postal and telegraph traffic problems dealt with by practical officers.

With regard to telephones the Postmaster-Surveyor is provided with expert assistants on the same lines as the District Surveyor, but where the District Surveyor may have control of two to four complete telephone districts each with its own headquarters and its own complement of expert staff, the Postmaster-Surveyor has one telephone district with headquarters in his own town, and with boundaries which are the same for telegraphs and posts as for telephones.

With engineering services which play such an important part in both telegraphs and telephones, the Surveyors have no administrative concern. The engineering department, since its establishment in 1870, has remained under entirely separate district management. Many of us are disposed to think that the separation is carried too far, and that local executive powers are too restricted, but that subject is too extensive and too contentious to be dealt with in the present paper. Not very many years ago it was thought to be desirable that the districts of superintending engineers and Surveyors should be co-terminous, and that for each Surveyor there should be a corresponding superintendeng engineer for the district engineering services, but this ideal apparently proved so difficult in application that it was not pursued. At the present time some superintending engineers correspond with two or more Surveyors, and some Surveyors with two or more superintending engineers. For our present purpose it is perhaps sufficient to say that contact is readily maintained in the provincial districts between engineering and administration, and that, although the contact may not be theoretically perfect, no serious local difficulty arises from the present diversity in organisation.

The ideal district unit for Post Office management would appear to me to be that in which posts, telegraphs and telephones, and may I say including engineering, fall together under one central administration suitably equipped with skilled administrative and technical staff. The size should be big enough to carry an officer in charge of standing adequate to assume comparatively large responsibilities, in order that the Secretariat may be relieved as far as possible of routine administration, and at the same time it should be small enough to enable the officer in charge to acquire intimate personal knowledge of its principal services, and to maintain close personal touch with the principal local officials—postmaster, and supervising officers—within his jurisdiction. These three considerations, relief of headquarters, personal knowledge of the district joint services and requirements, and personal touch with local supervisors constitute the principal justification for the district administration. And after over 30 years' experience I place the highest value on personal touch, for maintaining the all-important *esprit de corps*, for regulating and directing the abounding zeal which permeates our service, as well as for general encouragement and that human understanding which the Government service so badly needs and so frequently lacks. I am convinced that more good is achieved by ten minutes' conversation than by a dozen printed circulars of instruction, and that personal understanding between those in authority and those with lesser authority is the keynote of successful administration. It is, I think, a fair claim that the broad lines though not the details of the Surveyor's district organisation are in substantial harmony with the ideal I have suggested to you.

As you will have gathered, the association of the Surveyor with telegraphs is not the same as his association with telephones. His responsibility for both is nominally the same; but the telegraphs are administered by him through the postmaster, and the telephones principally through the district manager acting as intermediary between the Surveyor and the postmaster.

Taking the older service first—the telegraphs in all places—equipment, traffic, accounts and staff—are under the immediate supervision of the postmaster, who is frequently a practical telegraph officer himself, or if not has practical officers on his staff to advise him and ensure the efficient treatment of local problems. Questions and proposals falling outside local powers which it is necessary to submit for advice or for higher authority are passed to the Surveyor. Now, the Surveyor and his assistants, although experts in management, are not necessarily experts in telegraph traffic and equipment for which practical experience and technical knowledge are essential, and current arrangements, therefore, present a weakness inasmuch as they do not ensure that the postmaster's telegraph questions and proposals, if technical in character, will receive expert treatment by the Surveyor. The Surveyor's staff may happen to include an officer who has been trained in telegraph traffic but the present tentative organisation does not ensure it. For example, in my own district there is no trained telegraph traffic officer on my travelling staff, or in my office, or on the staff of the telephone district managers.

(To be continued.)

REVIEWS.

"*Appareils et Installations Téléphoniques.*" *Par E. Reynaud-Bonin, Ingénieur en chef des Postes et Télégraphes, Professeur a l'Ecole Supérieure des Postes, Télégraphes et Téléphones. J. B. Baillière et fils, 19, Rue Hautefeuille, Paris.*

This book, which consists of 487 pages, is divided into seven sections. The first section deals with subscribers' apparatus, the second with manual exchange equipment, the third with inter-exchange working, the fourth with special subscribers' installations, the fifth with automatic apparatus, the sixth with theory as applied to apparatus, and the seventh with theory as applied to lines. It will be seen that the whole subject, excepting the construction of out-door plant, is dealt with. The final section contains, among others, chapters on loading by spaced inductances or continuously, and the use of high frequency currents. The illustrations are clear and plentiful; and the book as a whole is well arranged. It forms one of a series of books published under the direction of M. A. Blondel entitled "*Encyclopédie d'Eléctricité Industrielle.*"

"*Funk, Wochenschrift des Funkwesens.*" *Weekly* 50 *pf. Weidmannsche Buchhandlung, Berlin, S.W.*68.

We have received the first two numbers of this Wireless weekly. It is well got up and well illustrated, and beside broadcasting programmes and other information for broadcasting enthusiasts, it has articles on "The Microphone on the Stage," "The Rights of the Wireless Amateur," "Broadcasting in Switzerland," "The Future of Broadcasting," "What Wave-lengths are still Free (unallocated)?" "Political Baptism of Broadcasting," and other interesting subjects. There is also an article on the twenty years' connexion of Dr. Bredow, the Secretary of State with wireless telegraphy.

We have also received for review a special issue of the "*Illustrierte Elecktro-Woche*" dealing with wireless (Arthur Berger, Berlin, W.5). It contains 64 pp. of articles on wireless subjects by experts, amongst whom are Dr. Bredow, Count Arco, W. Hahn, K. Schmidt, B. Pohlmann, K. Strecker, Professor Korn (on picture photography). Most of these authors are chief engineers or high postal officials. There is also an interesting history of wireless with portraits of the pioneers. The whole issue is lavishly illustrated.

"*Automatic Telephone Systems.*" *By William Aitken, M.I.E.E., A.Am.I.E.E., Vols. I, II and III. Messrs. Ernest Benn, Limited, 8, Bouverie Street, London, W.C. 4. 25s., 35s. and 55s. each respectively.*

Volume I was reviewed in the JOURNAL of October, 1921, Vol. II was published in July last and Vol. III has just reached us. This stupendous work, despite the modest statement of the author that he has not by any means exhausted the subject, does in fact cover all the important developments of automatic telephony so far as they are *in esse* or *in posse*. The author has, we think very wisely refrained from dealing with projects of speculative or doubtful worth which might have detracted from, rather than enhanced, the value of the book, without in any essential respect adding to its completeness.

The existing literature on automatic systems is to a large extent biased either by the predilection of the authors for a particular system or by being of a quasi-advertising nature. This fault cannot be ascribed to the present book. The " bus " system of numbering the wiring diagrams has been maintained throughout the volumes, and it only needs a casual glance at some of the more complex diagrams to realise what an assistance this system is to the enquiring mind, and also what care must have been taken to ensure accuracy.

It may be true that the introduction of the Strowger Director system by the British Post Office for London and other large areas in this country, practically means that step by step systems will become standard practice here, and may to that extent limit the development of other systems: but we must remember that diversity of type is an enemy of efficient service, increasing as it does the difficulties of maintenance and the complexities of inter-exchange working. This standardisation does not of course affect other countries, and there seems ample scope for the ingenuities of the inventor in providing other systems for countries where automatic telephony is still a comparative stranger or where the circumstances are not such as to need unity of standard. There is also much scope in perfecting private branch exchange facilities.

The following is a condensed outline of the contents of each of the three volumes :—

Vol. I.—Strowger system (Automatic Electric Company Chicago; Automatic Telephone Manufacturing Company); Siemens Brothers and Company's system; Western Electric Company's system; Relay Automatic Company's system; and system of Coventry Automatic Telephones, Limited.

Vol. II.—Equipment in subscribers' offices other than simple exchange sets; party line working; small switchboards for public exchanges and P.B.X's, private installations; community exchanges apparatus and circuits; automatic voltage regulation.

Vol. III.—Director system (Strowger) including A. and O. digit working; switching-selector-repeater working; 2-way repeaters; Panel system (Western Electric Company); Rotary and Radial Switch system (Ericcson's Stockholm); Semi-automatic and traffic distributing systems; Metering; Trunk and toll line working; Layout of plant; Power plant; Traffic problems; Methods of obtaining traffic data.

The general arrangement of the volumes is excellent, the paper and printing is good, the large diagrams are generally folded in one direction only so that they are not liable to be torn, and there is a good index in Vol. III which gives references to all three volumes. The book will no doubt become a standard authority on the subject and its production has been carried out in keeping with its permanent nature.

CORRESPONDENCE.

"THE PROBLEM OF THE TELEGRAPHS."

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

DEAR SIR,—The very interesting article on this subject explores most avenues of improvement, but I should like to add certain suggestions which might help.

DELAY AT THE COUNTER.

Deposit account telegrams and phonograms should not be delayed at the acceptance stage whilst the unnecessary process of calculating the charge is performed. Stock Exchange messages suffer most in this respect and phonogram circuits are congested considerably.

DELAYED DELIVERY.

The 7 p.m. closing rule for many large towns, *e.g.*, Bournemouth, is the worst form of advertisement for telegraphs. The public, including the sender of commercial messages, notices that a few minutes after 6 p.m. his telegram may not be delivered till the next morning, and then by a postman! He knows that Post Offices are open till 8 p.m., so that telegrams appear to take more than 2 hours to deliver.

DELIVERY ALTERNATIVES.

Those exasperating dead periods—for the telegraphs—on Sundays and at night could be obviated in the following manner :—

Postmasters in all districts should invite the public to arrange alternative delivery *via* the telephone. In almost every locality there is either a garage, hotel, or shop with a telephone. In such cases the subscriber might be willing to deliver messages out of hours providing he had written guarantees from the addressee for compensation.

Urgent messages at least would thus be safe. The Post Office should exhibit a list of such subscribers.

EXCESSIVE STAFF CHANGES.

In many cases staff would agree to unchanged duties and appointments for long periods. Seeing that each change means extra clerical cost and delay on messages, voluntary long-period duties should be accepted whereever possible with due regard to rights of other staff.

STAFF SUGGESTIONS.

In spite of the invitations to the staff to suggest improvements, many suggestions are held back because of the belief that such may cause personal feeling in offices.

It would be a great help if a box for receiving such missives be placed in an inconspicuous place. Suggestions need not be signed, and the manuscript should be confidential. In some cases the papers have travelled all over an office, revealing the author's identity. The persons concerned in the suggestion should be consulted by an independent officer and the comment of local supervising staff should not be allowed to control the verdict.—Yours faithfully,

"IMPROVE."

Putney, May 10.

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

DEAR SIR,—I, in common no doubt with many other telephone men, read Mr. Herbert's paper on "The Problems of the Telegraph" with great interest. Numerous papers have been written on this subject, but all unfortunately have to confirm that the senior service does not pay, and has not paid for years. Whatever the cause in the past may have been, the cause to-day is, in my humble opinion, due to the fact that the telegraphs have been superseded by forms of personal communication which appeal more to the public. The telephone at present best fills this want, as is clearly shown in the large increase in telephone lines that has taken, and is still taking, place, despite poor trade and shortage of money. That there may be better days to come for the telegraphs may be true, but in view of the results under the management of the able men who have guided its interests and development in the past, and those who control its welfare to-day, I am doubtful whether greater success may be looked for.

For internal communication the telephone must and will prevail: for overseas communication, while the telegraph at present holds sway, it must, in my opinion, eventually give way to radio telegraphy and telephony on account of the difference in cost. These means of communication are yet in their infancy. The engineers should perhaps concentrate their efforts on radiology, and produce a means of communication that can be made selective, secret, and fool-proof, and possibly enable the speakers also to see to whom they are talking. This may seem a far-away dream, but it will surely come, as also will the relaying of radio messages over the ordinary telephone subscriber's line.

There seems no reason why the telephones and telegraphs should not be a complement of each other for many years to come. As a telephone man, I am looking to the day when a telephone will be installed at all houses of a weekly rental of, say, 10*s.* and upwards. This day will not perhaps arrive for some time: meanwhile the telegraphs can educate the public to a greater use of the telegraph system.

I think Mr. Herbert lays rather too much stress on the value of the written record. I have discussed this matter with business men, and the general opinion is that the fact of a telephone user being able to get in direct touch with the person he wants and discuss the points at issue, receiving a reply, and even telling by the intonation of the voice how far a proposition is acceptable or not and modifying his views accordingly, all in the space of a few minutes and at a much cheaper cost than the telegram, puts the telephone service on a much higher plane than that of the telegram.

It is true, of course, that mistakes are made over the 'phone, but these are more readily discovered and rectified than when made in a telegram. There is, moreover, an assurance with telephone messages that they reach the place intended and the time of arrival is known, but in the case of telegrams the sender knows only the time he hands the message into the transmitting office, and is not even then sure as to its delivery. It should not be forgotten that the introduction of automatic telephony will minimise mistakes that may now be made by the operators, and put more responsibility on the subscribers, to whom it will be brought home very clearly that *all* the mistakes made are not due to operating errors.—Yours truly,

E. J. HIDDEN.

Liverpool, May 15.

LONDON ENGINEERING DISTRICT NOTES.

Football.

THE C.B. CLAY CHALLENGE CUP.

THE final football match for the Challenge Cup took place at the Charlton Athletic Football Ground at Charlton on Saturday, May 10, at 6 p.m.

The competing clubs were the South East External and the City External. Notwithstanding the late hour and bad weather conditions, a very encouraging attendance of onlookers were present and witnessed a very fast and exciting game. No goal having been scored at the end of an hour and-a-half, extra time was decided upon and just before the close of this extension the only goal scored was in favour of the South East External who as a result carried off the Cup. Each member of the winning team also received a medal.

The game was played in a very sportsmanlike manner, and as the result disclosed, the teams were very evenly matched.

The donor of the Cup, Col. C. B. Clay, very kindly consented to be in attendance, and at the conclusion of the game presented the Cup and Medals to the winners.

The proceeds of the match, which it is anticipated will be in the neighbourhood of £20, will be handed over to the Rowland Hill Benevolent Fund.

To celebrate their victory, the South East External are having a social evening on Tuesday, June 17 in the Dining Club of the Headquarters of the London Engineering District, Denman Street, London Bridge. Friends are welcomed.

Benevolent Society.

The sixteenth annual general meeting of the London Engineering District Benevolent Society was held on May 6, when Mr. McIlroy occupied the Chair. The Hon. Secretary, Mr. Slattery stated that grants varying from one guinea to ten pounds had been made to members, the total amount paid in grants amounting to £148. A donation of £40 had been made to the Hospital Saturday Fund and 157 hospital letters had been received for the benefit of members.

The value of such a Society as this cannot be overestimated. The subscription is exceedingly small, being indeed only one penny per week, and those who subscribe have the satisfaction of knowing that if they fall upon evil times assistance will be forthcoming and the possible greater satisfaction of being able to contribute to the help of others without needing assistance themselves. The working expenses are very small and therefore practically all the money subscribed is used for relief purposes. The Society works very quietly, but it is hoped that as a result of this note many more may be induced to join—not only those who may require benefit, but also those who would not need to draw upon the fund, but would enjoy the privilege of knowing that they were contributing to relieve very sad cases of distress. Every case is fully investigated by a committee of the applicants' colleagues and supervising officers, and there is no doubt whatever that every penny granted is amply justified.

There is an agent in every section, and Mr. Slattery, at Denman Street, will be pleased to answer any questions or give further information.

THE LATE MR. FRANCIS JACOB.

Mr. Jacob was educated at the Bedford Grammar School and King's College, where he was awarded the Siemens gold medal. He joined the firm of Siemens Brothers in 1873 and was for many years actively engaged in designing and laying submarine cables including the following :—

Brazilian Cable for the Platino-Brazileira Telegraph Co.—1873-4.

Atlantic Cable for Cie. Française du Télégraphe de Paris à New York.—1879.

Atlantic Cables for the Western Union Telegraph Co.—1881 and 1882.

Atlantic Cables for the Commercial Cable Co. in 1884, 1894, and 1900, &c.

He was the inventor of the multiple twinning system for cables which is now universally adopted, and also of numerous testing devices and apparatus including the Jacob's relay for submarine telegraphy. He was one of the oldest members of the Physical Society, and was regarded as perhaps the greatest authority on cables. He contributed the article on this subject in the *Encyclopedia Britannica*. For many years he was the chief electrician at Messrs. Siemens Brothers Woolwich Works, and in 1914 was appointed the works general manager. He retired from the latter position in June 1921 having completed nearly 50 years' service with the Company.

LISTENING IN AMERICA.

SAY, you air-bugs, have you got my wave length ? If you will tune-in, I'll give you an earfull concerning our ignorance. Reading a Philadelphia radio weekly has brought it all home to me; it needed only a glance at its heavy columns to show how little we know about the radio. Let me test your knowledge, Mr. Comradio, by asking the simple question : "What is the weight of a normally healthy electron ?" You don't know ? Neither did I till my diligent colleague "over there" told me.

Well, each electron weighs—take a deep breath—.0000000000000000000000088 of a grain—and not only that, but each cubic inch of metal contains 30 million million million electrons. How on earth have we managed to listen happily and contentedly to the B.B.C. programmes during the past eighteen months without being in possession of these figures ? And here are four unfamiliar terms which John o' London can add to his list of unfathomable radio mysteries:—"Neutrodyne," "logging," "flexo-former," and "mousing."

Listening in the States seems to be a highly technical and very specialised pastime compared with this country, where the majority of the listeners, perhaps, ask for nothing more than quality and variety in the broadcast—and the States could do with a large helping of our programme virtues. It must become rather tedious having your Beethoven sonatas mixed up with other advertisements for Smuggs's gum. The mention of gum reminds me of one effect of the radio in America which puts a sad aspect on their enthusiasm for what threatens to be a fatal influence on their gum-chewing. It is stated that since Uncle Sam began to listen he has not been so fond of his chew. I did not fully realise the reason till I tried my ear-drums by munching dry-toast while wearing the telephones.—*Glasgow Evening Citizen.*

THE POST OFFICE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

THE Hon. Secretary of the above Society advises that the following important additions have been made to the Library, and are now available to the Membership :—

(1) *Printing Telegraph Systems.* (Harrison.)
(2) *Poole's Telegraphy.*
(3) *Herbert's Telegraphy.*
(4) *Wireless Telegraphy.* (Rupert Stanley.) Two Volumes.
(5) *The Telephone and Telephone Exchanges.* (Kingsbury.)
(6) *Automatic Telephone Systems.* (Aitken.) Volumes I, II and III.

GOLF.

SECRETARY'S OFFICE *v.* STORES DEPARTMENT.

Played at Maidenhead on May 5, 1924.

RESULT.

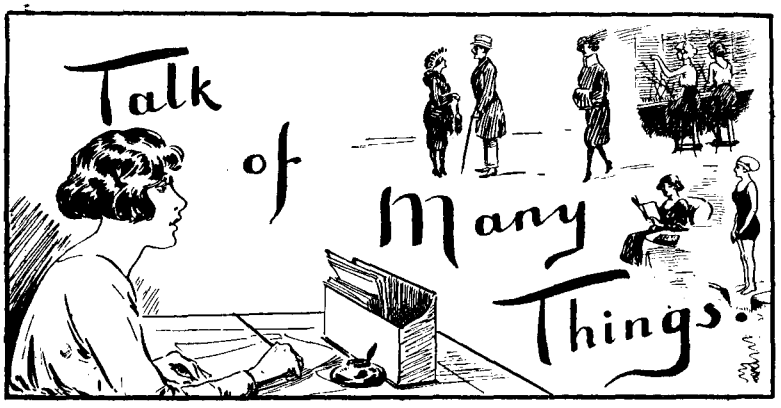
SINGLES.

Secretary's Office.		*Stores Department.*	
R. A. Little (2)	½	D. Macadie (4)	½
C. L. K. Peel (5), 2 up ...	1	D. Deas (11)	0
H. Darby (9), 4/2	1	A. G. Tydeman (12) ...	0
W. E. Weston (10)	0	H. A. Mann (14), 3/2 ...	1
W. E. Weston (10)	0	L. D. Harkess (14), 4/2 ...	1
De G. Gavey (12)	0	R. C. Owen (14), 1 up ...	1
R. W. Roadknight (12) ...	½	P. G. Bennell (15)	½
W. R. Birchall (15), 5/4 ...	1	A. S. Weston (15)	0
H. H. Kilby (16)	0	J. Mairs (18), 1 up ...	1
A. Gordon (18), 5/4	1	C. Wheeler (18)	0
	5		5

FOURSOMES.

Little and Peel	0	Macadie and Deas, 1 up ...	1
Darby and Roadknight, 4/3	1	Tydeman and Bennell ...	0
Gavey and Gavey	½	Owen and Harkess	½
Weston (W.E.) and Birchall, 3/1	1	Mann and Weston (A. S.) ...	0
Kilby and Gordon, 5/4 ...	1	Mairs and Wheeler	0
	3½		1½
Total ...	8½	Total ...	6½

WE TELEPHONISTS



THE last meeting of the season was held by the Post Office Telegraph and Telephone Society of London on Monday, April 28, when Colonel Kelly, Surveyor, General Post Office, read a most interesting paper entitled "Administration and Control of Telegraphs and Telephones from a Surveyor's Point of View," which provoked a keen and sustained discussion. The discussion, keen as it was, carefully skirted around the main issue, which is of course, whether it really is or is not an advantage to run the telephone service as an appendage of the postal and telegraph services. Such matters are settled in high places, and no amount of argument by the T. & T. or any other Society is likely to affect the decision one iota, and the Society members, realising this, left what is the fundamental issue untouched. Colonel Kelly's paper was special pleading to justify the present position of affairs—and it was well pleaded. The engineering representatives thought they saw an endeavour to bring their sacred lamps within the circle of the Surveyor's temple, and their protests were instant and vehement. It is hardly to be supposed, however, that a body of Post Office workers so select as to require a Whitley Council all to themselves could lose their identity in this fashion. And so the discussion ended as it had begun, and man went back to his work and to his labour until the evening.

But before Colonel Kelly's paper had disturbed the tranquillity of the gathering the work of the annual general meeting had been carried out with a harmony that might prove an example to any body. Proposition after proposition was placed before the meeting, the proposer in each case curtailing his remarks to just that point of brevity which allowed all essentials to be said and not a whisper more. The feat of the nine or ten seconders who succeeded their respective proposers was even more remarkable, for each said with the simplicity of a child reciting the opening line of its favourite nursery rhyme, "Mr. Chairman, Ladies and Gentlemen, I beg to second that proposition," yet so subtle was the variation in the tone colour of the voice employed and so marked the change in the particular word emphasised in the phrase that the whole blended into one glorious melody and made one hope that the list of propositions might run on till all the wondrous changes of these liquid voices had floated out on the hushed atmosphere of that attentive, nay absorbed, assembly.

FRANCISCO.

Indexes.

For quiet recreative amusement give me an index of contents to a year-book or a book of rules. Some people prefer to read a Bradshaw, but I find that I cannot read one without becoming anxious lest I lose the train and my breath through running for it. Moreover, I like to feel that if I catch a train it will arrive, but most of the trains I have read of in Bradshaw do not appear to arrive or, if they do, it is on Saturdays only. With an index, however, there is no uncertainty, no rush, and no anxiety. There is an inspired grouping of subjects which is sometimes humourous, sometimes poetic, and sometimes startling, but which always provides food for imaginative browsing.

Take, for example, the heading in the index to the King's Regulations—"Orphans, disposal of." Does not that fire the imagination? What *does* happen to orphans? Reference to the relative paragraph would shatter the glorious possibilities afforded by such a cryptic entry. Then there is the entry "Mustachios, length of." The thought at once arises that there must be a corps of highly-trained hirsute experts armed with a footrule and a pair of scissors.

If you do not include the King's regulations among your periodicals any other index will do. In the one I have before me the association of ideas is quite happy. There is "amusements, London" followed by "anarchy in Ireland." No doubt there is a good deal of similarity—for the Irishman. Passing on I notice the obvious connexion between "bankruptcy" and "banks," and the more shocking association of "banned films" and "baptists." One would suppose that cycling were an innocent enough pastime, and yet a succession of adjacent entries such as "bicycles" and "bigamy," "crime" and "cycling" and "motor bicycles" and "murder" seems to suggest that it is a demoralising practice. "Drapery" and "draughts" had better not be dwelt upon in cold print, but "dreams" and "drunkenness" sounds promising. Further down the list "Olympic games," "omnibuses, motor" and "order of merit" are eloquent tribute to the prowess of the Londoner who secures a place in a bus. He certainly deserves an order of merit. "Quarter-days" is preceded by "Quaker"—and who is not a quaker at such times? The undignified absurdity of "suffragan bishops" and "sugar beet" is corrected by the solemn logicality of "suicides" and "super-tax."

Enough has been said to show how eminently suitable is the thoughtful perusal of indexes for castaways on desert islands and guests at Banstead.

Select your index and entries at random and weave romance as you will.

PERCY FLAGE.

A Qualified Civil "Servant?"

To the Controller.

Re advertisement in to-day's *Express* for woman required for telephone exchanges.

Applicant would be glad of a prompt reply as she is anxious to obtain employment.

Mrs. Blank, Age 42 years, *Tall and Willing.* "No experience on Phone."

Before marriage, a cook, housekeeper, and would with written or personal references obtain employment in some capacity, but have not the confidence in turning out sweet dishes (owing to muscular trouble in the left arm) and in these days even people with titles cannot supply kitchen help to enable me to follow my own profession.

My slight troubles in no way affect me working with the right hand, and if I can obtain employment to help finance, I should be glad of a prompt answer. I have been an abstainer life long, but at present require a new set of teeth, have had all my own taken out some months ago, and am anxious to find money to get a new set of teeth.—Kindly reply, and oblige;

Mrs. Blank.

"Kutuzoff likes London."—*Evening Paper.*

And the Provinces, too?

Telephone Rhymes.

No. 2.

A TRAGEDY OF DELAY IN ANSWERING.

Ten little busy subs. waiting on the line,
One got answered, and then there were ni-ne!
Nine little busy subs., not inclined to wait,
One got the "busy-back," and then there were eight-t!
Eight little busy subs. apostrophizing Heaven,—
One advised "T.O.S." and then there were sev-en!
Seven little busy subs., in an awful fix—
One was "through" and then "cut off," and then there were six-x!
Six little busy subs., grown weary of the strife—
One left his line "L.G." and then there were fife!
Five little busy subs. (whose plight we must deplore!)
One was told to "ask again" and then there were foer!
Four little busy subs.—most pitiful to see—
One called for "Ambulance" and then there were thrree!
Three little busy subs.—one of them got "through,"
But the shock proved fatal, and there were twoo!
Two little busy subs., "glowing" in the sun,
One smashed his telephone, and then there was "wun"!
One little busy sub., flashing all alone,
He died of old age, and then there were none!

C.A.S.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.

LONDON TELEPHONE SERVICE NOTES.

Accounts.

THE number of accounts paid at Post Offices in London has been increasing. During the quarter ended March 31 last, out of a total of 186,000 payments 74,000 were tendered at Post Offices.

In order to get the vouchers cleared and posted quickly and with a view to reducing the time spent on tracing balancing errors, the system of dealing with the vouchers in the L.T.S. Controller's Office was reviewed.

As a result a new voucher providing for the entry of the amount in figures only instead of in figures and writing as formerly, was introduced on Jan. 15. The old method of entering the vouchers against each collecting office on a schedule in manuscript was also discarded in favour of two independent totals got out on adding machine rolls, one from the vouchers and the other from the relative cheques and money orders. If these two totals disagree with each other, the error is readily traced and put right before the vouchers are sent for posting in the ledgers.

The result has been most satisfactory, as not only has the time of clearing the vouchers during the busy period of the quarter been improved to the extent of over 100 per cent, but for the first quarter in which the new vouchers were in use no balancing errors arose as between the ledger amounts and the voucher totals.

* * * *

Choral Society.

The Langham Choral Society ended its season with two concert performances of German's "Merrie England," at King George's Hall, Tottenham Court Road, on April 29 and May 6. On the second evening Mr. Alfred Cracknell, of the Traffic Branch, sang the part of Sir Walter Raleigh very successfully. The audiences at both concerts gave every indication of their enjoyment of the tuneful work, especially in regard to Raleigh's song "The English Rose," and Essex's song "The Yeomen of England." The chorus work was good all through, but special mention should be made of the finale to the first act, when a fine climax was reached.

The Society is full of hope regarding its next session, which will commence in September; the rehearsals are being arranged for Tuesdays at the Morley Hall, George Street, Hanover Square.

* * * *

Sport.

The L.T.S. Cricket League (Night Staff) opened the season on May 12 when Carmel met Eagles at Dulwich Park. The fixture list in the League's handbook shows that 13 matches are to be played, the final match to be contested by the League Champions and the Rest of League. On May 26 the final for the Challenge Cup held over from last year is to be played off between Carmel and Pelicans. On June 18 a visit is to be paid to Tunbridge Wells for a match against the local Post Office team.

* * * *

The Lotus Swimming Club has commenced the season and has transferred its headquarters to the Lambeth Baths. The old-time champion, J. A. Jarvis, has been engaged as coach, and under the captaincy of Mr. G. Frier, of the Accounts Branch, the season promises to be very successful. The Hon. Sec. is Mr. W. H. Oliver, of the Traffic Branch, and membership is open to the male staff of the L.T.S.

* * * *

Multi-Coin Prepayment Boxes.

A large number of this type of coin-box have been fitted, and it is interesting to note that they are being used for calls to the Continent. The public at Wembley Exhibition are served entirely by this type of box.

The outstanding advantage of these boxes is that the full benefits of the telephone service are available at times when attended call offices are closed.

* * * *

Caught.

The operating staff must have derived a good deal of satisfaction when they read in their newspapers that a person who had been in the habit of annoying them on public call office circuits had been prosecuted, and punished. The actual charge of stealing electricity from the Postmaster-General and obstructing the Post Office in its business may appear to victims of such a pest as somewhat inadequate in its terms, but the result will no doubt act as a deterrent to others who may be inclined to such despicable conduct.

WEST YORKSHIRE TELEPHONE BENEVOLENT FUND.

The need has been felt for some time of a fund for the relief of the many necessitous cases arising from long-continued sickness, &c., which the ordinary channels of the department do not meet. In furtherance of this object a very successful Bazaar was held in the Church Institute, Leeds, the opener for the first day being Sir Charles Wilson, M.P., and the chairman W. H. Hancock, Esq., Postmaster-Surveyor of Leeds. The second day's opener was Councillor Morrison of Leeds, T. B. Johnson, Esq., Supt. Engineer for N.E. Province, presiding. The highly satisfactory sum of £350 was realised.

PERSONALIA.

LONDON TELEPHONE TRAFFIC STAFF.

Resignations on account of marriage:—

Miss M. J. POOLE, Telephonist, of Hornsey Exchange.
Miss M. SLATTER, Telephonist, of Chiswick Exchange.
Miss W. CHARMAN, Telephonist, of Chiswick Exchange.
Miss D. V. WHIPP, Telephonist, of Museum Exchange.
Miss M. KENNARD, Telephonist, of Trunk Exchange.
Miss P. L. E. SEWELL, Telephonist, of Trunk Exchange.
Miss N. TURNBULL, Telephonist, of Trunk Exchange.
Miss I. E. ELLIOTT, Telephonist, of Victoria Exchange.
Miss A. M. B. LOCKE, Telephonist, of Victoria Exchange.
Miss L. L. BAKER, Telephonist, of Victoria Exchange.
Miss K. M. SPENCER, Telephonist, of Victoria Exchange.
Miss C. G. FORD, Telephonist, of Victoria Exchange.
Miss K. C. WHITE, Telephonist, of Paddington Exchange.
Miss A. C. MAYLING, Telephonist, of Paddington Exchange.

CENTRAL TELEGRAPH OFFICE.

CABLE ROOM.

Mr. F. W. COOK, Telegraphist, has been promoted to Overseer.

Miss C. H. MCCULLOUGH, Telegraphist, has been promoted to Assistant Supervisor.

AUTOMATIC TELEPHONES.

Mr. WILLIAM AITKEN'S third volume on "Automatic Telephones," which has just been published, completes this comprehensive work. Similar in style and treatment to the first two, this volume covers large multi-office automatic systems, semi-automatic workings and miscellaneous systems, and concludes with a series of sections devoted to lay-out and wiring, power-plant and traffic problems.

The introduction of the Strowger system by the British Post Office for London and other large areas of this country, says Mr. Aitken, practically means that step-by-step switch systems will become standard practice here. This system is widely used in practically every country in the world, but systems with power-driven mechanism are also being widely adopted elsewhere. On the continent of Europe the rotary system is being introduced into many of the large cities; in the United States the panel system has been installed in a number of towns, and that number is increasing. A fundamental difference between the two opposing systems lies in the driving means. While the Strowger system is driven by step-by-step mechanism, in the Western Electric Company's panel and rotary systems, and also in the new Ericsson system, the switches are driven by bringing their mechanism into engagement with continuously running shafting. These different systems are minutely described

A special feature of the present volume is the inclusion of twenty-five folding plates, illustrating in exceptional detail on a large scale the systems actually introduced into New York and other large towns in the United States.

The volume which is published by Ernest Benn, Limited, is reviewed in another column.

THE HOUSE OF PITMAN.

WE have received the spring list of new books published by this firm. It consists of 32 pages of the most varied publications from the life of Lord Morley, a History of Printing, books on Shot Guns and Art Needlework, to Mechanical Refrigeration and all kinds of technical subjects. Books which will interest our readers—besides the works on Business Economics and Organisation—are Professor Flemings' *Introduction to Wireless Telegraphy & Telephony* (3s. 6d.), *Electrolytic Rectifiers* by N. A. de Bruyne (ready shortly), *Modern Radio Communications* by J. H. Regnier (5s.), *Automatic Telephones* by F. A. Elison (5s. ready shortly), *Electrical Insulation* by W. I. Flight, and several other books on Electrical subjects, and especially J. Poole's well-known work on *Telegraphy, Telephony & Wireless*. A new book by our colleague, Mr. Lee, on the *Principles of Industrial Welfare* (5s. ready shortly) we shall await with interest.

THE

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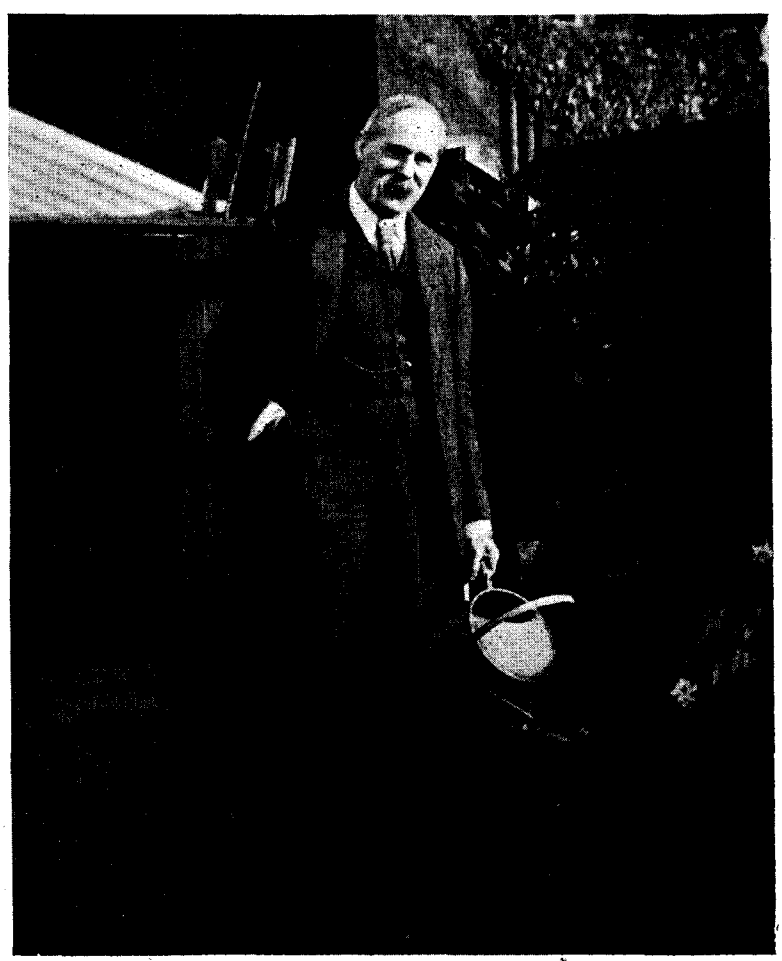
All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.*4.

TELEGRAPH AND TELEPHONE MEN.

VI.—MR. WILLIAM HAINWORTH



Mr. William Hainworth was born on July 14 1864. In August 1882, he entered the service of the Post Office as a Second Division Clerk in the Savings Bank Department, then housed in the premises in Queen Victoria Street which are now occupied by the London Telephone Service. History does not record whether he took part in the many mischievous and boyish pranks so notorious in that Department in the Eighties, and early Nineties; but, if he did, he performed due and faithful penance for two years in the subterranean world of the Investigation Branch. In 1894, he was specially appointed to the Second Class of the Supplementary Establishment (then in the swaddling clothes stage) in the Secretary's office, and by successive steps he attained in 1911 the position of Senior Staff Officer from which he retires in the coming August after long and untiring service. For more than twenty years the telephone branch has regarded him as a mainstay of its administration; his work has left its mark on all the great and various developments through which that great service has passed. In spite of—or perhaps because of—his intense interest in the problem of the moment, he achieved perhaps unknown to himself that unfailing sign of popularity—a nickname.

Mr. Hainworth will perhaps best be remembered officially as the headquarter expert in matters relating to the extension of the telephone service to the less populous towns and to the rural party line system—his much cherished off-spring. Whether his love of nature was greater than his love of telephones perhaps he himself could not now say; but he bestowed much thought and energy in bringing the two into closer relationship. Many exchanges for which he obtained authority in the early days are now in a very flourishing condition, and the records of his activities in this direction are as precise and detailed as care and consistent accuracy could possibly have made them. A man of encyclopædic experience and memory in telephonic history, precedent

and practice, of extreme rapidity and skill in drafting, of rare resourcefulness, and endowed with a temperament the serenity of which no adverse circumstances or pressure of work can perturb, and displaying an ungrudging willingness to help others in all matters personal or official, he takes with him the united wishes of all his colleagues for long life, happiness and good health, whether his time is spent in his cherished gardens or at his beloved Porlock. One thing is certain, he will always have "the grand essential of life—something to do."

"THE WORLD AT YOUR ELBOW."

BY A. A. JAYNE.

IT is usual to express the meaning of the above title as "The World At Your Feet" but as I wish to use it in connexion with the telegraph and telephone service it seems to be more appropriate to say "The World At Your Elbow." The fact is that telegraph traffic is not increasing in the correct ratio with the increase in telephone traffic and I want the potentialities suggested in the title brought home to the public. They do not realise that from their dining-room or their bedroom or their offices they are in direct contact with the far-flung organism of the land line telegraph service and the wireless telegraph service.

It is a commonplace thing to speak from a house in the suburbs of a distant town to another house in the suburbs of London. It is much more imaginative and romantic to view the possibilities of communicating with the uttermost parts of the earth from one's dining-room or from one's office. It does not occur to the British public that if they wish they have only to say the mystic word "telegrams" on the telephone, dictate a message addressed to Australia, sit down to dinner, and the chances are that soon after dinner is over a reply will be received to their message. The wireless service with all its ramifications is equally at the telephone subscriber's command. He can send a telegram by means of the telephone to absurdly remote places of the earth before retiring to rest and he will get a reply before breakfast the next morning. The time saving possibilities alone of the telephone in connexion with the telegraph service is a subject the general public have not even yet really begun to think about.

One of the greatest advantages the telephone subscriber has is in the direction of sending a message to other telephone subscribers at all hours of the day or night—providing the distant telephone subscriber will answer the telephone when it rings—especially during the night. Not many people are aware that this communication is open to them by the simple expedient of addressing their telegrams to telephone subscribers' numbers. A case in point is that if one desired to send an urgent message to a friend living in the outer zone of London in the middle of the night for 1*s.* all that is necessary is to address the telegram "Jones, Finchley 017, London" and it will be delivered possibly straight into the bedroom of Mr. Jones. There are limitations in the ordinary telegraph service for urgent telegrams to be delivered after certain hours in the evening, but the use of a message just described overcomes that difficulty. If it is desired to send a longer message than 12 words and it is not so urgent, the night telegraph letter service may be requisitioned for the purpose, *but this should be thrown open to every town in Britain.* The number of words could be reasonably reduced from 36 to 24.

All this no doubt is very stale to my readers, but the object of the foregoing is to suggest some directions where additional telegraph traffic may be gathered.

The public do not yet know these things.

Some of my readers will probably remember a certain divisional engineer in France who had a most remarkable dump full of priceless stores. Whenever one went to him with a mild request for a few elephant cupolas or a few sleepers or some other article which you mentioned in an apologetical way as being for a dugout, he always shouted at you in a most violent manner "Cupolas for dugouts! revettings for trenches! nonsense! Use your brains, sir, use your brains." Forthwith one went and used one's brains.

Publicity as regards telegraph and telephone services requires the use of brains, for unfortunately elephant cupolas cannot be provided.

I should like to draw my reader's attention to the following statistics :—

Service.	*Year* 1922.	*Year* 1923.
Phonograms	126,016	127,981
Night telegraph letters ...	182	375
Do. (by telephone)... ...	14	103

For reasons which I need not go into, any public campaign on behalf of the telegraphs and telephones must at present depend upon the resourcefulness of local officials. The publicity indulged in to produce the increases shown above is as follows :—

(1) Opportunities are taken at suitable times of getting paragraphs inserted in the local newspapers drawing attention to the services under notice.

(2) Brief notices are typed and placed in the smoking and reading rooms of hotels.

(3) Prominent notices are placed at Post Office counters.

(4) When parties of sightseers are shewn over the office their attention is particularly drawn to the telegraph and telephone facilities available to the public.

(5) On appropriate public occasions mention is made of these services.

In a lecture I gave to the Telegraph and Telephone Society at Glasgow in the spring of last year I ventured to say that every telephone installed in a house or office was a potential agent of the telegraphs. After very careful study I am convinced that practically the only extension of the telegraphs that is possible on a large scale is in direct ratio to the efforts made towards popularising both the telegraph and telephone services. That fact must just be looked in the face.

Large stores and restaurants offer a field of exploitation for the purpose of acting as agents for the telegraph service. For many cogent reasons the Department cannot allow business firms to accept telegrams from the public and telephone them free of charge to the telegraph office. This is where our old friend the divisional engineer's remark about "using your brains" comes in.

One such firm that I know of *is* accepting and sending such telegrams to the telegraph office from the public without additional charges to the *senders.* NO! The Post Office has not let the firm off. *The firm* pays the local telephone fees, collects the telegraph charges from the public, and the Post Office collects both with the telephone account. The telegraph services are advertised on the menus in the restaurants; cards giving essential information are placed on all writing and reading tables in the lounges, smoking rooms, &c., and attractive notices are hung in conspicuous places. In addition to other things the slogan is reiterated "Transact your business by telegraph and telephone." The Imperial cable is not overlooked in this scheme. The cost of the printing, &c., is borne by the firm.

The manner in which this is brought about is left to the imagination of the reader. It is not desired to stereotype his methods if he wishes to embark on a similar campaign. The result in the first two weeks of the foregoing little effort was 14 telegrams from the public—not a large figure, but I believe it was new traffic.

It is quite clear that the "World At Your Elbow" has to be brought home most emphatically to the minds of the public whether in their offices, their restaurants or their homes.

Imagine the result if every large firm could be persuaded to do something on these lines? The great point is that the effect is cumulative. If people once send a telegram from a restaurant

they will certainly want to do it again; they will remember that they can do it over their own telephone from their house or office, and so the thing will grow like other movements and the habit of telegraphing may be restored.

A leaflet to be continuously broadcasted might read as follows :—

USE THE TELEPHONE FOR

(1) Telegrams—inland and foreign.
(2) A telephonic address such as "Jones, Finchley 015, London" always if possible, but certainly late in the evening or during the night and ensure immediate delivery at all hours provided your correspondent is at home.
(3) Night telegraph letter service for certain large towns—36 words for 1*s*. Delivery by morning postman.
(4) Express letters dictated over the telephone.

The telephone fee is the only charge additional to the ordinary charges for the above and can be paid with the telephone account.

Simply ask exchange for "telegrams."

LONG-DISTANCE TELEPHONY IN EUROPE.

WE have received two important brochures on this subject with which we dealt briefly in our last issue, when we reported some of the decisions arrived at by the International Conference in Paris. The first is a reprint of a paper by Mr. F. Gill in *The Electrician*, published before the Conference assembled. Mr. Gill emphasises the necessity for unity of direction.

"In the quick diversion of facilities to meet sudden unforeseen demands of traffic," he says, "in the replies to inquiries for new facilities, in the operating technique, in the operating schedules and in all that appertains to the exploitation are found conditions which cannot be met by any organisation except one in which the general direction is unified, and this largely because causes which are local may, and often will, produce effects which are not local but general.

It has been recognised practically in the past that it is a difficult and very slow affair to get new lines constructed between two contiguous countries, involving meetings, discussions, sanction by parliaments; and it has been recognised as an almost impossible task to get new lines constructed between non-contiguous countries and through one or more non-interested countries; to these reasons, rather than to great distance, is due the fact that in Europe there is so small an international traffic and practically no traffic at all between countries whose boundaries are not adjacent.

The telephone business differs from some other businesses, and particularly from through railway work, in this: in telephony it is necessary that the whole of the machinery and wires involved in a connexion between any two subscribers shall be in operation simultaneously throughout the entire length during the progress of the conversion. For example, if a call is made from London to Christiania, the whole line, passing through, say, England, Belgium, Germany, Sweden and Norway, will be entirely occupied for the time by this one call, and must operate as one unit, without regard to the different ownerships through which it passes. The various kinds of plant must be harmonious, the methods of operation must be similar, and when repairs have to be made, or changes effected in the circuits, such matters must be attended to promptly; and, generally, there must be unity of direction (not merely of advice) over the fundamental matters, while large authorities are delegated to the local organisations.

The case of international railways is altogether different; that business is somewhat in the nature of the transmission of a parcel or package from place to place, and from hand to hand. When rolling stock is sent from Paris to Constantinople, the length of line engaged by that rolling stock at any one time is strictly limited, and the whole line has never under any circumstances to be simultaneously and solely at the disposal of that particular rolling stock. So long as certain fundamentals, such as the gauges, time tables, &c., are preserved, many other things may differ without affecting the service. Locomotives, for example, and the signalling, may be quite different in different countries, hence the analogy of international railways does not afford much light on this telephone problem.

So far, the International Technical Committee is devising detailed rules for standard methods of construction and operating, which, while good in themselves and tending to standardisation, do not lead to unity of direction; having a somewhat rigid character they may even be difficult to depart from in particular cases, and it is probable that some European international lines may have to be constructed without conforming to the rigid rules laid down for the general system. Further, it seems somewhat unlikely that any modern rules can be applied to the utilisation of such existing international lines as are available or can be built up out of the existing networks."

He proposes the organisation of a commission acting virtually as a private company of which only Governments would be stockholders. Each country subscribing to the scheme would elect one or more commissioners, the number of commissioners from each country being identical. These commissioners would be chosen so as to cover all the aspects of the subject, and they would form the directorate of the organisation.

Their first duty would be to appoint the executive officers to carry out all the planning, construction and operation of the European long-distance lines, to make plans for the handling of European traffic as a whole without regard to political considerations or boundaries of countries. Plans having been agreed upon the Commission would pass on to each country the budget for approval by Parliament, if necessary. The article continues :—

PLANT CONSTRUCTION.

"The plant required would then be constructed in the country designated; it would be constructed by the country or by the commission as agreed in each case, to the specifications of the commission and subject to verification by it. The cost of the plant would be paid for by the country in which the plant is situated, and this cost would become that country's contribution to the plant capital; the plant would belong to that country but be turned over to the commission to maintain and operate. Special arrangement would be made regarding the construction and ownership of submarine cables outside national frontiers. There might be cases of countries unable to provide the necessary plant capital, but unwilling that such a reason should be a hindrance to the construction of the required international lines. In these cases, it seems probable that the commission could influence the raising of the money required, the plant to be constructed being accepted, perhaps, in part security for the loan, or the commission might be provided with funds and be authorised to pay for the construction of, and own such lines.

In some cases the international plant would be independent and separate; in other cases it would be part of a larger plant; thus 50 international circuits might be provided by an independent international cable, or be part of a larger cable operated by a country, or again might be part of a larger cable operated by the commission; the holder, in any case of joint use, leasing circuits to other parties. In the case of existing lines to be taken over for international traffic, they could be either valued and transferred or leased. Thus the plant arrangements could be treated in each case in the most advantageous manner.

This method, subject as above, requires each country to provide the money necessary for the construction of all the international plant within its boundaries; on this plant capital the commission would pay to the countries a uniform rent of, say, 5 per cent. per annum, and the commission would be responsible for maintaining and renewing the plant (or paying for these services) and for turning over to the country the plant in good order, together with the proper depreciation fund, should the agreement ever terminate.

EXPLOITATION.

The operation of the entire system thus constructed would be in the hands of the commission, who would maintain their own repair and operating forces and generally conduct the through business for all the countries.

The commercial side of the through business would be handled by the commission, and all matters regarding additional facilities required by the public, such as long private telephone or telegraph lines, private lines for certain specified hours only, and similar matters would be dealt with by this section of the commission's executives. The rates to be charged for long distance service (as well as the standards of service to be given) would be drafted by the executives and settled by the commission. The rates would be fixed to be reasonable from the public point of view and would be sufficient to pay all the expenses, including the rent on plant capital, provide for all proper reserves, and in addition produce a profit. This profit, so far as it was judged advisable to distribute it, would be divided among the countries in proportion to the working capital provided by each country, that is, equally.

ADVANTAGES OF PLAN.

Looking over the scheme thus set out, it will be seen that it provides for the responsibility of the Minister to Parliament, because he is always acting by means of his own delegates, to whom he can give instructions, and he can withdraw from participation in the commission, if such a course should unfortunately be found necessary. It retains the ownership of plant in the country in which it has been constructed and by which the money for its construction has been found; and it provides for the finance in a simple and logical manner. It retains, to any country which feels the necessity, the construction of the long distance plant in the hands of its own regular construction forces. It retains to the long distance authority—that is,

to the commission—the unity of planning, direction, verification and operation without which it is impossible to carry on efficiently the through business. This matter is of paramount importance; the through business is not a simple, easy matter; it is, on the other hand, a complicated, difficult business; with a proper organisation it can be made to render effective service, and without such an organisation the service can only be second-rate. New methods, such as long distance loaded cables, repeaters, carrier circuits and the utilisation of the same circuits for both telephone and telegraph traffic have altered conditions in many ways; engineering requirements are much more severe than formerly and uniformity is essential; the increased distances now possible and the reduced costs make for great volume of traffic; the demand for flexibility to meet conditions which change daily, and at the same time the demand for absolute reliability of service over a very wide area, in various countries given by means of persons of varying races, all these call insistently for unity of direction.

The scheme provides for flexibility in planning: by reason of the unity of direction no detailed rigid rules are required. Instead, subject to general principles, each case can be dealt with individually and with the most economical treatment proper to its case; advantages in the art can be availed of as they become feasible.

The scheme permits the nations on the commission to meet on equal terms. Each nation would have the same number of delegates, provide the same working capital, receive the same rate of return on the plant capital expended by it, have the same share in the control of the through service and receive the same share of the profits.

It permits the through business to be envisaged as one entity without regard to political hindrance; it provides a satisfactory solution for one of the present difficulties—viz., the building of lines through countries which are not interested in the traffic on the route. Lastly, it provides a means of improving the local services so far as they react on the through business; if it were found that in any case the international business was suffering injurious reaction from defective local service, the presence of the nation's representatives on the Commission would provide a ready means for the exposure and redress of these troubles. Further, since the long distance service experiences the most difficult conditions, the extension and unification of this service would be bound to affect beneficially the local services."

Mr. Gill recognises that his original proposal for turning over the whole project to a company will not be entertained by the various administrations. The only other alternative to the foregoing suggestion is, he thinks, to frame a detailed code of rules to be observed by each country acting in the manner it believes to be in conformity with the code, with an advisory committee reporting at intervals. Such a course, he considers, could not give an efficient service, and this procedure would be much as if, after setting up a code of rules for the operation of the various activities of a steamship, it should be decided that having these rules no captain was now required to take the responsibility and direction.

The other booklet is an English translation of a series of articles on *Long-Distance Telephony* (Das Fernsprechen im Weitverkehr, Englische Ausgabe) forwarded by the Reichspostministerium, Berlin. This book, which is a compendious work on the subject, containing numerous diagrams and a map, has, we understand, also been translated into French, and puts forward some of the views of Germany as to the part she should play in the development of international European telephony. We touched upon this subject in our issue of last October (p. 4), and again in November (p. 36). Dr. Craemer, in an article on "The German Telephone Network as part of the future European Network," written before the German representatives had received an invitation to the Paris Conference, says:

It does not seem opportune to expect general agreements or to create special organisations for solving the problem of building up a European telephone net, because on account of the political confusion in Europe success would be doubtful and precious time would certainly be lost. This would be especially disadvantageous for the big countries with an extended traffic. In these countries the tasks of international and of domestic traffic are the same in respect of technical matters. Especially Germany is in this situation. In her domestic traffic (as in the U.S.A.) distances must be bridged which are quite as great as the distances in most of the European communications from land to land. For instance, the construction of a telephone line from Munich to Königsberg sets the engineer the same task as that of a connexion from Amsterdam to Rome, or from Paris to Prague, though both these latter lines only pass through Germany.

On account of the extraordinary density of her telephone net (again like in the U.S.A.) and from other causes which cannot be discussed here, it was necessary for Germany to go over from the aerial carrying of the long distance lines to the laying of telephone cables. In Germany, therefore, technical equipping of the cables for long-distance telephony has for a decade been the subject not alone of theoretical working, but also of practical experimentation in the fullest extent. Considering finally that in our country, besides a telegraph administration which knows its tasks, there exists also since the beginning of electrical telegraphy, an up-to-date electro-technical home industry, it is evident that all conditions precedent to a prosperous development on this line exist. A comparison of the telephonic organisations of the different European countries on the basis of official statistics gives first place in Europe to the German net in respect of mileage and density.

In order to reconstruct in its most important parts the German net, which had somewhat broken down during the war, and in order to make it a paying concern, the only thing to do was to place the principal lines underground. From the very beginning the requirements of the international traffic had to be taken into consideration, as otherwise further great costs would later on have been unavoidable.

Dr. K. W. Wagner, in the course of an exhaustive article on Long-Distance Telephony, which includes a historical review of Repeater development and treats fully of the Krarup system of cables, of cross talk, balancing and distortion, writes:

Next to the United States, Germany owns the greatest number of telephones among all the other countries in the world; in Europe she is in the first place.

By far greater part of telephone traffic is naturally in the areas of the large towns, the centres of commercial life. But toll traffic also increases from year to year as engineering progress renders long-distance telephony better and cheaper. More and more, the countries are being covered with a network of telephone lines. In respect of the total length of trunk lines, the United States holds the first place with 7,000,000 km. of lines; Germany follows with about 1,600,000 km. The German trunk line system, however, is much superior to the American system as to density, containing 3.31 km. of lines per square km., whereas the American network only has 0.77 km. per square km. Two countries own still denser trunk systems than Germany, namely, Denmark with 5.35, and the Low Countries with 4.17 km. of trunk lines per square km.

At present, the greater part of the trunk line system still consists of overground wires; further development, however, aims everywhere at cabling the great telephone tracts. Here, as in all technical undertakings, economy has to decide, within the limits of technical possibilities. In long-distance telephony, it is to be considered that telephone communication by cable is much less open to atmospheric troubles, to external interference and to the electro-magnetic field of neighbouring power plants, than by an open wire communication. Numerically the situation is that, within a given time, on an average, a cable circuit can carry 50 per cent. more calls. Cable lines may consist of small-gauge wire, 1 mm. in diameter and less, which cannot be used as open wire on account of insufficient strength. These small gauge wires have been rendered applicable to toll telephony by the development, during the last ten years, of a telephone repeater of good working qualities. The introduction of telephone repeaters means a fundamental advance, opening to telephony chances of expansion never thought of before, and the whole bearing of which can still not be foreseen. Even the first great practical successes of the application of telephone repeaters showed the importance of this invention. In the United States, in 1915, telephone communication could be established across the continent, from New York to San Francisco. In Europe, the first trans-continental telephone communications were established by Germany during the war; they served for inter-communication between the military headquarters and stretched from northern France to Russia as well as over Budapest and the Balkans to Constantinople.

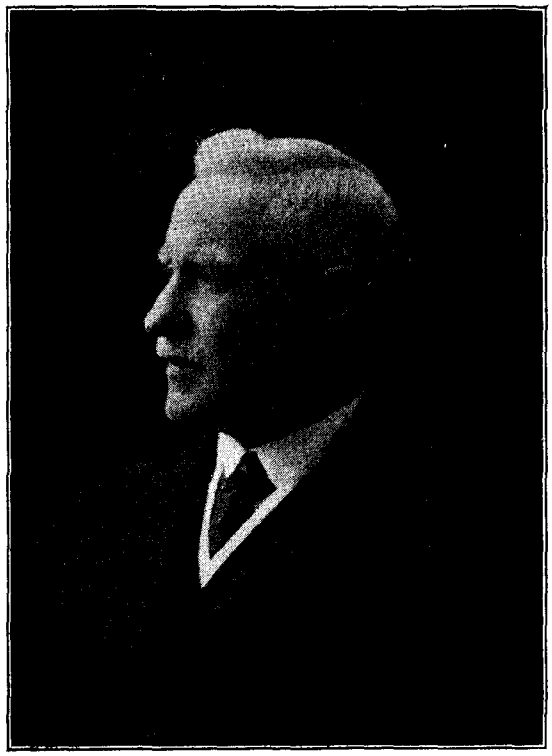
The technical possibility of linking up the European districts of commerce by an inter-state telephone system being proved, different countries began to study this question. Public attention was drawn to it, especially by an address held by Mr. F. Gill, the European representative of the Western Electric Company, on the occasion of assuming office as President of the Institution of Electrical Engineers in London. In this address he explained broadly his ideas of the development of a European telephone system. Mr. Gill makes use of the experience of the American Bell Telephone Companies, and of technical development work of the Western Electric Company. With all admiration for Mr. Gill's ideas and appreciation of the progress achieved by the great American companies, we must not think the American prototype transferable to European conditions which are quite different, without any alteration. In an important address, held before the Elektrotechnischer Verein at Berlin, Dr. P. Craemer recently pointed out the lines along which an organic development of the European telephone system is possible under consideration of the peculiar commercial, cultural and political conditions of the Old World. As to the technical questions, we regard it as necessary not only to copy the American constructions, but also to take advantage of the knowledge of other nations, especially that of German science and technique. With regard to the magnitude of the problem to be solved as well as to the most awkward financial condition of the Old World, no other points of view should be taken into account except those of highest fitness and efficiency.

The book also includes articles on Telephone Transmission Equivalents, by Dr. Breisig, on the Construction and Technical Properties of Long-Distance Cables, by K. Dohmen, on Recent Developments in German Continuously-Loaded Cables, by E. Schürer, on Repeater Practice, on Pupil and Pleijel Coils, on Vacuum Tubes, on the Balancing of Induction Interferences, and on Four-Wire Cores in "Star" Formation, together with other instructive treatises on the main subject. It is a useful addition to the literature of long-distance telephony.

W. H. G.

RETIREMENT OF MR. HOWARD EADY, DISTRICT MANAGER, EXETER.

MR. EADY, who may be described as one of the pioneers on the telephone service, as his experience dates back to the days of the Edison Peg and Slipper pattern switchboards, joined the Western Counties & South Wales Telephone Co. in 1886, and took up duty as an Inspector at Plymouth; in February, 1887, he went to Bournemouth, where, in due course, he became Chief Inspector, and in May, 1893, was promoted to the position of Local Manager of the Bournemouth centre, acting in that capacity until August, 1900, when he was promoted to the position of District Manager of the Channel Islands. During his period of service as Local Manager of Bournemouth he was responsible for and carried out the introduction of the first scheme of underground work in that town; he likewise performed a similar duty at St. Helier, Jersey. While at Bournemouth, it is understood that the first experiment



[Photograph by Chandler & Co., Exeter.

MR. HOWARD EADY.

of "running in" a flat cable over an existing one, and while at Jersey the first experiment of laying underground cables with "waxed joints," were carried out successfully under his supervision and direction.

From June, 1915, until the date of his retirement, Mr. Eady has been District Manager of the Exeter district, thus holding the position of District Manager for 24 years. Despite the retarding influence of the Great War, he has, since his appointment to Exeter, so developed the business in his district as to produce a 69 per cent. increase in lines, a 72 per cent. increase in stations, and a 92 per cent. increase in revenue.

Mr. Eady has had his share of the usual emergency duties that fall to the lot of a poor telephone man. On one occasion his main exchange was burnt out owing to the defective work of a local electricity company, and, of course, his experience includes the usual tale of snowstorm breakdowns.

His hobbies have been those of Freemasonry (in which he has risen to high Provincial Grand Rank), fire-fighting, and bowling. As a volunteer fire-fighter he has served some 30 years, having risen from the rank of fireman to that of captain, which latter position he held in the municipal fire brigade (which he organised) at St. Helier, Jersey, for 15 years. He is a Membre d'Honneur of no less than 5 Compagnies des Sapeurs-Pompiers of France.

It may be added that while at Exeter he has, with the sanction of the Secretary, organised and trained a staff fire brigade at the head Post Office, Exeter.

As a District Manager he has always acted upon the motto he used as a fire chief, viz., "Come, not go," and he has always been very popular with the staffs under his control.

TELEGRAPHIC MEMORABILIA.

IN a recent leaderette in *The Electrical Review* on the continued delays to progress of the Imperial Wireless Service and with special reference to the repeated advertisements of "new developments," "the latest results of scientific research," &c., &c., our contemporary remarks: "We welcome every step forward in the development and improvement of radio telegraphy, but as we pointed out in our issue of March 7, we cannot wait for perfection to be attained. No sooner has a new improvement—which appears still to be in the future—been accepted than it will be superseded by another: and all the while we remain without a wireless service of any kind!"

According to Lloyd's agent at Mozambique, the British steamer *Cragness* (5,098 tons) went ashore early in May at Barracouta Point, 40 miles south of Mozambique. The crew were picked up by the Eastern Telegraph Co.'s cable steamer *Lady Denison Pender* and transferred to the steamer *Karoa.*

The French cable steamer *Edouard Jeramec* recently arrived at St. Johns for supplies from the area east of the Grand Banks, where the French Trans-atlantic cable, which had broken in deep water in that region, was being repaired. The work, it was stated, was proving very difficult.

As an example of the infinitely small in this universe of ours our readers are recommended to the researches of Dr. W. R. Whitney, of the American General Electric Co., who, according to *Science Service,* has calculated the amount of power received and developed "by a small loop antenna radio receiving set. Dr. Whitney stated that a loop one foot in diameter, in receiving radio impulses at Schenectady from San Francisco, received such a minute amount of energy that the energy set free by a house-fly in climbing one inch up a wall would equal what was received day and night and for a continuous period of 35 years."

The report of the *Compagnie Radio-France,* of Paris, is an interesting document. It declares that the company's installations were completed in 1923. The working of the first transoceanic connexion established with the United States in August 1922, was very satisfactory, and the increase in the traffic in the final months of 1923 was about 200 per cent. as compared with the early months of the same year. A Press service with the Argentine Republic was started in 1923 and was amplified so as to comprise communications in both directions in January, 1924, while this year a regular service will be definitely assured for all classes of messages. A large station was being erected near Rio de Janeiro in view of connexions between Brazil and Europe, and the company had obtained a contract for traffic with this station, which was to be completed at the beginning of 1925. The traffic with Beyrouth, which was opened in December, 1922, had largely increased. Concerning the central installation at Sainte-Assise, the report states that trials were now proceeding in the sense of a connexion with China and Japan, and the results were such as to permit of the hope that regular and rapid communications would take place as soon as these two countries themselves possessed stations of a power and efficiency comparable with those of the Radio-France. The net profits of 679,000 fr. for 1923 have been carried forward.

On May 27, Mr. Baker asked the Postmaster-General whether a licence had recently been granted to a Danish company giving it a monopoly of telegraph traffic between Great Britain and the Scandinavian countries and Northern Russia.

The Postmaster-General, replying, said that the question no doubt referred to the Great Northern Telegraph Company of Denmark. It had recently been agreed to extend this company's licence until the end of 1934, the preferential rights to unrouted traffic which the company had hitherto enjoyed being surrendered. The terms of the company's licence were similar to those granted to other companies which were permitted to land cables in this country.

A previous query by the same questioner and regarding the same company as to whether the Great Northern Telegraph Company were negotiating for the sale by the Government of the Stonehaven Radio Station, had also been put to Mr. Hartshorn who answered to the effect that some informal conversations had taken place on this subject. The company was a Danish Company, and it was considering the question of using radio-telegraphy as an adjunct to its cables. It was aware that a licence in this regard could only be issued to a company registered in this country.

In these connexions the report of the company for 1923 should prove of special interest. That report states that the working of the Vladivostock, Kiachta, and Helampo routes has exceeded expectations. The Russian Government has kept the lines in good condition, placed spare lines at the company's disposal during interruptions and traffic blocks, and generally co-operated with the company. The correspondence exchanged terminally with Russia, *via* the company's cables, has also shown a satisfactory increase. The Danish Government has promised the extension of the company's concession until the end of 1944. The British Government has agreed to a prolongation of the company's landing rights for a period of ten years, and to a re-arrangement of the working agreements. The chief point of the new arrangement is the right given to the company, throughout England, to enter into direct relations with the public through its own offices, and in co-operation with the Eastern Telegraph Co.; formerly the company had dealings with the public in London only. By virtue of this arrangement a public office has been opened at Newcastle, and it has also been arranged that the Eastern Telegraph Co., whose interests in many places run parallel to those of the company, will handle the Scandinavian, Finnish, and Baltic traffic from London, Glasgow, Edinburgh, Dundee, Hull, Leeds, Bradford, Manchester, Liverpool, Birmingham, Bristol, and Cardiff. On the other hand, the company now deals with the traffic which the Eastern Telegraph Co. used to collect and deliver through its own office at Newcastle. An arrangement has been negotiated with the Swedish Government, according to which the company is allowed to transact business in Sweden until the end of 1934 on similar, though somewhat harder, conditions. The negotiations with China have not developed satisfactorily. Negotiations have been re-opened, but the company has had to protest against actions on the part of the Government which threaten to violate certain long-established rights. Future difficulties may arise in connexion with the co-operation between the Chinese and Japanese Governments with regard to the telegraphic connexion between the two countries. The report further states that radio competition has increased, and rates had to be adjusted to meet this. So far the company has not met with radio competition in the Far East, but mention is made of a concession made by the Chinese Government to a Japanese firm to enable it to construct a powerful station near Peking.

The traffic receipts showed an increase of about £72,900, and the total receipts rose by approximately £92,600. The total expenditure increased by £44,100. A dividend and bonus of 22 per cent. is recommended, and it is proposed to place £33,333 to the reserve and renewal fund (making it £3,359,294), and to carry a balance of £312,078 forward. The meeting was held in Copenhagen on June 12.

The extent to which wireless installations are used now-a-days in connexion with sea-going vessels, and particularly with the great trans-Atlantic liners, may be gauged by a brief account of the radio equipment of the United States liner *Leviathan*, which has recently had added to it receiving equipment for tuning in stations on long and short waves simultaneously, combined with the ability to transmit and receive messages on different wave lengths at the same time. The *Electrical Review*, continuing the account of this modern wonder, adds, "Three antennae are used for transmission and two for reception. The transmitting installation includes one valve transmitter which is used on wave lengths of 1,800, 1,935, 2,100 and 2,400 metres. With this transmitter communication may be established with the shore, regardless of the ship's position in the Atlantic. In addition, one Radio Corporation duplex telephone and telegraph transmitter, and one 2-kW Navy standard spark set make transmission on shorter waves possible while the high-powered transmitter is being operated. Transmitting and receiving apparatus has been installed in two motor lifeboats so that communication may be established after they are launched. This plant consists of two 1/2-kW transmitters and two receiving sets equipped with two stages of amplification.

The receiving equipment in the *Leviathan* consists of the following: One Radio Corporation duplex telephone receiver, one special rejector receiver, enabling the operation of two telegraph transmitters and receivers simultaneously on 600 to 8,000-metre wave lengths, one Navy type long-wave receiver (1,000 to 25,000 metres) for listening to high-powered Government stations, one Radio Corporation receiver, 300 to 7,000 metres. Automatic break-in systems for telegraph receivers have been installed to make reception of signals possible as soon as the operator releases the key, and automatic remote control enables the operator to start generators for transmission with the least effort.

Loud-speaking apparatus can be placed on the stage and in various parts of the vessel connected direct with the radio room for the reception of broadcast programmes, and auxiliary batteries have been installed so that communication may be established in case the power supply from the engine room is interrupted. A staff of eight operators and two messengers are included in the personnel necessary for the handling of the radio equipment.

A Blitzfunk service (Lightning service) of telegrams at a super-urgent rate has been established by means of wireless between Germany and Austria.

A number of new broadcasting stations are now opened or are in course of erection upon the Continent. Several of these will use considerable power. The Spanish station (School of Posts and Telegraphs, Madrid) now transmits fairly regularly on Sundays from 6 p.m. until 8 p.m. This concert is broadcast upon a wave-length of 480 metres. Several short-wave German stations can now be heard between 390 and 500 metres, and in addition to the transmitting stations at Berlin, Frankfort, and Munich already in operation, new stations at Königsberg, Breslau, Hamburg, Stuttgart, and Leipzig will be operating local services by the end of this month. Each new station will have a range of about 100 miles. Copenhagen is to have a 1-kW broadcasting station.

According to the *Financial Times* the United States destroyers *Hull* and *Corry*, equipped with sonic depth-finders, have been ordered to Alaskan waters to survey the ocean bed and select the route for the proposed new United States Government cable between Seattle (Washington) and Seward (Alaska). Congress has appropriated for 1,000 miles of new cable in the Alaskan system, and it is now being manufactured in Great Britain. The cable ship *Dellwood* is already *en route* with the first section, which will probably be laid by the time these lines see print, the second section is expected to be completed and laid by September.

The South African Postal and Telegraph Herald number for May arrived just too late for any comment in our June issue, and this, the first opportunity is taken of congratulating the official side, the staff side and the staff journal upon the "Report of Proceedings of First Meeting of the Post Office Departmental Committee" which met at Cape Town on April 11 of this year. The Committee was modelled on our own Whitley Committee and the name of an old London man, Mr. T. H. A. Warren, formerly of the Cable Room, stands out from the official side as one who it is understood has taken no small part in the organisation of this innovation. It is believed to be the first occasion upon which the official and staff sides have met round a conference table to discuss the *pros* and *cons* of difficulties and grievances. Judging from the report of the first effort the movement augurs well for better relationships between all concerned.

A communication has been issued by the General Post Office dealing with the experiments which have been conducted on both sides of the Atlantic since 1915 with the object of linking the American and European telephone systems by wireless, which is impracticable with the existing types of submarine cable. Having outlined the earlier steps in this direction, the *communique* proceeds: Transmission of radio telephony has taken place weekly from the Long Island station, which has been received and measured in this country by the Post Office and by the Western Electric Co. In January, 1923, demonstration a simple loop frame aerial was employed at the receiving end. A special receiving antenna was built by the Post Office, and tests showed that reception on it was more powerful and more free from atmospherics than on older systems. During the winter months, when conditions were favourable, speech was occasionally distributed during the day time over the land lines to a number of telephone subscribers at their homes in London and other parts of the country. The improvement gained was, therefore, the possibility of communication during certain hours when there is daylight in both countries, which, under the previous reception conditions, was in general unsatisfactory. The success of these one-way experiments has encouraged the Committee (Admiral Sir H. B. Jackson's) to recommend to the Postmaster-General the installation of an experimental 200-kW telephony valve transmitting plant at the new Post Office station at Rugby, of a similar type to that in use for the experiments in America, so as to enable two-way conversation to be carried on.

AUSTRALIA.—NEW RADIO STATION.—The chain of radio communication across Northern Australia will be added to by the decision of the Postmaster-General (Mr. Gibson) to erect a station at Camooweal, in Queensland.

Reuter's Agency, Melbourne, states that the Commonwealth Postmaster-General is shortly to approach the Treasurer for an additional grant of £2,000,000 out of loan funds to meet expenditure in connexion with the efforts being made by the Post Office to improve the telephone, telegraph, and postal systems. The above amount is in addition to £9,000,000 authorised by Parliament for a three years' programme of work.

The Postmaster-General called a conference in Sydney last month of representatives of Australia, New Zealand, and Fiji, to consider proposed amendments to the existing radio regulations. The conference has agreed to allow "open" receiving sets to be used (as against sets capable of receiving one wave length only), and also to the issue of a common licence for all owners of receiving sets at 40*s.* per annum for the broadcasting subscription, exclusive of 5*s.* per annum for the Government. During the discussion it was stated that in March there were 2,864 experimental licences in New South Wales.

AUSTRIA.—Regular broadcasting is expected to commence this month in Austria, a concession for the purpose having been granted to a group composed of banks and electrical firms. The Post and Telegraph Administration is to issue regulations on the basis of the contract which has been made.

CANADA.—Upon the authority of the *Evening News* it is stated that Montreal will soon possess what is said to be one of the most powerful broadcasting stations in the world. It is C.K.A.C., owned and operated by the newspaper *La Presse*. The object of the station is to give "chats about French-Canada for French-Canadians," of whom there are about 2,500,000. In addition, there are 2,000,000 Frenchmen in the United States. Both English and French will be used in these talks, which should have started by the end of last month. A 7,000-watt three-phrase rectification "All-Canadian-make" Marconi set will be used.

To this information the Canadian publication *Natural Resources* adds:—"As has been previously explained, the Dominion Government is establishing a system of radio stations from the Yukon and the Arctic coast southward to connect with other telegraph systems at Edmonton. By this means the heavy cost of maintaining the wire-line in British Columbia, north of Hazelton, will be saved, and the Mackenzie River valley from Fort Smith northward, for the first time, will have the benefit of wireless two-way communication with the rest of the world. Last season the first two stations in the series, those at Dawson and Mayo, were erected and have functioned satisfactorily. This spring, work will be started on the station at Edmonton, which will be the southerly base of the system, and upon those at Simpson and Herschel Island as soon as navigation conditions permit the transportation of material. The Herschel Island station will be the most northerly in the system, being

situated on the Arctic coast west of the Mackenzie River delta. The Canadian Corps of Signals will erect the three new stations. The approximate distances between the stations are : Herschel to Dawson, 385 miles ; Dawson to Mayo, 113 miles ; Mayo to Simpson, 468 miles ; Simpson to Edmonton, 655 miles ; a total of 1,621 miles.

CANARY ISLANDS.—According to Press reports French interests are seeking from the Spanish Government a monopoly of broadcasting, and of the sale and licensing of receiving sets throughout the Islands.

CHINA.—The Shanghai correspondent of Reuter's Agency announces that radio broadcasting has been introduced by the *Shun Pao*, the first Chinese newspaper to take up the matter.

HUNGARY.—Negotiations are being carried on between the Hungarian Government and the British Marconi interests, with the intermediary of the British-Hungarian Bank, with the view of obtaining a broadcasting monopoly for Hungary. The British Marconi group has an important participation in the British-Hungarian Bank, and it is believed that the Hungarian Government wants to obtain a sterling loan in exchange for the concession.—*Financial News.*

JAMAICA.—*Commerce Reports* states there is practically an absolute prohibition at present against the erection and operation of radio equipment in Jamaica. The local government, however, is endeavouring to draw up a set of rules under which permits may be granted for the operation of receiving sets by private individuals.

MEXICO.—The Mexican Government intends to substitute in its radio-telegraphic installations the continuous wave for the spark system. It appears that it had already arranged contracts in Germany for four stations of this kind at a cost of one and a half million pesetas. These stations will be set up at Merida, Vera Cruz, and Tampico. The stations of the old type at these places will be transferred to the Islas Marias, La Paz (in Lower California), Guadalajara (in Jalisco), Acapulco, and to the State of Guerrero.

NEW ZEALAND.—Wellington, New Zealand, informs us that the New Zealand radio news, the first service of the kind in the Southern Pacific, was transmitted on May 5 to inter-colonial and trans-Pacific passengers in ships of the Government and amalgamated lines. Its extension to Raratonga and the Chatham Islands is being considered.

Also that the total postal and telegraph revenue in New Zealand for the first quarter of the current financial year was £690,210, compared with £642,044 for the corresponding period of last year.

PORTUGAL.—Information recently reached this country through the ordinary press channels that the control of broadcasting is being sought by the British Marconi Co., which has obtained a concession from the Portuguese Government to operate broadcasting stations. This company is already active in Spain.

SOUTH AFRICA.—The construction of the Cape Town Radio station is well in hand—four masts are now being erected, and are well advanced. In all there will be 16 masts 800 ft. high, and 32 masts of 300 ft. The staff employed at the present time numbers about 500, and the equipment of the station is expected to cost about £500,000. The station will cover an area of about 4½ miles square.

Applications have been received by the Postmaster-General for licences to establish broadcasting services at the following places : Durban Corporation, within a 200-mile radius of Durban. Graaf's Trust, Cape Town, within an area bounded by a line joining Knysna—Prieska—Upington (The Cape) thence to the south-eastern extremity of the south-west territory. Associated Scientific and Technical Societies of South Africa, within a radius of 100 miles of Johannesburg expect to use this station which has a power of 500 watts. The apparatus is American.—*Commerce Reports.*

SWITZERLAND.—The Swiss correspondent of the *Daily Telegraph* states that it has been announced at Berne that, in order to assure for the Swiss Confederation a majority of the shares in the Marconi station at Berne, the Federal Council has purchased 800 nominal 500-fr. shares hitherto held by the English company. It has further subscribed for 600 new shares in order to increase the capital to 2,200,000 fr. At present out of 4,200 shares the Swiss Government holds 2,200.

UNITED STATES.—The *Telegraph & Telephone Age* declares that Mr. M. A. Noss, chief engineer of the Telepost Laboratories, New York, has developed a high-speed radio telegraph receiving system which makes possible radio reception at speeds above one thousand words per minute. By means of recording adjustments reception may be carried on at any speed from ten words per minute upward. The signals are received on paper tape, and appear in simple dots and dashes identical with those appearing on Wheatstone received tape, except that instead of the marks being made by an inked wheel, the employment of chemically-treated tape permits the incoming signals in an amplifier circuit to register in dark lines easily readable. The system embodies a static reducing feature which permits of receiving clear signals through severe static conditions.

An Ideal.—We want to go back to pick up the golden strand. We want to seek that summary of economic and social and political life which will have consecrated regard for the just price, which will never take material advantage for personal ends, of knowledge, or of power, or of good fortune, or of personal gifts. Such a conception of the most sacred responsibility to others will be needed in any organisation of society, individualistic or socialistic, or the curiously fluid compound in which we live to-day.—THE LAY READER. J. J. T.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

TELEPHONES.

THE total number of telephone stations working at April 30 last was 1,167,403 of which 413,826 were connected with London and 753,577 with Provincial exchanges. Notwithstanding the interposition of the Easter holidays, the new business in April was good, and the net addition of 8,911 stations was 27 per cent. higher than the net increase in the corresponding month of last year, which also included Easter.

Residence rate circuits increased during the month by 2,414 bringing the total at April 30 up to 189,098 compared with 159,129 a year ago.

Call offices working at the end of April numbered 17,745, the net addition during the month being 70. Call offices in kiosks in public thoroughfares (which are included in the above total) now number 647.

In April 22 new exchanges were opened under the rural exchange development scheme, and at the end of the month 453 of the 588 exchanges authorised were working. The new exchanges opened provided service at the outset for over 5,600 subscribers, whilst the exchanges now under construction will provide for a further 1,600 subscribers.

The number of inland trunk calls originated during March, 1924, totalled to 6,129,428, an increase of 686,939 or 12.6 per cent. over the corresponding month of 1923. The total number of calls for the financial year 1923-24 was 69,607,880, compared with 58,842,106 in the previous year, an increase of 10,765,774 or 18.3 per cent. The trunk revenue for the year, although affected by the reductions on July 1, 1923, in the charges for certain short-distance calls, also shews a satisfactory increase, the total amounting to £3,557,915, an increase of £281,869 or 8.6 per cent. over that for 1922-23. The outgoing Anglo-Continental calls during 1923-24 numbered 176,476, whilst the revenue amounted to slightly more than £100,000. For the previous financial year the totals were : calls 146,532, revenue £83,332.

The following table grouping the total number of exchange stations according to the type of equipment installed at the respective exchanges, shews that during the past financial year most of the growth has been in connexion with central battery exchanges. For purposes of comparison the corresponding totals at March 31, 1914, have also been included, and it is interesting to note that although the greatest percentage increase in the ten years, 1914-1924, occurs in connexion with automatic stations, these even now represent but a small proportion of the total :—

Date.	Stations on C.B. Exchanges.	Stations on Magneto Exchanges.	Stations on C.B.S. Exchanges.	Stations on Automatic Exchanges.
31/3/1914	369,694 (51%)	321,654 (44%)	35,361 (5%)	947 (—)
31/3/1923	612,356 (61%)	277,257 (27%)	93,329 (9%)	30,203 (3%
31/3/1924	681,555 (61%)	279,979 (25%)	119,899 (10%)	41,601 (4%)

The figures in brackets represent in each case the percentage to the total exchange stations.

Further progress was made during the month of May with the development of the local exchange system.

Among the more important exchanges extended were :—

LONDON.—Burgh Heath, Hounslow, Kingston, Molesey.
PROVINCES.—Whitley Bay.

During the month the following additions to the main underground system were completed and brought into use :—

Luton—Dunstable,
Rhyl—Colwyn Bay,
Manchester—Bury,

while 56 new overhead trunk circuits were completed, and 111 additional circuits were provided by means of spare wires in underground cables.

The
Telegraph and Telephone Journal.

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

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. X. JULY, 1924. No. 112.

THE PRAISE OF OTHER LANDS AND TIMES.

IN the widely different fields of literature and sport a familiar phenomenon amongst the critics is the *laudator temporis acti* who finds his contentment only in the heroes of the past and can see no perfection save in the accomplishments of the dead. For the one, no novelist of solid achievement has flourished since Thackeray, Dickens and Meredith, with, perhaps, an exception in favour of Mr. Hardy; no one has worthily touched the lyre of Tennyson, Browning and Swinburne, no essayist fills the places of Lamb, De Quincey and Carlyle. And so with the other. Who can bat like Grace or keep wicket like Blackham? Who now can recapture the cunning of Spofforth or Alfred Shaw with the ball? Where will you find such oarsmen or pugilists as in the past; or three-quarters like Stoddart, half-backs like Don Wauchope, and forwards like the Gurdons? In the field of telephony—a progressive art—the praiser of past days has little opportunity for indulging his foible. Here the perverseness of the critic always takes the form of praising other systems than his own. All other countries he imagines are adopting the automatic system with feverish expedition, while his own is fumbling with it but tentatively. The farmers on the boundless prairie, the dwellers on the fjord, each and all possess cheap and serviceable telephones, but the honest yeoman at Pondon Episcopi or Ripton-under-Bostleworth cannot obtain service save under prohibitive terms. He turns longing eyes to Sweden or Switzerland, he remembers the tag "they do these things better in France"—meaning anywhere but England. The Frenchman compares his backward development unfavourably with that of Finland and Uruguay; the German lauds the superior courtesy and consideration of the English service, while even the American coming to London discovers aspects of our telephone service which he compares to the detriment of his own. The traveller, of course, may learn by experience of other systems to put a proper value on the service at home, but more often he notes the one favourable facet which strikes his attention and forgets the many advantages which the native article may possess over the foreign one.

There is, however, a notable difference between the two classes of critics to which we have referred. The admirer of the past worthies has his counterpart in the enthusiast for the newer schools of literature. The latter may find Thackeray too didactic, Meredith formless and tedious, too much rose-water in Tennyson, too much meaningless rhetoric in Swinburne, and so forth; he may take the extreme view that all the merit lies with the moderns, that these have greater freedom of expression, and spontaneity, a less heavy style, and a closer touch with the spirit of the times. All that went before is *vieux jeu*. So also in those lighter accomplishments which, at this season, we make no apology for bringing to the aid of our argument. We are all familiar with the school of critics which considers that the sportsmen of the past would cut an indifferent figure in the exacting and highly specialised conditions of to-day. Who was ever like Hobbs or Armstrong or Hagen or Mlle. Lenglen?

The champion of his country's telephone service, however, if we except the interested advocate, is an unusual character. He may perhaps be found, as we have said, amongst those who have wrestled with telephonic difficulties in ill-developed countries and recalled with a sigh excellencies left behind which they did not before appreciate. The average man knows nothing of the groans which go up from other lands, groans of the same depth and timbre as his own, when, as sometimes happens in the best organised services, delays and cut-offs occur, wrong numbers are given or lines are out of order. What he does not appreciate in the more progressive countries, with which we make bold to include our own, are the ninety and nine times when his call is effected with promptitude and dispatch, indeed so much as a matter of course that it excites no comment. He does not perhaps realise that it is this average efficiency which makes his exasperation the greater when the telephone does fail him. The critic, even the dissatisfied subscriber, has his proper place in the scheme of things, as a constant stimulus to the improvement of the service. But, after all, perhaps we do not take sufficient encouragement from the hundreds of thousands of subscribers who never complain. It may be that some few of them do not trouble to do so; it is certain that the overwhelming majority do not because they find the service good and constantly improving.

HIC ET UBIQUE.

WE congratulate Mr. R. A. Dalzell, Director of Telegraphs and Telephones, whose name appears in the Honours List amongst the C.B.'s. We also congratulate Mr. E. J. Harrington, Deputy Accountant General who has been made a C.B.E. on his retirement. He is succeeded as Deputy Accountant General by Mr. F. J. Pearson, I.S.O. Mr. H. Townsend becomes an Assistant Accountant General, *vice* Mr. Pearson. Another retirement in that department is Mr. E. W. A. Clausonthue, an Assistant Accountant General, who is succeeded by Mr. W. A. Mattinson.

VISCOUNT ST. DAVIDS, presiding over the thirty-seventh ordinary general meeting of the Anglo-Portuguese Telephone Co., said that the company needed to be made independent of the fluctuations of the exchange in Portugal. The present position

was that, although their business was sound, the company was unable to make a profit, the fall of the escudos wiping out the benefits of the increases in tariff that the company had been authorised to make. They wanted power to increase their rates automatically as the exchange fell, and also to supplant the flat rate by the measured rate.

"MANXMAN," writing to the Liverpool papers, thinks it anomalous and "progress in the wrong direction" that the General Post Office should hope to provide telephonic communication with America, while it is still impossible to telephone to the Isle of Man. This we suppose is the outcome of some paragraphs upon some experimental wireless communications with the United States, and is significant of the confusion which exists in the minds of some of the public between a regular, commercial telephone service and interesting radio experiments in that field.

Answers says that telephone subscribers in London number 220,000 at the end of March. Double this number and subtract 41,578, and you will get the correct answer in terms of the number of exchange telephones.

THOSE who know the island (writes a correspondent of the *Manchester Guardian*) will see an ironic association in two items of Jamaican news recently published—one that a riot has taken place in Kingston, and the other that the Government is advertising for tenders to take over and bring up to date the antiquated telephone system. Telephones were established in Jamaica in 1893, and it has long been held that only a riot could bring about any alteration in the service, which has advanced but little since its inauguration and must surely be one of the worst in the world. Business men in Kingston have been known to request the company to remove the telephones from their offices and to strike their names off the lists of subscribers as they found the strain of obtaining a number too great to be borne in such a hot climate. A relative of mine whose place of business was near the telephone exchange found it quicker when he wanted a number to write it out and send it round to the superintendent. He used to tell the story that once he posted a letter to the exchange requesting a number. Two days later he had a reply, also posted, "Number engaged."

SPEAKING for ourselves, we think that to make the "ironic association" complete news of the capture of some gigantic fish should have been published at the same time. Telephone stories and fish stories have this in common that they increase in exaggeration at each re-telling and would, in fine, cut a mighty poor figure in a state of naked truthfulness.

ACCORDING to the *Financial Times* a new concession has been granted to the Chili Telephone Co., Ltd., for a term of 20 years.

THE Commercial Secretary at Rome (Mr. J. H. Henderson, O.B.E.), informs the Department of Overseas Trade that all the preparatory studies for the cession of the Italian telephone service have been finished, and the definite text of the conditions of transfer will be submitted by the commission to the Minister. The Administration has already entered into relations with the companies to which the service will be entrusted, but the definite transfer has not yet been effected. The urban telephones will be divided into five zones and ceded to an equal number of companies—two for North Italy, two for Central and South Italy, and one for the Islands. The concession companies will have some initial expenditure for the increase of plant, apparatus, and the introduction of the automatic system. The inter-urban lines will be ceded to one company because no one was willing to undertake the service for Central and South Italy.—(*Electrical Review*).

IT is announced that the Soviet Government intends to inaugurate a telephone line between St. Petersburg and Stockholm.—*Reuter* (Moscow).

THE ADMINISTRATION AND CONTROL OF TELEGRAPHS AND TELEPHONES FROM A SURVEYOR'S POINT OF VIEW.*

BY T. KELLY, C.M.G.

(*Continued from page* 161.)

In by-gone days, when the telegraphs were perhaps in a more flourishing condition than they are now, every District Surveyor had on his staff an inspecting telegraphist—a skilled practical officer whose whole time was devoted to telegraph supervision and traffic problems. The establishment of a telegraph traffic section at headquarters, followed by standardisation of methods of control and supervision and simplification of procedure generally, and the substitution of telephones for more complicated telegraph apparatus at the smallest offices led to the elimination of the Surveyor's telegraph inspector and the assignment of his duties partly to postmasters, partly to Assistant-Surveyors, and partly to headquarters traffic officers. The training of new entrants, circuit observation, sub-office telegraph inspections and minor traffic matters, now fall to postmasters and their staff; the local inspection of the head office telegraph service is done by the Surveyor's travelling staff, usually in conjunction with the examination of the postmaster's annual report; the examination and criticism of the service from the statistical standpoint are done in the Surveyor's office; and larger problems are reserved for discussion with the officers of the headquarters traffic section, whose services are placed at the disposal of the Surveyor, and who are always most willing to afford assistance and advice.

The practical results on the telegraph service when measured by accepted standards are not unsatisfactory, as concentrated effort by personnel counterbalances as far as possible deficiencies of organisation but it is generally admitted that the absence of a telegraph traffic officer on the District Surveyor's staff constitutes a flaw which it is hoped will in course of time be remedied.

At the present time the telegraphs in Surveyors' districts by association in staffing arrangements and supervision, as well as in organisation, are allied more to posts than to telephones—the rank and file staff are known as sorting clerks and telegraphists, and at the great majority of offices perform mixed postal and telegraph duties, but the declared policy of the department is to recognise the closer natural kinship of telegraphs with telephones and gradually to draw them together, at all events for the higher supervision and control. The outstanding expression of that policy is the placing of the two services under the one director at head uarters. In the provinces experiments are proceeding in the direction of control of telegraphs and telephones jointly by telephone district managers under the Surveyor. I am not in a position to forecast what the result may be; but I think I shall be expressing the views of very many practical officers of both services if I state my personal opinion that, whatever may be the merits of joint control in the higher realms of management, specialisation of traffic staff for each service will still be essential There is ample scope, so it seems to me, in telegraphs as well as in telephones for the undivided attention of specialised traffic staff, and to train a telephone traffic officer in telegraph traffic, or a telegraph traffic officer in telephone traffic in the belief that a high degree of efficiency may be achieved in both, and that the same officers may attend to either service as the need arises is to stultify both services. It is true that the general administration of the telegraph service—the application of business principles with the modifications imposed by Government control, the selection and control of staff and regulation of their working conditions, and the maintenance of proper relations with the sister services of posts and telephones, may not demand a high degree of technical knowledge. But the selection of the most suitable apparatus, the quality of the operating, the investigation of improvements in appliances to keep the telegraph service up to date, the proving out and the laying down of principles to govern every phase of manipulative work and supervision, are essentially work for specialised technical experts, and it is my firm belief that for telegraphs alone this is a whole time task for a purely telegraph traffic staff.

The Surveyor's concern with these conclusions lies in their application to his own particular sphere. It may be argued that the conclusions, though sound enough as applied to headquarters, may yet be inapplicable to a Surveyor's district with its narrower field of possibilities and simpler problems. But my experience has been that the telegraph problems falling within the purview of a Surveyor are sufficient in quantity and quality to justify a district telegraph traffic officer who would keep himself in constant touch with the headquarters telegraph traffic staff for exchange of experience, for benefit of consultation and advice, for development of ideas, and for knowledge of wider issues elsewhere.

The Surveyor's district includes from 600 to 800 telegraph offices of varying size and importance giving employment—full or part time—to upwards of 1,200 telegraphists; these are under the immediate supervision of postmasters and the only regular inspection of the results of the postmaster's management is at the hands of non-technical Assistant Surveyors.

It should be remembered that the Surveyor and his Assistant Surveyors are concerned not only with telegraphs, but also with the much larger postal and telephone branches; they are trained in administration and inspection,

* Paper read before the London Telephone and Telegraph Society.

Where the intermingling of Strange Races simplified by the Esperanto of Commerce

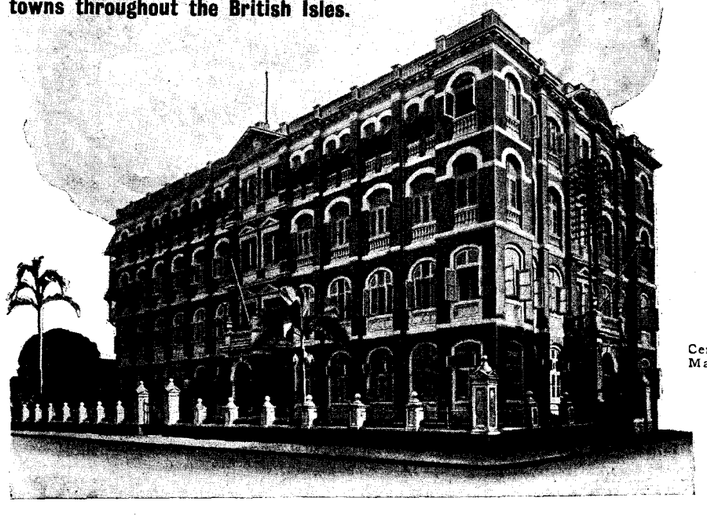
BOMBAY 10,000 lines over 17th May, 1924

THE dial calling device of the STROWGER Automatic Telephone may truly be termed the Esperanto of Commerce, speaking, as it does, a universal language.

In remote oriental cities where many different tongues are spoken, where the commercial and social customs are strangely different from ours, and the climatic conditions are often severe—where the rendering of adequate telephone service once seemed an almost insurmountable problem—STROWGER Automatic Telephone Equipment is now rapidly becoming the standard.

Unusual climatic conditions of all kinds have been met successfully by STROWGER Automatic Equipment. In the arid cities of Mesopotamia; in humid countries such as Cuba, Hawaii, and the Philippines, and in the rugged climates of Manchuria and Canada, the STROWGER Automatic system is operating with entire satisfaction, rendering modern, high grade telephone service.

The flexibility of STROWGER Automatic Equipment in meeting these widely varying conditions has resulted in a remarkable growth in its adoption by foreign countries in all parts of the world and secured its acceptance by the British Post Office for London and other important cities and towns throughout the British Isles.



Central Exchange, Bombay, where the Manual System has been supplanted by STROWGER Equipment.

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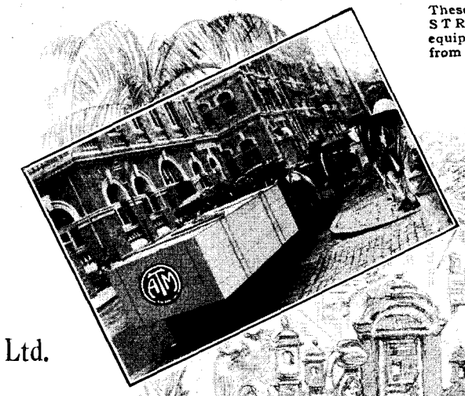
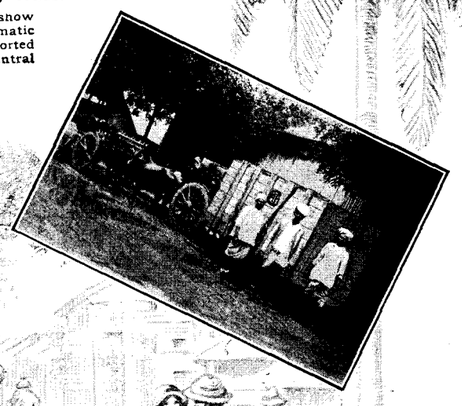
ASSOCIATED COMPANIES:
International Automatic Telephone Co., London.
Automatic Electric Co., Chicago, U.S.A.
International Telephone Sales & Engineering Corporation, New York.
Automatic Telephones Ltd., Sydney.

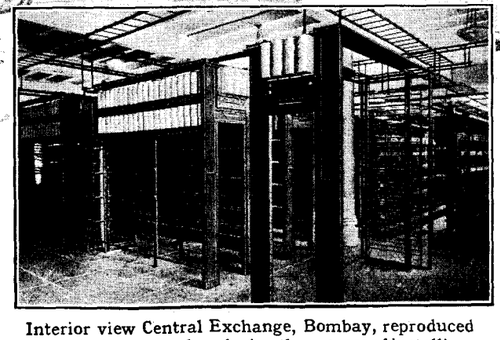
FOREIGN SALES REPRESENTATIVES.
Messrs. Western Electric Co.
Connaught House, Aldwych, London, W.C. 2

Although Bombay has supplanted Manual Telephone Equipment for the modern STROWGER method, it still retains the slow moving bullock teams for the conveyance of heavy loads.

These two photographs show STROWGER Automatic equipment being transported from quay side to Central Exchange.







Interior view Central Exchange, Bombay, reproduced from photograph taken during the process of installing.

in organisation of services, in buildings requirements and in staff management. In these matters they must be expert, and, taking into account the extent of their field of action, they have quite a full task to keep abreast of their duties. It would scarcely be humanly possible for them to acquire a high degree of technical knowledge in all three branches, or, if acquired, to retain and exercise it efficiently, and there is no good reason why they should be highly trained technically in one branch more than in another, seeing that they have to administer all three.

With the department's extensive activities day-to-day administration, involving co-ordination of services and management inspection in an area of the size of a Surveyor's district constitutes full occupation for staff specialised in the general principles of administration. If, in addition, the Surveyor and Assistant Surveyors were required to attain a high degree of specialised technical knowledge in one or more sections of the business administered they could only do so at the expense of larger issues.

The case for a purely telegraph adviser on the District Surveyor's staff depends largely on the importance of the following duties and how far they can usefully be done by administrative staff without full technical qualifications :—Investigation of circuit arrangements between office and office ; Examination of manipulative qualifications of telegraph staff and supervision over training of learners ; Organisation of telegraph arrangements for special events ; Inspections of working arrangements in instrument rooms including circulation of telegrams ; Supervision of statistical returns.

Some of the duties obviously cannot be entrusted to non-technical men, all of them could be much more efficiently done by a telegraph expert, and taken together all of them would provide full occupation for a district traffic officer. Most telegraph men will, I think, agree with my conclusion that a telegraph traffic officer should form an integral part of a Surveyor's travelling staff, supplementing the administrative staff and completing a practical organisation.

With Postmaster-Surveyors the telegraph difficulties met with by the District Surveyor are not so prominent. The postmaster's establishment of the Postmaster-Surveyor includes a large telegraph branch with superintendents and supervising officers experienced in local management and acquainted with routine traffic problems, and the Postmaster-Surveyor is able to draw from them the assistance and technical advice required for traffic duties at other offices under his control.

The relation of the Surveyors—both District Surveyors and Postmaster-Surveyors—to the telephone service is theoretically one of full managerial responsibility, the same as for telegraphs, but in practice, as already mentioned, the larger part of their authority is exercised through their deputies the telephone district managers, who are purely telephone officers of lifelong telephone training, equipped with specialised staff for traffic, accounting and canvassing, organised on lines that are both practical and scientific.

As before stated, the District Surveyor's jurisdiction may comprise at present two or more telephone districts with headquarters different from his own, and this scattering of forces is a source of inconvenience and of minor embarrassment. But progress is being made towards the ideal administrative unit, which is a self-contained district with boundaries the same for the Surveyor, the telephone manager and the superintending engineer, and with one headquarters conveniently placed for the joint administration of posts, telegraphs and telephones.

Taken by itself, and if I may pass over without comment the detachment of the engineering branch, the telephone organisation within the telephone district is on sound practical lines adapted to present circumstances. It is management by an expert assisted by experts in all branches, and if the telephone service could be entirely separated from all other branches of the department's business and stand alone, I do not pretend to believe that the district Surveyor, superimposed on the telephone district manager, would be so essential as he now is to the success of the telephones. But the question of separation has been definitely abandoned, and is not a matter of practical politics. It is necessary, therefore, to look at the telephones as but one of the three important branches of the department's business, closely interwoven with the other two in matters of policy, of staff, and of office accommodation, and inevitably demanding at some point co-ordination of the different interests and joint administration on general lines.

At the majority of the smallest exchanges—those at scale payment sub-post offices—the same staff attend to posts, telegraphs and telephones, on the same premises, frequently in the same room. These constitute more than half the exchanges in the Kingdom.

A large proportion of the other exchanges are housed in post offices, and though usually staffed separately during the day there is a large percentage of cases where assistance is rendered by postal and telegraph staff for night and Sunday service.

In my own district, with 240 exchanges, 56 per cent. are in scale payment sub-post offices ; 18 per cent. are housed with the post office in Crown premises., *i.e.*, 74 per cent. are mixed up with posts and telegraphs ; and only 26 per cent. are in separate premises, of which 20 per cent. are in buildings owned or leased by the Crown and 6 per cent. on the premises of the attendants.

Postal and telegraph staff is concerned also to greater or less degree with telephone call office transactions. Payment of telephone accounts, telephone enquiries and correspondence, as well as other minor services incidental to telephones.

Besides the use for telephone work of staff, primarily postal and telegraph, telephone staff is extensively used for that section of telegraph work dealt with by telephone, *i.e.*, telegrams to and from telephone subscribers, and telegrams to and from telegraph offices served by telephone circuits, about 20 per cent. of the total telegraph operating transactions.

As one of my reasons urged in justification for the Surveyors' connexion with telephones is the need for co-ordinating the management of the three principal branches of business to ensure harmonious relations and proper perspective, I have given these figures to show the extent of the physical association of telephones with telegraphs and posts.

The mingling of the services in buildings and staff justifies itself on merits by the common advantage—principally financial—and is an important feature in provincial administration. It demands at the very least unified control of buildings and staff. To have different officials responsible for upkeep and cleaning of different rooms of the same building, with no possible clear line of demarcation, would obviously be inviting trouble. It is equally obvious that different local disciplinary authorities for staff using largely the same rooms and doing the same kind of work would be objectionable and unworkable. These difficulties are avoided by bringing buildings and staff as a whole under the local jurisdiction of the postmaster.

The mingling of the services does not involve so inevitably local control of traffic problems, canvassing, or accounting, and these specialised sections of telephone management pass by the postmaster and vest in the telephone district manager. To regularise his relations with postmasters the district manager is armed with the powers of a member of the Surveyor's staff for the following reasons :—it is plain that the district manager should not issue traffic directions and accounting instructions to the telephone staff, except through the postmaster who is responsible for their work and supervision ; it is clear also that, if the district manager's orders are to be effective, they must be given with the authority of an officer superior in rank to the postmaster, and as the postmaster could not be expected to serve with harmony and efficiency two independent masters—his Surveyor and the district manager, the district manager must be denied independence, and must act with the Surveyor's authority as a surveying officer. By bringing the district manager into the Surveyor's organisation the unification of control of the three services, posts, telegraphs and telephones, thus becomes complete in the Surveyor.

Because I have so far stressed co-ordination of the joint services, and uniformity of control and administration, as strong reasons for the Surveyor's position in the telephone organisation, it must not be assumed that the Surveyor is simply an administrative figurehead in relation to telephones.

Telephone district management falls under the following headings :—

1. Buildings and accommodation.
2. Staff control and discipline.
3. Traffic—mainly inspection, provision of equipment, revisions of establishment, circulation, and supervision of operating.
4. Canvassing and contracts.
5. Accounting.

And the Surveyor is concerned in greater or less degree with all. He is as before stated recognised as expert in accommodation requirements, in staff management and discipline, and in general administration according to Government conditions and limitations. All telephone buildings and staff questions fall normally within his province. His personal relations to telephone traffic canvassing and accounting are not so close and intimate as in the case of the corresponding postal and telegraph sections ; but he nevertheless exercises general and effective oversight over them.

With regard to office accommodation, the Surveyor usually initiates schemes for new buildings or important extensions of existing buildings. He formulates the requirements for posts and telegraphs, but for telephones the schedule of requirements is prepared by the engineer-in-chief in conjunction with the headquarters traffic section, a reservation that standardisation should soon render unnecessary.

Unless the scheme concerns only the engineering department, as for example, an automatic exchange with no manual equipment, the steps necessary to provide the scheduled requirements for posts, telegraphs and telephones fall to be taken by the Surveyor.

For large schemes, whether telephone alone or joint postal, telegraph and telephone, the Surveyor co-operates with the Office of Works in seeking a site and in planning the new building, but subject to collateral approval of the engineering department as to the position of the site and the suitability of the building for engineering purposes.

In all buildings schemes, particularly those for a combined post office and exchange, close collaboration between the Surveyor, the engineering department and the Office of Works' architect is essential, but I think I am right in stating that the department looks mainly to the Surveyor to see that the "all in" result, *i.e.*, position, site area, building, internal arrangements, public and traffic facilities, and cost, is satisfactory.

In all that concerns telegraph and telephone staff, *i.e.*, appointments, training, probations, transfers, discipline, promotions and retirements, the Surveyor is closely in touch. He has taken over from the Secretary the major portion of the clerical work of a more or less routine character inseparable from essential formalities and records associated with staff management.

The postmaster is responsible for selecting new candidates for admission to the service, and for training them. The district manager approves the selection in the case of telephonists and supervises their training, the Surveyor ensures that both have done their duty, and takes the steps necessary for admission of the approved candidates to the Civil Service fold.

In *discipline* the Surveyor acts as magistrate in the more serious cases, and as court of appeal in lesser cases. In *promotions* the postmaster recommends, the district manager concurs—or otherwise—in the case of telephonists, and the Surveyor authorises where an allowance for supervision only is concerned, or submits to Secretary, with a recommendation supported by personal knowledge or local enquiry, if a substantive promotion is involved. The Surveyor acts also as first court of appeal for officers who have the misfortune to be passed over.

The Surveyor's association with traffic questions which are dealt with primarily by traffic superintendents under the D.M.'s supervision is that of business director applying to the best general advantage the specialised knowledge of experts. He turns the cold light of financial examination on proposals perhaps rosy-tinted with professional enthusiasm. It is his concern to see that standards appropriate to the various phases of work, staff, accommodation, equipment, development, public facilities, &c., have been established after the fullest test, examination and consideration, and that having been established they are applied with discretion, foresight, and full regard for financial effect.

It is one of the principles of Government administration under Treasury supervision that expenditure additional to that regularly authorised may not be incurred without satisfactory check and control. Treasury restrictions limit severely the spending powers of officers who are directly interested in the results of their official expenditure. In the Post Office service it is rarely that expenditure and its result can be brought together and so compared as to furnish acceptable justification for money spent without precedent authority, which is another probable reason why the financial powers of local officers, who are assumed to be directly concerned with the results of their spending, are fixed at a comparatively low point. In the case of expenditure for staff, which is by far the largest item of Post Office expenditure, the spending officer is the postmaster for posts and telegraphs, and the district manager for telephones—the latter being directly responsible for the provision of adequate staff for the exchanges; and on Treasury principles proposals for increasing staff charges emanating from them must undergo critical examination before approval is given. The nearest officer of higher rank assumed to be disinterested is the Surveyor, and all revisions of force, whether from the postmaster or the district manager, pass, therefore, to the Surveyor for approval, after clerical and critical examination in his office to ensure compliance with rules and standards and accuracy of statistical presentation. The possibility of error or rashness on the part of the Surveyor is guarded against by financial check by the Comptroller and Accountant-General, and reference of the more important cases to the Secretary. The extension of agreed standards for framing staff requirements may sooner or later lead to simplification of procedure in telegraph and telephone staff revisions, and relieve the Surveyor of some portion of his responsibility; but the signs are not all hopeful for early change.

With telephone equipment, internal and external, the Surveyor's association is limited. He authorises new call offices and new rural telephone exchanges—a frequent occurrence recently—on the recommendation of the district manager, on evidence of the fulfilment of certain conditions, on favourable comparison of revenue and cost, and on satisfactory arrangements for accommodation and attendance. But the designing of the most suitable equipment for new exchanges as well as revision of equipment at other exchanges, is properly left to the department's professional experts—the telephone district manager, the headquarters traffic officers and the engineers. Additions to internal plant—if no question of accommodation is involved—or additional subscribers' lines, or junctions, or short trunks which are governed largely by approved standards, are arranged for by the telephone district manager, who satisfies the Surveyor from time to time as required that increase of equipment keeps pace satisfactorily with growth of business. The district manager's proposals for the annual trunk telephone programme are, however, scrutinised and passed by the Surveyor before submission to headquarters, as an additional safeguard in view of the large financial outlay involved.

The *telephone canvassing and accounts* fall under the immediate control of the telephone district manager who has the assistance of a contract manager for canvassing and contracts, and of a chief clerk for accounts and correspondence. The district manager is required to satisfy his Surveyor that his canvassing staff is placed and employed to the best advantage, and that their activities, as measured by new revenue secured and cost incurred, are successful. He is responsible to the Surveyor also that his district office is well organised and supervised, that all records and accounts are kept in accordance with rule, that the subscribers' bills are promptly despatched, and the revenue duly collected, and that his staff is no more than sufficient for the work they have to do.

It will thus be gathered that the Surveyor is in close daily touch with the management of telephone business generally, and that his position in the telephone administration is not alone that of co-ordinating officer for which there is indisputable need, but also of active administrator for the assurance of efficiency with economy according to Government ideals and Treasury requirements, and for the supervision and control of staff in accordance with their status and rights as State employees.

If I might now recapitulate, in few words I should say that :—

In *telegraphs* the Surveyor is the district controller, supervising and directing the telegraph business through postmasters, but in technical matters having no technical adviser on his staff, he is more dependent than he should be for advice and assistance on the headquarters traffic section.

In *telephones* the Surveyor is also the district controller, acting through postmasters in buildings questions and staff management, but acting through one or more telephone district managers, his expert assistants, in other purely telephone matters—traffic and equipment, canvassing and accounting.

I should like, as Surveyor, to take this opportunity of paying tribute to the telegraph and telephone work done by postmasters, or under their supervision, and to the keen professional interest evinced by postmasters in the telegraph and telephone services, as well as in postal services. Whatever good reasons may have existed for the limitation of postmasters' activities in the direction of telephone traffic, canvassing and accounting, they are rapidly disappearing with the present generation of postmasters. The time should not be far distant when the telephone organisation in a Surveyor's district will follow the same lines as posts and telegraphs, and postmasters' responsibilities to the public and to the department be similar for all three branches.

The ideal district organisation would then be comparatively simple, viz., a district controller with staff on a functional basis similar to that adopted at headquarters, *i.e.*, general administration supported by professional advice in all important branches, and one convenient headquarters for the administration of posts, telegraphs and telephones throughout the district. Such an organisation would be comparatively inexpensive, would provide for unlimited expansion of business, and would go far to promote the efficiency of the joint services in the public interest.

EMPIRE PAGEANT COUNCIL.

THE following letter has been addressed by the Secretary of the Empire Pageant Council to the General Secretary of the Civil Service Confederation :—

As you are aware, an appeal has been made throughout the Civil Service for voluntary performers to take part in a great Pageant of Empire which is being staged under Government auspices in the Stadium at Wembley from the 21st July to 30th August next. So far, the Civil Service has not come forward in very great numbers, and it may be that Civil Servants would respond more readily to the appeal which is being made if they could be assured that they would be placed together in a particular scene or episode in groups comprising their friends and colleagues.

With this idea in mind I should like to suggest that the Civil Servants and their friends and relations might be invited to take part in the episode which depicts the visit of Admiral Blake's fleet to the Mediterranean and its rescue of the Christian slaves from the Barbary pirates. For this very dramatic and picturesque episode we require the services of 878 men and 145 women.

The episode will be staged on Tuesday and Friday evenings from the 22nd July to the 29th August (12 performances in all) from about 8.35 p.m. to 9.20 p.m. in the first three weeks, and from 8 p.m. to 8.50 p.m. in the last three weeks. Costumes will be provided and they may, if desired, be purchased at the close of the Pageant at a nominal rate by those who use them; a free non-transferable pass to the Exhibition, available for the period of the Pageant will be given to each voluntary performer, together with facilities for travelling at reduced rates to the Exhibition from one of the London termini for performances and rehearsals at the Stadium. It will be possible to purchase for 10*d.* a return ticket to the Exhibition normally costing 1*s.* 3*d.*

Preliminary rehearsals will take place in the evenings in London during the period 1st—14th July, and in the Stadium in the evenings during the period 14th—30th July.

I shall be very much obliged if you can convey this invitation to your London membership and give them every encouragement to take part in what will undoubtedly be a very interesting and noteworthy production.

The Pageant will in fact be the largest ever staged in this country.

Such necessary clerical and organising work as may be required will be undertaken by my staff here. All that I would venture to ask you to do is to send us the names and addresses of those who are good enough to offer their services.—Yours sincerely,

W. M. HILL.
Secretary, Empire Pageant Council.

Will any Civil Servants or their friends willing to take part in the "Blake Episode" on the terms set out above, please send their names and addresses to me as soon as possible.

HUGH SHAYLER,
Parliament Mansions,
Victoria Street, S.W.1.

Telephone: Victoria 3000.

EVERYDAY WORK AS A SPORT.

By WINIFRED M. ETHERIDGE.

THE paper read to the London Telephonists' Society recently on "The Influence of Sport on our Work," in which Mr. Pounds showed in a most interesting way how the qualities necessary for good sportsmanship are those which should have the best results on our work, opens up a subject that has far-reaching possibilities. In this little paper I propose to take his idea a step farther and suggest that it would be an excellent thing for ourselves and our efficiency if everyone would bring to their work the same keen interest and energy they give to their hobbies, and so turn their everyday work into a sport.

Before we can make any attempt to do this it is necessary at once to rid ourselves of the popular fallacy that work is an evil and leisure an unmixed good. When you come to think of it, if you carefully weigh up the good and bad of an average day you'll find that the working portion holds many pleasant recollections, while the so-called leisure portion has its full share of annoyances and disappointments.

Generally speaking, work in some form or another occupies a third of our lives; indeed when we allow for sleep, work represents half our waking hours. That being so, it seems foolish to make a hard and fast line between work and play and to consider the working half of life as necessarily disagreeable. On the contrary, it seems only reasonable to insist on the working half being as pleasant as possible because of the big slice of life it represents.

"Yes, that's all very well," you'll say, "but what about work that is dull and uninteresting and uncongenial." Yet no work that requires the exercise of any intelligence need be dull or uninteresting, and if it is neither then it need not be uncongenial. One of the most important things to remember about work—and this applies to life generally—is that you take out just what you put in, neither more or less. If we give our minds and energies to it grudgingly and reluctantly, believing that it is something unpleasant to be got through somehow, it will give us no satisfaction. Yet bring to it the keenness we think necessary for a hobby and we find all sorts of unexpected interests, difficult things become simplified, and we experience the pleasant feeling of having done something really well.

Last season we had two prize competition papers by Supervisors which illustrated excellently the results of the two attitudes. In one, the writer assumed that the necessary rules and regulations made a supervisor's work so mechanical that personality had no opportunity for expression. The whole tone of her paper was pessimistic.

In the other case a supervisor wrote of the joys of relief supervision—a job that most supervisors look on as one of the least desirable in an exchange! She found unlimited interests in her varying duties, saw all their humorous possibilities, and revelled in the opportunities they afforded of gaining fresh experience and extending her personal influence. She realised that a cheerful, keenly interested supervisor meant an efficient section, while a disgruntled bored supervisor meant a section with a constant tale of woe.

Even the most ordinary routine can be made interesting if one uses a little intelligence, and one of the best means of finding the interesting things about it is to cultivate one's powers of observation. It is surprising how unobservant we are and how little we notice or remember of what we see every day. One of the many excellent features of the Boy Scout lore is the training of the observation. Young Scouts are told to look at a certain shop window for a few moments or walk down a particular street, and then give an account of all they have seen. At first they miss a great deal, but after a while the list grows longer and longer and it is very surprising how much there is to see which escapes ordinary notice. I tried this experiment myself not long ago. Most people who know it will say that Farringdon Street from the station corner to Ludgate Circus is *not* a thoroughfare to linger in. I have come along it to the office for the last 10 years or so, and thought I knew it well, but when I walked down it resolved to see everything scout fashion I found I didn't know Farringdon Street at all! There were numerous really noticeable things that I had never seen in all my journeyings! Of course, I do not suggest that Farringdon Street is an ideal subject to be interested in, but the experiment showed how easily one can miss a big proportion of what is before one's eyes.

Apply the same experiment to work and you find there is always something new and interesting. A telephonist who looks on her position as a collection of numbers to whose unreasonable demands she has to attend, by means of certain set expressions and mechanical actions which do not interest her, will get no pleasure from her work and will find her days drag in a wearisome way—for which she blames the work. Another girl who finds all her subscribers interesting as samples of humanity and becomes familiar with all their telephonic idiosyncrasies will find her days pass quickly and happily.

The same with supervision. A supervisor who looks on her Section as a set of girls, more or less troublesome, who have got to be kept in order, won't find much happiness in her day's work, yet one who studies the different personalities of her staff and the methods that work best with each, and realises how much her own personal influence can affect her staff and their work, will find there is always something to enjoy. Or on clerical work, a peg count, for instance, can be just a lot of bothering figures that convey nothing to the clerk, or it may show all sorts of interesting comparisons and variations that suggest lines of investigation, and causes, and effects, and make a fascinating study. It is only a question of how you look at it.

When anyone joins a club in order to pursue any hobby, such as tennis for instance, he or she is usually determined to attain some fair degree of proficiency as, without it, full advantage cannot be taken of the opportunities for enjoyment afforded by the club, and moreover there can be little pleasure in the game if one is a "dud." Yet the same person may in business be content to just drift along, very bored with his job, and blaming the work itself because he finds it tedious.

When we go into occupation of a new house or office or room the first thing we do generally is to see about our physical comfort. We consider, quite reasonably, that as we have to spend many of our hours there we may as well be comfortable, so we consider light and draughts and the suitability of furniture and so on. How often do we consider our mental comfort in the same way, and say to ourselves "I've got to do this work for some time, so I may as well get as much fun out of it as I can." Too often, I am afraid, if the work does not appeal at once we just drift along doing it in a more or less mechanical way, hoping that presently something more congenial will turn up. Then, if a change does not immediately prove to be for the better we feel injured. Yet if we adopted the idea that the work we were doing to-day we should have to keep on doing for the rest of our lives so we must make sure we were going to be mentally comfortable at it, things would be far better done and we should all be much happier over it.

If we look on work as a good game, it is a long way towards making it one. In our leisure hours, if we go to an entertainment we go expecting to enjoy ourselves and generally do so. Bring the same mind to our work and the result will probably be the same. I know personally I have often got much more pleasure out of getting an important job done against time and seeing it successful, than from a visit to the latest American super-film.

One is bound to have disappointments anyway, at work or play, but if it is a good game the playing of it is much more important than the result. The wider one's activities the greater the opportunity for error, but, as we all know, the only people who never make mistakes never make anything else, and it is only by mistakes we really learn. The attitude of mind that one is only paid to do certain work and not paid to take an interest in it is a foolish, one for it reacts on the individual and does more harm to the person adopting it than to anyone else. Make your work a game that you are just playing for love of it and it will become as interesting. And it does not stop there, for if you work to an ideal you soon realise that you must play for your side and not for yourself, and because you won't let yourself down you can't let down your chief, or your office, or your section.

In conclusion I do not think I can emphasise my point better than quoting Sir Henry Newbolt's well-known poem on "Playing the Game":—

There's a breathless hush in the Close to-night—
Ten to make and the match to win—
A bumping pitch and a blinding light,
An hour to play and the last man in.
And it's not for the sake of a ribboned coat,
Or the selfish hope of a season's fame,
But his Captain's hand on his shoulder smote—
"Play up! Play up! and play the game!"

The sand of the desert is sodden red,—
Red with the wreck of a square that broke;
The Gatling's jammed and the Colonel dead,
And the regiment blind with dust and smoke.
The river of death has brimmed his banks,
And England's far and Honour a name,
But the voice of a schoolboy rallies the ranks:
"Play up! play up! and play the game!"

This is the word that year by year,
While in her place the School is set,
Every one of her sons must hear,
And none that hears it dare forget.
This they all with a joyful mind,
Bear through life like a torch in flame,
And falling, fling to the host behind—
"Play up! play up! and play the game!"

EARLY DAYS OF THE LONDON-PARIS TELEPHONE.

A PARIS journalist, writing under the signature *Jean Pam*, relates in *La Chronique* some experiences of the working of the London-Paris wire in its early days.

Continental journals in those days, he says, relied almost exclusively on press agencies. Representing a great French provincial newspaper, I was expected only to supplement the service given by the agencies. I lived exclusively by the Press, but the special work for my French journal only brought me in a fixed amount.

There were then no special London representatives of the Continental press, such as exist to-day. A radical transformation has taken place under my eyes. It is not exactly due to the telephone, although the latter plays a capital rôle in the work of my excellent *confrères*.

I return to the London-Paris telephone. For a long time the telephone never worked without causing a grand sensation in the French colony. It worked so badly when it did work! The need of that telephone never made itself felt. Suddenly, one night, the bell of the London-Paris telephone rang. That was so unexpected. Everyone in our office sprang up.

With a bound I was beside the apparatus which had something of the appearance of those coal boxes one still sees in our French kitchens; the upper part was surmounted by a box furnished with a porcelain mouthpiece into which one spoke. You wrote standing up. On the table beside you were a couple of candles which had to be lit *presto*, and which gave forth a twinkling light.

The administrations never consulted the subscribers as to the best arrangements to adopt for a work they did not understand; but were steeped in science and of a congenital infallibility. Behold the poor shorthand writer by a sort of black stove, standing upright in a catacomb, with two candles near him—two candles which take several good minutes before they yield a funereal light which illuminates . . . . . the wrong side of the notebook of the unfortunate scribe. Let us pass on.

A Britannic voice issues from our apparatus. A distant, vague unknown voice!

"Who are you? Where are you speaking from?"

"I am speaking from the middle of the English Channel!" replies the sepulchral voice from the invisible.

"Come! What is the joke? A voice from the sea!"

"I am speaking from the deck of the steamer *Monarch*."

"What does that mean, the steamer *Monarch*?"

"It is the steamer charged with the laying of cables. The fault is repaired. In a few days, a few hours, perhaps, communication will be re-established between London and Paris."

* * * *

Since those days there has been no total interruption of service. There has been communication of some sort, even during the most violent tempests.

ROYAL VISIT TO MARCONI HOUSE.

GENERAL H.R.H. PRINCE PURACHATRA, Director of the Siamese State Railways, visited Marconi House on Tuesday the 10th instant and instructed the Relay Automatic Telephone Company Ltd. to despatch to Siam some of their new loud-speaking telephones and other apparatus to work in connexion with the "Relay" Automatic Telephone Exchanges which are at present serving the Siamese State Railways.

His Royal Highness expressed his pleasure at the service the "Relay" exchanges were giving in his Country. This is one of the first over-seas cases of the application of the new loud-speaking telephones to automatic telephony which has been developed by the Relay Company of Marconi House. Several are already working on installations in England, such as Lloyd's Bank, the British Empire Exhibition, Marconi House and elsewhere.—*(Communicated.)*

SWEDEN.—TAXI-CAB RANK TELEPHONES.

The following arrangements have just been installed in Norrkoping (pop. 60,000) to obviate the trouble which the public experienced in telephoning for taxicabs; it often happened that one had to ring up three or four cab ranks before finding one with an available taxi. Under the new arrangement the "Cab Union" pays the telephone authority for two telephonists in the local exchange to deal with "cab calls" at a special "cab position." There are nine cab ranks, each for 23 cabs at each rank, there is a c.b. instrument associated with three jacks. When a plug is inserted in a jack the line is completed through a 3,000-ohm resistance. Each chauffeur is provided with a plug, and it is his duty to insert the plug in a jack when he is free at the rank. The "cab operator," by pressing a key causes, "marking" lamps associated with each rank to light, if a plug is in any jack at the rank. This shows where there are cabs free. Each line from the rank has also an ordinary calling lamp for the receipt of calls made from the rank.

There are two transfer lines in the outgoing junction multiple, so that when a subscriber asks for "cabs," the answering telephonist puts the caller through to the "cab operator"; this operator presses the "marking" key and ascertains at which ranks cabs are free, and chooses the rank nearest the calling subscriber. The "cab operator" has in front of her a map showing the nine cab ranks, and a list of streets, showing which are the first, second, and third most suitable ranks. The public can order cabs in advance, the orders being ticketed and then passed on to the relative rank 10 minutes before the cab is required.—*Svensk Trafik-Tidning.*

A PIONEER IN TELEGRAPHY.

THE *Farnham & Haslemere Herald*, in making an appeal to its readers to adopt some method of raising means to maintain Sir Wm. Cooke's grave in the local cemetery, gives the following interesting particulars of his life :—

Sir William Cooke was born near Ealing on May 4, 1806. His father, William Cooke, was a Doctor of Medicine and Professor of Anatomy at Durham, and was appointed Reader in Medicine to the newly-organised University there, where he began his lectures in 1833 and died in 1857. His son was educated at a School in Durham and at Edinburgh University, thereafter serving in a variety of staff appointments in the East Indian Army from 1826 to 1831.

Returning to England on furlough on account of the state of his health in the latter year, he soon afterwards relinquished his appointment in the Madras Native Infantry, and proceeded to Paris, where, in 1833 and 1834, he studied anatomy and physiology, and practised modelling anatomical dissections in coloured wax, an art in which he acquired great skill. Early in 1834 he returned to Durham, and prepared models for illustrating his father's lectures. Next year he accompanied his parents on a Continental tour, and at Heidelberg he met Professor Tiedman, the Director of an Anatomical Institute, who offered to assist him in procuring the means for making wax preparations. Accordingly he hired a room there, and during the winter of that year he worked so assiduously in wax modelling that he was able to supply his father at Durham with a copious supply.

How he became diverted from this class of work may be related in Cooke's own words extracted from a number of letters, mostly written to his mother, and from other reliable sources.

In a work of two volumes, published by him in 1856, entitled *The Electric Telegraph; Was it invented by Professor Wheatstone?* he says:—

"About March 6 1836, a circumstance occurred which gave an entirely new bent to my thoughts. Having witnessed an electro-telegraphic experiment by Professor Muncke, of Heidelberg, who had taken his idea from Gauss, I was so much struck with the wonderful power of electricity and so strongly impressed with its applicability to the practical transmission of telegraphic intelligence, that from that very day I entirely abandoned my former pursuits and devoted myself thenceforth to the practical realisation of the electric telegraph. Professor Muncke's experiment was at that time the only one I had seen or heard of. It showed that electric currents, being conveyed by wires to a distance, could be caused to deflect magnetic needles and thereby give signals. It was a hint at the application of electricity to telegraphic purposes, but provided no means of applying that power to practical uses. His apparatus consisted of two instruments for giving signals by a single needle placed in different rooms, with a battery belonging to each ; the signals given were a cross and a straight line marked on the opposite sides of a disc of card fitted on a straw at the end of which was a magnetic needle suspended norizontally in galvanometer coils by a silk thread. Within three weeks after the day on which I saw the experiment I had made, partly at Heidelberg and partly at Frankfort, my first electric telegraph of the galvonometer form, which is now at Berne."

The apparatus which Cooke saw at the Heidelberg Professor's place was probably Baron Schilling's Telegraph.

RAILWAY COMPANIES' LEAD.

It is not the object or purpose of this article to follow in chronological order the rather lengthy list of improvements on his original system, enumerated by Cooke himself in a series of most loving and affectionate letters to his mother, nor to appraise his contribution to the science of telegraphy. Suffice it to say that the ultimate result of his monumental work was the adoption of his telegraph system by the railway companies and the formation of the first telegraph company in this country.

Writing to his mother under date June 10, 1837, he informed her that yesterday he went to King's College to meet Professor Wheatstone and to try his instruments, which had nearly received their last touch. "I had hoped," he added, "to have had our experiments made public to-day, but dare not till the patent is out, as one day's impatience may ruin all. The King's health is still so precarious that he can transact no business. A report was very prevalent yesterday that he was dead, but contradicted in the evening." In a postscript he joyfully adds, "Hurrah for the 10th of June. I send you good news ; this moment (five minutes to 10 o'clock) obtained. All now is safe. Cooke and Wheatstone's patent signed by his Majesty, and receiving the great seal this day, June 10, 1837, for electric telegraph alarums."

This refers to the first of the many patents of Cooke and Wheatstone.

Their first meeting took place in February, 1837, and after a few interviews they agreed to work together in partnership, a step which affected both the happiness and public reputation of Cooke.

Wheatstone's name and reputation over-shadowed, if not eclipsed, that of Cooke, who was regarded by some of the scientific world as a mere business partner or practical mechanic whom Wheatstone had selected to work out his ideas and inventions. The latter has been suspected, and with apparent justice, by unbiased authorities of giving countenance and currency to these opinions which became so universal that not until after Cooke's death did the scientific world realise the error of their judgment. Cooke himself published two volumes as already stated, and his brother, the Rev. Thomas Fothergill Cooke, M.A., was the author of a pamphlet in 1868 on "The Authorship of the Practical Electric Telegraph in Great Britain," and another in 1869, entitled "Invention of the Electric Telegraph : The Charge against Sir Chas. Wheatstone."

In 1841 some difference had arisen between Messrs. Cooke and Wheatstone as to their relative positions in regard to the invention and introduction of the electric telegraph, and it was agreed to refer the question to Sir Marc I. Brunel and Prof. Daniell.

Their award, which was issued on April 27, 1841, after detailing Cooke's experimental work from its beginning in March, 1836, pointed out that in February, 1837, while engaged in an intended experimental application of his telegraph to a tunnel on the Liverpool and Manchester Railway, he became acquainted, through the introduction of Dr. Roget, with Prof. Wheatstone, who had been engaged for some time in somewhat similar experiments.

In May, 1837, they took out a joint patent, on a footing of equality, for their existing inventions. The terms of their partnership, which were most exactly defined in November of the same year by a partnership deed, vested in Mr. Cooke, as the originator of the undertaking, the exclusive management, of the invention. As partners standing on a perfect equality, they were to divide equally all proceeds, a percentage being first payable to Cooke, as manager. After examining the other details of this agreement, the referee's judgment is given as follows :

"Whilst Mr. Cooke is entitled to stand alone, as the gentleman to whom this country is indebted for having practically introduced and carried out the electric telegraph as a useful undertaking, promising to be a work of national importance ; and Prof. Wheatstone is acknowledged as the scientific man, whose profound and successful researches had already prepared the public to receive it as a project capable of practical application ; it is to the united labours of two gentlemen so well qualified for mutual assistance, that we must attribute the rapid success which this important invention has made during the five years since they have been associated."

With feelings of the highest esteem Messrs. Cooke and Wheatstone acknowledged the correctness of the facts stated, and expressed their grateful sense of the friendly and gratifying manner in which the opinion of their joint labours, and the value of their invention had been recorded. There can be little doubt, after perusing Cooke's numerous letters to his mother and other correspondents—now the property of the Institute of Electrical Engineers—that Cooke was more suspicious than jealous of Wheatstone, whether from intuition or from some knowledge of the experiences of others, cannot now be definitely affirmed. Certain it is, however, that the Professor laid claim to many inventions to which he undoubtedly was not entitled.

The so-called Wheatstone Bridge, for instance, was the invention of Christie ; the electric clock and the first printing telegraph instruments were purely and solely the absolute inventions of Bain, whose claim was vindicated beyond all manner of doubt, and with unenviable reflections upon the spurious claimant.

It has been said of Cooke that any soreness of feeling which might once have existed towards Wheatstone had been outlived, but the facts remain that, long after the award of Messrs. Brunel and Daniell, articles continued to pour into the scientific press, and pamphlets continued to be published, in which bitterness of expression was not the least common feature.

When the Electric Company's Bill was introduced in the Parliamentary Session of 1846, the old struggle for priority was renewed, and Bain relentlessly opposed it before a Committee of the House of Commons, which met for nearly a week in March, and finally found the preamble proved.

In June Bain again appeared as the chief petitioner against the Bill before a Select Committee of the House of Lords, under the Chairmanship of the Duke of Beaufort. All the evidence had been taken, and Counsel for Bain had been heard, when, on Saturday, June 6, an adjournment was made until Monday, the 8th, the Chairman remarking that the parties might come to some understanding in the meantime.

When they met on Monday it was intimated by Counsel that they had taken advantage of the interval which had elapsed to come to a satisfactory arrangement, and that the opposition to the Bill had been withdrawn. Explanations and congratulations followed, and so the "Electric Telegraph Company" was founded with all three patentees (Cooke, Wheatstone and Bain) incorporated.

This Company, one of the largest telegraph organisations in the world, continued its sphere of usefulness from then until 1870, when the Company was compulsorily bought up by the Government, but not without a strenuous struggle against the arbitrary methods adopted at the transfer.

Bain received £7,500 for his patents, and if certain of them were used by the Company an additional £2,500, while the total paid, including Cooke and Wheatstone's share, amounted to £120,000.

Sir Charles Wheatstone was knighted in 1868, and Sir William Fothergill Cooke in 1869. Wheatstone died in Paris on Oct. 19, 1875, Bain in a home at Kirkintilloch on Jan. 2, 1877, and Cooke at Farnham on June 25, 1879 ; so that he outlived all his contemporaries.

Cooke's correspondence, now in possession of the Institute of Electrical Engineers, and extracts from which, relating particularly to the invention and development of the electric telegraph, were published in 1895, contain

one short, sad document, written in rather nervous and shaky characters on a black-bordered sheet of notepaper. It is in these words :—

" My latest wish is that my funeral should be most modest and inexpensive, with a simple stone at ' my head,' inscribed simply thus :

WILLIAM FOTHERGILL COOKE,
Died ——th, 187—.

" Nothing more whatever. And if my name should be recorded on our family vault in Oaklands Churchyard, let it be simply :

W.F.C. In Memoriam.
Born May 4, 1806.
Died and buried in Churchyard at Farnham, 187—.
May 4, 1879, William Fothergill Cooke."

Is it too much to ask your readers to pass a kindly thought of remembrance to the illustrious dead resting in their midst, and to adopt some simple method, such as the purchase of a small annuity, where the authorities would be enabled to maintain Cooke's resting-place in perpetuity ?

REVISION OF TELEPHONE CHARGES.

THE following alterations to the telephone charges come into force on July 1 :—

Local Calls.—The charges of $1\frac{1}{4}d.$ for a local call and of $2\frac{1}{2}d.$ for a second unit call are reduced to $1d.$ and $2d.$ respectively. These reductions apply also to chargeable calls originated by Rural Party Line subscribers.

Discount to Large Users.—The rebate of 5 per cent. on the value of calls in excess of 2,000 per annum is abolished.

Trunk Calls.—Certain of the charges for short-distance trunk calls are reduced by $1d.$ The following table shows the present and new charges for trunk calls up to 50 miles for each of the three charge periods. The charges for calls above that distance remain unaltered.

	7 a.m.—2 p.m.		2 p.m.—7 p.m.		7 p.m.—7 a.m.	
	Present Charge.	New Charge.	Present Charge.	New Charge.	Present Charge.	New Charge.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
$7\frac{1}{2}$—10 miles ...	4	3	3	3	3	3
10 —$12\frac{1}{2}$ „ ...	5	4	4	3	3	3
$12\frac{1}{2}$—15 „ ...	6	5	4	4	3	3
15 —20 „ ...	8	7	6	5	4	4
20 —25 „ ...	10	9	8	7	5	5
25 —35 „ ...	1 1	1 0	10	9	6	6
35 —50 „ ...	1 6	1 6	1 1	1 0	9	9

OBITUARY.

We deeply regret to hear, on the eve of going to press, of the sudden death of M. Pierard, the chief engineer of the Belgian telegraph and telephones. Our late Belgian colleague was well known and respected in this country, where his ability and amiability always ensured him a welcome when visiting England. To his colleagues of the Belgian administration and his sorrowing relatives we tender our respectful homage and sympathy.

WIRELESS INSTALLATIONS AND POWER WIRES.

The South Wales Electrical Power Co. have issued the following striking leaflet (which we reproduce with acknowledgments) to wireless enthusiasts, drawing their attention to the necessity for taking proper precautions to protect their installations from power wires.

LISTEN IN!

Electricity if properly applied will

CURE PAIN.

Consult your Physician.

But Electricity will

GIVE PAIN

if not properly applied.

CONSULT THE SOUTH WALES ELECTRICAL POWER CO.

Cardiff B.B.C. Station has a plant capacity of approx. 2 h.p., and has a 350 metre wave length whilst the South Wales —Electrical— Power Co. has a plant capacity of approx. 80,000 h.p. and distributes at voltages up to 11,000 at a wave length of 12,000,000 metres.

Aerials are erected to receive from the B.B.C. Station, and NOT from the South Wales Electrical Power Co.

To obtain a supply for Power or Lighting purposes from the latter Company, apply Head Office.

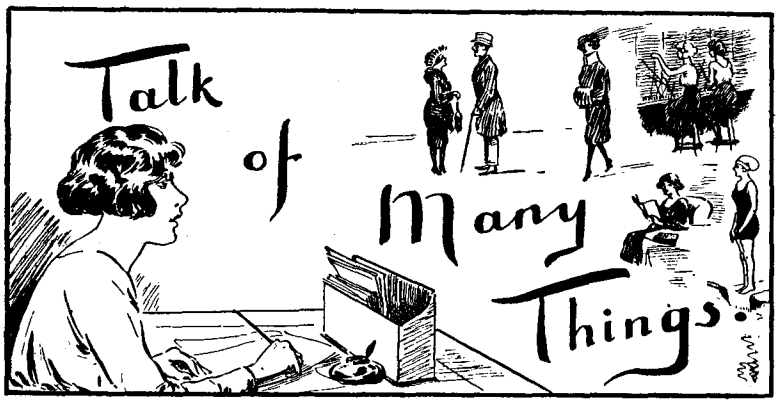
To protect yourselves, and to meet with the requirements of Clause 4, B.B.C. Licence, all aerials crossing or adjacent to any overhead Power Wire must be guarded.

Free advice regarding this will be given to anyone making application to

SOUTH WALES ELECTRICAL POWER CO.

TEL. No. 1407 (3 LINES). PARK PLACE, CARDIFF.

WE TELEPHONISTS



WE have pleasure in printing the following from a new contributor :—

DEAR EDITOR,—You have an interesting page in your journal devoted to the doings of telephonists. I have often wondered if any of your readers would be interested in what the writing assistants do. Quite a lot of my colleagues have been operators, and though we had many exciting times in the old days with irate subscribers, we have discovered that being a W.A. is not "all jam" either. In the old times we could always put in the last word and disappear; but now, unfortunately, there is no getting away from a subscriber at the counter. They come, at times with a determination to say a lot, and a lot of things they do say too—not always printable! A rough time we have of it, sometimes, trying to smooth ruffled feelings. The operators have a bad time of it we know when a cable breaks down, but I wish they could spend a day at the counter in the office when such a thing happens. The unlucky ones usually commence calling to see about it shortly after 9 a.m., and continue in a steady stream all day. It is no use settling to work. No sooner do we sit down than we are up again to tell someone that a water pipe had burst into the cable, or that there had been a fire. Some of the subs. realise that it is an unavoidable accident, but others refuse all the comfort we offer them of speedy repairs, and complain loudly of hundreds of pounds losses. "Eight telephones in my office," said one man, "and you can't get one of them in working order." Then follow threats to claim for losses, complaints about the service in general, enlightenment as to the brain power of those in authority and the complainant's personal opinion of the unhappy counter clerk. Finally, an indignant exit to a growling and grumbling accompaniment. Sometimes after a little gentle persuasion they go away in quite a good temper, one or two usually re-appearing later on in the day demanding to see the manager. A few see the funny side, as in the case of one man who asked if I was sure that it was not a beer pipe burst into the cable!

Many other incidents could be given of crotchety people—not all telephone subscribers, by any means. But, of course, it's all in the day's work, and perhaps we shall get our reward in the next world!

Back-Chat.

It is difficult to write on one's back. I speak from experience, but I would not have you suppose that I have been indulging in some extraordinary gymnastic contortion. What I mean to convey is that when I lie on my back I find it difficult to write. So far from being strenuous, I have been reclining at length in the grass on a hillside, thinking of nothing in particular and wearing a disreputable sports suit and an expression more than usually vacant. I have permitted the beauty of hill and valley, tree and bird to saturate me, and without my permission the rain has often done the same.

The ceaselessly purposeful activity of nature has been a reproach to my languorous indolence. Shamedly I take out pen and paper and make a valiant attempt to grind out my monthly lines. Looking up for a moment to gain inspiration and to ponder upon a complex problem of orthography (is it one or two *fs* or is it *ph*?) I catch sight of a footpath. There it goes, down across the meadow, through the hedge, over a musical brook, up the hillside, round the wood and—yes it is *ph* I think, but the printer will know.

Later the chatter of voices and ripple of laughter distract me, and a party, equipped with ruck-sacks, sticks and heavy boots, pass by bound for the top of the local Everest. Anon I see them again through my field-glasses, venturing round narrow ledges and crawling up heart-stopping places to a sterile, boulder-strewn summit. I wonder why they do it, and why they spend so much time and energy in going where I have been scores of times—through my glasses. Perhaps they like to sit on the mountain's scarred old head and tell him of the beautiful streams and soft sweet grass at his feet and of his graceful skirts of green trees and cool shadows. Perhaps they like to watch the mist spill soothingly over his furrowed brow. I am sure they share with me a hatred of the mountain railway and deprecate such an insult to a mountain's dignity.

I resume my attempt to write but there is a bird in the woods nearby. What sort of bird is it? I cannot tell, nor can I tell how sweet is its song. What kind of trees are they—well what matter? The wood is a Gothic Cathedral filled with divine music. I glance again at my sheet of paper, and I find that I have written absentmindedly "I am directed by." By whom or what? By Nature I think, to rise up and go forward and upward and to breath in and drink beauty.

But it's so awfully comfortable on my back in the grass and humanly I say "To-morrow." And on the morrow, too, I will crouch like an S over my desk and write.

PERCY FLAGE.

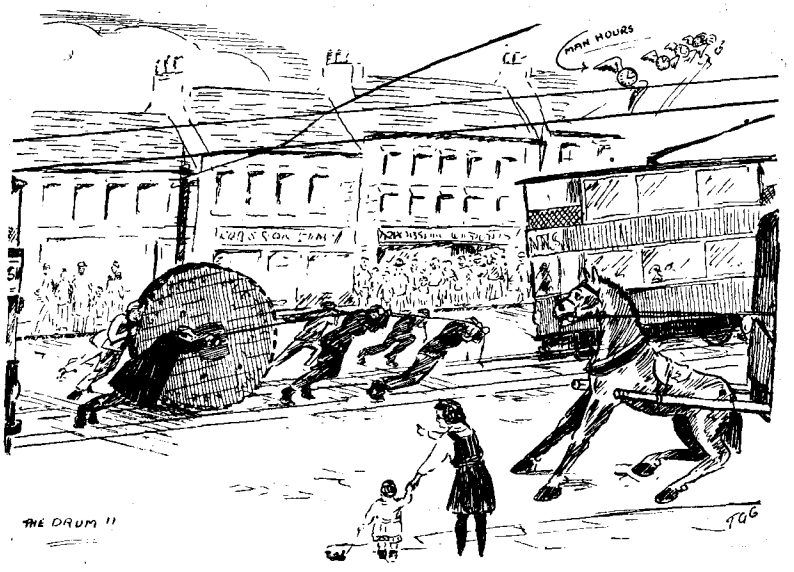
Good News from "Telephony": May 23rd 1924.

THINGS ARE NOT GOING TO THE DOGS.

My grandpa notes the world's worn cogs,
And says we're going to the dogs.
His grand-dad in his house of logs,
Swore things were going to the dogs.
His dad among the Flemish bogs,
Vowed things were going to the dogs.
The caveman in his queer skin togs,
Said things were going to the dogs.
But this is what I wish to state—
The dogs have had an awful wait.

H.E.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.



[*Drawn by T. A. Christelow, Newcastle-on-Tyne.*

THE DRUM.

AUTOMATIC TELEPHONES FOR JAPAN.

The contract for the reconstruction of the Toyko telephone system, which was utterly destroyed in the recent earthquake, has been awarded to the Nippon Electric Company, Limited, of Toyko, an associate company of the Western Electric Company.

The entire system is to be the Strowger Automatic Type and will be manufactured in England jointly by the Western Electric Company, Ltd., of London, and the Automatic Telephone Manufacturing Company, Ltd., of Liverpool.

The initial order covers an equipment of 25,000 subscribers' lines to be installed in five offices, with trunking equipment in two other offices to enable the subscribers on the new automatic exchanges to reach the subscribers on the remaining existing manual exchanges.

The value of the initial contract now placed is about three quarters of a million sterling and the entire reconstruction programme will involve the building of about 25 new exchanges in due course.

PRESENTATION TO MR. ARTHUR COTTERELL.

ON Monday afternoon, June 2, in the impressive Deputation Room at the Secretary's Office and before a large assembly representing every headquarters branch of the General Post Office as well as the Birmingham telephone district, Mr. R. A. Dalzell, C.B., C.B.E., the Director of Telegraphs and Telephones, presented Mr. Cotterell on behalf of his numerous friends in the service with an excellently mounted 2-valve wireless set and loud speaker, a gold mounted fountain pen and an illustrated autograph album of unique character, as well as an etching, the gift of Mr. Henry J. Howard, of the Mails Branch, and two excellent camera portrait studies of Mr. Cotterell by Mrs. Eleanor Thomson, of Palmers Green.

Mr. Dalzell was very happy in recalling the honourable and leading part played by Mr. Cotterell in the introduction of telephony since its inception in England in 1879, and testified to the esteem felt for him by his colleagues all over the country who had travelled along the same pioneer road, and he wished him every possible success and happiness in the future activities with which, as a man immersed in so many scientific interests, he would no doubt soon engage himself.

It was evident throughout Mr. Dalzell's kind and complimentary speech that the sentiments he expressed so well were heartily shared by those who had assembled to do honour to their colleague on the occasion of his retirement.

Mr. Cotterell, in reply, said: I thank you from the bottom of my hear for these beautiful presents, for the generous words that have been said and for your cordial acclamation, I wish that I could conjure to my lips words which would adequately express my deep appreciation of your goodness to me. As to the presents I cannot imagine a more pleasing and more appropriate gift than this very fine wireless set which represents the last word, as yet, in the latest development of telephony. It will give great delight to my family and friends as well as to myself, and whenever I use it I shall be reminded of the givers. I am indeed glad to receive this album containing the autograph of my many friends which will recall pleasant memories. This book is rendered all the more charming because I understand that it has been very kindly illustrated by Miss Margaret Maitland Howard, one of whose pictures hangs on the line at the Royal Academy, and the inscription in the book is the handiwork of another friend, Miss Nancy Prout; both these ladies being daughters of two esteemed colleagues.

I have also to thank Mr. H. J. Howard for this fine etching of Moret, and for several illustrations which he has added to the book—also Mrs. Eleanor Thomson for these fine photographs of myself which she very kindly took in her studio. I should like to praise them more fully but for the fear of appearing too vain.

I am much obliged to Mr. Dalzell for the part which he has taken in the proceedings to-day, and for the very kind things which he has said. I am mindful, of course, that he is the Director of the British telegraph and telephone services, and, therefore, I regard his presence and action on this occasion as an honour, a kindness and a high mark of courtesy.

I imagine that all the arrangements for this presentation and send off have entailed considerable work to someone, and I thank my old friend and colleague, Mr. T. A. Prout, for this further instance of his unfailing goodwill and kindness.

As has been pointed out I believe I may claim to have entered the telephone service earlier than any one else now in the service, and I am proud to think that I have therefore been in a sense the doyen of the service. It may be that there are still in the service some others who entered the Post Office some days or weeks before my entry in the telephone enterprise in November, 1879, but my point is that, if there are any such, they would not be in the telephone service then but on the telegraph or postal sides.

Well, as Mr. Dalzell has said, it has been a long road. Sometimes it has been stony and mostly uphill, but it has been very interesting, opening up many pleasant vistas. In the mind's eye I see, when looking back, a small group of pioneers—I could almost count them on the fingers of one hand at the time when, as a boy, I ventured to throw in my humble lot. That tiny group has been added to till you are now a huge army charged with the carrying on of this great enterprise. It has been my privilege and pleasure to see, in the course of this great march, all, and to walk and converse with practically all, those men who have played any prominent part in British telephony, and to see the whole growth of the business. That is a great satisfaction.

To-day we reach a milestone, an important one for me, as it marks the point on the road when I leave you, but ere I turn aside to "seek fresh fields and pastures new," let me pause for a moment to thank you for your goodness to me and to wish you one and all "God speed."

POST OFFICE TOTAL ABSTINENCE SOCIETY.

THAT the "P.O.T.A.S." still waxes strong in the Post Office firmament was well in evidence when the annual meeting of the Society took place in the handsome oak hall of Gresham College on May 29. An appreciative audience had gathered in reasonable expectation of being not only entertained, but also enlightened, and they were not disappointed. The musical programme was up to the usual standard, the reputation of the Society in this particular respect was well maintained. Miss Norah Tappenden ably presided at the piano, and also rendered two pianoforte solos, in a very pleasing manner. Miss Rita Roberts in her singing proved herself an accomplished soprano. Two recitals given by Miss Minnie Malien showed that lady to be a very entertaining elocutionist, particularly were we interested in "The Telegram," little thinking that, in every-day fulfilment of our duties, we were handling missiles of such potential mischief and embarassment. We were relieved to find, however, that it all ended with conventional happiness. Mr. R. A. Jones gave two songs for which he was applauded.

An innovation at these meetings was that of the gymnastic display given by a squad of messengers from G.P.O. North, under the leadership of Mr. Keay. All the various evolutions were negotiated with wonderful rhythm and precision. Club swinging, blindfold boxing, vaulting horse and pyramids were items of great interest, a sword swinging solo by J. H. Lovejoy received prolonged and well-merited applause.

Mr. C. G. Ammon, Parliamentary Secretary to the Admiralty, who is, as is well known, a former Post Office man, presided and gave an interesting address, remarking how glad he was to have an opportunity of speaking before a Post Office audience to testify to the great advantages which he believed followed the practice of total abstinence. For that reason he had readily accepted the invitation. Speaking as a life-long abstainer, he was convinced of its soundness in promoting the stability of the Commonwealth. He spoke with not a little feeling of the fact that he began as a messenger, the proudest moment of his life being when he first donned that uniform. Speaking of the future he said that the nation that was comprised of total abstainers was going to lead the world. At the end of an inspiring and interesting speech, Mr. Ammon was warmly applauded.

Shortly afterwards he was compelled to leave for a critical division in the House of Commons, and he was succeeded in the chair by Mr. F. J. Brown, Assistant Secretary, G.P.O. Sir Wm. Joynson-Hicks, who wrote regretting inability to be present, has signified his pleasure at continuing as President of the Society, an honour he esteems very much.

Miss Madgshon, Chief Principal Woman Medical Officer of the Post Office, has kindly consented to become chairman of the Council of the Society.

H. B. W.

CORRESPONDENCE.

METAL STORAGE TRANSMITTERS.

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

SIR,—In view of the many inaccuracies contained in Mr. Donald Murray's letter on Metal Storage Transmitters, published in the April issue of the TELEGRAPH AND TELEPHONE JOURNAL, I should be grateful if I might be allowed to correct any misapprehension that may have arisen concerning the Miniotti Metallic Storage Automatic Transmitter.

Mr. Murray blandly states that he was the "first to propose the idea, and the first to construct" an apparatus for transmitting telegraph signals with the aid of steel balls projecting from apertures in a container. It will perhaps be interesting to Mr. Murray to learn that, whilst his experiments were conducted in 1916, mine were made as far back as 1909.

The views expressed by Mr. Castelli in his article in a previous issue of the TELEGRAPH AND TELEPHONE JOURNAL, *re* the disadvantages of Perforating Tape transmission, were made chiefly in connexion with our most important telegraph traffic, namely, the ordinary brief commercial and private message. For press work the perforated slip system may have the advantages mentioned by Mr. Murray, but his statement that "it is impossible to get anything like the speed with a metallic storage transmitter that is easily obtainable with keyboard perforators and tape transmitters," is altogether incorrect. That may have been the case with his apparatus, but with the "Miniotti" the maximum output of the average expert manipulator can be easily absorbed, it being possible to accumulate 450 signals in the one minute. With the Baudot this is, I find, unnecessary, a storage of 150 being quite sufficient.

Mr. Murray also complains that "stoppages and confusion and reduced output" will arise by reason of the operator overtaking the speed of the machine. This is not possible, for when the full complement of accumulated signals is reached, a bell is caused to ring, and the interval arising whilst the stored words are being transmitted, can then be utilised by the operator in attending to corrections, &c. This, it will be agreed, fulfils all that which is capable by perforated slip systems; but the simplicity of the mechanism, and its low cost of manufacture and upkeep, are such that it is impossible not to agree; that if only from an economical point of view, its adoption would greatly benefit any of the telegraphic administrations.

Concluding, I can assure Mr. Murray that the experiments that are still being carried out by myself with this transmitter are further demonstrating my claim, that for ordinary commercial traffic it has many practical advantages over the perforated slip systems.—Yours truly,

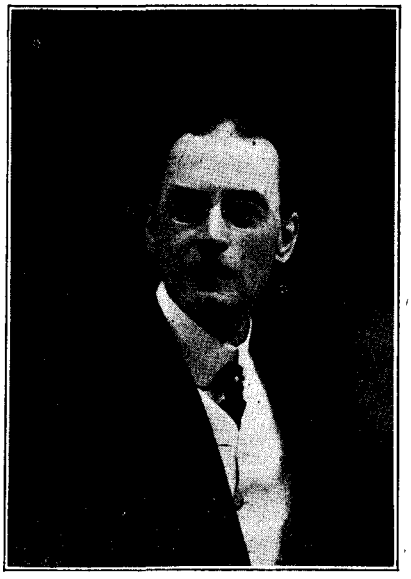
GIOVANNI MINIOTTI.

LONDON TELEPHONE SERVICE NOTES.

Presentation to Mr. F. E. H. Webb.

THE London telephone service has lost a very well-known and popular officer by the retirement of Mr. F. E. H. Webb, which has been necessitated on account of ill health some 18 months before the normal date. Mr. Webb enjoyed an interesting career which commenced in assisting his father who was Secretary of the I.E.E. He was then attracted to the United States of America and after association first with a lumber concern, and then a scientific publishing company, he entered the service of the New York Telephone Company and remained with them for some years. On returning to England telephone work was the magnet and short periods were served with the National Company and the P.O. Engineering Department.

Mr. Webb entered the Post Office telephone service in 1901 and during the last 23 years has had experience in almost every section of headquarters traffic work. Until a few years back when his health began to fail, Mr. Webb was one of the most active members of the staff from the social point of view. He was in his element organising dances, whist drives, concerts and outings



MR. F. E. H. WEBB.

and there was practically no branch of sport in which he did not take an interest. No game came amiss to him and his charm as colleague or friend was added to by an apparently inexhaustible store of anecdote. He was one of those few people who can hear a good story, and remember it later at the right moment and re-tell it without missing a point.

Unfortunately in recent years his failing health has gradually led to the cessation of most of his activities, and, greatly as it is regretted by his old friends, his early retirement has not come as a surprise to them.

On May 21 there was a little ceremony in the Refreshment Club at St. Bride Street when a farewell presentation was made to Mr. Webb. The gifts consisted of a silver hot water jug with inscription, an armchair, some rugs and a dressing gown, some stainless knives and a wrist watch for Mrs. Webb who was present with her husband. Mr. Dive made the presentation with a happy and appropriate little speech, and Mr. Webb replied in quite his old style, referring humorously to the present fund as like the widow's cruse; for although he kept adding to the list of things he wanted there always seemed to be some money over.

All his old friends and colleagues heartily joined in Mr. Dive's wish that the rest from official cares would speedily restore Mr. Webb to health, enabling him to renew some of his former activities and gain full enjoyment from his future freedom and leisure.

Messengers' Institute.

The annual display of the London Messengers' Institute was held at the Institute Premises in Throgmorton Avenue on Friday May 23 last.

The chair was taken by Mr. W. A. Valentine, Controller of the London Telephone Service and the distribution of the "Peel Cup" and the medals awarded by Mr. Leech was made by Mrs Valentine.

During the evening squads of messengers under the able guidance of their instructor, Mr. G. P. W. Keay, gave an exhibition of the gymnastic exercises on the horizontal and parallel bars and on the vaulting horse, and made up several very creditable set pieces. The lighter side was provided for in the shape of blindfold boxing and Messenger Vine swung swords to the music of the Institute orchestra which, under the capable direction of Mr. Gadsby, played at intervals during the evening.

Before Mrs. Valentine presented the prizes, the chairman addressed a few words of advice to the boys in the value of having and keeping a good name throughout life, and stated that it gave Mrs. Valentine and himself much pleasure to know that the first winners of the "Peel Cup" awarded for all-round efficiency in gymnastics was the squad of the London telephone service (Messrs Vine, Gardner, and Keemer.)

The medals awarded by Mr. Leech for individual prowess were also presented by Mrs. Valentine.

At the request and on behalf of the messengers of the London telephone service, Mr. Valentine presented Mr. G. P. W. Keay, the Institute's popular gymnastic instructor, with a handsome walking cane.

Culled from the Exchanges.

Addiscombe.—An eventful day was May 16, when our exchange reached its first birthday. A tea party was arranged and the former Supervisor, Miss Adlam, was invited to take part in the celebrations. Each member of the staff was the recipient of a birthday gift and the occasion was observed in the manner appropriate to birthdays of the very young.

It was all very jolly and we hope that as we grow older we shall still be able to count the years with interest and satisfaction in the knowledge that though small in stature Addiscombe is leading a useful life.

BIRTHDAY TEA PARTY, ADDISCOMBE EXCHANGE.

ADDISCOMBE EXCHANGE, AGE 1 YEAR.

* * * *

NOTE.—The compiler of these notes would be glad to receive items of interest from the Exchanges for inclusion in these columns.

PERSONALIA.

LONDON TRAFFIC STAFF.

Resignations on account of marriage :—

Miss D. M. GODDARD, Telephonist, of Central Exchange.
Miss R. M. FRENCH, Telephonist, of Holborn Exchange.
Miss L. M. COLLARD, Telephonist, of Putney Exchange.
Miss V. D. BULLOCK, Telephonist, of Regent Exchange.
Miss E. W. FLACK, Telephonist, of Regent Exchange.
Miss A. E. MARTIN, Telephonist, of Regent Exchange.
Miss K. E. LUSBY, Telephonist, of Museum Exchange.
Miss H. E. MOULTON, Telephonist, of Museum Exchange.
Miss M. MCNICOL, Telephonist, of Paddington Exchange.
Miss E. LAURSEN, Telephonist, of Paddington Exchange.
Miss F. E. RAINES, Telephonist, of Trunk Exchange.
Miss P. L. HOLMES, Telephonist, of Trunk Exchange.
Miss M. R. GIDNEY, Telephonist, of Trunk Exchange.
Miss B. FRENCH, Telephonist, of Trunk Exchange.
Miss A. E. GWYNN, Telephonist of Trunk Exchange.
Miss M. ANDREWS, Telephonist, of Hammersmith Exchange.
Miss S. A. BENTLEY, Telephonist, of Chiswick Exchange.
Miss A. M. ARTHURS, Telephonist, of Chiswick Exchange.
Miss M. SHILLUM, Telephonist, of Dalston Exchange.

THE

Telegraph and Telephone Journal.

VOL. X. AUGUST, 1924. No. 113.

CONTENTS.

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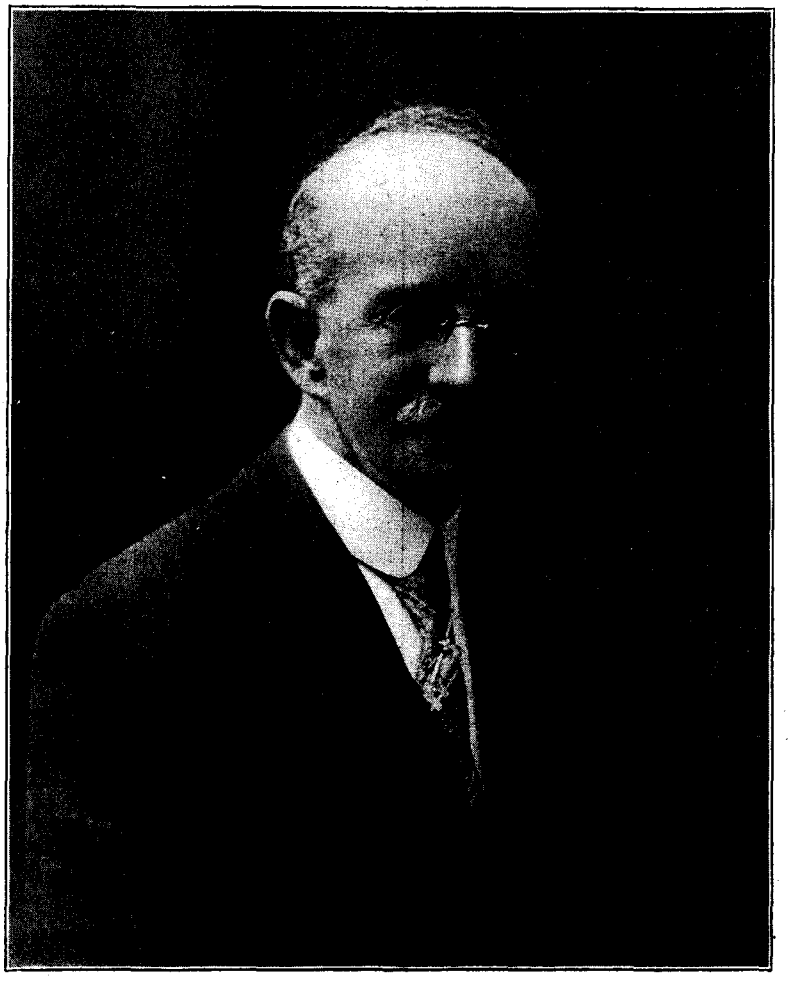
All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.4.*

TELEGRAPH AND TELEPHONE MEN.

VII.—MR. G. R. W. JEWELL.



MR. G. R. W. JEWELL, Chief Superintendent, Telegraphs, Manchester, was born on Jan. 15, 1866. He entered the telegraph service at Manchester as an Unpaid Learner on Jan. 31, 1880, and passed through all the grades until he reached the head of his department on Dec. 24, 1921.

Mr. Jewell obtained promotion from the rank and file at the comparatively early age of 32, and his subsequent advancements came at fairly regular intervals, due to his painstaking methods and conscientious attention to his duties. Until his appointment to his present position his services were utilized mainly in the Instrument Room, but he had experience in the Survey, Accounts, and Telegraph Correspondence branches.

Of a kindly, considerate, and genial nature, always willing to listen to troubles and difficulties and to give sympathy, and help when possible, Mr. Jewell has always had the good will of the staff under his control. Proud of the Manchester office, which for years held an outstanding position in the provincial telegraph service, it has been a source of regret to him that circumstances arising from conditions beyond his control have resulted in a decrease of the traffic dealt with at Manchester, and seriously affected the flow of promotion to the staff under his charge. He is now little more than a year short of the normal age for retirement, and his many well-wishers trust that his remaining period of service may be as smooth as is consistent with his high office, and that on its termination he may be in possession of good health and able to enjoy to the full the leisure then awaiting him.

THE TRAINING OF THE CONTRACT OFFICER.

BY F. W. GEORGE (*Contract Manager, Brighton*).

A RECENT article in *The Times* raises some doubt as to whether Mrs. Glass prefaced a famous recipe with the proviso " First catch your hare " ; but this condition can well be adopted as a sound telephone maxim.

The contract section is the vanguard of the telephone service, and administrative headquarters and engineers can only deal with schemes on the basis of anticipated development in exchange lines, which the contract force has to obtain.

The responsible duty of selecting and training contract officers necessarily devolves on the contract managers : when one realises that there is a telephone station development of less than 3 per cent. in this country as compared with 14 per cent. in the United States of America, it is manifest that only the fringe of telephone development has yet been touched, and it is certain a very considerable augmentation of the contract force must be made, when the engineers have overtaken the arrears of cable work resulting from the transfer conditions and aggravated by the War.

The training should, therefore, be thorough and intensive, in order that the least promising material may be eliminated and the net result an efficiently trained force of commercial representatives and dividend earners. A contract officer who is sent out equipped only with a schedule of tariffs and the contract manager's blessing is unlikely to prove a fruitful vine.

In the following syllabus of training, which is in force in this district, the points covered ensure a contract officer having a good insight into the administration and working of the telephone service, enabling him as a commercial representative to render explanations to subscribers in understandable and non-technical language. Space will not permit me to enlarge in detail on all the points covered by the syllabus, with the exception of the all-important objective " new business," but the observations given after each item indicate the line of training. The syllabus is as follows :—

1.—" *The Telephone Service—What it is, What it does, and How it does it.*"

Trace the development of the telephone service from its inception to the present day and the building up of the vast exchange and trunk line system.

2.—" *The lay out of underground cables and distribution to subscribers.*"

Our friends the Engineers are good enough to interest themselves in this phase of the business, and their kindly help has enabled the contract officers to get a clear insight into plant lay-out which is invaluable, both in the initial training of the contract officers and subsequently when qualified to undertake field surveys in development studies.

3.—" *An outline of exchange operating methods and procedure as regards busy subscribers with overloaded lines.*"

4. " *How large and small switchboards are operated.*"

Both the foregoing points are dealt with by co-operation with the Traffic Section and conducted visits to representative exchanges.

5.—" *Private Branch Exchange Telephone working.*"

This is covered by visits to important Private Branch Exchanges and gives the contract officer in training a good idea as to the possibilities of this class of development.

6.—" *Telephone Tariffs.*"

In addition to familiarising the contract officer with the telephone tariffs, advantage is taken to explain the basis of the tariffs. For example, rental of installation—based on the capital charges and maintenance costs for the circuit, instrument and exchange equipment. Trunk charges—based on capital charges and maintenance costs for the trunk line, plus operating costs. Local calls—based on operating costs. This enables the contract officer to deal broadly with questions as to the conditions which govern tariffs.

7.—" *Public and Private Wayleaves.*"

An explanation of the department's wayleave powers with observations as to wayleaves with public bodies.

8.—" *Map Reading.*"

This is important, not only in order that a contract officer may obtain a comprehensive grip of the lay-out of his territory, but because it is part of the initial training for field survey work on development studies.

9.—" *Telephone Accounts.*"

As contract officers are often called upon to explain accounts to subscribers, an insight into the method of accounting is given.

10.—" *Call Office Development.*"

Emphasize the value of the call office as an educational and advertising factor.

11.—" *Development Study.*"

The article in the TELEGRAPH AND TELEPHONE JOURNAL for June, 1923, covers the ground so thoroughly that its inclusion in the syllabus is essential. It may perhaps be mentioned that a development study indicates the increase in business considered probable after taking into account all the varying factors, but the contract officer should not regard this as final ; rather he should set out to beat the figures if possible. He should not make the mistake of relaxing efforts if it is seen that the development estimate is likely to be exceeded even if he personally made the study, as it is recognised that at best the forecast can only be an intelligent anticipation, which may be upset by subsequent events that could not have been foreseen when the study was made.

12.—*The successful Contract Officer.*

Having conserved space in covering other items in the syllabus it may perhaps be permissible to deal with this at some length. In an article in the TELEGRAPH AND TELEPHONE JOURNAL for November, 1922, I made some observations as to the essentials for success in a contract officer, and the following remarks are addressed to the contract officers, not only to new entrants, but to the " old brigade," in the hope that they may perhaps induce a new line of thought and enable them to view the business from a new angle.

Plan your work. Haphazard canvassing and spasmodic efforts will never win through. Sustained results are only obtained by organized canvassing methods. Get on your ground in the golden hours of the morning when you are mentally alert and fresh. Morning canvassing will generally produce better results than can be obtained after lunch. Break new ground continually. Do not keep ploughing over the same old furrows.

Develop personality. Don't talk about yourself ; talk telephones. Avoid stereotyped methods ; be flexible in thought and reasoning. Know when to finish talking. A good argument is often spoilt by over-elaboration. Give time to the prospect in hand and do not exercise injudicious pressure. This often hardens people in their decision not to subscribe. Hustle has been defined as " false haste" and germinates suspicion in the minds of prospective subscribers.

Stimulate interest in your prospect. Tell him what the telephone does. How it saves him time, money, develops his business, and how a residential telephone service gives him security and banishes isolation.

Bring out the salient points of the service without being technical. Go "all out" for residential business. The private house

subscriber is the key to development. A large number of private residences connected will ensure service being taken by traders, which in turn compels the commercial house and the professional men to subscribe. Don't be a Micawber, waiting for something to turn up; an order may be waiting for you round the corner. Be an optimist. I recently heard the definition of an optimist which is so true as to be worth repeating :—"An optimist sees an opportunity in every difficulty, and a pessimist sees a difficulty in every opportunity."

Study the temperament and status of the prospective subscriber, in some cases using persuasion and in others deference, but always with the same objective—" new business."

Do not play off business rivals. The fact that Jones has given you an order for a line need not be advanced as an argument to his rival Brown to subscribe for service. Brown will know soon enough and consider the contract officer tactful in not mentioning it.

Always observe the " etiquette of the road " when calling on business firms, and take your turn with other commercial representatives seeking interviews. They have equal right of access to their customers.

Remember always that the measure of success in developing a provincial district is best indicated by the growth of rural exchange stations, which is a true test of effective contract work in the creation of a demand for telephone service, as compared with the existing demand in the more commercial urban districts.

Above all, get interviews. If you fail at the first or second attempt, call up the office reserves and canvass by post, following up later. The interview and contract will eventually be secured.

Keep a chart on your office wall, ruled up to show exchanges in your territory and divided into weeks, the date of last visit being indicated by a X in the " week " column. This prevents the possibility of any exchange being neglected or overlooked.

Don't take a parochial view. Regard the telephone system from a national standpoint, in the development of which you are a personal factor. Aim at reaching the desideratum, 100 per cent. efficiency.

GOLF.

SECRETARY'S OFFICE *v.* C.T.O. AND L.T.S.

Played at Bush Hill Park on Monday 7th July, 1924.

RESULT.

SINGLES.

Secretary's Office.		*C.T.O. and L.T.S.*	
C. L. K. Peel (5) 2 up	1	E. Woods (8)	0
H. Darby (9) 4/2	1	W. G. Valentine (16)	0
J. W. MacNair (4) 3/2	1	C. D. Upham (18)	0
B. Savage (11) 7/5	1	J. B. Minhinnick (16)	0
W. E. Weston (8) 1 up	1	A. W. Edwards (18)	0
A. Gordon (18) 5/3	1	W. H. Napier (16)	0
De G. Gavey (12) 4/2	1	B. Hain (14)	0
H. H. Kilby (16) 2 up	1	J. Deacon (18)	0
	8		0

FOURSOMES.

Peel and Darby 2/1	1	Woods and Valentine	0
MacNair and Savage 6/5	1	Minhinnick and Upham	0
Weston and Gordon 6/5	1	Edwards and Napier	0
Gavey and Kilby	½	Hain and Deacon	½
	3½		½
Total	11½	Total	½

TELEPHONE DEVELOPMENT OF GREAT CITIES.

THE annexed tables show the telephone development of some of the largest cities in the world. Whilst Stockholm still takes the first place, western American cities follow very closely in its wake, and we may add that many other cities of the first magnitude (as regards population) in the United States could have been added to the list, but that they would have swelled it to inordinate length. We have, therefore, confined ourselves to the four largest, together with San Francisco and Los Angeles, which give a fair idea of the high state of the telephonic development of American towns.

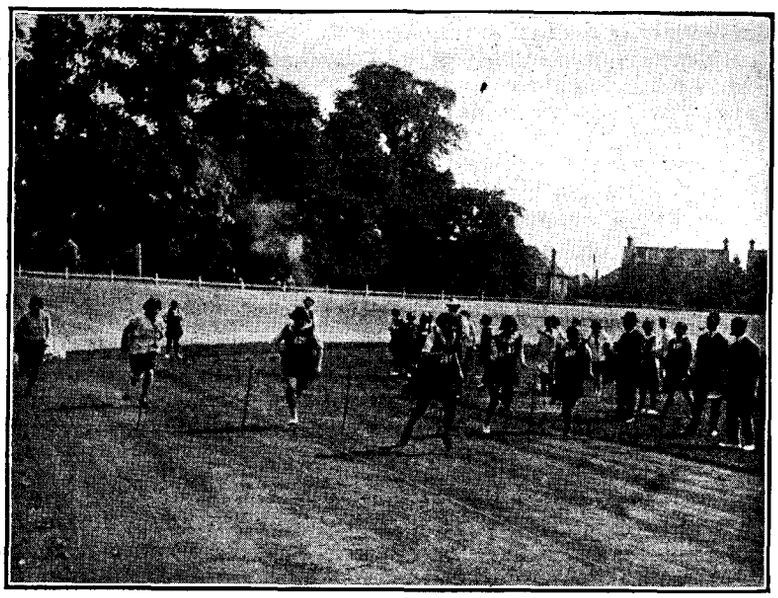
The unusually high development of Stockholm is partly due to the competition between the State and the Almanna Co. which formerly existed, and the resultant duplication of telephones. To those who are familiar with the results which follow the cessation of competition—viz., the gradual cessation of duplicate lines—it will not be surprising to learn that the total number of telephones in Stockholm has been decreasing for the last few years. It is not improbable that this process is by now completed and that they will shortly shew an upward tendency again.

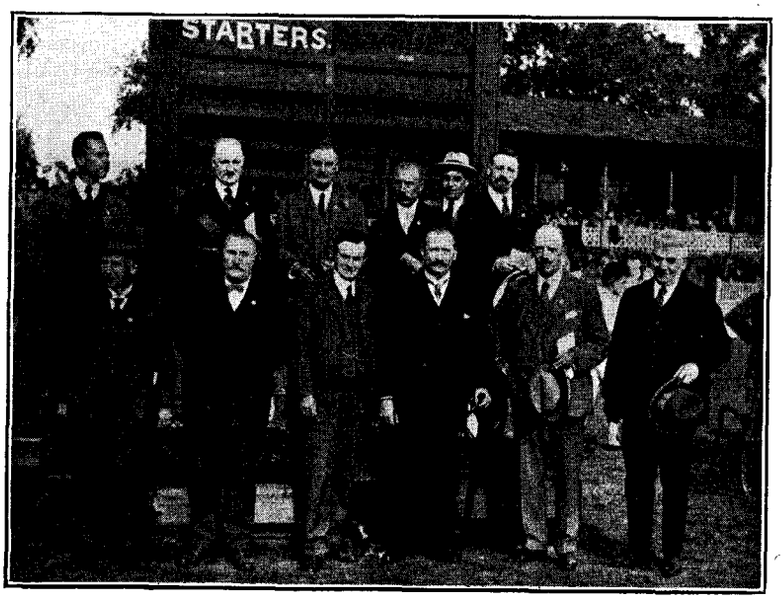
Copenhagen, another highly developed European city, is a good second to Stockholm, and amongst the systems serving a population of a million and upwards, Berlin comes first, closely followed by Hamburg, London and Paris.

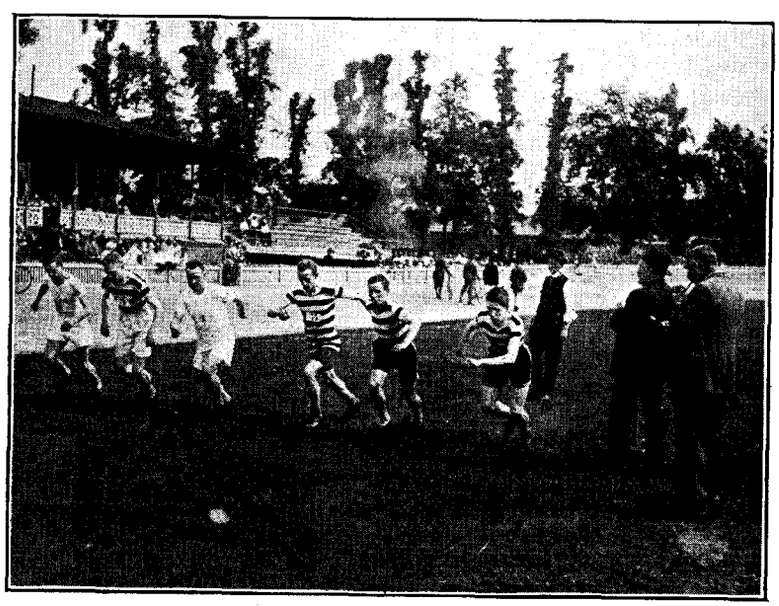
We have hitherto, in dealing with British cities, shown the development of telephone areas only, thus including a large number of suburbs where the development was much poorer than in the city itself. By this means British towns appeared to compare unfavourably with foreign ones, and in the following table we shew the development both of the city proper and of the city with its surrounding area. It will be seen from this that the London County Council area, which is the official limit of London, shews the respectable development of 1 telephone to every 13 inhabitants. Figures for 1923 have been added where obtainable.

DEVELOPMENT OF PRINCIPAL CITIES.

Cities.	No. of Telephones. 1922.	1923.	Population per Telephone. 1922.	1923.
Stockholm	103,760	—	3.6	—
San Francisco	172,742	—	3.9	—
Los Angeles	189,458	—	4.5	—
Chicago	638,650	—	4.5	—
Boston	340,352	—	4.9	—
Toronto	112,211	—	5	—
New York	1,072,632	1,185,997	5.8	4.9
Philadelphia	284,000	—	6.7	—
Copenhagen	89,562	—	6.3	—
Copenhagen and Suburbs	111,580	—	7.8	—
Berlin (Greater)	355,691	—	11.2	—
Hamburg, Altona, &c.	113,482	—	12	—
Paris City	185,312	203,731	16	14
,, and Suburbs	—	220,674	—	19
London (L.C.C.)	308,349	329,363	14	13
,, telephone area	369,038	401,065	19	17.6
Vienna	84,338	—	22	
Glasgow (City)	38,242	39,754	27	26
,, (7-mile radius)	43,111	44,926	29.3	28
Liverpool (City)	29,778	31,186	27	26
,, (7-mile radius)	40,256	42,370	29.7	28
Manchester and Salford	36,737	39,072	27	25
,, (7-mile radius)	50,585	54,648	31	29
Birmingham (City)	24,893	27,846	37	33
,, (7-mile radius)	28,998	32,431	44	39







CENTRAL TELEGRAPH OFFICE SPORTS, HERNE HILL.

THE RIGHT HON. VERNON HARTSHORN PRESENTS THE PRIZES.

TELEGRAPHIC MEMORABILIA.

THE Annual General Meeting of the Eastern Telegraph Coy. was a particularly interesting one this year in that the chairman was able to report that the Company was back again to its old pre-war standard as regard the average time of transmission over their various cable systems. In support of this it was stated at the gathering that the Company have a staff constantly engaged in the reading of messages for errors. "As a result of the figures compiled from these observations," said the chairman, "the latest error return of all the companies' stations shows that the percentage of error for hand working is .199, and for automatic working .038, or for both classes an error percentage of .095. I think you will agree with me that in both cases the result shows a very high degree of efficiency, particularly when it is recognised that these are mostly code and cypher words which to any ordinary person in most cases would be difficult to pronounce, and I trust it may have the effect of dispelling any anxiety you may feel as to the accurate transmission of cablegrams, at any rate so far as the Eastern Companies are concerned."

The dispute with Turkey formed another subject. This the Company appeared to treat with a certain stoical fatalism; briefly, according to a report in the London *Times*, "the dispute has arisen over a sum of over £100,000 due for terminal rates at Smyrna during the hostilities between Turkey and Greece, and the amount is claimed by both parties. The Company has repeatedly conveyed its desire to pay over this sum, which has been provided for, immediately to the rightful party to be settled by international arbitration. Neither country has agreed to this course, though the matter has been pressed through the diplomatic channels. Turkey is proceeding against them in her country for the recovery of this amount, and Greece threatens to take similar action."

"Turkey," said Sir J. Denison-Pender, "has closed our offices in her territory, and we have, therefore, had no alternative but reluctantly to terminate the engagement of the Turkish staff and withdraw from the country. I do not think, however, you need feel perturbed, as the present profit derived from the Turkish traffic after paying expenses does not materially affect our revenue either one way or the other, although on sentimental grounds we, of course, regret that associations which have been so cordial during practically the whole of the Company's history should have been terminated, whether temporarily or permanently, through no fault of this company."

The Company may feel fairly complacent about the matter, but those who have had facilities for watching the Constantinople telegraph traffic since the closing of the Eastern Company's office in that city cannot but deplore the fact which has deprived the British trader of the Company's efficient service and given in exchange the acme of unreliability.

During the past year the associated companies acquired the rights of a patent for superimposing another means of communication on the existing cables.

All cables are what is called "duplexed"—that is to say, two messages pass over one copper wire in opposite directions at one and the same time. This new invention for superimposing enables one to send an additional message at the same time in one direction; so that you have on one copper wire two messages going one way and one message coming the other way at the same time, thus providing a third channel on an existing cable with small additional expense. This is actually working on one of the Gibraltar-Malta cables, where it is carrying additional traffic very satisfactorily, and is now being installed on other cables of the associated companies. It also has the advantage that it will convey local traffic between two adjoining stations on a main line route without interfering with the main line through traffic which continues to pass at the same time.

The report then goes on to speak of the development of wireless and its effect on cables, and this portion is hereunder produced *in extenso* as some indication of the cable company view of their modern competitor.

"For some years past at these meetings it seems to have been expected that I should make some statement concerning wireless. Nothing has transpired since last we met to alter in any way the opinions which I have previously expressed. At our last meeting I informed you that the Company had applied for wireless licences for full-powered stations in Great Britain, India, and China. With regard to the two former, you are no doubt aware the Government will in the course of possibly a few days declare their policy with regard to wireless communication; and, as regards China, the present state of that country renders any negotiations very difficult.

Wireless competition with the Eastern Telegraph Company is in operation between England and Egypt, between France and Indo-China and Madagascar, and between Holland and the Dutch East Indies. In the case of the three former countries the rates of charge are lower than those in operation by the cables, but so far the competition has not been such as to necessitate any reduction of our tariffs. With regard to Holland and the Dutch East Indies, the rates charged by the wireless and the Company's cables are the same.

There is, however, little doubt that, though wireless has demonstrated its great practical value in very many different ways, it still remains true that the submarine cable, with its world-wide privacy of transmission and freedom from atmospheric disturbances, is the most reliable, swift, and secret method of international communication."

From this and from indications in other directions it may be safely predicted that whatever may be the future developments of radio-telegraphy, the sponsors of cable telegraphy do not mean to lay down their arms and die quietly. Speaking some few weeks ago to some Continental experts in telegraphy of both types, the writer gathered that the next Americo-European submarine cable is likely to prove the last word in high speed submarine cable transmission. These advances in cable construction, once generally adopted, will set up a pace for radio telegraphy which the latter cannot possibly maintain without recourse to high-speed apparatus, and a much improved organisation for dealing swiftly not only with a percentage of traffic at triple rates, but also with the ordinary commercial and social ordinary rate traffic.

AUSTRALIA.—The Federal Government, reports Reuters' Trade Service, propose to spend £442,000 in providing additional telegraph and telephone cables between Sydney and Newcastle (N.S.W.) and between Newcastle and West Maitland (N.S.W.). It is proposed to put down a cable between Sydney and Newcastle containing 200 wires and one containing 100 wires between Newcastle and Maitland. Ultimately 150 telephone circuits will be provided in addition to telegraph circuits. It is hoped by this scheme to increase the present annual revenue from £20,000 to £120,000 in twenty years.

The Commonwealth Government, which holds a controlling interest in Amalgamated Wireless (Australasia), Limited, it is reported, is actually at the moment proceeding with plans for the establishment of a comprehensive service capable of affording direct communication between Australia and Europe, as well as America. Amalgamated Wireless, Limited, will shortly erect in Australia, a high-powered station in the vicinity of Sydney. In each of the other capital cities of the Commonwealth there will also be a feeder station for direct communication with the high-powered station and the subsidiary feeders. It is proposed that the charges on all messages shall be reduced by 33⅓ per cent., and there will be special concessions for week-end radiograms.

AUSTRIA.—Following the demonstrations by the Technological Trade Museum, declares *Commerce Reports*, a permanent service has been undertaken by the Oesterreichische Radio-Verkehrs-Aktiengesellschaft. At present this company co-operates with the Austrian postal authorities in transmission. It is proposed to use the radio installation on the building of the War Ministry for the first station. Experiments have been made with a normal power of 1 kW. Different wave-lengths will be used. Broadcasting took place for the first time on March 25, on a 1,200-metre wave-length, and regular broadcasting is to be started on July 1. Economic data, intended for a small clientèle, will be in code, which will be changed every week so as to avoid listening by those not entitled to the service. The tax for a set will be 10 gold crowns, collected by the Post Office. To cover the expenses of the broadcasting station, every owner of a set will pay a yearly fee of, possibly, 50 gold crowns, which fee will be reduced considerably in cases of hospitals, associations, and schools; public places where radio is used for advertising purposes will pay a higher rate.

BURMA.—The Government of India has submitted for the consideration of the Government of Burma tentative proposals for the development of broadcasting in India and Burma. Licences to broadcast will be issued to approved persons or companies by each of the local Governments, as, owing to the size of the Indian Empire, a grant of an exclusive licence to one company would be unduly restrictive. Otherwise the conditions of the licence follow closely those of the British Broadcasting Co.

CEYLON.—It is also reported by the same source that a committee has recommended that a radio broadcasting service should be undertaken by the Government, and that it should be controlled by the Post Office.

FRENCH W. AFRICA.—Radio communication has been established between France and her West African colony by the opening of the new radio telegraph station at Bamako.

GREECE.—The renewal to the Eastern Telegraph Coy. (British) of certain rights not enjoyed by other foreigners is receiving consideration by the Greek Government.

GERMANY.—What is termed by Reuter's agency "a new broadcast receiver" has just been tested in Munich, where a high postal official demonstrated on June 17 an invention which, it is claimed, enables telephone subscribers to listen to concerts, speeches, &c. It is reported that the second act of the "Valkyrie," played at the Munich State Opera House, was heard distinctly through a small apparatus attached to an ordinary telephone instrument. It is added that the invention will be put on the market in October.

JAPAN.—The Tokio correspondent of the same agency announces the first Government broadcasting station in Japan has just been completed in the central radio station in Shiba Park. In order to promote a general knowledge of radio and its uses, and with the natural thoroughness of the Japanese, steps have been taken to include in school text-books simple lessons demonstrating the value of this means of communication. The Department of Communications is still engaged in drawing up the necessary regulations for the control of broadcasting, and has, according to report, decided to license one station with a radius of 100 miles for each of the nine

cities of Tokio, Osaka, Sapporo, Sendai, Aomori, Nagoya, Hiroshima, Fukuoka, and Niigata. In other cities the radius of the licensed station is limited to 20 miles. Applications for permission to operate broadcasting stations are far in excess of the number of licences to be granted, and a rigid scrutiny of the qualifications of each applicant will be necessary before the licence can be granted and the broadcasting service inaugurated.

PORTUGAL.—A very sad story comes through the British Chamber of Commerce at Lisbon regarding the utilitarian side of radio-telegraphy in Portugal which is evidently in a chaotic condition, and one most prejudicial to the commerce of that country. Great delays are experienced in communicating with ships, and little attention is paid to ships calling up Portuguese stations with urgent messages for shipping agents. "The wireless service of the country," the report asserts, "is so bad that undoubtedly some day there will be a serious maritime disaster owing to the lack of attention paid at the wireless stations" to calls. There are three principal stations in the country—at Leixoes; at Lisbon, worked by the Post Office; and a powerful Portuguese naval station at Monsarto. The first two are supposed to deal with shipping traffic, but their installations, though apparently technically capable of dealing with shipping, are, in practice, unable to do so, owing to lack of trained staff. The naval station is not available for shipping work.

RHODESIA.—*Commerce Reports* states that it is proposed to connect Salisbury with Pretoria, South Africa, by means of a 6-kW duplex radio telegraph installation. At present all aerial traffic from Salisbury and Beira and territories to the north and east, which now communicate with the south by way of Salisbury, must be retransmitted at Bulawayo. The proposed direct transmission would enable Bulawayo to concentrate more freely on Northern Rhodesia and Congo traffic, which would result in a saving of 50 per cent. in such telegraph work and considerably relieve the telegraph stations at Johannesburg and Cape Town.

SOUTH AFRICA.—Radio broadcasting is to be started at Cape Town next month. The inauguration of a broadcasting station at Johannesburg on July 1 has been followed by a great demand for receiving licences. The wave-length is between 350 and 450 metres; a 500-watt transmitting set is used. The opening of this station has caused quite a wave of enthusiasm for wireless apparatus, and there, as in this country, the home-made set is the hobby and pride of many a telegraphist. The Associated Societies' licence gives an area for the collection of fees from listeners extending 100 miles in all directions from Johannesburg, and it is expected that the station will be supported by the fees paid in by persons owning receiving sets.

SUMATRA.—According to *Eastern Engineering* the Netherlands East Indies Government intends to erect two new stations in Sumatra, one of which will be located at the free port of Bengkalis. The erection has probably commenced by this time, and on its completion the installation of a station at Belawan will be undertaken and it should be in operation some time this year. There is now only one high-powered station in Sumatra, that located at Sabang. The new station will be installed and operated by the Government, in the same manner as the Government stations in other parts of the archipelago. Both stations will have a radius of not more than a few hundred miles. The station at Belawan will be used chiefly by shipping companies for communicating with vessels at sea, for which the only present means of communication is by land wire and cable to Sabang, Penang, and by other near-by ports that have radio stations. The installation at Bengkalis will greatly facilitate communication, as there is no cable or other wire communication between Bengkalis and the mainland of Sumatra.

UNITED STATES.—The practice of delivering telegraph messages in a nearby town by telephone is held by the Ohio Public Utilities Commission to be a more efficient method than to establish a branch telegraph office therein.

According to one of Reuter's American correspondents the Convention of the Associated Manufacturers of Electrical Supplies has officially banned the word "broadcasting" and substituted "radiocasting" as being more applicable. One's taste may be somewhat depraved, but the substitute for the original hardly recommends itself to the ears of a sensitive Anglo-Saxon who, however, would have nothing to say against the very descriptive and sweeter sounding "Radiodiffusion" of the French, but our German colleagues of the Technical Colleges have settled upon "Rundfunk,"—well, and there you are!

An interesting item worthy of note to the students of terrestrial Magnetism appears in the report of the Astronomer Royal. The latter states that the magnetic elements at Greenwich now are:—declination, 13 degrees 35.1′W; horizontal force, 0.18452 C.G.S. units; vertical force, 0.43187 C.G.S. units; dip, 66 degrees 51.9′.

I do not know who he was, but his better half was evidently attracted by the glittering of the Post Office telegraph apparatus at Wembley. He, not over anxious to display manly ignorance of the mysterious collection of wheels and cases—at least, in the eyes of his respecting spouse—had made one or two evasive but non-satisfying replies to the lady of his choice who, nevertheless, still lingered aggravatingly behind. Then, as a last resource, and with something of the primitive force of the original forest dweller, the son of toil dragged the partner of his joys and woes away from the Government stand, exclaiming "Can't you see? It's just a lot of samples of Post Office brass polishing"!

How many Londoners have noticed or heard of the huge frame aerial erected on the roof of the tower of Bush Building, Aldwych, London, by the United Shipping Board? It has been installed together with the necessary apparatus to conduct business communication between London and the United States, says the *Electrical Review*.

The aerial is 8 ft. by 8 ft., and is wound round with 48 turns of wire, measuring in all 1,536 ft. The apparatus consists of nine valves (four high- and two low-frequency, one detector, and two 10-watt power amplifiers for loud speakers). Messages can be received from places 8,000 miles distant. It was designed by Mr. R. H. Redmond, the European radio supervisor of the United States Shipping Board, and, being mounted on ball-bearings, can be turned in any direction from the interior of Bush House by a wheel.

As an indication of how scientifically telegraph traffic is studied in large Government offices nowadays, it may be mentioned that the curve of the delivery time of telegrams rose perceptibly in the case of telegrams delivered in the City, Strand and Charing Cross districts from the very first day of the closing of Waterloo Bridge. The additional congestion of the streets due to the blocking up of the latter thoroughfare had by so much made it more difficult for boy messengers to safely find their way through the thickened mass of vehicles.

An interesting development of Anglo-Continental communications has recently been inaugurated by the use of the "split" Baudot system on the Anglo-German circuits. The system itself is, of course, not by any means new, but this is the first occasion upon which it has been adopted by the German authorities, and has opened a vista of possibilities which may eventually have a large influence on the stabilisation of Anglo-Continental telegraph communications through Germany. Reference is here made to the establishment of direct connexion between London and Bale by means of two channels of one of the duplex double Baudots working between London and Hamburg, and is proving an excellent reserve communication in the event of interruptions of the normal route to Switzerland. May we also accept this development as a token that the German telegraph authorities are turning their attention to multiplex systems? We should not be surprised.

Last month saw the retirement, in excellent health and spirits one is delighted to be able to say, of Mr. C. Sanderson, Plant Superintendent of the Inland Department of the C.T.O., to whom is extended the sincerest of wishes for many happy days of retirement. With the departure of friend Sanderson passes out of the doors of G.P.O. West, one of the most competent of the "old brigade," one of the best of sportsmen of the new!

One reads the *Cable Room Monthly* with real interest month by month, but the July number stands out as specially replete with knowledge and artistic appreciation. The article in French on the Paris C.T.O. in the Rue Grenelle would prove an excellent examination paper for new entrants to the Cable. Even with a dictionary at the side of the candidate it would prove no mean test.

Literary Study.—The aim of literary study is not to amuse the hours of leisure; it is to awake oneself, it is to be alive, to intensify one's capacity for pleasure, for sympathy and for comprehension. . . . . The spirit of literature is unifying; it joins the candle and the star, and by the magic of an image shows that the beauty of the greater is in the less.—*Literary Taste*, ARNOLD BENNETT.

J. J. T.

WHO INVENTED THE TELEPHONE?

MEMORIAL TO AN ITALIAN CLAIMANT.

A MARBLE tablet, says a correspondent of the *Observer*, with a medallion portrait has been placed on the public Post and Telephone Office at Florence to the memory of a Florentine citizen, Antonio Meucci, "the inventor of the telephone—poor and defrauded of his rights."

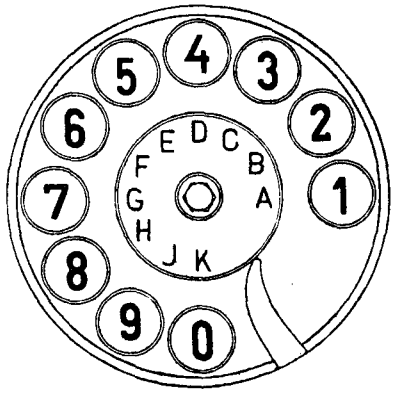
The story of Antonio Meucci, like that of many inventors, is curious and pathetic. He was born in Florence, of poor parents, in 1808, and on growing up he earned his living for some time as a theatrical scene-shifter. His political opinions brought him into conflict with the authorities, and he and his wife emigrated to the United States. Here he set up successfully a piano factory and a candle factory, without attaining any particular success with either. Meucci's home on Staten Island became a centre for Italian political refugees, and when Garibaldi fled to America after '49 he was warmly welcomed by the Meuccis, with whom he lived for a year or two, working in the candle factory. In the intervals of candle-making Garibaldi and his host would make experiments with a wonderful new invention for transmitting sounds to a distance which Meucci had discovered. Garibaldi on the first floor of the little house, and Meucci in the cellar, would talk together for hours through this original, primitive telephone, of which the merit undoubtedly belongs to the Italian exile, who was the first to make a practical application of principles which others only considered as a vague possibility.

Meucci perfected his apparatus to the best of his ability, and some years later he presented it for examination to the President of the New York District Telegraph Company. Getting no encouragement, in 1871 he went to the Patent Office in Washington and took out a patent for his invention. Through lack of knowledge and, still more, through lack of means, he omitted to protect himself completely by taking out supplementary patents for the different component parts of his appliance. Meucci's designs became known, it is said, through the indiscretion of someone in the Patent Office, and five years later the honour of having invented the telephone was publicly awarded to the Scotch engineer, Graham Bell, who took out a patent in 1876 for a telephonic apparatus only differing slightly in certain details from that of Meucci. The remainder of Meucci's life was passed in vain efforts to get his prior claims recognised. He brought law suits, and friends took up his case, but, hampered by extreme poverty, he was never able to fight successfully and he died, a bitterly disappointed man, in 1889.

BERLIN AUTOMATIC SYSTEM.

Telegraphen und Fernsprechtechnik gives some particulars of the system of dialling to be used in the Berlin automatic telephone system which will be of interest to our readers.

Plans for the conversion of the Greater Berlin system to automatic working were, we are informed, decided on in principle two years ago. Berlin at that time comprised 37 exchanges, 190,000 lines and 390,000 stations.* Plans had, therefore, to be laid for the installation of a million-system. Greater Berlin will be divided into groups of 100,000 designated by a letter of the alphabet. This letter will, accordingly, appear in the telephone directory, so that a subscriber connected with the Merkur exchange will appear thus: A2 Merkur 3618. A2 signifies the index letter and the cipher of the relative exchange at which the automatically-connected subscriber is to be found. By dialling A the calling subscriber is connected with the head office of the 100,000-group designated by A, whilst by dialling No. 2 immediately thereafter



connexion is obtained with the exchange in this 100,000 group designated by this number. In the example given A2 will obtain the exchange "Merkur." The Greater Berlin dial—as also that of Hamburg, in which likewise a million-system is under construction—contains, therefore, a row of letters on the inner side as well as the usual numbers, as shewn in the diagram. The designation Merkur cannot, however, be omitted at present for trunk and junction traffic with manual exchanges; 3,618 is the actual connexion number. Along with the telephones fitted for automatic subscribers, a small direction-tablet will be introduced later giving the names of the exchanges and their translation into index letters and index numbers to make matters easier for the subscriber. If a subscriber to an automatic exchange has dialled the index letter and index number of a manual exchange, he automatically gets the B operator of that exchange to whom he must give the number he desires. This operator makes the connexion in the usual way in the multiple field. W. H. G.

*The official total for 1922 was 335,691.—*Editor, T. & T. J.*

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

THE number of new telephone stations connected during May was 19,588, a particularly good figure. 8,671 telephones were ceased, making the total number working at the end of May 1,178,320, 417,220 in London and 761,100 in the Provincial districts.

The growth in exchange subscribers during recent months has averaged over 6,000 subscribers per month. The total at the end of May was 674,166 of which 202,546 subscribers were connected with the London system and 471,620 were distributed over the rest of the country.

The marked growth in residence rate connexions, noticeable since the lower rates were introduced in July, 1922, is being well maintained. 4,575 new installations were added during May, whilst the cessations were relatively low at 1,540. The proportion of residence rate subscribers in London is higher than in the Provinces, the total of 70,768 representing more than one-third of the total exchange subscribers. In the Provinces there are 121,365 private house subscribers, constituting one-fourth only of the total exchange connexions.

With regard to rural statistics, 21 new exchanges were opened during May in rural areas, and a further 15 were authorised under the specially favourable terms conceded two years ago to stimulate the growth of the telephone service in outlying parts of the country. So far approximately 6,000 subscribers have obtained service under these terms, in respect of 474 exchanges opened. A further 128 exchanges have been authorised, but are awaiting completion.

In addition to the opening of new rural exchanges, over 100 rural party line subscribers were provided with service, making a total of 8,570 of these stations working at the end of the month.

The total number of call offices in rural areas was 5,549 at May 31, an increase of 48 over the April total.

In response to the special campaign last spring, in the interests of agriculturists, to induce railway companies to have telephones installed at their outlying stations, about 14 rural railway stations on an average have been linked up with the exchange system each month.

The total number of call offices working at May 31 was 17,879, 3,994 in London and 13,885 in the Provinces. The net increase for the past five months has averaged 95 per month. The number of street kiosks also is increasing at an average rate of 20 per month. The total at the end of May was 673, of which 21 have been erected recently in the streets of London.

Further progress has been made with the development of the local exchange system. Exchanges opened included the following:—

Old Swan (Liverpool).
Royal (Liverpool).

Among the more important exchanges extended were:—

LONDON.—Brixton, Purley, Wallington, Waltham Cross.
PROVINCES.—Torquay.

During the month the following additions to the main underground system were completed and brought into use:—

London—Bristol.
Birmingham—Worcester.
Burnley—Todmorden.
Birmingham—Stafford (section of Birmingham—Manchester cable),

while 89 new overhead trunk circuits were completed, and 66 additional circuits were provided by means of spare wires in underground cables.

PRESENT-DAY MULTIPLEX TELEGRAPH DEVELOPMENTS IN THE C.T.O., LONDON.

THE following up-to-date list of the Baudot and other five-unit types of high-speed telegraph apparatus now in use in the C.T.O., London, in connexion with the stations given in column 1, is published as an interesting item for the benefit of our provincial, colonial, and foreign colleagues, as this or similar information is not infrequently asked for by technically-interested visitors to the London office. The following explanation of English code signs for the offices mentioned in column 1 is, of course, added for the guidance of those unacquainted with English procedure :—

AB —ABERDEEN.
BE —BELFAST.
BD —BRADFORD.
BH —BOURNEMOUTH.
BM —BIRMINGHAM.
BR —BRIGHTON
BS —BRISTOL.
CB —CAMBRIDGE.
CF —CARDIFF.
DE —DUNDEE.
DN —DUBLIN.
DY —DERBY.
EA —EASTBOURNE.
EH —EDINBURGH.
EX —EXETER.
GW —GLASGOW.
GY —GRIMSBY.
HS —HASTINGS.
HU —HULL.
IH —IPSWICH.
LE —LEICESTER.
LS —LEEDS.
LV —LIVERPOOL.
MI —MIDDLESBROUGH.
MF —MILFORD.
MR —MANCHESTER.
NG —NOTTINGHAM.
NC —NORWICH.
NT —NEWCASTLE, TYNE.
OF —OXFORD.
PY —PLYMOUTH.
PR —PRESTON.
RG —READING.
SF —SHEFFIELD.
SMU—SOUTHEND-ON-SEA.
SO —SOUTHAMPTON.
SX —SWANSEA.
TW —TUNBRIDGE WELLS.
TS —C.T.O., LONDON.
YO —YORK.
NV—NEVIN repeater office only.

r.p.m.—Revolutions of distributor brushes per minute.
w.p.m.—Number of words transmitted dealt with by the total number of *arms* per circuit. As all circuits mentioned are duplex all figures given should be multiplied by two, thus: AB four Duplex Channels at 120 *w.p.m.*=240 *w.p.m.* for entire circuit, *i.e.*, 120 in each direction. The letter G indicates vibrating relay used, otherwise Post Office Standard.

BAUDOT CIRCUITS (INCLUDING WESTERN ELECTRIC) IN THE C.T.O.

STATION.	Number of Duplex Channels	Type of Circuit Dx.	Distributor, How Driven.	Speed Correction.	Line, Aerial or Cable.	Main Voltage.	Repeater	G Relay	Main Speed.	REMARKS.
AB	4	Quadruple	Reed and Phonic Wheel	Mechanical	Cable Loop and Aerial	100	PR-EH	G	180 *r.p.m.* / 120 *w.p.m.*	——
BE	4	„	„ „	„	„	100	PR	—	„ „	Murray Automatic Baudot Receiver: To be converted into Triple Dx 240 *r.p.m.* 120 *w.p.m.*
BD-NT (NT[3])	4	Split Quadruple	„ „	Electrical	Cable Loop	100	—	G	„ „	BD Intermediate Station: 2 Arms to each station, with a switch at BD on second Arm to cut out NT if a third arm required.
BH	4	Quadruple	„ „	Mechanical	Aerial	80	—	—	„ „	——
BM[1] (1st) ...	6	Sextuple	Trainwork and Governor	„	Cable Loop	60	—	—	180 *r.p.m.* / 180 *w.p.m.*	——
BM[3] (2nd) ...	6	„	„ „	„	„ „	60	—	—	„ „	6th arm through to NC. Retransmitter: To be discontinued later and 6th arm restored.
BR	5	Quintuple	Reed and Phonic Wheel	„	Aerial	40	—	—	180 *r.p.m.* / 150 *w.p.m.*	300*a* Resistant Coil inserted in line circuit.
BS	5	„	„ „	„	Cable Loop	80	—	—	„ „	——
CB[2] ...	4	Quadruple	„ „	Electrical	Aerial	40	—	—	180 *r.p.m.* / 120 *w.p.m.*	——
CF[1]	4	„	„ „	Mechanical	Cable Loop	80	—	—	„ „	——
CF-NE ...	4	Split Quadruple	„ „	Electrical	„ „	80	—	—	„ „	CF Intermediate Station (not yet installed) 2 arms to each station.
DE	3	Quadruple	„ „	Mechanical	Cable Loop and Aerial	80	PR-GW	G	„ „	——
DN	4	„	„ „	„	Aerial	80	NV	—	„ „	——
EA[1]	4	„	„ „	Electrical	„	80	—	—	„ „	——
EH	4	„	„ „	Mechanical	Cable Loop	80	PR	—	„ „	——
EX-PY (PY[4])	4	Split Quadruple	Direct Motor-driven Governor	Mechanical	„ „	80	—	—	„ „	EX Intermediate Station: 2 arms to each Station with a switch at EX on 2nd arm to cut out PY if a third arm required.
GW[3] (1st) ...	4	Quadruple	Reed and Phonic Wheel	Mechanical	„ „	80	PR	G	„ „	Automatic and 5 tapper Keyboard interchangeable Baudot Receivers.
GW[4] (2nd) ...	4	„	„ „	„	„ „	80	PR	G	„ „	Automatic and 5 tapper Keyboard to be installed later.
GY	4	„	„ „	„	Aerial	80	—	—	„ „	Fitted for two lines simplex or one duplex.
HS-TW (HS)	6	Split Quadruple	„ „	Electrical	„	40	—	—	„ „	TS Intermediate Station: 3 arms to each station, 1 through arm TW-HS
HU	4	Quadruple	„ „	Mechanical	Cable Loop	100	—	G	„ „	Automatic Booth-Wilmot Keyboard and Receivers: To be converted into Motor distributor drive and Governor.
IH-YH (YH[1])	4	Split Quadruple	„ „	Electrical	Aerial	40	—	—	„ „	IH Intermediate Station: 2 arms to each Station with a switch at IH on 2nd arm to cut out YH if a third arm required.
LE-DY (DY)	4	Split Quadruple	Reed and Phonic Wheel	Electrical	Cable Loop	60	—	G	„ „	LE Intermediate Station: 2 arms each station.
LS	4	Quadruple	„ „	Mechanical	„ „	80	—	G	„ „	——
LV (1st) ...	4	„	„ „	„	„ „	80	—	—	„ „	To be converted into Automatic. Booth-Wilmot Keyboard and Receivers.
LV (2nd) ...	4	„	„ „	„	„ „	80	—	—	„ „	„ „ „ „

BAUDOT CIRCUITS (INCLUDING WESTERN ELECTRIC) IN THE C.T.O.—*contd.*

STATION.	Number of Duplex Channels	Type of Circuit Dx.	Distributor, How Driven.	Speed Correction.	Line, Aerial or Cable.	Main Voltage.	Repeater	G Relay	Main Speed.	REMARKS.
LV (3rd) ...	4	Quadruple	Direct Motor-driven Governor.	Mechanical	Cable Loop	80	—	G	180 *r.p.m.* / 120 *w.p.m.*	——
NG	3	„	Reed and Phonic Wheel	„	„ „	60	—	G	„ „	To be converted into Automatic Booth-Wilmot Keyboard and Receivers.
NC	4	„	„ „	„	Aerial	80	—	—	„ „	4th arm through to BM—Retransmitter: To be converted into Split Quad TS-NC-LT. NC Intermediate.
NT	4	„	„ „	„	Cable Loop	120	—	G	„ „	——
PY	4	„	„ „	„	„ „	100	—	G	„ „	——
PT (PT) ...	4	„	„ „	„	„ „	50	—	—	„ „	——
PR-EH (EH2)	4	Split Quadruple	„ „	Electrical	Cable Loop	80	—	—	„ „	PR Intermediate Station: 2 arms to each station.
RG-OF (OF)	5	„	„ „	„	Aerial	40	—	—	„ „	TS Intermediate Station: 3 arms to OF, 2 arms to RG, 1 through arm RG-OF.
SF	4	Quadruple	„ „	Mechanical	„	80	—	—	„ „	To be converted into Automatic. Murray Keyboard and Morkrum Page Printer.
SMU	4	„	„ „	Electrical	„	40	—	—	„ „	——
SO	5	Quintuple	„ „	Mechanical	Cable Loop	70	—	—	180 *r.p.m.* / 150 *w.p.m.*	——
SX-MF (MF)	4	Split Quadruple	„ „	„	Cable Loop and Aerial	80	—	G	180 *r.p.m.* / 120 *w.p.m.*	SX Intermediate Station: 2 arms to each station with switches at SX on 1st and 2nd arms to cut out MF on one or both arms if required.
YO-MI (MI) ...	4	—	—	—	—	—	—	—	„ „	——
1st Reserve ...	4	Quadruple	„ „	Mechanical	Loop Set	80	—	—	„ „	Available for all quadruples excepting Automatic, G Relay circuits, Split Baudot. Intermediate station. (Subject to slight alteration.)
2nd Reserve	4	„	„ „	„	„ „	100	—	G	„ „	Available for all quadruples excepting Automatic, Split Baudot Intermediate station. (Subject to slight alteration.)
3rd Reserve	$\frac{4}{5}$	Quadruple Quintuple	„ „	Electrical	„ „	80	—	—	„ „	Available for all quadruples, &c., as 1st Reserve set on the Quadruple Plate. BS, BR, SO on the Quintuple Plate.
MR3 (1st) ...	4	Quadruple	Forked Reed and Phonic Wheel	Mechanical Buffer	Cable Loop	80	—	—	240 *r.p.m.* / 160 *w.p.m.*	Western Electric Automatic and Page Printers.
MR7 (2nd) ...	4	„	„ „	Electrical (Lamp Resis.)	„ „	80	—	—	„ „	„ „ „ „
MR5 (3rd) ...	4	„	Reed and Phonic Wheel	Mechanical	„ „	80	—	G	180 *r.p.m.* / 120 *w.p.m.*	Automatic Booth-Wilmot Keyboard, and Baudot Receivers.

REVIEWS.

"*The Electrolytic Rectifiers.*" *By N. A. de Bruyne. Sir Isaac Pitman & Sons Ltd., Parker Street, Kingsway, W.C.2. 3s. 6d. net.*

An interesting book on a subject which seems to have escaped publicity to an unusual degree in this age of popular science. The author obviously knows his subject, and leads us in simple and lucid language through his and other investigations into the mysteries of the behaviour of lead and aluminium in various electrolites; he favours the theory of a gas envelope supported around the aluminium electrode by an oxide film and gives full reasons for his preference.

The book contains a description of the various methods of connecting the cell or cells, and concludes with instructions for the construction of a simple electrolytic rectifier for use in charging small accumulator batteries such as those used generally for wireless reception.

"*Automatic Telephones*" (*double volume*). *By F. A. Ellson, B.Sc. Hons. (Vict.), A.M.I.E.E. Sir Isaac Pitman & Sons Ltd., Parker Street, Kingsway, W.C.2. 5s. net.*

This—the latest addition to Pitman's Technical Primers—is an admirable treatise by one of our engineering colleagues on the fundamental principles, methods and advantages of automatic telephony. The illustrations are good and well annotated. There are descriptions of subscribers' apparatus and trunking and traffic problems, and the systems described are those of the automatic Telephone Manufacturing Co., Siemens, Western Electric and the Relay Automatic Company. A very useful appendix of standard terms and definitions, reproduced from the British Engineering Standards Association's Report, and a bibliography conclude what is a first-rate primer.

"*Handbook of Circuit Diagrams with Explanations.*" *By John M. Heath, 1st Lieut. Signal Corps, U.S. Army* (*McGraw-Hill Publishing Co., 6 and 8, Bouverie Street, E.C.4*).

This is a useful little book containing 72 clearly-drawn diagrams of both local and common battery connexions, accompanied by the necessary explanatory letterpress. Western Electric, Kellogg, Stromberg-Carlson and Dean systems are all fully treated, and the general principles of both local and common battery manual practice are set out in a very convenient diagrammatic form. The book is provided with an index.

A number of the *Mechron* has been handed in for review, and though this periodical, published in the interests of the mechanicians of the Post Office telegraphs and telephones, makes no claim to high literary merit, the specimen before us is a model to other organs with greater pretensions. Our columns were never designed to discuss the merits of one class or other of our colleagues, in the Service or out of it, but writing from a purely literary standpoint the points of view of the subscribers of *Mechron* are moderately stated in simple straightforward English. That in its pages is found room for chatty articles on interesting subjects may be gathered from the reproduction of one of them (Mr. W. E. Earp) published in another part of the present issue of the TELEGRAPH AND TELEPHONE JOURNAL. There is also no trace of a single error, typographical or otherwise, from the first to the last page. We are pleased indeed to have had the opportunity of reading this printed production by our very own "mecs."

The
Telegraph and Telephone Journal.

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. X. AUGUST, 1924. No. 113.

CONTINUITY OF TELEPHONE SERVICE.

CONTINUITY of service is so much a matter of course in the eyes of English and American telephone subscribers, that the vast majority of them can hardly conceive of a service which normally comes to end at the hour when the shops and offices close, and does not function at all on Sundays and holidays or at best only for a couple of hours. Admirers of Continental systems—and especially of cheap rates—whose experience is perhaps limited to the service in capital cities or whose telephonic needs have never chanced to require fulfilment in the night hours—seem seldom to be aware that night service is the rare exception in the country towns of Europe outside of the British Isles. And yet the provision of telephonic facilities at night is a very considerable economic problem, usually involving increased staffing which must affect the costs upon which annual charges are based.

A recent article in an American review is not slow to point out that only in the United States, Canada and Great Britain is continuous service given. It states that in only one per cent. of the French exchanges, and in 5 per cent. of the Belgian and German exchanges, is service available day and night, whilst in most of the exchanges in Norway, Sweden, Switzerland and Italy it is similarly restricted in varying degrees. It would, of course, be fairer to these countries to shew the proportion of subscribers who enjoy a continuous service rather than the proportion of exchanges. It would then be found that, though only 1 per cent. of the exchanges in France might be open day and night, 50 per cent. of the total number of French subscribers were receiving service at all hours, and that a similar test applied to Germany would shew a correspondingly improved state of affairs. Nevertheless, the fact remains that in only the very largest cities are exchanges continuously open (in France, we believe, there are only about ten outside Paris), and that fair-sized towns of commercial and historical importance are only in receipt of service between 8 a.m. and 8 p.m. or an hour or two longer. The American writer remarks that not only are the hours in the smaller places short, but also that the exchanges are closed for a generous luncheon interval, usually from 12 to 2. Whilst he gives this country full credit for opening the majority of its exchanges day and night, he does not apparently quite realise the insignificance (in point of numbers) of the minority whose service is limited. Of the comparatively few exchanges not continuously open upwards of one hundred provide a night service in return for a special payment by means of through switching arrangements to another exchange, with the result that the proportion of total number of subscribers in Great Britain enjoying continuous service is as high as 99.7 per cent. This facility, in short, is so universal in English-speaking countries that, as we have said, it is taken for granted; our only object in adverting to it is to remind our critics that telephone "service" has different connotations in different countries.

HIC ET UBIQUE.

WE congratulate our colleague, Mr. J. Stuart Jones, M.B.E., on his promotion to Deputy Chief Inspector of Telegraph and Telephone Traffic, vice Mr. T. Mackenzie, who has retired.

Mr. R. P. Crum has been promoted to the grade of Inspector and Mr. D. H. Thomson to that of Assistant Inspector, Class I.

Mr. H. G. Trayfoot, Inspector, is now in charge of the telegraph division, and Mr. R. P. Crum of the trunk division, of the Traffic Section.

LONG-distance telephone communication has recently been established between Leningrad and Reval.

A DIRECT telephone line from Pegu to Rangoon has recently been put into operation. The extension of the line to Mandalay (where the flying fishes play!) is under contemplation. This is in accordance with the policy of the Post and Telegraph Department of the Government of India in extending telephone trunk lines.

THE telephones in Lithuania are owned by the Government and are under the control of the Department of Ways and Communications. According to *Commerce Reports*, the telephone was practically unknown in Lithuania for general use until installed in 1915 by the Germans at the time of their occupation of the country. The apparatus was, however, recently replaced with apparatus manufactured in Esthonia by the Tartu Telefoni Wabrix A. S. The central exchange office at Kovno accommodates 1,012 subscribers. Nevertheless, the number of telephones now in use is twice what it was a year ago. There are 44 operators at the central exchange and besides giving local service a long-distance service is maintained to all parts of Lithuania, to Latvia, and to points from Kovno to Konigsberg, East Prussia, and to Berlin. A few banking establishments have installed private branch exchanges, and the central office has provision for 200 such branches.

THE telegraph statistics for the Dominion of Canada for 1923 shew that the wire mileage had increased from 262,343 to 270,782 miles, of which 97,055 were in Ontario, 33,666 in Saskatchewan and 31,560 in Quebec. 128,008 miles belonged to the Canadian Pacific Railway, 92,545 to the National Telegraph Co., 18,593 to the Western Union Co., and 15,253 to the State. The total number of land messages transmitted was 16,150,106, and of cablegrams 1,302,224. Of the 4,930 offices open, 1,709 belonged to the National Telegraph Co., 1,457 to the Canadian Pacific, and 1,342 to the Dominion Government.

THE Telephone Capital Bill which passed its Second Reading in the *Dail Eireann* contemplates the spending of £500,000 during the next two years on the Irish Free State telephone system. Telephone cables have already been laid between Dublin and Cork, and Dublin and Mullingar, and it is proposed to extend them from Mullingar to Athlone, Longford, Castlerea and Roscommon. The Irish Postmaster-General claims to have doubled the number of telephone lines in the Dublin district since it was transferred from the British Post Office.

The ideal of "a telephone in every home" is not appreciated by every American. The following conversation lately took place according to the *Sunday Pictorial* at an assembly of American business hustlers in London:

"Getting through a 'phone call is like getting into heaven," he went on. "Hardly a private house has a telephone in a bedroom. Even your business people don't like using the 'phone if they can help it."

The man who was having a cup of afternoon tea with him and his wife, one of America's first statisticians and the mathematical genius of the largest insurance company in America at Newark, New Jersey, who had hitherto said nothing, suddenly woke up.

"And a good thing, too," he said. "I have taken the trouble to make a calculation in a certain New York office, and discovered that of seventy-eight messages over the 'phone during that time, over fifty were superfluous and 'time-wasters.'

"Morning, noon and night the telephone is going. It is the biggest time-waster on the American continent. The 'phone is so handy—the temptation to use it for trifles that don't matter, extreme."

ON the other hand other visitors entertain that more flattering view of the British service to which we are lately becoming quite accustomed. Says a writer in the *Daily News*:

Never before have girl telephonists had quite so many different accents and dialects to deal with. Australians, Canadians, New Zealanders, and Americans all pronounce their vowels differently, whilst the British Isles just now is giving London a greater wealth of dialect than has probably ever been heard before. Evidently, however, the telephonist has risen to the occasion, for I haven't heard a single visitor grumble about the English telephone service.

THE elaborate experiments made by the "Radio Austria" recently to test a new transmitter at the Deutsch-Altenburg station for rapid telephonic transmission to B.B.C. stations in England have, says the *Exchange Telegraph*, proved successful. Clear answers were given from the north, midlands, and south of England and Wales. The longest distance over which a message was transmitted was between Vienna and Bramley, 1,600 kilometres.

Deutsch-Altenburg is a small town about 40 miles east of Vienna.

A CORRESPONDENT points out that the private automatic telephone installation at Britannic House, described in the June issue of the JOURNAL, is not the largest private installation of the kind yet erected in England. He informs us that the private installations installed by Siemens Bros. for the Lucas Electrical Co., Ltd., for Cadbury Bros., for the Asiatic Petroleum Co., Ltd., and for the Southern Railways, are all larger.

THE New York Telephone Company, which operates in the States of New York and New Jersey, shews a remarkable development for the year 1923, when a net gain of 203,230 telephones was obtained. This company has now the following city-systems with over 10,000 stations:—New York 1,185,979, Buffalo 87,740, Newark 63,429, Syracuse 33,568, Albany 29,897, Jersey City 29,842, Schenectady 18,114, Utica 16,307, Binghampton 12,975, Yonkers 12,615, Troy 11,088, and Elmira 10,338. These systems have, generally speaking, doubled in size in the last ten years, whilst Jersey City has increased fivefold.

"WE were discussing," says the *Leicester Mail*, "this very point (the telephone service) with the Hon. Charles Dunning, Prime Minister of Saskatchewan.

'In Canada (he said) we don't have your antiquated system. We have automatic 'phones in the towns, and get right through to where we want to be. If the number is engaged there is an automatic signal, and no time is wasted.'

Cannot England, with an effort, manage to be as up-to-date as is Canada?"

We also "have automatic 'phones in the towns," but the manual system predominates—as it does in Canada. We are getting used to this sort of thing. The impression created is that the manual system is the exception in Canada, while, of course, the reverse is the fact.

A POSTMASTER in Lancashire reports an incident from an *unattended* call office near Preston, which illustrates the readiness of the public to "ask a p'liceman" when in trouble. The coin apparently stuck in the slot:

Telephonist.—Call the attendant.
Caller.—What?
Telephonist.—Call the attendant.
Caller.—All right.
Interlude.
New Voice.—I think it's all right now, Miss.
Telephonist.—Are you the attendant.
Voice.—No, I'm the constable on point duty.

The call was then duly effected.

THE TELEPHONE AS A TARGET.

"MEN of all sorts take a pride to gird at me: the brains of this foolish-compounded clay, man, is not able to invent anything that tends to laughter, more than I invent or is invented on me."

Falstaff's little outburst often occurs to me when at the close of an exacting day's work—a statement, of itself, inviting humour—I turn to the newspaper cuttings for some lighter entertainment.

At this hour, when "comes in the sweet of the night," my table has been, so to speak, swept of "cases," and the innocent cause of so much inquietude, past and present—the telephone—stands forth alone in its sombre, penitential guise. Parenthetically, I have often thought what a splendid department we should be were it not for the telephone.

I remember a remark made by the then Engineer-in-Chief to the Post Office in the course of a speech delivered at a dinner held prior to the transfer of the National Telephone Company's system to the State. Comparing its capital value with that of the mail and telegraph services, he said: "And what, gentlemen, is the telephone after all? It is a very small thing." I wondered. I had helped to nurse this "small thing"—it was ever a backward infant—for nearly thirty years. Fortunes had been made out of it; the only speculation I had ever ventured upon was connected with it, and was so successful that I wished my plunge had been wild instead of mild; it had evoked envy and jealousy in staid quarters; august names had been associated with its management, and it had been an inexhaustible stand-by for a thirsty Press.

In a sense, in point of size and, I say it without a qualm, in point of cost to the user, the instrument which stands on desk and table or grips the wall is undoubtedly a very small thing; but small things, like small men, have a way of asserting themselves. It has been styled the Cinderella of modern services; in modern phraseology it might aptly be termed the business and family drudge; and the family drudge was for generations a popular theme for the humorist. But the latter-day Marthas and martyrs of our households have discovered the weak spots in our armour and have acquired disconcerting habits of independence and retaliation, whereby jocularity at their expense is becoming risky, and this fountain of amusement is in danger of running dry.

Thus, the telephone parallel ceases, for it possesses no such happy weapons of defence or offence, and is likely to continue a perpetual source of inspiration to the censorious and the waggish. Therein lies its weakness; it is incapable of "back-chat"; abuse, vituperation, and derision may be poured into its ever-open ear, and it must take its chastening meekly; while we, its sponsors, are equally helpless. We are confronted daily with exaggeration and misunderstanding against which reason and knowledge rebel, but we are sensible of the futility of retort even were this luxury permitted; which, wisely, it is not, for if there were no other reason the difficult task of laying a popular delusion would be reason enough.

Take one of them, the jumper-knitting and novel-reading libel, a much favoured fallacy. Occasionally we seize an individual, a journalist for preference, march him into an exchange under adequate protection and prove to him by ocular demonstration the impossibility of such crimes under our well-ordered administration. Against his will he is convinced; but what is one convert among a crowd of unbelievers? You might just as well attempt to clear an acre field of weeds with a table fork. So the story drags on wearily, an interminable, tiresome serial. And who, by the way, *could* read a novel with myriads of little lamps continually jumping into life like accusing eyes?

Then there is the "engaged number" topic. We explain time and again that it is far easier for the "hello"—an odious mispronunciation never perpetrated by a Britisher, educated or otherwise—girl to "get a number" than to argue about it; and still the fable of indifference or obstinacy finds infidels and publishers.

It is not generally recognised that speed is in itself, indirectly, one of the greatest provocations of peevishness and bad temper, and is largely responsible for the nervy, jumpy state in which the world at present finds itself. That calm, stolid imperturbability once the proud and envied characteristic of our race is fast dwindling into extinction, though it revives fitfully in the presence of great events or of imminent danger. This was, no doubt, bound to come, once the barriers of our insularity were broken from within and without by the irresistible advance of modern methods of communication.

Anyhow, willingly or not, we have been drawn into the vortex of speed, and we cannot get away from it, for it is thrust upon us at every turn: quick transit, quick fortunes, quick lunches, quick news, quick ways of acquiring smatterings by quack methods. And at the first baulk or hindrance the air is alive with fret and fume, particularly if the telephone be the offender.

Those of us who knew old London—we need not go back more than forty years—may sigh for its lost atmosphere of repose. Whatever hurry and excitement existed then was mental rather than physical. It was as useless to chafe at the complacency of the four-wheeled cab-horse as to attempt to urge a rubicund bus-driver to proceed until he had exchanged his last compliment with a competing rival. Noise there was in plenty, but it was more uniform and sustained; the sound of iron tyres jolting over uneven granite was preferable to the raucous blasts of intimidating motor horns; while responsibility for the avoidance of accidents rested with the driver rather than with the pedestrian. There were more fogs and they were blacker and lasted longer, and street illumination was feebler; but patience and resignation took small account of these drawbacks, these being the virtues of the age—an old and dying age. Everything was older; the houses, the streets, the police were older, newspapers were older, and so I opine were their writers; while the telephone and the cigarette were only just born.

Youth took his work seriously, cropped his hair close, was deferential to his elders and effaced himself generally. Commercial juniors were relegated to the back-ground, and their training and apprenticeship were protracted. In London banks, for example, a young cashier was never seen. The manner of it is suggested by Dickens in his description of "Tellson's" in the "Tale of Two Cities." "When they took a young man into Tellson's London house, they hid him somewhere till he was old. They kept him in a dark place, like a cheese, until he had the full Tellson flavour. Then only was he permitted to be seen, spectacularly poring over large books, and casting his breeches and gaiters in the general weight of the establishment."

This is no exaggeration, for it was before the age of machinery; it was the age indeed of inventive stagnation. It must have been a dull and insipid time for the journalist before the public services began to multiply and provide windmills to tilt at. It took a genius like Dickens to discover so promising a field for humorous exercise; and he made the most of his material.

The Circumlocution Office is a classic too well known to need reference; but both coaching and steam were fruitful subjects for his ready pen. Thus, Mr. Pickwick: "Travelling was in a troubled state, and the minds of coachmen were unsettled. Let them look abroad and contemplate the scenes which were enacting around them. Stage coaches were upsetting in all directions, horses were bolting, boats were overturning, and boilers were bursting."

We can laugh at and enjoy this fun now, but, believe me, it is no more ridiculous than many of the paper shafts that are shot at the telephone to-day, and which we are perhaps inclined to take too seriously. Who knows but that choleric coach-owners and solemn railway magnates were enraged and agitated by this covert attack on their cherished enterprises? Maybe they relieved their feelings by letters to *The Times* breathing indignation and annoyance, and denying *in toto* the lying charges of this ignorant upstart. One can imagine the subject set forth on the agenda for discussion at the next meeting of the board with resolutions duly recorded in the minutes, in faultless manuscript.

There is consolation and hope in the knowledge that all public services have, more or less, been the objects of derision and obloquy—and that they have survived. The fact is, mankind is prone to expect from a corporation what it never reaches individually, perfection; likewise it forgets that the united wisdom of counsellors is powerless against the one act of an obstinate or careless fool.

In this connexion, perhaps railway companies (and consequently the travelling public) have suffered as much as any common utility. A good example of this occurred years ago in my own neighbourhood when a railway was proposed. It was stipulated that it should not run within a mile of the village; but time brings its revenge—the village has moved to the railway.

Only recently I heard a die-hard legend anent the South-Eastern line which went the round thirty years ago. It concerned a man and a dog. The man desired to take his pet to London, and as dogs were not then allowed to travel by train, the animal was directed to trot behind the rear coach. At the first stoppage it was found to be in high condition; at the second it had disappeared. At London Bridge the intelligent and faithful beast was discovered on the platform awaiting its master.

There is no more point in the story now than in the wildest of any Dickensian fancy, for who in these days gibes at railways? No one. Not because the management are more alert and conscientious, but because the public have learned their lessons of patience and appreciation. Heedless of pin-pricks, overcoming obstruction, and impervious to ridicule, the managements have gone on their useful way until the nation has—with probable reluctance—come to acknowledge the pre-eminence of our railway system for safety, comfort and convenience. Besides, as it is the manner of crowds to seek new excitements and outlets for holiday exuberance, so the attention of critics is diverted to any new invention and innovation which promises a fertile field for their activities.

This criticism does not come at once, for the first stage of a new thing is wonder. It requires to be established before its flaws and short-comings become apparent, and in proportion to its non-fulfilment of expectation so is the strength and length of the attack.

The gramophone is an example. It is now many years old, but in common with many others I, when forced by enthusiastic friends to listen to its scratchy, whirring outpourings, instinctively look round for a brick.

Aerial transport and wireless telegraphy have not yet reached a stage to be regarded as familiar utilities, and their possibilities are not within the ken of the uninitiated. Like children they are still happily ignorant of what the world has in store for them in the path of adversity; but their time will come.

Our time, the telephone time, is in full swing, and the pendulum as yet shows no sign of slackening; so much so that those whose faith in a solution of the theory of perpetual motion is still active may take heart. But we may reassure ourselves; some of us at least may live to be justified, though the hour is not yet. Maybe some young telephonist now in the probationary stage will, as a grey-haired old lady, half a century hence, when telephones are as popular as sunlight, gather her grandchildren around her, and turning over the yellow leaves of an old diary entertain them with records of gloomy days at the switchboard—not without a sentimental sigh, for an unreturning past, mellowed like the writing in the book.

The worst of the telephone is that it presents so many easy openings for mistakes and misunderstandings. There is no real equivalent in other public services to the "wrong number" trouble; If you board a 76 'bus you may be fairly confident that the driver will not be tempted to turn on to the 86 route, or if you should ask the booking clerk for a ticket to Clapham and he dates you one for Chatham the mistake is soon rectified; and it is as likely as not that the booking clerk, and not you, will be the aggrieved party.

Now, mark the possibilities of error in asking for a telephone number, such as, say, Eltham 7324. Eltham may be converted into Feltham, Elsham, Meltham, and the only numeral which may be regarded as tolerably safe from transposition is the "7." There are three persons engaged in the operation, the caller and two telephonists—all human, and all, therefore, liable to err. Any one of those three, but most likely the caller—especially if he prides himself on his wonderful memory for figures—may transpose the number into 7342, 7234, 7243, 7423, or 7432. A mishap of this kind will bring a fourth participant in the action—the person wrongly called up, and to him, certainly, some measure of sympathy is due. I am not sure that he feels he gets it, because before he has time to express himself the mistake has been discovered and rectified; but to both the caller and the called there is a sense of wrong and irritation which is out of all proportion to the lapse of one of three people, each blaming each.

And this sense is one of shock, check, disappointment or hindrance. The caller is in a hurry and, finding his warm greeting falls upon cold, strange ears, loses his temper, while the recipient at the other end yearning maybe for a little diversion, is angry at the sudden failure of a short-lived hope. Both are exasperated, and while neither perhaps is prepared to charge the exchange with deliberate intent to annoy, they have the feeling that they are not being treated with that consideration which is their due. They forget the one hundred times when there has been no hitch, and magnify the hundred and first when someone or something fails them, and a letter to the Press is the result.

Only those who have fallen into the dreary and, except where telephones are concerned, hopeless habit of writing letters to the Press, realise the awful temptation to lay on the colours thick. It is wonderful how scanty and bald, facts, without embellishment, look on paper, and how far more pleasing they appear after they are clothed and trimmed. There would be nothing very attractive in a true account of the foregoing imagined happening, which might read thus: "Sir,—Your readers may be interested in an unusual experience which befel me to-day in connexion with a telephone call. Contrary to the almost invariable custom of the exchange to connect me immediately with the number I require, I found myself in communication with a number for which I had not asked," &c. But something in the following strain will catch on at once, "After waiting exactly five minutes before the young lady at the exchange would condescend to attend to me, I asked, with the telephone directory before me, for Eltham 7342, in the manner lately imposed upon telephone subscribers by the pundits at headquarters, &c."

With a little trouble and research I could no doubt fortify my argument by reproducing many actual examples, but this is a serious journal, and to cumber its pages with fables would be indecorous. Besides, the choice is so vast and the style so varied that selection would be difficult. If, however, you read *Punch* from cover to cover and enjoy it, as I do, you will find that a week rarely passes without some sly jest on this fruitful topic. Two columns were recently devoted to a description of the installation of a telephone on the homely sideboard, even to the receipt by the happy and in this case, humorous subscriber of a dozen cards enabling him to notify his friends of the event. The recital led up to these cards, for the culminating joke, very properly appearing as a coda or tail-piece, was printed in italics, so that none might miss it; and it was this: "Why aren't they stamped?"

One more excerpt; this from the *Referee*. Again, I quote the precise words: "I must try and cheer him up" (him being the Postmaster-General) "What's his number? Oh, here we are! Ting-a-ling-a-ling!"

Now, the definition of a joke may be expressed in one word, shock. It is the unexpected that moves our laughter, and the more violent the shock the more are our feelings tickled. Here the unexpected lies in "Ting-a-ling-a-ling," because anyone acquainted with the manipulation of a telephone is at once puzzled as to the quarter from which comes this merry sound. The narrator was the caller, and if he heard the ting-a-ling-a-ling of the distant bell, his experience was unusual; if, on the other hand, it was his own bell in action, he must have replaced the receiver and waited to be summoned when connexion was effected; and if this is his usual method it is high time he acquainted himself with the elements of telephone practice.

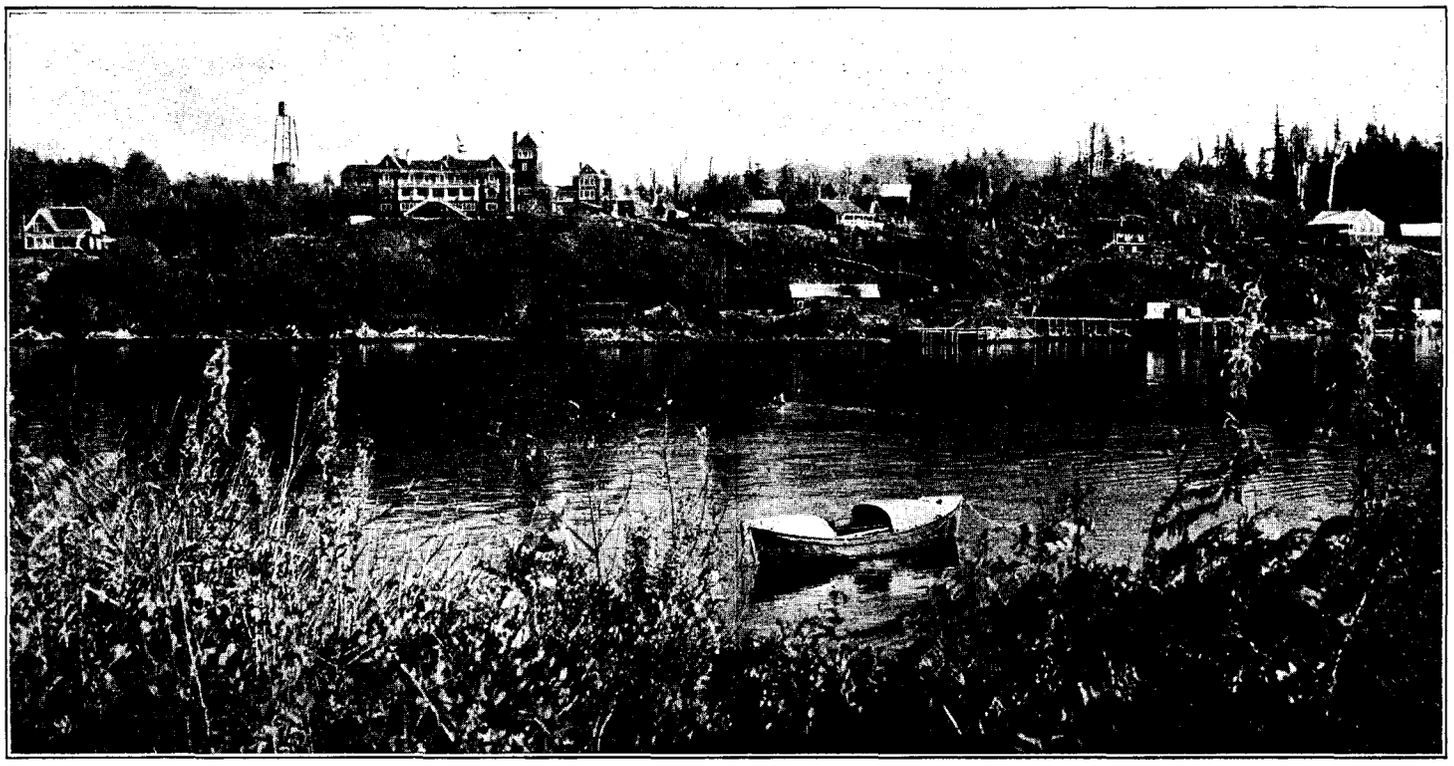
After all, "howlers" in the Press are not rare, and there is little merit in the discovery of them.

EUSTACE HARE.

THE PACIFIC CABLE.

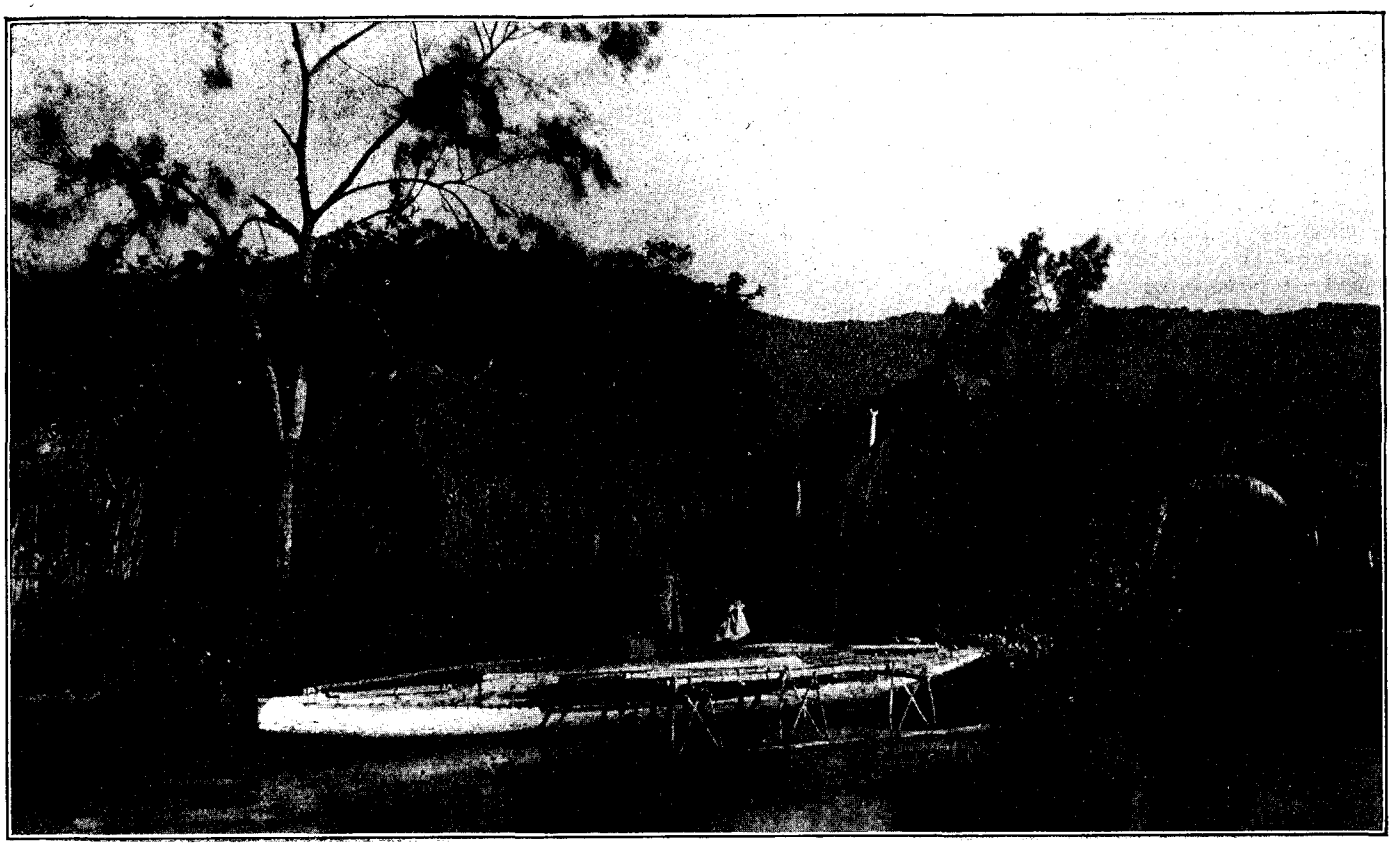
THE Pacific Cable Board is to be congratulated on the admirable brochure which it has issued on the "All Red Route *via* Pacific." The Pacific cable needs no advertisement amongst Post Office men and women. Its association with the Imperial Cables in forming the All Red route from Great Britain to the Dominions in the Pacific is well known amongst them, but the story of its conception and the details concerning it, which are given in this pamphlet, are not common knowledge and they are well worth perusal.

The institution of the Imperial Cable, Government-owned and Government-operated, between this country and Canada, although originally carried out under the pressing needs of the War, was a bold step for a Government to take, having regard to the competition



BAMFIELD CABLE STATION, BRITISH COLUMBIA.

SOUTHPORT CABLE STATION.



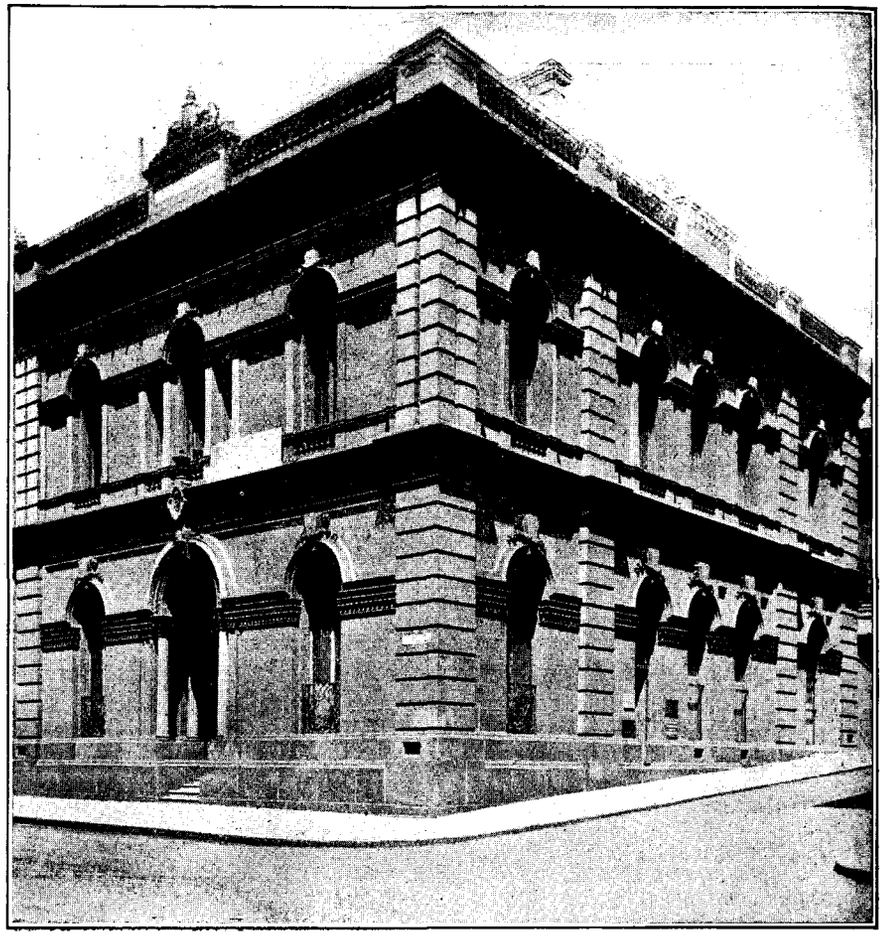
FIJIAN VILLAGE AT SUVA.

FANNING ISLAND (ROAD THROUGH COCOANUT TREES).

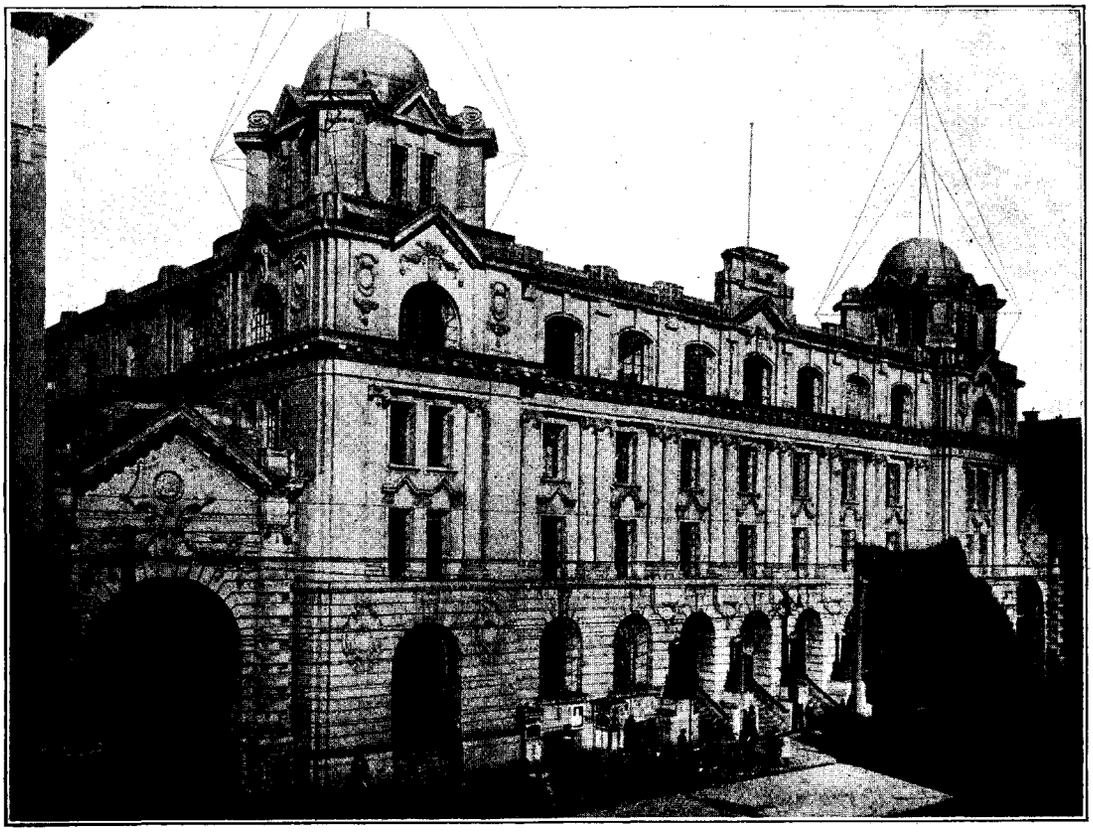
for traffic which had to be faced from the cable companies, but the provision of the Pacific cable was an earlier and even more courageous departure from traditional policy.

The honour of suggesting the provision of a cable from Canada to Australia seems to belong to Sir Sandford Fleming, who put forward the idea so long ago as 1879. Sir Sandford Fleming was Chief Engineer of the Canadian Pacific Railway, and he pointed out that the approaching completion of the railway to the Pacific coast, with the concomitant extension of the Canadian telegraph system, made it possible to provide a telegraph route between Great Britain and the dominions in the Pacific which would not pass through foreign countries. Although the proposal was favourably discussed at various conferences in the colonies and at home, no real progress was made for over 20 years. The scheme had no attraction for the cable companies; the capital expenditure involved was very heavy, and there was a certainty that the cable would be worked at a loss for many years and considerable doubt whether it ever would pay. Finally, agreement was reached between the Governments interested as to the ownership and management of the proposed cable, and the participation of the British Government was authorised in 1901 by the Pacific Cable Act. Once the decision to lay the cable was arrived at, no time was lost and the cable was opened for public traffic in December, 1902.

The business of the cable made steady progress from the beginning. During the first complete year of its existence it carried over 800,000 telegrams, but it was not until the outbreak of war that the full value of the cable was realised. It became of vital importance for carrying the correspondence between the Home Government and the Governments of the Dominions, and but for its immunity from enemy attack, apart from the solitary instance in September, 1914, when it was cut at Fanning Island by the German Cruiser *Nurnberg*, the situation might have been disastrous.



PACIFIC CABLE OFFICE, SYDNEY.



G.P.O. AUCKLAND (PACIFIC CABLE OFFICE ON TOP FLOOR).

At the present time the cable is carrying about 10 million telegrams of all classes yearly, and it is satisfactory to note that, for the past nine years, there has been a surplus on each year's working, even after the payment of the annuities to redeem the capital of £2,000,000.

The pamphlet gives detailed information on the ownership and management of the cable, the connecting systems, the quality of service, tariffs, &c., forming altogether a very comprehensive description of the cable.

Through the courtesy of the Pacific Cable Board, we are able to reproduce, for the benefit of our readers, several of the illustrations in the brochure.

RETIREMENT OF MR. THOMAS MACKENZIE.

ON June 30 the telegraph service said good-bye to one of its most interesting personalities in Mr. Thomas Mackenzie, Deputy Chief Inspector of Telegraph and Telephone Traffic, who retired on that date on reaching his sixtieth birthday.

Mr. Mackenzie, in common with many others who have attained high positions in the Post Office, entered the service as a telegraphist at the Central Telegraph Office, in 1882. He was appointed to the clerical establishment of his office as a 3rd class Clerk in 1894, being promoted to the 2nd class in 1902. In 1904 he reached the 1st class and then in rapid succession became Principal Clerk, Superintendent, Higher Grade, and Assistant Controller. Appointed to the latter position in April 1917 he was called to the traffic section in July of the same year as Deputy Chief Inspector on the promotion of Mr. John Lee to the Postmastership of Belfast.

Mr Mackenzie was prominently identified with a number of reforms and improvements in telegraph practice and his record of Committee work is imposing. Between 1907 and the date of his retirement he served on no less than 10 important committees, chief amongst them being :—working and cost of intercommunication switch in London (1907), continuous working and retransmission of untranscribed Morse slip (1909), circulation and delivery of London telegrams (1910), delivery by telephone of telegrams in London and the Provinces (1911), abolition of office copies of received telegrams (1917), and revision of telegraph establishments (1921-23). This is a record of which Mr. Mackenzie may justly be proud.

He was greatly interested in everything affecting the welfare of the telegraph service and those connected with it, and it was a matter of keen regret with him that telegraph traffic during the past few years continued to show a downward tendency. He was ever ready to advise and guide his subordinates, and in his dealings with them always showed the greatest desire to understand their point of view. His keen analytical mind enabled him to find flaws in arguments and propositions which had escaped the notice of the less experienced, and the writer has a shrewd suspicion that he extracted a good deal of quiet amusement from the discussions which followed the detection of inconsistencies.

Mr. Mackenzie was a man of wide sympathies and was ever ready to give practical help in cases of distress brought to his notice. The official in him never grew hard or harsh, those who wrestled with him officially invariably discovering that he was extraordinarily tender hearted, and those who knew him best feel that they have been separated by his retirement from a staunch friend. He carries with him the best wishes of those with whom he has been associated for a long and happy life.

Gardening has always been one of Mr. Mackenzie's chief hobbies, and his garden is a model of neatness and order. The odd pebble in the gravel path which always seemed to get out of place will now have fewer opportunities for offending, and the dead and dying violas will never be allowed to dim the scene of life and virility which is characteristic of Mr. Mackenzie's domain.

CORRESPONDENCE.

METAL STORAGE TRANSMITTERS.

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

SIR,—I have not time for controversy, and I must therefore leave it to our old friend Anno Domini to decide whether my opinion or that of Signor Miniotti is the more accurate in regard to tape transmission or metal storage transmission in telegraphy. We are in agreement on many points. For instance, I agree that Signor Miniotti's machine is much simpler and cheaper than tape perforators and transmitters. A wheel-barrow is also much simpler and cheaper than a Rolls Royce. but I prefer the Rolls Royce myself. You see I must keep up the reputation Signor Miniotti has given me for "blandness."

Although I have not time for controversy, Signor Miniotti's letter in your issue of July, 1924, supplies me with a convenient peg upon which to hang some facts which may interest your readers.

I expressed the opinion that *speed* is the determining factor in the use of perforated tape in place of metal storage of signals. From the American point of view, telegraph speeds in Europe are lamentably low, and I agree that the rate of 30 words a minute on the Baudot is ridiculous. I have recently received a letter from Mr. George M. Yorke, Vice-President in charge of Engineering, Western Union Telegraph Company, New York, in which he says :—

> "Now as to speed of transmission. Our experience is that operators of their own volition get up to 70, 80 and even 120 words per minute on the free keyboard perforators, and we believe that with suitable arrangements of apparatus and staff it is undesirable to provide printer equipment which does not operate satisfactorily at 60 words a minute. We have made some observations which indicate that under average conditions in an operating room here in this country we would be throwing away about 50 per cent. of the operators' capacity if we provided printers which would operate at a maximum speed of 40 words per minute instead of 60."

This is entirely in line with my own experience, and it is for that reason that I decided long ago to abandon metal storage transmission and employ perforated tape transmission.

There is just one other point in Signor Miniotti's letter in regard to which I should like to mention a few facts. I claimed to be the first to propose the idea and the first to construct a bicycle ball transmitter, and Signor Miniotti says :—

> "It will perhaps be interesting to Mr. Murray to learn that, whilst his experiments were conducted in 1916, my own were made as far back as 1909."

Signor Miniotti is right. I am greatly interested to hear that my experiments were conducted in 1916 and that his experiments started in 1909. Upon looking up the official diary that I kept while I was in the service of the British Post Office I find the following entry on March 29, 1905 :—

> "In the afternoon Mr. Gavey came down with Mr. Tremain and discussed the No. 2 system (the Murray Multiplex) and bicycle ball scheme. Mr. Gavey said he would send the papers on to the Secretary and would recommend preliminary experiments with the ball transmitter."

On April 14, 1905, an entry in the diary records that the Postmaster-General had approved of the ball transmitter experiments being proceeded with at once.

On June 24, 1905, the diary says :—"Ball transmitter model finished. It is a complete success and works very well."

On July 26, 1906, an entry reads :—"Working on the ball transmitter. Discussed the position with Mr. Noble and Mr. Booth, the question having been raised as to whether the Baudot tape transmitter was not better than the ball transmitter. The matter is to be further discussed." The diary also records experiments with the sliding letter-block transmitter, afterwards known as the ring transmitter.

On Oct. 15, 1906, I sent out a 29-page circular letter with blue prints to all the leading telegraph administrations, including Italy, advocating the use of the improved Murray multiplex based on the combination of the Murray Automatic and the Baudot multiplex systems. I mentioned direct transmission and indirect transmission by perforated tape, "or with metallic continually circulating letters composed of 'carriers' with bicycle balls or

pins." Later on, I mentioned letter carriers with five pins or five bicycle balls.

I sent out another illustrated circular on the subject on April 12, 1907, to all the leading administrations, including Italy, describing the progress of my experiments, and on March 16, 1908, I sent out to the administrations, including Italy, still another report on the progress of my experiments, illustrated with photographs and description, in this case of the ring transmitter.

The Italian administration was, therefore, aware of my experimental work in connexion with the bicycle ball transmitter and the ring transmitter as far back as October, 1906. It was several years subsequent to this date that Signor Taccani brought out his ring transmitter, and still more recently that Signor Miniotti brought out his bicycle ball transmitter. The latter admits that his earliest date for the ball transmitter is 1909. If anyone can establish an earlier date for the ball transmitter idea than I have proved in this letter, I shall be glad to know about it.

Metal pin transmission is an old idea, but the bicycle ball transmission idea is so novel that I feel I am entitled to claim credit for it.—Yours truly,

DONALD MURRAY.

INDUSTRIAL WELFARE CONFERENCE.

THE above conference which will be held at Balliol College, Oxford, from Sept. 12 to 16, should prove of special interest to those members of the telegraph or telephone service who may be in the happy position of being able to attend during the above dates.

The men attending the Conference will live in Balliol College for the time, and rooms and accommodation will be provided for the women who care to attend at one of the women's colleges, probably Lady Margaret Hall. The cost of board and lodging, including attendance at the lectures and other social events, is likely to be covered by 15*s.* per day.

Special leave by substitution, it is understood, will be facilitated for those who may wish to attend.

The provisional arrangements are as follows :—

LECTURE CONFERENCE, BALLIOL COLLEGE, SEPT. 12-17, 1924.

Friday, Sept. 12.—7 *p.m.*—Dinner.

„ „ 8 *p.m.*—The Master of Balliol, Professor ALEXANDER D. LINDSAY, C.B.E., will welcome guests and deliver opening address.

Saturday, Sept. 13.—10.30 *a.m.*—Lecture by Mr. A. P. M. FLEMING, M.I.E.E., Mem. A.I.E.E., author of *The Principles of Apprentice Training*, &c., "Education in Industry."

„ „ 8 *p.m.*—Lecture by Sir JAMES CANTLIE, K.B.E., Principal of the College of Ambulance, "First Aid and Ambulance Organisations."

Sunday Sept. 14.—10 *a.m.*—A Short Service.

„ „ 11 *a.m.*—Lecture by Miss A. MAUDE ROYDEN, M.A., "The Ethical Bases of Welfare."

„ „ 4.30 *p.m.*—Lecture by Mr. F. W. GILBERTSON, J.P., Director of Messrs. W. Gilbertson & Co., Ltd., "An Employer's view of Welfare."

„ „ 8 *p.m.*—A Debate.

Monday, Sept. 15.—10.30 *a.m.*—Lecture by Professor F. TILLYARD, Author of *The Worker and the State*, &c., "Industrial Legislation and the Welfare Worker."

„ „ 5.30 *p.m.*—Welfare Supervisors' Session.

„ „ 8 *p.m.*—Lecture, with musical illustrations on the place of choral and orchestral activities in industrial welfare work.

Tuesday, Sept. 16.—10.30 *a.m.*—Short papers by Mr. G. S. RIDER, General Welfare Superintendent, L.M. & S. Railway, and Mr. F. W. MANDER, Welfare Supervisor, Messrs. W. Vernon & Sons, Ltd. (Flour Millers), and others.

„ „ 4.30 *p.m.*—Lecture by Mr. JOHN LEE, C.B.E., M.A., M.Com., author of *Principles of Industrial Welfare, Industrial Organisation*, &c., "Discipline and Freedom in Industry."

„ „ 8 *p.m.*—Summing up and Social Evening.

Wednesday, Sept. 17.—9 *a.m.*—Breakfast.

N.B.—It is anticipated that the railway companies will again grant special fares for delegates attending the Conference.

AUTOMATIC EXCHANGES SUPPLIED BY SIEMENS BROTHERS & CO., LTD.

WE have received from Messrs. Siemens Pamphlet 500a. giving a list of public and private automatic telephone exchanges that have been manufactured and supplied by them. More than one hundred exchanges are listed, varying from small private installations of 15 lines to large public equipments such as the Edinburgh network of automatic exchanges, which has an initial capacity of 14,460 lines. The firm is engaged in the following works in the Colonies :—

South Africa.—The Company has been awarded the contracts for the first two large public automatic exchange equipments ordered by the Union of South Africa.

One of these equipments is for a 2,500-line exchange at Port Elizabeth, Cape Province, and the other is for a 2,000-line exchange at Pietermaritzburg, Natal Province. These contracts, which were open for public competition, were placed after the various automatic telephone systems tendered had been thoroughly investigated by the South African Department of Posts and Telegraphs.

Australia.—The Port Adelaide semi-automatic exchange was the first public automatic exchange to be completed by the Company. The plant, which accommodates 1,000 lines, was built at the Woolwich Works, and satisfactorily brought into service in August, 1916.

This equipment was specially designed for the Australian Government, who were anxious to test the semi-automatic exchange system.

An order has been received from the Australian Government for a 3,800-line full automatic exchange for South Brisbane, Queensland. This exchange will form one of an extensive network in this rapidly growing city.

Canada.—The Department of Telephones for the Province of Manitoba has ordered from the Company a 6,000-line equipment for the St. John's exchange, Winnipeg. This equipment was successfully opened on the 16th June 1923. Prior to this contract, practically all telephone equipment for the public service throughout Canada was supplied from American sources, and this contract was secured in the face of the most strenuous competition.

An order has been placed with the Company for a rural automatic exchange on a 3-figure system for the public service at Indian Head in the Province of Saskatchewan.

The initial equipment is for 230 direct exchange lines and 40 rural lines, capable of accommodating 16 telephone stations per line. Facilities are being provided to enable direct automatic connexions to be obtained over both short and long toll junction lines serving the rural area. This equipment was brought into service in April, 1923.

THE LATE DR. R. MULLINEUX WALMSLEY.

THE tragic death of Dr. Robert Mullineux Walmsley, due to a motor car accident while crossing the street, removes a figure with which the majority of telegraphists and telephonists students were acquainted, a man whose teaching had behind it the force and the conviction of one who possessed practical experience and practical knowledge of the things concerning which he taught and wrote. For London Post Office students Dr. Walmsley will always be associated with the Northampton Institute, Clerkenwell, but although he took up his work at the Institute so long ago as 1895, he had already had experiences which alone would have placed him in the forefront as a technical college chief.

He was born and educated in Liverpool. He took his degree B.Sc. London in 1882, and his D.Sc. London (Electricity and Magnetism) in 1886. He was for a time a master at the Royal Naval School, New Cross, and an assistant to the late Professors Ayrton and Perry at the Horological Institute, Clerkenwell. He worked under Prof. Ayrton, and, later, Professor Silvanus P. Thompson, as Senior Demonstrator in Electrical Engineering and Applied Physics at the Finsbury Technical College, from its opening in 1883, until he was appointed principal of the new Technical College at Karachi in 1886. During his stay in India he advised the Government of Bombay on matters connected with the development of technical education in that Presidency. Upon his return to England he was appointed Senior Mathematical Lecturer and Demonstrator at the City and Guilds College in London, and later he became Professor of Electrical Engineering and Applied Physics at the Heriot-Watt College, Edinburgh. He left there in 1895 to come to Clerkenwell as stated. In addition to his work at the Northampton Polytechnic Institute, where many thousands of students came under his care, Dr. Walmsley was keenly interested in all matters concerning technical education. He served on numerous committees in this connexion. The development of technical optics in England was a subject in which he took a very keen interest. His contentions in this regard were fully justified during the European war, and it was a matter of satisfaction to him and those associated with him that the Northampton Institute was able to turn its Optical Department to good account in the training of girls as lens grinders. He was also one of the first to realise the vital necessity of giving disabled soldiers a chance to make a fresh start in life when their former means of occupation was no longer possible. He trained at the Institute many men who had lost an arm or leg, so that they were able to follow such a calling as that of sub-station attendant. His book, *Electricity in the Service of Man*, was a very popular work, a new and very large edition having only recently appeared. Dr. Walmsley was a Fellow of the Royal Society of Edinburgh and a member of the Institution of Electrical Engineers.

LONDON ENGINEERING DISTRICT NOTES.

Retirement of Inspector Mallows.

MR. MALLOWS, Inspector at C.T.O. for a number of years, was retired on June 30 at the age of 60 years. A farewell concert was held at the Ship Hotel on June 27, and a good gathering of retired and serving members of the staff was present to give him a rousing send off. A special feature of the gathering was the number of ladies present, which went to prove that he is just as popular with them as he is with the sterner sex.

Mr. Hart of C.T.O. very ably carried out the duties of Chairman, and presented Mr. Mallows with a clock, and Mrs. Mallows with an umbrella and handbag, the gift of the engineering staff. Songs and speeches preceded the presentation, and an enjoyable evening was spent.

An umbrella, the gift of his office colleagues, was presented to him by Mr. Steed at a little informal gathering prior to the evening concert.

Mr. A. Bascombe.

IT is with very much regret that we have to announce the death of Mr. A. Bascombe, late Sectional Engineer, West External Section, who died suddenly on June 24 from heart failure following on pneumonia. On retirement from the Service in 1918 he removed to his native place, *i.e.*, Cornwall, but unfortunately he only enjoyed his retirement for 6 years.

On leaving the Royal Engineers he became associated with the United Telephone Co. in 1887, which Company was later absorbed by the National Telephone Co. Mr. Bascombe had a vast experience of external construction, one item being the running of the Birmingham trunks. Prior to the transfer of the National Telephone Company's undertaking to the Post Office he was engineer for the City Division of London for several years. To successfully run this district with its great congestion and numbers of subscribers with large installations called for ability of a very high order.

Mr. Bascombe had the respect of both his superiors and subordinates in the fact that he had the courage of his convictions, and called a spade a spade. The sincere sympathy of all who knew him goes to his widow and children in their bereavement.

Institution Award.

The Council of the Institution of Electrical Engineers has awarded the Webber Premium to Mr. S. C. Bartholomew, Executive Engineer, for his paper on "Power Circuit Interference with Telegraphs and Telephones"

WIRELESS AND THE WEATHER.

WE, as a race, are proud of our weather, and its vagaries. It is one of our heirlooms, cursed or blessed by successive generations as the moment (or the patch) inspired them. As every new invention has in its turn been regarded as the "*deus ex machina*" of the prevailing sun, wind or rain, it is not unnatural that the thoughtless should ascribe the weather spasms of 1924 to the influences of our new scientific pastime—wireless broadcasting. Our readers will no doubt enjoy the following letters which were addressed to the Editor of the *Yorkshire Telegraph and Star*.

Sir,—Referring to the letter of "An Opposer to Wireless," I write to support her in her views. In addition, I would like to protest against the continued use of all apparatus (too numerous to mention in your column) capable of creating vibrations in the ether. In particular I have noticed that a few days after "Old Sol" has transmitted his light waves in more than generous proportions, the atmosphere becomes highly charged, with the result that my wife keeps me awake most of the night "listening in" to the thunder. I hope that you will see your way to immediately ask the Labour Government to suppress this, if possible, by Act of Parliament, failing which the only course appears to be for a society to be formed, with the avowed intention of removing the ether! In this event I propose the election of "An Opposer to Wireless" to the presidential chair.

I regret that "An Opposer to Wireless" omitted a number of happenings which can probably be attributed to wireless. Ask the gardener if there has not been an unusual supply of wire-worms, due, no doubt, to the "earths" of wireless fanatics. Why is my wire-haired terrier moulting? Why is trouble in the coil industry threatened? Why are the teacakes short of currants?

I knew an old gentleman who sometime ago "listened in" and exactly three weeks later died very suddenly. He was only 102.

The long series of unfortunate happenings, without parallel in the world's history, encourages me in the belief that before long, we may, by reactionary effort and in spite of resistance, be able to transform the individuals who are in contact with this switchery or to insulate them in an ohm or a volt. In the meantime, sir, I implore everyone to "swat that electron."

Seriously, will anyone advance a reasoned argument that radio transmission or reception has any effect on weather conditions?—Yours, &c.,
Sheffield. XPERIMETER.

P.S.—I think it is "By the Way's" aerial that is to blame! He should stick to golf.

Sir,—I was gratified to see in Thursday evening's edition of the "Star" that "An Opposer to Wireless" has taken this matter up so strongly. He is quite correct when he asserts that this new-fangled craze is ruining our weather. All over the country there are these awful wireless stations sending out at random those nasty little wireless waves. A big percentage of these little monsters are never picked up, and what happens then? They merely line up into what is known as wave-lengths and get between this earth and the sun, this obscuring it from our vision. Then again, as our dear friend suggests, some more of these funny little beggars start fooling about with the clouds, and the clouds, poor things, do not know what to do.

I think also that publicity should be given to the cruel method whereby tom cats are deprived of their "feelers" to supply heartless and inhuman wireless fiends with "cats' whiskers." I was rather grieved to see, dear friend, that you failed to mention this cruel procedure in your letter.

The only way to stop this ridiculous and childish wireless craze is to form a Union or Brotherhood of Wireless Wreckers, and to unite together with the fixed intention of destroying all wireless waves that we may come across. From practical experience I can advise my friend the best way of doing this. All you need is a good supply of common salt and a little patience. All he need do is to take his stand (and his salt) on some high ground or building and carefully sprinkle a little salt on their tails as they fly past. Of course, he may be unable to recognise a wave, but I always know them because they are more or less like a box with the top, bottom, and the sides knocked off.

To be really successful in our campaign we shall have to seek the help of our Member of Parliament, who must be made to tackle this problem, a problem which is spoiling our weather, and even threatening our very lives. It is grievous to think that these men are wasting their time on such paltry questions as unemployment and housing.

Well, dear comrade, I must now close, but I sincerely wish you all success in your gallant little effort to save the world from destruction.—Yours, &c.,
VAL V. HOLDER.
Sheffield.

RADIO REVIEWED.

BY W. E. EARP.

(*By kind permission of the Editor of* THE MECHRON.)

PERHAPS the greatest advance in science in the past four years directly affecting the public is the art of wireless, or to call it by the correct name, Radio Telephony and Telegraphy. No one will doubt for a moment that 1923 saw us leap from what may be called a common fact to a most interesting feat of modern telephony.

It seems only a short time ago when the patient amateur listened in on his humble set to hear the then wonderful signals to be picked up from various high powered stations, signals which to the uninterested were meaningless and dull. But it was these whispers that inspired the experimenters with the desire to improve. Who would have dared to think that we should be able to sit by our own fireside and listen to Grand Opera being performed miles away, only the man who "messed" about with a few coils, odds and ends, &c., made in improvised workshops at home, dreamed of talking without the aid of connecting wires.

Nevertheless, the dream came true: at first, slowly but surely, until now we have an almost fool-proof means of entertainment to fill in our dull evenings.

Let us consider the immense difficulty which must have presented itself with the re-broadcasting of concerts from our American cousins.

Firstly, take the actual direct reception of the signals; this in itself is no little performance.

I have spent many a long hour trying to catch a few words or snatches of music on a fairly powerful receiver, but with very little success, in so far as being good enough for re-broadcasting to a very critical audience.

The terrific bangs and crashes one hears in the telephones during the small hours of the morning is appalling; to get the signals to a good strength without at the same time increasing the strength of extraneous noise, is wonderful, but our radio men did it.

Secondly, the results of the direct reception were transmitted by land line to the London Broadcasting Station which must give the signals a good amount of distortion and noise, but they got there alright and are still fit to listen to when re-broadcasted to the London "listeners in."

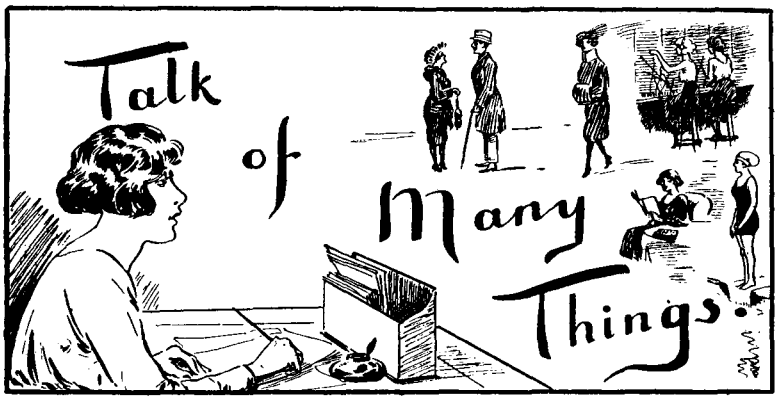
Thirdly, these signals were sent by more land lines to a number of Broadcasting Stations in the provinces and retransmitted to all and sundry, who if they cared to just stir a hand to don the head phones, were able to listen to the latest feat of science which owes itself to the men who delve into the mysteries of nature.

Surely, the age of miracles is not past, and I for one look with eagerness for the time when we shall be able to see each other by the same medium which carries voice and music across the vastness of space.

It will come, I feel sure, if not in our time, then before very many years have elapsed.

[Mr. Earp has touched the keynote when he foresees that television is bound to come by the same medium as wireless telegraphy and telephony.—ED.]

WE TELEPHONISTS



Courtship A La Code!

(A ROMANCE OF THE L.T.S.).

HW, an EI, met a TT named TY, in RG PK, and, after some conversation, invited her to accompany him to WY. She consented, and met him the following day at P. He gave her a RO time, and finally took leave of her at VI, where she caught a train to RH, after arranging to lunch with him next day in the CQ.

As their acquaintance progressed, they agreed upon a C rendezvous, not too distant from L or CW, where they could meet daily.

On one occasion TY told her admirer she had been annoyed by the unwelcome attentions of an engineer named Smith. "I'd like to HS!" exclaimed HW, "I daresay he's only A, but don't you ST of it! Perhaps I'd BA him about it."

However, shortly afterwards HW was promoted to CI, and on the strength of his promotion, decided to CA-fusal; so one summer evening at CD, when the Wsun was sinking in a golden HY, he proposed to TY beneath the spreading branches of GK, and she accepted him with a PY smile!

Having a substantial balance in the BK, our hero purchased a bungalow at UP, and one sunny September morn, the lovers were married in HC, the Rector of RD officiating.

The bride borrowed AD, because it MV more becoming, and carried a bouquet of BT!

LG acted as best man and coaxed the chief bridesmaid to PR sprig of MI lavender in his coat. He also made EU a spray of HP buds in his buttonhole, in order to let M, but, in stepping back to admire the effect, he trod on WT, which made WX; however, the entrance of the bride was instrumental in EG the breach.

After the Rector had pronounced HW and TY man and wife, he took TL of the bride in the usual way, and the happy pair, amid showers of confetti, left the church by the BG. A very quiet reception was held in WL, where the young couple were the recipients of several congratulatory TS, and the wedding gifts, which were both numerous and costly, included a travelling TK, an ED rifle, a FL, a HA, and a prize OP. After the reception, Mr. and Mrs. HW motored up to town where they stayed for a few days at the GO Hotel before travelling N for their honeymoon.

So here we will take our leave of them, in the sure and SN hope that their married life will SW!

C. A. S.

Effective Depressions.

The setting sun was tinting the sky and earth with pink and gold, the birds were at evensong. There was a gentle breeze, cool, but wanton, now here, now there. There was green grass and rose-decked hedges, and there were companionable friends with hospitable tobacco-pouches filled with smokable mixtures. The half-audible comment of one of the group, "How beautiful and joyous" was echoed silently and sincerely. Then down the breeze came the sound of bells pealing from a neighbouring belfry, varying in volume as the light airs played to and fro. Gone was the colour and the sweetness, and black depression saddened me.

The sound of church bells always fills me with a curious sadness, and I have often tried to account for it. I think it must result from an impress received in childhood. Perhaps the bells were calling on a wet and dismal Sunday evening when Sabbath calm appeared to my childish mind to have deteriorated into boredom. Perhaps a sense of wickedness oppressed me because I was not obeying their insistent summons or perhaps, when the bells ceased, I was frightened by the reproachful silence and the knowledge that I was too late.

Judge me not unduly strange—I have met others who feel similarly, and who are just as effectively depressed by just as ordinary things. Of course, my practical friends tell me that my obsession is foolish, that I have only to associate pleasant thoughts with the pealing of bells and other of my abhorrences and all will be well. I gather indeed that their treatment, if persisted in, would eventually lead me to erect a belfry and carillon in my garden. Then would my practical friends be able to placate my neighbours? I think not, for practicality is often impracticable. Let them tell the man who has arrested the descent of a heavy packing-case with his head that he should try to regard it merely as a paternal caress bestowed for good conduct. Let them convince the man with a bus-wheel on his neck that his real trouble is nothing more serious than a tight collar. What do these matter-of-fact people know of depressions, and how human such people could be if they only knew the effectiveness of depressions! They do not understand. Nor, I must confess, do I understand the fine lady who, when riding a white horse near Banbury Cross, wore bells on her toes. But then I do not like bells.

PERCY FLAGE.

Telephone Rhymes.

A.D. 19—— ?

"Who killed Wrong Number Trouble?"
"We," said the Heads,
"With our brainy deductions
And Service instructions—
We killed Wrong Number Trouble!"

"Nay," said the Supervisors,
"*We* sealed its fate,
For both early and late
We've drilled our staff in concentration
On correct pronunciation—
We sealed its fate!"

"Tut, Tut," quoth the staff,
"Pray, don't make us laugh!
We made it die!—
Yes, we all had a try,
And our clear articulation
Is the pride of all the nation—
We made it die!"

"Well, well," spake the Public,
But who dug its grave?
You all did your best,
But *we* did the rest—
For since upon its track sent
We've evolved a *standard accent*—
We dug its grave!"

"So let's toll its knell,
Since we've all done so well!"
"With full co-operation
And clear enunciation—
Let's toll its knell!"

Chorus of Subscribers:

"Now we all are agreed that our charges you may double,
Since at last we are freed from the Wrong Number Trouble—
We're rejoiced at the death of the Wrong Number Trouble!"

C. A. S.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O., (North) London, E.C.

THE POST OFFICE TELEPHONE AND TELEGRAPH SOCIETY OF LONDON.

The Hon. Secretary notifies that the undermentioned books have been added to the library of the Society:—

"*Wireless Telephony and Broadcasting.*" Dowsett, 2 vols.
"*Automatic Telephones.*" Ellson.

A revised catalogue of the library is now available for members, and applications for copies should be made to the local agent or to the Hon. Librarian, Telephone and Telegraph Society of London, G.P.O. North, E.C.1.

LONDON TELEPHONE SERVICE NOTES.

London Telephonists' Society.

MEMBERS of the London Telephonists' Society and others will be interested to learn that the programme arranged for next winter's session is likely to prove exceptionally interesting to the many new telephonists who have recently joined the service, as well as the more senior members.

The committee announces that arrangements have been made for the meetings to be held in future in the Drawing Room, Central London Y.M.C.A., Tottenham Court Road. This room is particularly well appointed and generally considered to be most conveniently situated. It is, therefore, hoped that with the usual whole-hearted support of the members of the Society, the meetings in the new home will be as successful as in the past.

The half-hour musical programme which was so much appreciated last session is to be continued, and the hon. secretary will be glad to learn of any exchange willing to undertake the responsibility of providing the musical items for one of the meetings.

The session opens on Oct. 3, when Mr. P. W. H. Maycock will deliver his presidential address which is to be entitled "Random Reflections."

On Nov. 7, Mr. F. W. Thwaites will give a lecture on "The Advent of Automatics," and coming as it were on the eve of the general introduction of automatic exchanges in London and the consequent intercommunication between the new automatic exchanges and the existing manual exchanges, this lecture should make a streng appeal.

The thrill of the session, however, is reserved for Dec. 5, when we are to have Miss McMillan's playlet, "Wrong Numbers," staged under the direction of Mr. E. A. Pounds in the King George's Hall.

The February and March meetings will be devoted to the reading of the competition "prize papers," and distribution of prizes.

In connexion with the competitions several new features have been introduced, the principal being that the committee invite members to submit "telephone" limericks, and it is proposed that the audience at the March meeting shall judge which is the best of those selected to be read.

The committee desires to take this opportunity of asking all the older members to endeavour to interest the large number of newcomers to the exchanges in the activities of this Society and to give them a personal invitation to come along to the meetings to support Mr. Maycock and give him a real good year of office.

The Hon. Secretary is Mr. E. S. Thirkell, Traffic Branch, 32, St. Bride Street, E.C.4.

Shadows.

One is reminded of the saying concerning coming events and the shadows they cast, by the preliminaries now taking shape in connexion with the introduction of machine switching, commonly referred to as "automatics," in the London area.

We have had for some time, of course, Epsom and Official Switch as the advance guard, and automatic aids have been in operation for some years at Central and Paddington Exchanges, but the immediate future holds much greater things in store.

The first visible sign of the great move forward will be in October, when the old exchange names of Bromley, Dalston, Hammersmith and Hornsey will disappear and these exchanges will be re-christened Ravensbourne, Clissold, Riverside and Mountview, respectively.

The uninitiated may find it difficult to understand why the introduction of machine switching should make it necessary to change the names of exchanges, and it should be explained that it will be necessary to spell out on the instrument dials the first three letters of the exchange name required in order to route the call before the required number is signalled. This explanation is adequate in explaining how it is that we cannot have more than one exchange name commencing with the letters Ham, *e.g.*, Hampstead and Hammersmith, but it does not explain why the name of, say, Dalston should be changed. Well, Dalston clashes with Ealing for the reason that we are limited to ten signals to convey twenty-four letters, and the initial letters E and D use the same signal. It will be apparent how difficult it is to name new exchanges to avoid clashing with existing names.

The second visible sign, or perhaps it would be more correct to say an invisible sign, will be the disappearance of all five-figure numbers. The next issue of the Directory will be void of these. The reason for this change is that the system demands the sending of seven signals for each call; only seven, and always seven. As the routing of the call takes three in every case, four remain, so that no telephone number can exceed this number of digits. It follows that no telephone number can have less than four digits, so that all single, double and triple figure numbers must also disappear. The majority of these changes will be made by prefixing cyphers to the existing digits, making them up to four.

Within a comparatively short time we shall have the mechanical Tandem Switching centre in operation. This will be a huge junction centre, and the working from manual exchanges will be semi-automatic. Briefly, the operation will be as follows: A telephonist receiving a call for an exchange to which she has no direct junctions will give her demand in to Tandem and will have a junction allotted to her. The Tandem telephonist will set up the number on a row of keys, using the first three letters of the required exchange followed by the four digits of the number. The call will then be described at the terminal B positions on what will be known as a Code Call Indicator. The number will appear illuminated on a frosted glass plate, and the B telephonist will pick up any disengaged plug and connect to the multiple of the number described. This operation washes out the illuminated number and another can then appear. It sounds very much like a conjuring trick. It means, of course, that the technic of operating will undergo a change.

We are in for strenuous times, but that does not worry us.

Visitors.

In the course of a year our exchanges are visited by inhabitants of all parts of the globe and it is always a pleasure to note the keen interest of the very welcome visitors.

The language difficulty sometimes crops up, but with a little resource on both sides it is invariably overcome.

The following instance came under notice recently. A visitor knowing very little spoken English desired information. He was not properly understood and was asked to write down his request. He did so and the exchange official read "Average of the kept times for making a proposal of the message to secure it." The figure shewing the average delay in establishing trunk calls was given, it is hoped with success.

A Presentation.

A pleasing little incident took place at 32, St. Bride Street, on June 11, when, before a goodly gathering of his friends and colleagues, Mr. H. R. Moulton (Service Section) was presented with a wedding gift consisting of a canteen of stainless cutlery, and a small 8-day mahogany clock. In making the presentation, Mr. Benham commented on his long official association with Mr. Moulton, and in a few well-chosen words offered not only his own congratulations, but those of Mr. Moulton's many friends, and wished him a long and happy married life.

In reply, Mr. Moulton thanked all those who were responsible for such a handsome gift, and on behalf of the future Mrs. Moulton and himself, he thanked Mr. Benham very sincerely for his kind wishes. Whilst it was perhaps a tall order to invite all those present to his home at Barnet, Mr. Moulton hoped that whenever any of his friends were in the vicinity they would not fail to give him a call.

We all wish our colleague the very best of luck, and may he enjoy many years of happy married life.

PERSONALIA.

LONDON TELEPHONE STAFF.

Officers resigned on account of approaching marriage.

Miss D. B. JARVIS, Trunk Exchange.
Miss V. V. PATEMAN, Trunk Exchange.
Miss K. N. OVENDEN, Trunk Exchange.
Miss M. M. BEDFORD, Park Exchange.
Miss E. M. FOSTER, Central Exchange.
Miss G. WOODING, Finchley Exchange.
Miss J. SMITH, London Wall Exchange.
Miss E. L. M. ARNOTT, London Wall Exchange.
Miss K. R. BORN, London Wall Exchange.
Miss F. V. TAPPING, Paddington Exchange.
Miss L. M. STANTON, Victoria Exchange.
Miss W. M. SIMMANCE, Victoria Exchange.
Miss E. J. VINCE, Streatham Exchange.
Miss G. M. SCOTT, Langham Exchange.

OFFICERS PROMOTED.

Miss A. M. WEBB, promoted Supervisor, Royal Exchange.
Miss A. K. KNAPP, promoted Supervisor, Dalston Exchange.
Miss D. BEADLE, promoted Asst. Supervisor, Class II, Barnet Exchange.
Mrs. C. H. WARDEN, promoted Asst. Supervisor, Class II, Hop Exchange.

THE

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CONTENTS.

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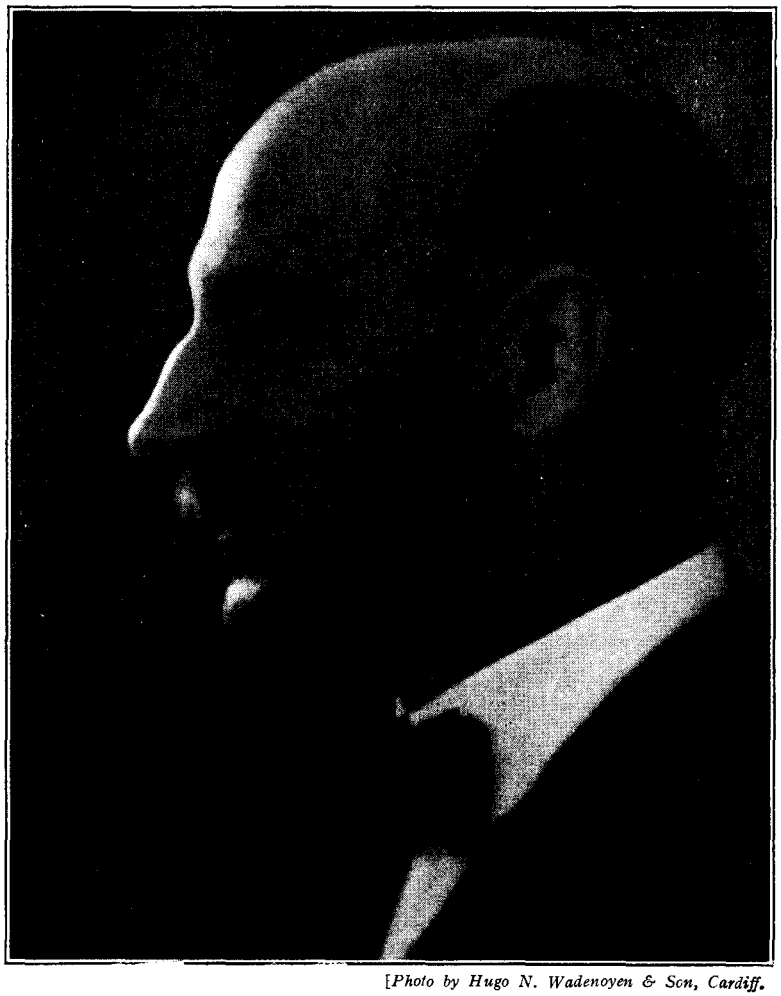
All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.*4.

TELEGRAPH AND TELEPHONE MEN.

VIII.—MR. BENJAMIN WAITE.



[Photo by Hugo N. Wadenoyen & Son, Cardiff.

MR. WAITE was born at Huddersfield and educated at the Grammar School, Fartown, near that place. His telephone career began in August, 1887, in the service of the National Telephone Company, at Huddersfield. In 1891, four years later, he was appointed as local manager at Blackburn, and two years later as District Manager. In May, 1894, he was transferred to Norwich as District Manager of the Eastern Counties, which, at that time, covered an area from the Wash to the Thames including Norfolk, Suffolk, Huntingdon and Cambridge, and the greater part of Essex.

In May, 1903, he was appointed to the Cardiff district which comprises the larger portion of the South Wales coalfield, and important shipping interests. Telephone development at Cardiff during the past 20 years has been somewhat remarkable, and the city of Cardiff to-day holds the second place in the United Kingdom for the number of telephones to its population. Mr. Waite is a keen business man, enthusiastic on telephone matters, and before the great transfer in 1912 took a leading part in one section of the Inventory of the National Company's plant to be purchased by the Post Office.

By personal touch with the staff under his control he gains their confidence, co-operation and esteem, and was the only District Manager called upon to give evidence in the House of Commons' Telephone Enquiry in 1921, under the chairmanship of Mr. Evelyn Cecil, M.P. He has equally the confidence and esteem of the public and business men with whom, in the course of his work, he comes in contact. His chief hobbies are gardening, photography, and walking.

POWER CIRCUIT INTERFERENCE WITH TELEGRAPHS AND TELEPHONES.*

ABSTRACT OF PAPER READ BEFORE THE I.E.E. BY S. C. BARTHOLOMEW, MEMBER.*

THE greater telephone development and the different conditions as regards the generation and transmission of electricity in the United States have resulted in the problems associated with interference developing earlier, and apparently in a much more violent form, than in this country. This is very evident from the widespread interest in the subject in that country, which has culminated in the appointment of Joint Committees of the National Electric Light Association and Bell Telephone systems on the physical relations between the electricity supply and signal systems. The National Main Committee consists of 56 members, and there are local committees covering districts, and sub-committees on research, field investigation, &c.

The Railway Commission of the State of California published a report of some 1,200 pages embodying the results of exhaustive tests carried out by the Joint Committee on inductive interference. The treatment of the subject is of a very high order but does not deal with the electric traction side of the problem.

In this country we have not had the same widespread problems. The troubles have been more in the nature of isolated incidents, and the need for research on anything like the scale found necessary in America has not arisen. This can partly be explained by the fact that until the last few years there was little distribution of electrical energy by overhead lines, the development being almost wholly underground. Further, where overhead high- and extra-high pressure lines have been erected, cross-country routes have been the rule, and in few cases are the routes parallel with and in close proximity to the main trunk lines of the Post Office which follow the public roads. In America, it is gathered, it is common practice for the power transmission lines to be erected on public roads, whilst the voltages employed appear to be generally higher than in this country where 33 kV is the highest in use at the moment, although a 66-kV line is under construction.

It is proposed to use the words "communication circuit" to cover both telephone and telegraph circuits, except in cases where the particular type of circuit requires special treatment, and as a preliminary it will be well to consider what is involved by each of those methods of communication.

The technical problem of telephony is concerned with:

(*a*) The transformation of the spoken word into electrical waves corresponding to it;

(*b*) The transmission of these electrical waves for perhaps hundreds of miles with the least possible distortion or loss of intensity and without the addition of foreign disturbances; and

(*c*) The reproduction at the receiving end of an audible sound which is a counterpart of the electrical wave and so of the originating spoken word.

The apparatus employed in this interplay of sound waves and electrical waves is extremely sensitive and delicate, dealing as it does with amounts of energy so small as to be outside the ordinary purview of the power engineer. A telephone receiver will respond to a fraction of a microwatt, i.e. that amount of power will transform an electrical wave into an audible sound wave.

Similarly, telegraph systems, although not so sensitive as telephones, have to reproduce faithfully the originating electric impulse as a signal at the receiving end of the circuit. Here again the apparatus is very delicate and the operating currents are small.

It is obvious from this that if the telephone and telegraphs are to carry out their functions in an efficient manner they must be kept free from foreign currents and voltages, which are relatively infinitesimal compared with the strong currents and voltages employed on power systems.

The working of power systems may have detrimental effects on telegraph and telephone systems by leakage or by induction.

Definition of leakage.—Leakage currents are those which stray from a power system and enter a communication circuit at an earth plate and leave it at another earth connexion on the same circuit. Telegraph circuits are usually worked with an earth return, and such circuits are more likely to be affected by leakage from stray currents than are telephone circuits.

Stray currents may emanate from tramway or railway systems using an uninsulated return or from faulty electric light and power circuits. The strength of a stray current depends upon the voltage between the two earth connexions and the resistance in the circuit.

The communication-circuit apparatus may be made unreliable or useless according to the strength of the stray current in the circuit.

Definition of induction.—Inductive effects from power circuits may interfere with the working of telegraph circuits by mutilating the signals, and in the case of telephone circuits may affect the signalling arrangements associated with calling and clearing or, what is more common, disturb the speech on the circuit by producing noises.

Inductive interference with communication circuits may be caused either by the normal operation of the power circuits or by abnormal conditions resulting from short-circuits, switching operations, &c. Further, in certain circumstances, even though the working of the circuits may not be affected, conditions may be set up by induction producing such high potentials in the communication circuit that there is actual danger to life from shock or risk of damage to plant.

With the effects described there is also a danger of acoustic shock to anyone who should happen to be listening on a neighbouring telephone circuit at the time. As regards danger to life, it should not be taken that such conditions exist or have existed in this country.

Inductive interference may be produced by both overhead and underground power circuits, the former being the more usual. It is, of course, unnecessary to discuss here the general laws of the inductive effects of electrostatic and electromagnetic fields associated with electric circuits, as, with the exception perhaps of electrolytic and heating work, they are associated with every useful application of electricity. The author thinks, however, that it will be helpful to recall briefly the principal features.

Electromagnetic induction.—The strength of a magnetic field round a conductor is directly proportional to the current. If the current is alternating there is a complete cycle of change in the field with every cycle of current. The rate of change of the field intensity is proportional to the frequency, being influenced to a certain extent by the wave-shape. The density of the magnetic field is greatest near the conductor, and at other points varies inversely as the distance from the centre of the conductor. The induced voltage produced by a power line upon a neighbouring wire running parallel with it will depend upon the field strength (which is proportional to the current), the frequency, the length of parallelism and the separating distance.

Electrostatic induction.—Where wires are suspended in the air and insulated from each other and the earth, they may be regarded as two plates of a condenser. Each wire forms one side of the condenser, the earth being the other. Any charge or electromotive force applied to one wire will produce a difference of potential between that wire and the ground, which will affect the potential between the other wires and the ground. With every change of strength in the electromotive force, or with reversals such as are associated with alternating-current systems, the charges induced in the wires will vary accordingly. The electric charge on a wire varies directly with the applied voltage on the disturbing wire. The potential of this charge will depend upon the capacities of this wire to the disturbing wire and to earth. The charging current produced depends upon the value of this potential and on the capacities referred to. It follows from this that while the charging current and therefore the disturbance vary as the length of parallelism, the static potential induced is not affected by the length. The charging current varies also with the frequency. As the electrostatic induction on a conductor depends not only upon the capacity between the conductor and the disturbing wire but also upon the capacity between the conductor and earth, it follows that the presence of other wires and earthed objects in the neighbourhood affect the conditions in this respect.

The following is a comparison of the effects of the two fields:—

Electrostatic induction is proportional to the voltage of the power system but is independent of the current, whilst electromagnetic induction varies with the current in the power system but is unaffected by the voltage. Both electrostatic and electromagnetic effects are proportional to the frequency of the power system. Where power lines and communication circuits are in such proximity that inductive interference may be expected, this is usually referred to as an "exposure." The voltages produced by electrostatic induction are independent of the length of the exposure, whilst the electromagnetic effects are proportional to the length of the exposure. On the other hand, the amount of current flowing is in both cases approximately proportional to the length of the exposure, the current due to magnetic induction being the same at all parts of the circuit, which is not the case with that due to electrostatic induction.

A study of inductive interference in America, the principal work on which has been carried out by the Californian Railway Commission previously referred to, has led to the standardisation of terms which are very convenient for describing the conditions associated with the problem. Power circuit voltages and currents are classified under two general heads: (1) Balanced voltages and currents, and (2) residual voltages and currents, the former being those which are balanced with reference to the earth, whilst the latter are those which are unbalanced with respect to earth. At any instant of time, the algebraic sum of either the balanced currents or the balanced voltages in the several conductors is zero, whilst the algebraic sum of the total currents in the several conductors is the residual current, and the algebraic sum of the total voltages to earth is the residual voltage. As an illustration, a circuit consisting of an overhead trolley wire with an uninsulated rail return is wholly unbalanced with respect to the earth, the total voltage and current being residual. On the other hand, a double-wire circuit with no connexion to earth and conductors arranged symmetrically with respect to the earth and other objects would have neither residual voltage nor current, as the voltage to earth on one side would be equal and opposite to that on the other. The

* Mr. Bartholomew received the Webber premium for this paper.

same would apply to the current, and in that case both voltages and currents are wholly balanced.

Excepting the cases of traction systems employing earthed returns, it can be taken that the balanced voltages and currents are those which perform useful work in the circuit, whilst the residuals perform no useful part in the operation of the system and are, in fact, a measure of the failure to reach a perfect design in the apparatus and line, having in mind other interests.

The inductive effects of "residuals" are usually greater than those produced by "balanced" voltages and currents of equal magnitude. This is due to the fact that the residual components in the several conductors are all in phase and their inductive effects are cumulative, whilst the balanced components in the several conductors are out of phase. For instance, in the case of a three-phase system they are out of phase by 120°, and the resulting effect is materially influenced by the fact that the balance components partially neutralize one another. In other words, the residual voltages and currents act like a single-phase circuit consisting of the line conductors in parallel, and an earth return. Inductive effects are therefore relatively great, as there is little neutralizing as is the case with balanced voltages and currents.

The causes of and remedies for these inductive effects will be indicated in the sections dealing with the different power systems, but it will not be out of place to point out here the salient differences between the two kinds of inductive effects.

Residual currents and voltages act as though the power system were a single-phase system with the line conductors in parallel, and transpositions or crosses in the power lines do not reduce the induction *except* in so far as such a proceeding brings about a reduction in the magnitude of the residuals themselves; for instance, the line capacities may be brought into better balance thereby. On the other hand, transposing or revolving the wires forming a telephone circuit disturbed by such inductive effects will reduce the interference.

In the case of disturbance due to balanced currents and voltages, transposing or revolving both power wires and telephone wires will reduce the inductive effect.

Residual currents and voltages may be produced in the power system by the following conditions:—

(*a*) Unbalanced capacity and leakage between the various conductors and earth.

(*b*) Unbalanced loads between phases on a system in which the neutral point is earthed.

(*c*) The development of the third harmonic and its odd multiples in generators and transformers on systems using star connexions with the neutral point earthed.

As regards (*a*) it is obvious that to reduce these the various conductors must be arranged uniformly, relative to earth or other bodies. Similarly (*b*) is a matter which can be taken care of by a proper lay-out of the system and its loads.

In the case of (*c*) the remedy lies in the design of an alternator to generate voltages and currents as nearly as possible of sine wave-shape, and in the employment of transformers working with a small magnetizing current and so connected that the effects of hysteresis and changing inductance in disturbing the wave-shape of current and voltage curves are minimized.

The presence of large residual currents is possible only where there are earth connexions on the power circuits, as if earth connexions are not used the residual currents are limited to leakage currents and unbalanced charging currents.

The inductive effects of different types of power circuits as used commercially have certain common features which affect the intensity of disturbance and which may be summarised as follows:

(1) *Avoidance of close proximity between power wires and communication circuits.*

(2) *The use of apparatus (rotating machinery and transformers) designed, or worked in such a way as to be free from harmonics.*

(3) *Restriction of residual voltages and currents.*—These are particularly difficult to lessen in the case of traction systems using track returns. In the case of ordinary power systems, they can be lessened by line balance, by the avoidance of excessive magnetic density in transformers, by avoidance of certain transformer connexions, and in some cases by the provision of supplementary devices which suppress or short-circuit the harmonic components. These effects are not reduced by transposing the power lines except in so far as such transposing assists in equalizing the capacities of the conductors to earth.

(4) *Transposing the power line conductors.*

(5) *Transposing the communication circuit conductors.*—Telegraph and telephone one-conductor circuits with earthed return cannot, of course, be transposed.

(6) *Electrical balance of communication circuits.*—This is important. A telephone circuit with its two conductors and apparatus perfectly balanced as regards series impedances, capacities and leakage to earth, and with both conductors exposed uniformly to the inductive effects, would be free from disturbance. Unfortunately such ideal conditions cannot be obtained in practice. The varying weather, trees, the small boy with the stone, are factors which would defeat the most skilful balancing of the terminal apparatus, even if it were commercially possible to provide apparatus balanced to fulfil laboratory requirements. Circuits in underground cables are, of course, not included in the above list of disabilities.

(7) *Abnormal conditions on power systems.*—These may cause disturbance of a very serious character in neighbouring communication circuits, even if they are not of long duration.

NOISE IN TELEPHONE CIRCUITS.

To appreciate the effect of small currents in producing noise in telephone circuits, it should be borne in mind that a small fraction of a microwatt of power at voice frequencies will produce an audible sound in a telephone receiver. The frequencies of voice currents in a telephone circuit are found to vary between 100 to 4,000 cycles per second. This last figure may seem a high one, but it should be borne in mind that we are dealing with the currents produced by the overtones as well as the fundamental pitch of the human voice (the pitch of male singing-voices usually falls within the frequencies 80 to 550 per second, and of female voices between 160 to 700 per second). The mean frequency of these varying currents is found to be 800 per second, which is the figure used for telephone transmission calculations. Any extraneous currents in a telephone circuit having frequencies within the limits mentioned will, therefore, have deleterious effects on the efficiency of a circuit, and this is particularly the case with extraneous currents of frequencies between 800 and 1,200 cycles per second. Mr. Gill (*Transactions of the American Institute of Electrical Engineers*, 1919, Vol. 38, p. 261), illustrated by curves the relative interfering effect of single frequency currents in a telephone receiver. From these it is obvious that the interference effects of foreign currents are influenced very greatly by the frequency. The effects of an extraneous current at a frequency of 25 cycles per second is about 1/1,000th of that produced by current of the same strength at a frequency of 1,100 cycles. As bearing on the same point Lord Rayleigh stated that the maximum sensitivity of the ear is reached at not less than 1,024 vibrations per second and possibly higher (*Philosophical Magazine*, 1907, Vol. 14, p. 602).

Power circuits do not usually operate at a higher fundamental frequency than 60 cycles per second, and there is little interference with speech from the fundamental frequency. It is unfortunate, however, that there are usually present, due to various causes, harmonics on the fundamental voltage or current wave which are within the range of the human voice, and it is these harmonics which are the chief cause of interference with telephone circuits.

If the current and voltage waves of power systems were of pure sine wave-shape there would be little or no disturbance of speech in neighbouring telephone circuits, as apart from the less sensitivity of the ear mentioned above, the telephone receiver itself is not so responsive to these low fundamental frequencies. It is possible, however, for the fundamental frequency to interfere with the telephone apparatus used for signalling, &c., and also with telegraph circuits.

The effect of the higher harmonics is to produce noises in the telephone receiver, which even if they do not prevent good speech, are always annoying. In case where the amount of noise is not sufficient to distract the attention of the telephone user it may interfere with the effective use of the circuit by reducing intelligibility, and so decrease the value of the circuits.

It is possible to operate a telephone circuit which has a good margin of speech efficiency, even though there may be considerable interference, but it will be realized also that with a circuit working near the limits of commercial speech the introduction of a disturbing effect may be sufficient to render the circuit unworkable.

The telephone system of the British Post Office is laid out on a system of definite speech-transmission values, the unit fixing the values being "miles of standard cable," that is equivalent audibility to that received over a circuit of a definite length with standard apparatus for transmission and reception. The standard cable is one having conductors of 20 lb. per mile, and constants of capacity, inductance, &c., which need not be gone into here. Suffice it to say that measurements of audibility are made in terms of standard miles in the same way that pounds and yards are used for measurements of weight and distance. The allowances for audibility vary with the type of service given. Local service should not exceed 30 m.s.c. (miles of standard cable), whilst the general standard for long-distance communication between Great Britain and Ireland aims at a transmission audibility not exceeding 35 m.s.c. between any two subscribers. It should perhaps be observed that the greater the number of m.s.c., the less is the audibility; further, that although 35 m.s.c. is regarded as the standard of good commercial speech, expert telephone users can receive with much higher figures. It will be seen, therefore, that speech values are the basis on which line plant is provided. The saving of an additional mile of standard cable may involve very great cost, and similarly the addition of interfering noise reducing audibility may be represented by monetary loss. As an example, on a 600-lb. aerial trunk circuit 200 miles long, the loss of one mile of standard cable reduces the circuit to that of 400-lb. circuit, and if a 400-lb. circuit would suffice, then 35 tons of copper would be saved.

The amount of noise that can be tolerated on a telephone circuit without undue interference with speech has not been specially investigated by the Post Office. In one or two cases of interference, measurements have been made of the amount of loss in miles of standard cable introduced by the inductive effects; this method involves comparative audibility measurements being made with the power circuit in operation and when shut down, but the arrangement is not satisfactory unless the interfering noise is considerable.

Two other methods, more suitable for general application, are, however, under investigation.

The apparatus for the first consists of an alternator giving a sine-wave of known frequency and output, and of means for listening to the sound produced by known fractions of this. This known sound is balanced against the induction which it is desired to measure, by the two being rapidly interchanged by means of a commutator, the whole arrangement forming a kind of "flicker" sound meter. A similar kind of arrangement, using relays to change over, has been used in America for comparing pure sounds of different pitch.

In America a standard noise-measuring circuit has also been devised. The method involves the comparison with a standard noise of the induced current in the telephone receiver, the magnitude of the standard noise being changed until the two noises, standard and induced, are judged by the observer to have the same detrimental effect on a telephone conversation. The generator which produces the standard noise is connected to a shunt box by means of which various amounts of standard current are shunted through a telephone receiver. The telephone receiver is connected alternately by means of a mercury switch to the standard noise shunt and to the line under test, and the magnitude of the standard noise is adjusted by means of the shunt until the point of equality is found.

The standard-noise generator is an electric generator of the inductor type, composed of a disc of non-magnetic material in which are inserted a number of soft iron pole-pieces and which revolves between the poles of a permanent magnet. Coils are wound on the poles of the magnet, and, as the disc revolves, an alternating current is induced in the winding by the pulsations of the magnetism caused by the motion of the soft iron pole-pieces under the permanent magnet. The voltage of the generator and the resistance of the shunt are so adjusted that when the generator is operated at 240 cycles the calibrations on the shunt give directly the effective value of the current through the telephone receiver in micro-amperes. In the standard apparatus this shunt is provided with steps up to 150 μA. It is stated that this amount is not sufficient in certain cases, and that as the variations in quality and pitch of the interfering note differ considerably from that of the standard, it is somewhat a matter of individual judgment as to the valuation of the standard noise, and the method cannot hope to be precise. Men who are accustomed to measuring noise, however, usually agree as to magnitude. It is this difficulty which it is hoped to avoid in the apparatus now under investigation. The author does not know the number of noise units which is considered unobjectionable in America, although it has there been suggested as a basis that, as regards important circuits of such length that the speech margin is small, the extraneously induced current in the telephone circuit should not exceed in noise-producing value the effect of 10 μA at a frequency of 240 cycles per second. On unimportant circuits and where there is a surplus of volume of transmission, as on short-distance circuits, current somewhat in excess of the above limit could be allowed. These proposals do not appear to have been agreed as acceptable, however, to the two interests concerned.

There are difficulties in the way of fixing a maximum allowable noise. Any public telephone circuit in this country is likely to be joined through to any other, wherever situated, and, if so be, the various circuits in the series making up the completed connexion—local, junction, and trunks—has each its maximum noise, the cumulative effect might be disastrous. Each circuit taken alone might be tolerable, but in combination is unfit for public service.

HARMONICS.

It is generally found in power systems that high-frequency components are present in the current and voltage waves. In the case of alternating-current systems these high-frequency components are usually a multiple of the fundamental frequency and are called harmonics. Similar components are often found in direct-current systems and it is usual to refer to them also as harmonics. Harmonics perform no useful purpose in the operation of the power system and may, in fact, in certain circumstances, have deleterious effects.

Slot harmonics are produced by practically all generators and motors and are the most frequent cause of disturbance in telephone systems. It is the breaks in the surface of the iron at the slots which are the fundamental cause of these harmonics. These slot ripples are usually of such frequency as to be specially objectionable to telephone circuits, as they fall within the speech frequencies, and the reduction of slot harmonics should preferably be taken into account when designing a machine.

The Sub-Committee on wave-shape standards of the Standard Committee of the American Institute have done a great deal of work in investigating this question. Both the British and American committees had before them the evidence that harmonics between certain frequencies are particularly harmful so far as inductive interference is concerned. As a result of the American Committee's investigations a telephone interference-factor meter has been devised which gives a direct reading showing how the wave-shape is loaded in this respect (H. S. Osborne, *Transactions of the American I.E.E.*, 1919, Vol. 38, p. 261). It is stated in the same paper that approximate analyses of a number of cases show very clearly that, in general, the machines with high telephone interference factors are machines with large slot harmonics. It is believed to be the intention of both Committees to penalize wave-shapes which contain the frequencies mostly affecting telephones.

It should not be overlooked, however, that the third harmonic, although not in the range, is one very likely to cause disturbance to telegraphs. If a three-phase generator with earthed neutral point is feeding directly into a power line, i.e. one in which the voltage is not stepped up, it is nearly always the case that, as the harmonics are in phase, a pronounced third harmonic shows itself as a heavy charging current oscillating between the earth connexion and the three lines in parallel.

In addition to the third harmonic, odd multiples of the third may also appear and add to the detrimental effect. The author believes that two different methods of overcoming this trouble have been suggested, tried, and successfully used on a small scale. One of these depends for its effectiveness on the use of filters tuned to reject the frequency current which it is desirede to suppress, by similar means to that employed in wireless reception for some years.

Transformer harmonics.—The magnetic density at which transformers are worked is a most important feature in the production of harmonics, as if the exciting current is large the effect is to develop large higher harmonics, i.e. to produce a flat wave. The reduction in magnetic density can be accomplished by lowering the impressed voltage per turn. Attention can perhaps be drawn here to the Californian Commission's General Order No. 52 on this point, which reads: "Transformer connexions. In order that the wave shape of voltage and current may be distorted as little as possible by transformers, all connexions on Class H power circuits shall have an exciting current as low as is consistent with good practice, which current shall not at rated voltage exceed 10 per cent. of the full current. Except that for transformers without neutral ground connexions on the line side, the exciting current at rated voltage need not be less than 0.2 ampere."

Class H power circuits are those having 5,000 volts or more between any two conductors, or 2,900 volts or more between any conductor and earth.

Harmonics in direct current systems.—As previously stated, harmonics are found in direct-current as well as in alternating-current systems. In the case of direct current, the ripples are usually slot harmonics and are produced in the same way as in alternating-current generators. There is, however, the difference that the slot harmonic in the case of direct current is not the combination of two harmonics. The amplitude of the harmonic is constant and its frequency is equal to the number of slots which pass a given point per second, e.g. in the case of an armature with 120 slots and running at 500 revolutions per minute the frequency of a slot harmonic will be $120 \times 500/60 = 1{,}000$.

Harmonics or ripples may be caused by commutation, i.e. by changes in the current as the segments pass under the brush. The frequency of the ripple will be equal to the number of segments which pass a brush per second.

Rotary converters.—Of recent years a great deal of trouble has been caused by harmonics produced by rotary converters, as they are now commonly used for supplying direct current to traction systems where the power system is usually unbalanced and where the residual voltages and currents are considerable. As is well known, in this type of machine alternating current is collected by slip-rings on one side of the armature and taken to the commutator on the other side of the armature, where it is collected from the brushes as direct current. Slot harmonics are produced in the way already described, and in modern machines these have been found to be very disturbing to neighbouring telephone circuits. The speed of machines is usually such as to produce harmonic frequencies likely to disturb speech. There are, of course, other sources such as the position of the damper bars in the pole shoes.

Mercury Arc rectifiers.—Here is yet another producer of "interference" which, however, was dealt with by Professor E. W. Marchant who kindly placed his account of the successful methods he adopted at my disposal.

TRANSPOSITIONS.

The voltages produced in a telephone circuit by the electric and magnetic fields may be separated into two effects usually referred to as transverse and longitudinal induction. The transverse induction is that produced between the two sides of the circuit, whilst the longitudinal induction is that produced between the two sides of the circuit and earth, or along the circuit. The induced voltages due to the former effect will cause currents to circulate through the terminal apparatus, whilst the latter may result in currents through the apparatus if there is a difference in the inpedances and capacities to earth of the two sides of the circuit.

The author may perhaps be pardoned for indicating in its simplest form the effects of the electric and magnetic fields on a neighbouring telephone circuit and the benefits to be obtained by transposing the latter. The simultaneous occurrence of electric and magnetic induction is the normal result of the proximity of power lines and communication circuits. Fig. 1 shows a non-transposed telephone circuit and a disturbing power line. The effect of one wire only of a power circuit is considered The (*a*) wire of the

telephone circuit, being nearer than the (*b*) wire, has a higher induced potential due to the electric field and at the same time a larger E.M.F. from the magnetic field. Assuming that the potential of the wire of the disturbing circuit is increasing in the positive sense as shown, and the current increasing in the direction shown by the arrows, then the illustration indicates what is occurring at that time. The telephone receiver at B will be more disturbed than that at A.

If now a transposition is made in the telephone circuit at the right point the magnetic effect at the terminals can be eliminated, as shown in the figure. *On the other hand, however, the electric field effects are not so completely* neutralized. There are four points at which a current divides and flows in opposite directions, i.e. 1, 2, 3 and 4. Single transpositions are, of course, *not effective with long exposures, and theoretically in the result of electric* induction could be eliminated only by an infinite number of transpositions.

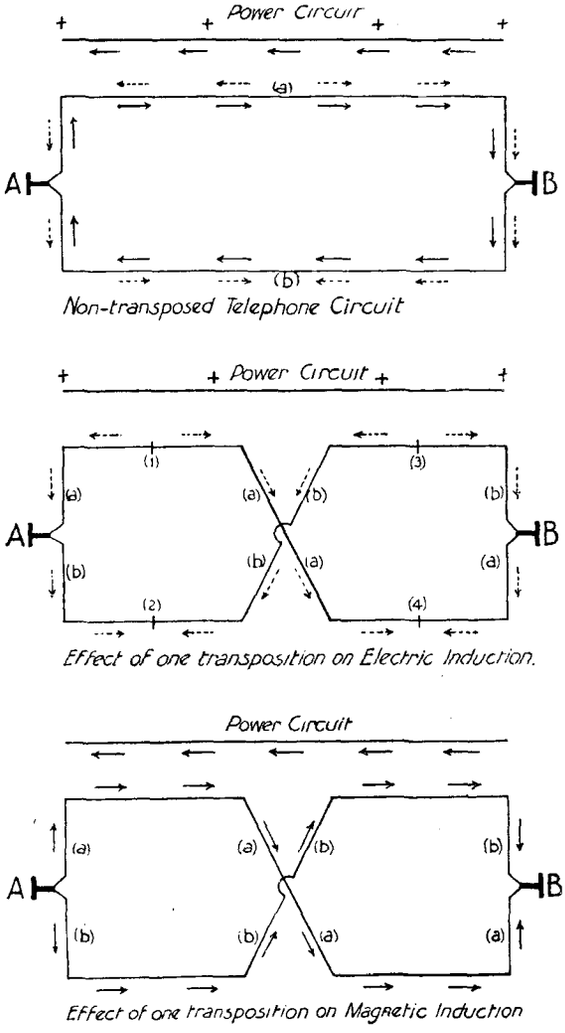


FIG. 1 —Effect of transposition on induction.

- - -> indicates current due to electric induction.
——> indicates current due to magnetic induction.

It should be observed, too, that the actual induced voltage on the wires due to the electric field, i.e. the longitudinal voltage, is not reduced by the transpositions, although the *effect* of that voltage on the apparatus may be neutralized with the lines in good condition. Further, it is extremely difficult, and sometimes impossible, to secure such an accurate electrical balance to earth of the two sides of a complete telephone circuit as to reduce the disturbance of its electrical field to a sufficiently low figure for satisfactory working. The use of the earth for signalling purposes is an essential feature of modern telephone practice, and although relays and retardation coils are tested for balance, which ensures that they will be unaffected by neighbouring telegraph and telephone circuits, this may not be the case in the very much stronger fields produced by power circuits.

The transposition in the positions of wires forming the circuits of telephone and power circuits where these circuits are parallel is a most important method for reducing inductive interference. The object of transpositions in a communication circuit is to equalise the electrical effect of near-by influences so that the wires are similarly affected in a given length. The transposition of power wires will produce neutralizing effects in the telephone circuits due to balanced voltages and currents, whilst to transpose the telephone wires tends to equalise the inductive effects in the two sides of the circuit, whatever may be the cause of such effects.

It has been the practice of the Post Office for many years to transpose telephone wires in order to prevent disturbance from telegraph circuits and cross-talk between the telephone circuits themselves. The inductive effects produced by a single-wire telegraph circuit on a telephone circuit carried on the same pole line may be considerable, as the length of parallelism may be great and the separating distance as low as 12 inches, and a very good balance of the telephone circuit is required for satisfactory working.

Two methods of transposition are employed in this country. The older system is known as the "twist," in which four wires (two circuits) are taken as a unit and occupy at the insulators the four corners of a square, the diagonals comprising a circuit. At successive poles each wire changes its position to the next corner of the square and thus in four spans completes a spiral, the twist being right-handed (Fig. 2). The other system is that employed in America for many years by the American Telegraph and Telephone Company in which the wires are run straight for a certain number of spans and their position is changed at definite points. The wires comprising the circuit in this system are erected on the same arm and the transposition points vary according to the position of the arm and of the wires on the arm. There are several variations of the system but all are apparently equally efficacious in preventing inductive effects and cross-talk from neighbouring telegraph and telephone circuits. The American system adopted by the Post Office is based on a unit length of 8 miles.

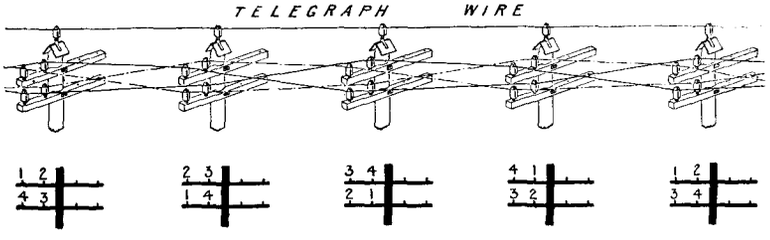


FIG. 2 Twist system of transposition

PARALLELISM.

It is obvious that one of the most important factors in preventing and minimizing inductive interference is to avoid conditions where power lines and communication circuits will run parallel to each other. It should be an axiom that where parallelism cannot be avoided the greatest possible separating distance should be provided. This is important not only in connexion with inductive effects resulting from the normal working of the power line, which may be small if proper precautions are taken, but because it is impossible to guarantee that some abnormal occurrence on the power system may not by its unbalancing effects cause serious disturbance. One naturally asks what are the permissible conditions, and one seeks for a simple rule which will apportion due weight to the factors and give a safe answer. Unfortunately, these factors are very complicated, involving, as they do, not only such simple matters as separating distance, lengths of exposure, normal voltages and currents and frequencies, but also wave shapes of transformers and generators, capacities and inductances of power and communication circuits, and the configuration and separation of the power and communication wires.

The Californian Joint Committee did not commit themselves beyond stating that "every reasonable effort shall be made to avoid parallels and where there are parallels they should be as short as practicable." Further, "that the power lines and communication lines shall be kept as far apart as practicable and this separation should be at least equal to the height above ground of the power wires, except when closer proximity is unavoidable."

There are three considerations to be borne in mind. These are the induced effects which may be produced by (*a*) balanced voltages and currents, (*b*) the residual voltages and currents, and (*c*) abnormal occurrences arising out of faults, switching, &c. The first-mentioned may, perhaps, be forecast and allowed for; (*b*) is a more difficult matter, and (*c*) more difficult still, the factors being modified by all types of fault and by the position of the communication line in respect to the generating station and the position of the fault. The inductive effects of balanced voltages and currents are the most tangible to handle, and in the case of a three-phase overhead line the theoretical effects have been considered by several investigators. To forecast the results of those effects and those of the residual voltages and currents on neighbouring telephone and telegraph circuits in terms of noise value and mutilating effects on telegraph signals is, in the opinion of the author, to enter into the region of prophecy and he is not in a position to commit himself on the matter. As regards actual maximum tolerable values, those taken in the Californian report are no doubt near the mark in the case of telephones;

that is, the extraneously induced current in the receiver should not exceed in its noise-producing value the effect of 10 micro-amperes at a frequency of 240 periods per second; but those taken in the case of telegraphs, viz. the extraneously induced current at the circuit terminals, should not exceed 2 milliamperes at a frequency of 60 periods per second, or its equivalent at any other frequency, e.g. 1 mA at 25 periods per second appears to be on the high side. The types of telegraph apparatus and their sensitivities vary considerably and the author would place the maximum figure at 0.5 milli-ampere for this country.

N.B.—It is sincerely regretted that Mr. Bartholomew's erudite and carefully written paper has been so severely reduced in length due to the exigencies of space. Much valuable matter has been omitted which, with his kind permission and the continued courtesy of the I.E.E., we hope to reproduce at some not very distant date.—ED. *T. and T. Journal.*

THE BAUDOT TELEGRAPH PRINTING SYSTEM ON AN INDIAN RADIO CIRCUIT.

FROM OUR INDIAN CORRESPONDENT.

AN interesting application of the Baudot system of telegraphy to radio has recently been made in India. For some years past the question of improving telegraphic communication between India and Burma had been under consideration. There is no cable across the Bay of Bengal, so that all traffic has to pass *via* Calcutta and over the lines passing round the north of the Bay. There is also no railway connexion between India and Burma, and the land-lines pass through difficult country which renders them liable to interruption. About one-third of the traffic between India and Burma normally passes through Madras, and it was eventually decided to install a high-speed duplex radio service between Madras and Rangoon, utilising valve transmitters of a nominal power of 25 kilowatts. The radio plant was obtained from Marconi's Wireless Telegraph Company and installed during 1923. The actual gross power required to work each set is about 40 kW, and the power supplied to the plates of the valves about 18 kW. With this power it was hoped to get sufficient signal strength to work high-speed for a considerable part of the year, the distance being about 1,100 miles, though it was realised that with this power automatic telegraphy would be impossible during periods of severe atmospheric disturbance. The service was required to handle the ordinary commercial traffic between Southern India and Burma, and thus to serve as a relief to the land-lines. In recent years the tendency in India has been to discard Wheatstone in favour of the Baudot system, which is now used on most of the main routes in India where automatic telegraphy is required. The radio sets at Madras and Rangoon, however, had been designed for Wheatstone work, which would have entailed special staff and instruments at the telegraph offices, with the inevitable disadvantages of working two systems simultaneously. The advantage of employing a system which was already in general use caused the use of Baudot to be seriously considered.

The principal factor to be examined before deciding to adopt the Baudot system was the working speed of relays. For the same number of words per minute, the Baudot element is rather longer than the dot in Morse. Thus, each Baudot channel gives 180 letters per minute, that is, approximately 70 words per minute for two channels.* The duration of the shortest current impulse is then 1/42 second. Wheatstone reversals at the equivalent message rate would give about 28 dots per second, the length of the actual current impulses being 1/56 of a second. It appeared, therefore, that no alteration was required in the relays or keying arrangements, which had been designed for Wheatstone working at 150 words per minute. The only other possibility of trouble was the question of maintaining synchronism. It was thought possible that an occasional "atmospheric" coinciding with a correcting impulse might destroy synchronism. Practical experience, however, has shown that no special trouble arises from this cause, and, in fact, it is found that, under fair conditions, the Baudot system on a radio circuit is more steady than on a long land-line. This is probably due to the absence of line-retardation which is liable to vary over long land-lines in the severe climatic conditions of India. Having decided to use the Baudot system, two-channel working each way was adopted in the first instance. The operating of the circuit is carried out in the Central Telegraph Offices at Rangoon and Madras. Transmission is effected by hand on the ordinary Baudot keyboards and signals are relayed automatically at the radio transmitters. At the receiving stations signals are automatically relayed from the radio receivers to the Central Telegraph Offices, where they are printed in clear language by means of Baudot apparatus on tape in the usual manner. The terminals of the lines from the radio transmitter and receiver at each telegraph office are thus treated exactly as if they were land-line outlets. For purposes of control the radio transmitter and receiver at each end are connected by direct telephones to the Central Telegraph Office, where the instrument is on the same table as the Baudot instruments.

At Rangoon the transmitter is about 15 miles from the Central Telegraph Office which controls it, and it was found possible to erect the receiver in the Central Telegraph Office itself. At Madras where a previously existing spark station, less than a mile from the Central Telegraph Office, had been adapted as control station, the receiver is located about three miles away. In each case directive aerials of the crossed-frame type are installed, but the directive properties are not found necessary for eliminating signals from the local transmitter. They can, therefore, be fully utilised for reduction of atmospheric interference. *As had been expected, Baudot working is impossible during bad atmospherics, but not more so than high-speed Morse telegraphy.* When automatic printing is used with the latter a very small percentage of errors makes practical working impossible. The Baudot system has the advantage of direct printing combined with great flexibility and does not require the preparation of perforated tape, so that the receiving operator can very readily obtain corrections and generally collaborate with the adjacent transmitting operator.* As a test, direct transmission from Calcutta to Rangoon was successfully carried out, signals being transmitted by land-line from Calcutta to Madras, a distance of over 1,000 miles, and thence automatically relayed by radio to Rangoon. It would thus be possible, using the "Echelon" arrangement, to work one arm from Calcutta, say, and one from Madras, giving the direct duplex connexions Calcutta—Rangoon and Madras—Rangoon simultaneously. For the greater part of the year two-arm Baudot each way should be able to cope with the total direct traffic between Southern India and Burma, which amounts to some 1,600 messages a day, and there appears to be no technical difficulty in adopting three- or four-arm if traffic requires.

On several occasions satisfactory tests of the application of the Baudot system to radio work have been reported in the technical press, but it is understood that this has not been adopted elsewhere as a permanent arrangement for dealing with traffic over a radio circuit of more than a thousand miles. The installation of the stations and the other work connected with the Madras—Rangoon circuit were carried out entirely by the wireless and telegraph officials of the Department of Posts and Telegraphs, India.

* According to the basis upon which British and Continental calculations regarding Baudot speeds of working are made, 180 letters per minute would not produce more than 30 average words, i.e. five letters and one space for each word.

* Although the Baudot system does not *require* the preparation of perforated tape, the latter has proved a very useful adjunct, and its use in this country is steadily making headway in connexion with Baudot working, while the Continent is also alive to certain advantages to be derived from this method.—ED. T. & T. JOURNAL.

PROGRESS OF THE TELEPHONE AND TELEGRAPH SYSTEMS.

THE total number of telephone stations working at the end of June was 1,189,260, of which 421,334 were in London and 767,926 in the Provinces. This represents an increase of 30,768 or 2.7% on the March total, and is the best result for any quarter on record.

The number of new telephone stations connected during June was 18,040, a comparatively low figure due to the interruption of the Whitsun holidays. The cessations, however, 7,100 stations, also were not heavy, so that the net increase for the month was well above the average.

The number of subscribers' telephones rented at the specially reduced tariff for private residences was 194,962 at the end of June, an increase of over 8,000 compared with the March total. London appropriates 71,999 or 37 per cent. of these subscribers. The proportion of residence to total subscribers stands at 29 per cent. This is a steadily growing figure, especially in London.

29 new exchanges were opened during the month in rural areas, under the special terms authorised in July, 1922, to encourage rural development. Altogether rather more than 600 of these exchanges have been authorised, 503 of which are already working.

During the month 167 rural party line stations were connected, making a total of 8,737 at June 30, and 20 railway stations in sparsely populated districts were linked up with the exchange system. The number of call offices in rural areas also advanced from 5,549 to 5,618 during June.

Call offices generally show a growth of 366 for the quarter, i.e. they increased from 17,675 to 18,041. 695 of these call boxes are kiosks erected in public thoroughfares, services being available day and night.

The latest available record of trunk traffic is for the month of April, when the marked progress recently shewn in long-distance communication was well maintained. As some indication of the growth of the inland trunk service the traffic dealt with during the month of April, 1924, is compared with that for April in the two preceding years as follows :—

April,	1924	...	...	6,118,959
,,	1923	...	...	5,231,458
,,	1922	...	...	4,261,459

It will be noticed that the total exceeded four millions in 1922, five millions the following year, and six millions in 1924, the increase being mainly in the shorter distance trunk calls.

Further progress was made during the month of July with the development of the local exchange system. Among the more important exchanges extended were :—

LONDON—Hop.	PROVINCES—Bexhill-on-Sea.
Hendon.	Hastings.
Reigate.	Horsham.
Wembley.	Sevenoaks.

During the month the following additions to the main underground system were completed and brought into use :—

Glasgow—White Craigs, Spean-bridge—Barrhead,
Wolverhampton—Shrewsbury, Stockport—Buxton,
Warrington—Northwich,

while 98 new overhead trunk circuits were completed, and 108 additional circuits were provided by means of spare wires in underground cables.

TELEGRAPHS.

Baudot or Teletype working has recently been introduced on the following routes :—

Baudot—

Bristol—Newcastle—Hull.
C.T.O.—Leicester—Derby.
Birmingham—Leicester.
C.T.O.—Manchester (3rd)—Automatic transmission.
Birmingham—Nottingham—Peterborough.
Bristol — Manchester has been extended to Edinburgh.
Plymouth—Bristol ,, ,, ,, ,, Birmingham.
Aberdeen—Glasgow ,, ,, ,, ,, Manchester.
,, ,, ,, ,, ,, ,, Birmingham.
Birmingham—Manchester ,, ,, ,, Belfast.
Glasgow—Belfast ,, ,, ,, ,, Londonderry.
Liverpool—Manchester ,, ,, ,, Sheffield.
Birmingham—Norwich ,, ,, ,, Yarmouth.

Teletype—

Birmingham—Coventry.
,, —Shrewsbury.
,, —Wolverhampton.
C.T.O.—Carlisle.
,, —Wembley Exhibition.
C.T.O.—Colchester.
,, —Newmarket.
Manchester—Preston.
Newcastle—Darlington.
Liverpool—Chester.

HISTORY OF THE TELEGRAPH AND TELEPHONE IN CHILE.

MR. VICTOR M. BERTHOLD, of the American Telephone and Telegraph Co., continues his series of histories of the telegraphic and telephonic development of the South American republics with an interesting work on Chile, a copy of which he has been so good as to send us. We learn from it that these services had their ups and downs. Civil wars, revolutions, earthquakes, and other ills not incident to European systems, have all combined to stay their progress at various times.

The electric telegraph was introduced in Chile in 1851, when a concession was granted to a William Wheelwright, and the "Compañia de Telégrafo Magnético entre Valparaiso y Santiago" was formed. The line was completed in the summer of 1852, when the first message passed between Valparaiso and Santiago, but the service was not opened to the public until April 23, 1853. It was not financially successful, and the Government had to aid the Company with sundry grants and to construct the lines southward of Valparaiso itself. The State, therefore, entered the field and completed a line to Talca in 1857, and issued the first decree regulating rates in that year. Civil war broke out in 1858, and hindered development, and the same year a law was passed declaring all State lines part of the postal service. This was repealed in 1872. A financial crisis in 1878 followed by a war with Peru, 1879-1883, were adverse to telegraphic development. After 10 years of progress (1881-1890), during which the wire development increased from 8,784 km. to 13,355, a revolution broke out in 1891 which disorganised the service. Extensive reconstruction of the system took place in 1892 and 1894, and, continuing its policy of extension, the Government possessed 20,397 km. of wire in 1900. The terrible earthquake of 1907 provided another set-back.

In 1920 the State system owned 29,715 km. of wire, the private companies 21,632, and the railways 9,645, or 60,992 in all.

TELEPHONES.

The telephone was introduced into Chile as early as 1880 by José Dottin Husbands, who formed the Compañia Chilena de Teléfonos de Edison, and had two or three hundred telephones working in Valparaiso by 1881. Various other private companies were started, and ultimately amalgamated in an English company, the Chile Telephone Company, Ltd., which began operations in 1889 with 2,070 subscribers. In 1920 this Company possessed 19,867 of the 24,945 subscribers' lines in the country, and although commissions have deliberated long on the advisability of the service being acquired by the State, the project has been abandoned or postponed. There was a proposal, we believe, to convert the Company into a national organisation with largely-increased capital and Chilean stockholders, but a recent newspaper report states that a new concession has been granted to the Chile Telephone Co. for a term of 20 years.

Mr. Berthold, who is a specialist on the subject, has produced a very useful and well-documented brochure, more interesting to the reader perhaps than this brief résumé would suggest.

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Telegraph and Telephone Journal.

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

Managing Editor - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

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HOLIDAYS.

IT would probably astonish the many who take most established things as a matter of course to learn that the annual summer holiday—at least, for those who have to earn their living—is a custom of no great antiquity. We read that, in the days of Charles Lamb, who was a clerk in the East India Company—a fairly liberal and considerate firm,—annual leave was unknown in that institution; at most, a few days' holiday might be granted as a matter of grace when a man's health seemed to need it. Yet early in the nineteenth century, Brighthelmstone, Margate, and Hastings already enjoyed a considerable vogue, and the custom of resorting to bathing places, not only for curative purposes, but for pleasure, was fast spreading. We may assume that their patrons were people of independent means, and those who wished to be thought so, professional men who could spare the time, and merchants and shopkeepers who could leave their businesses for a short spell to rejoin the family at the seaside. It would be difficult in these days to find the employee who does not enjoy one, two, or three weeks respite from the daily round during the year, in addition to those accretions to the bank holidays which many are enabled to take. We imagine that few employers are left of the race of Scrooge who considered that a holiday-time was a poor excuse for picking a man's pocket. So well recognised is the beneficial effect of that change of scene and thought, the tonic of a new air and a brief period of outdoor life on men and women confined during their working days within four walls, and often harassed morning and evening by journeys made under the most uncomfortable and trying conditions, that the holidays of their staff are looked upon by most principals as well earned, and indeed as part of the unalterable scheme of things.

It certainly requires the pen of a gifted essayist to describe the feelings of release—even from congenial work—with which one plunges into the freedom of those all too quickly passing days, the new atmosphere of sights and sounds with which one is surrounded, the sense of irresponsibility enjoyed in a dose too small to be positively harmful, and the pleasure of tasting for a short time the amenities of an "independent" life. Not all the vagaries of the English climate can destroy this satisfaction, and it may be here remarked in parenthesis how much of a poor summer's day can be seized upon and made the most of during a holiday, so that the threatening clouds and unwelcome showers fade afterwards from the memory of the day's pleasure. From a well-spent holiday we return much the poorer in purse but richer in some indefinable possession—not the possession of that pottery of unspeakably unchaste design and lavish ornamentation (inscribed "A Present from the Seaside") which seemed to delight our forbears—but in some renewal of strength and widening of experience, some golden memories which hearten us for the daily task.

RETIREMENT OF MR. W. HAINWORTH.

ON Aug. 15 a representative gathering of his colleagues and friends (and the terms may be said to be synonymous) assembled in the Assistant Secretary's room to say farewell to Mr. Hainworth, on his retirement from the Secretary's Office after 42 years' service, and to present him with a memento of their esteem. This took the form of a splendid edition of Spenser's *Faerie Queen* in six volumes, illustrated by Walter Crane, of first editions of several volumes of William Watson's poems and William Morris's *Waters of the Wondrous Isles*, and an *edition de luxe* of Dumas' *Lady of the Camelias*. Mrs. Hainworth, who accompanied our old colleague, was presented with a handsome blouse-case. Mr. F. H. S. Grant, Principal Clerk, made the presentation in a happy speech in which he referred to Mr. Hainworth's unrivalled official experience and readiness to help others, and hoped he would fulfil his promise to rival the achievement of his father who is still in the enjoyment of his health and pension. Mr. Hainworth having expressed in a short speech his pleasure at the gifts, and the kindly thoughts which accompanied them, the meeting closed with cordial handshakes and good wishes.

HIC ET UBIQUE.

THE returns of the telephone development of the various European states which are to hand so far indicate that a considerably greater increase took place in 1923 than in 1922. Great Britain, as our readers are aware, showed an increase of over 102,000 stations, while Germany had upwards of 168,000, France of 55,000, Denmark of 13,000, Switzerland 10,000, Belgium 18,000, and Sweden about 8,000. With the returns of several large states yet to come there is already an increase of nearly 400,000 stations reported as against 340,000 for the whole of Europe in 1922. The total number of stations in the principal telephone using countries of the world (omitting Canada, which is fourth in aggregate) are as follows :—

United States	15,369,101
Germany	2,242,332
Great Britain	1,148,095
France	579,412
Sweden	402,389

WOMEN have more tricks ready for the capture of the feminine vote at this year's Presidential election than the other sex, and there will be no excuse for any who neglect to go to the poll, says the Washington correspondent of the Central News.

For instance, instead of the customary "Number, please," it is expected that "Hello, have you voted to-day ?" or "Good morning, it's time to go to the polls," will be the greeting for women who use the telephone on election day.

What would be the effect of such a message on a determined non-voter who hastened to leave some household duty to answer the telephone, and looked for some important or interesting message we leave our readers to imagine.

THE *Daily Graphic* in an article entitled "A High Prices Complex," says: "Even the Post Office, the telephone service, the railway companies, all refuse to believe that cheapness stimulates demand, in spite of such monumental proofs as the newspaper industry in this country and the Ford car in America."

There seems to be some mistake somewhere. Nearly all the daily papers are doubled in price since the war, but not even the most deft use of statistics could demonstrate that the price of the telephone has increased in anything like that ratio.

AN East Anglian daily paper in comparing British with American telephone development says "if we were asked for the true explanation, we should say it was to be found in the unconscious admission of a Post Office official. Questioned about the matter, he pointed out that an increase in the numbers of telephone users 'meant an increased cost of administration.' A clear piece of evidence of the evil restraint on progress caused by nationalisation."

We know not what official made this "unconscious admission," but we imagine that it is patent that it costs more to "administer," say, two million telephones than one, whether by State or by private enterprise.

THE annual report of the Posts & Telegraphs Department of the Federated Malay States shews that the number of telephone subscribers increased by 208 during 1923. With extensions there are altogether about 3,000 circuits in the States. The mileage of telegraph and telephone wire exceeds 24,000 miles, and the number of telegrams increased from 375 to 384 thousand.

AN Arbroath subscriber sends to the District Manager, Aberdeen, the following appreciation of the service :—

"May I be allowed to say that I have been greatly pleased with the unfailing courtesy that has characterised all communications I have had with your department. A public service such as yours is too often subjected to unfriendly criticism which takes no account of the difficulties to be contended with, but which calls for an amount of Christian patience which I am afraid is conspicuously absent from a good many of your subscribers !"

THE following story is from the *Telegraph and Telephone Age* of Chicago :—

A man was arrested for assault and battery and brought before the magistrate.

Magistrate (to prisoner).—What is your name, your occupation, and what are you charged with ?

Prisoner.—My name is Sparks, I am an electrician, and I am charged with battery.

Magistrate.—Officer, put this guy in a dry cell."

THE *Sunday Chronicle* pays the following testimony to the general accuracy of the telephone directory :—

What is the reward for discovering a mistake in the London telephone directory ? On the top of page 501 is the section mark HUG-HUT, and the last name in the column is "Hutton." But this is followed on the next page by "Hum" and the Huttons proper do not come in until six pages later. Considering the extreme care with which the directory is compiled, this slip must be almost a record, and should make the 1924 edition as valuable as a postage stamp with only one "n" in penny.

TELEGRAPHIC MEMORABILIA.

ACCORDING to the Paris correspondent of the London *Daily Telegraph*, it would appear that the French Administration of the P. T. and Telephones has introduced an automatic joke into their telephone system, which apart from its inevitably differing effect upon differing psychologies, could only have been installed at a very appreciable cost while adding to the electrical and mechanical complications of an already complicated system. "In future," says the correspondent, "when a subscriber calls the telephone exchange, a number will appear over the subscriber's desk on the operator's board to indicate his turn in the waiting list. As each call is answered the subscriber who started, let us say, twelfth in order, will gradually move nearer to number one, but should he, in protest against delay, tap, or rattle the telephone hook in his office, the number of the impatient one will automatically disappear, and he will again have to begin at the end of the waiting list." The merciless mechanism will repeat the *punishment* as many times as the offence is repeated.

The *Synchroniser*, an American journal, is apparently a publication which most thoroughly espouses the cause of electricity and which leaves no stone unturned in order to defeat any opposition to the extended use of this mighty force to the service of man. The necessity for any such propaganda among the enlightened peoples of the Trans-Atlantic States came somewhat as a surprise to the writer who had hitherto conceived the idea that it was rather to this side of the "herring-pond," one would rather feel bound to look for retrogressive views and opinions on this subject. However, it appears that, according to our North American contemporary, there are actually folks in the States who have raised strong opposition to the use of the electric light for the purpose of increasing the egg-laying capacity of hens, and this on humanitarian grounds ! The *Synchroniser* will have none of this. With true legal acumen it not only counter-points the attack of cruelty to the lower animals, but conclusively proves to its own satisfaction if not to the hens that the use of electric light definitely *adds* to the happiness of this domestic bird. Thus, "the opponents of the use of electric light in the egg-laying industry forget that the sole object of hens in life is—eating. The provision of electric light stimulates the hens to spend twice as much time in this practice, and therefore doubles the pleasure of existence for them." *Verb. sap.* !

Again it is to the *Daily Telegraph* that we are indebted for an interesting account of what may be looked upon as a real development of broadcasting.

It appears that a prominent firm of American merchants have a broadcasting station situated on the steel pier at Atlantic City, New Jersey, where they have arranged for a deep-sea diver, *possessed of descriptive and literary talent*, to go down to the ocean bed about a mile out. From this point, through the heavy glass windows of his helmet, he observes and by means of a wireless telephone describes to those above the sea-floor with its marine flora and its many strange finny and other inhabitants of the submarine world.

It is understood that from the beginning of October the Ministry of Agriculture has arranged with the British Broadcasting Co. to issue from London a regular fortnightly bulletin containing information designed mainly to assist and interest agriculturists and others concerned in the land and its cultivation. About 15 minutes will be devoted to each message.

The following announcement is published for the benefit of our manufacturer subscribers. The Italian Ministry of Posts and Telegraphs in Rome has issued a notice drawing the attention of manufacturers and sellers of radio receiving sets to the fact that only such sets as are approved by the Ministry of Communications can be sold in that country. In order to avoid unnecessary delay in placing their instruments on the market, firms desirous of manufacturing or selling in Italy should get into touch with the Higher Institute of Posts and Telegraphs, Via del Ré, Rome, whence full particulars of the conditions can be obtained.

Mr. Baker, in the House of Commons recently, asked the Secretary for Mines whether his attention had been called to the decision of the American authorities to test wireless as a means of saving life in mining disasters; and whether he would undertake investigations on similar lines.

Mr. Shinwell said he was aware that experiments had been made in the United States. Experimental work on a small scale had also been undertaken privately in this country and his Department was watching developments both here and abroad. He would communicate the suggestion to the Safety in Mines Research Board.

The German Atlantic Telegraph Co., of Cologne, has been authorised by the Spanish Government to connect up a submarine cable which will give direct telegraphic communication between Vigo and Emden.

The cable steamer *Faraday* has laid the last portion of the 2,200 miles cable from Barbados in an all-British system linking the West Indies with Nova Scotia.

Reuter's agency records as a fact that Dr. J. H. Hammond, jr., the American inventor, to whose credit are to be placed remarkable feats in the distant control of battleships and submarines by radio waves, has developed a system of radio transmission which is claimed to achieve at one stroke three very important and long-looked-for results.

The doctor claims to have solved the problem of multiplex transmission through the ether. For instance, in a test carried out in Rome, a concert and a lecture were both transmitted simultaneously from the same aerial and on the same wave length, and were picked up separately on the same receiving aerial, says Dr. Hammond, while another station transmitting on exactly the same wave-length was unable to cause any interference. The latter point is quoted as an illustration of the second result achieved by the invention, namely, immunity from jamming. Thirdly, the system is said to afford privacy of communication, for it appears that the waves sent out by Dr. Hammond's transmitter are virtually immune from interception by unauthorised stations. As to the means by which these results are claimed to be secured, Dr. Hammond explained that his method was to produce a secondary modulation in the radiated waves, and thus to form a characteristic wave that would only yield intelligible signals—either telegraphic or telephonic—to a receiver acquainted with its characteristic and having the necessary apparatus to detect it. At the same time it is necessary by prearrangement for the receiving station to know exactly what factor to use in order to rectify the wave. The multiplex result arises from the fact that more than one—perhaps even four—different characteristics can be applied simultaneously to the same wave, each conveying a different message.

It is understood that this system, upon which Dr. Hammond has been working for a considerable time, is preferably applied to short wave-lengths.

The report of the W. India and Panama Telegraph Co., Ltd., for 1923 shows a margin of only £3,056, or, with interest added, the sum of £3,455 as a result of the year's working. There was a debit balance of £85,334 brought forward, but although the company has been working at a profit, this profit is a small one, so that the debit balance carried forward is still well over £80,000. With the commencement of the competitive Government services in October next both the annual subsidies and the authorised additional charges will cease, and it is doubtful if the company will be in a position to continue operations.

The Marconi International Marine Communication Co. Ltd.'s report for the same year shows a net profit of £85,315 against more than twice that amount for the preceding year. There are several causes to account for this result. For example, during the year a lower scale of pay ruled in all seafaring ratings, and the salaries of telegraph operators were reduced proportionately. Thus the amount receivable by the company from shipowners for the services of telegraph operators has been substantially less. This is mainly responsible for the reduction in the gross revenue for the year. Apart from this circumstance, the real revenue of the company shows little change. The profits again suffered from the depression in trade. A number of vessels remained out of commission. The improvement which was manifest at the beginning of 1923 did not continue. The company has suffered from other exceptional circumstances during the year; it lost nearly £8,500 owing to the failure of the Banco di Sconto, of Rome, who were the company's bankers in Italy, while a substantial reduction in the profits of the company's foreign business resulted from the depreciation of the Italian and Brazilian currencies.

All our readers will agree with the *Electrical Review* that Mr. J. W. Meares, C.I.E., electrical adviser to the Government of India, rendered a useful service to the World Power Conference at the first business meeting by drawing attention to the different ideas prevailing as to what was meant by the term "billion" in relation to the world's power resources. In English-speaking countries it was always held to mean one million millions, while in some foreign countries it was used to represent 1,000 millions—a vast difference. It was interesting to observe that when using the term "billion" some of the foreign delegates afterwards mentioned that they used it with the meaning given to it by Mr. Meares. The term "milliard" is correct English for one thousand millions, it is also to be noted.

The "First Radio World's Fair" is to be held in New York from the 22nd to the 28th of the present month. The latest information received states that, among the inventions to be shown will be at least three instruments designed for the purpose of "radiocasting" photographs in motion, and it is stated that half a dozen recognised wireless engineers are trying to perfect systems for transmitting pictures. A number of the leading radio trade organisations are planning to hold their 1924 conventions in New York during the Fair, and fully a thousand jobbers and dealers, native and foreign, are expected to attend the show.

Three Parliamentary items which reached the editorial letter-box too late for these columns last month may still prove of special interest to both telegraph and telephone readers:—

(1) The Royal Assent was given to the W. Indian Islands (Telegraph) and the Pacific Cable Bill.

(2) The Postmaster's deputy replying in the House of Commons, on July 16, stated that he understood that many landlords required a small payment by their tenants for permission to erect wireless aerials. The matter was primarily one for settlement between landlord and tenant, and the Postmaster-General had at present no power to intervene. The Broadcasting Committee of last year expressed the view that the practice was unjustifiable and should be abandoned. In this the Postmaster-General concurred, and he was considering what steps could be taken to prevent the spread of the practice.

(3) On the previous day the P.M.G., asked if he could give the results of the radio telephony experiments which had been recently carried out in America, stated that the results of the experiments at present available were encouraging.

The use of wireless direction finders is gradually making headway in the Mercantile Marine. The Radio Communication Company has recently completed the equipment of 17 large ships, and four other installations are in progress.

Mr. A. Lofthouse, telegraphist in the C.T.O., London, who studied at the Polytechnic, has been awarded the second prize in Telegraphy Grade I (City and Guilds of London Institute) for the year 1924. The prize, which is awarded by the Pewterers' Company, consists of £1 in cash and a bronze medal. His colleagues unite in congratulating Mr. Lofthouse upon his success and are grateful for the honour thus indirectly conferred also upon the C.T.O.

From the first issue of the *Elektrische Nachrichten-Technik* in an article on *Die elektromagnetische Welle*, Herr Karl Willy Wagner writes the following highly interesting paragraph, which, coming from so high an authority should have more than ordinary weight:—"One hears the repeated question." says Herr Wagner, "Is not the broadcasting movement merely a fashion of ephemeral importance?" I believe not. Man will never permit this new means of communication to pass out of his hand. He will rather extend it and build upon it. The possibility of an almost unbounded range for transmitting sound which can so easily be attained will always be an invitation to use this means of communication.

The *Electrical Review* performed a most useful and welcome service to the Post Office by the publication in its issue of Aug. 8 of an illustrated description of the Post Office Research Station at Dollis Hill. Few of our readers, few probably of the manipulative, or even the administrative staff of the telegraph and telephone departments of the British Post Office, are aware of the activities of the Research Section branch of the Engineer-in-Chief's head-quarters organisation and it is hoped to return in more detail to the account given by the representative of our appreciative and scientific contemporary.

AUSTRALIA.—According to the *Daily Telegraph* the Government's new broadcasting regulations completely alter the existing scheme, which is based on sealed receiving sets, each set being sealed with a particular wavelength allotted to the broadcasting company to which the purchaser subscribes. The new scheme adopts the principle of the open set, and charges a licence fee ranging from 25*s.* to 30*s.*, according to the radius of the broadcasting station. Two classes of station are authorised, one mainly devoted to advertising, and the other to entertainment. The latter receives revenue licence fees, less 5*s.* retained by the Government. This scheme limits the number of broadcasting stations in each State. The uncertainty of the Government regulations has hitherto considerably restricted the popularity of broadcasting in Australia, for the sealed set, designed to prevent monopoly and ensure revenue to the broadcasting companies, never had a chance to prove itself, although an excellent service was operating in New South Wales

for several months. Experimental licences for *bona fide* investigators are provided under the new scheme, and the Government collects the revenue.

CANADA.—As a result of arrangements made between the British Government, the Canadian Department of Marine and Fisheries, and the affiliated Marconi companies, radio stations will be established near Montreal and Vancouver as links in the Empire radio "chain." The stations will be owned and operated by the Marconi Wireless Co., of Canada, will have a guaranteed operating speed of a hundred words a minute, and will cost approximately three hundred thousand dollars each. Licences have been issued by the Canadian Department of Marine permitting the Marconi Co. to proceed with the work.

CHILI.—*Commerce Reports* give information regarding the unsatisfactory results of the present broadcasting scheme and outline the remedy about to be applied. The above journal says that arrangements are being carried out in Chile for a radio broadcasting system to embrace every town and city in the country. The syndicate known as Radio Chileno plans to erect two new stations, one in the south of the country at Temuco and the other at Antofagasta, in the nitrate zone. The principal station at Santiago has been in operation for some eight months, but in view of the unsatisfactory results obtained with the present equipment the station will be dismantled and re-equipped with modern American apparatus of the same type and power as that purchased for the new plants. During the change-over a 10-W American transmitting set will be used to broadcast programmes.

CZECHO-SLOVAKIA.—A radio transmitting station of 5-kW capacity has been opened at Kaschau by the Government. A similar station is to be established at Pressburg, and a 1-kW station at Ungvar.

Three new radio stations are to be erected by the Ministry of Posts and Telegraphs. These will be situated at Kosice (Slovakia), Bratislava (Slovakia), and Uzhorod (Carpathian Ruthenia).

FRANCE.—On July 28 the French wireless company "Radiofrance" experimented with the Baudot high-speed multiplex printing telegraph apparatus between *Villecresnes* and Lyons. Owing, however, to heavy atmospherics it was found impossible to maintain communication, the parasitic currents effectively preventing synchronism for a longer period than a few seconds.

SWITZERLAND.—From Agency and private sources it is learnt that work has commenced on the erection of the antenna tower at the new radio transmission station at Hongg, near Zurich. The tower, which will be constructed of steel, will be 213 ft. high, and in order to warn aviators of the existence of the tower it is to be painted in red and white, while four red lamps at the apex are to be kept illuminated at night.

Also that the St. Gall Radio Association has decided to construct a wireless receiving station at the Saentis Observatory, which is 8,300 ft. above sea level.

From *Le Rapport sur la gestion des Télégraphes et des Téléphones Suisses en* 1923, we gather several items of very useful information. According to this report the Hughes far from becoming obsolete is gradually replacing Morse in that country. This is less understandable than the statement that telegrams are telephoned more quickly than they can be telegraphed, statistics having proved while a telegram can be telephoned in two to three minutes it takes between 5 and 6 minutes to telegraph it.

The radio telegraph station of Berne, exploited by the Marconi Company and the Swiss Federal Government, dealt with 215,315 telegrams during the official year mentioned or an average of 687.9 per diem. The traffic exchanged between England and Switzerland, 101,190 telegrams, was a little less than that exchanged with Spain, Poland, Denmark, Czecho-Slovakia, the remaining countries of Europe plus the traffic of America, Asia, Africa, and Australia all combined.

A curious feature of the figures before me is that, while the inward and outward traffic between this country and Switzerland was fairly equal in both directions, in rough figures fifty-five thousand in the direction Switzerland to England as against forty-five thousand in the opposite direction with the two exceptions of Denmark and Poland where the results reached were similar in nature, every other country shows a remarkable disparity between outward and inward, thus :—

Switzerland to America ...	46,905	America to Switzerland ...	7,173
„ „ Asia ...	4,575	Asia „ „ ...	234
„ „ Africa ...	1,449	Africa „ „ ...	4
„ „ Australia...	681	Australia „ „ ...	2
„ „ Spain ...	24,544	Spain „ „ ...	5,233
„ Czecho-Slovakia	1,679	Czecho-Slovakia „ ...	230

Mr. Eustace Hare, in his article "The Telephone as a Target" in last month's issue, is likely to prove prophetic as well as retrospective in the accuracy of his philosophy, and this is brought home to one when one reads public complaints regarding the errors in wireless telegrams, which latter are no less immune from distortion than those exchanged over submarine cables and land lines. The public amazement at the miracle of transmission through space without wires is gradually simmering down, and the telegraph service will, before long, reach that point where, as Mr. Hare says, "the first stage of a new thing is wonder. It requires to be established before its flaws and short-comings become apparent, and in proportion to its non-fulfilment of expectation so is the strength and the length of the attack." History proves this to be true, and surely history will repeat itself in regard to wireless telegraphy and telephony alike. Ask the B.B.C. if they have received any grumbles ?

The Press will ere long have exhausted its plaudits and not all will see as far or realise so correctly as did the *Westminster Gazette* at the beginning of July the possible difference between the description of a system by an enthusiastic inventor or idealist and the results of every day working, or the cold calculating analysis of a brother scientist. Speaking of Imperial wireless the editor wrote : "Nor can the directional system of Marconi be rightly spoken of as a 'beam' system. It has apparently been found possible to confine the receiving area to a 'certain angle or sector' covered by the transmitted energy, but apparently much has yet to be done before that angle is made so acute as to justify itself as a 'beam.'"

It may be an appropriate moment to place on record the salient features of Mr. Hartshorn, the Postmaster-General's speech in the House of Commons on Aug. 1, when it was formally moved by Mr. W. Graham, the Financial Secretary to the Treasury, that "the indenture made on July 28 1924 between Marconi's Wireless Telegraph Company and the Postmaster-General, on behalf of his Majesty, with reference to the construction of a wireless telegraph station on the beam system should be approved."

It was an historical incident in the story of the progress of the science of telegraphy the result of which will be watched all the world over. A much abridged report of what Mr. Hartshorn said follows :—

"Having regard to the complicated nature of the problem which presented itself when I first endeavoured to make myself conversant with the facts, I came to the conclusion that it would be a good policy to set up a committee. I was fortunate in having, as chairman of that committee, Sir Robert Donald, whose unflagging interest in Imperial wireless is universally recognised. The committee was set up on these terms of reference :

> To consider and advise upon the policy to be adopted as regards an Imperial wireless service so as to protect and facilitate public interest.

Their main recommendations were twofold in character—first, that it should be the policy of the Government to insist that all the stations in this country used for communication with any part of the Empire should be in the hands of the State, and, secondly, that the Post Office should operate directly under an improved business organisation all the Empire stations in Great Britain. The committee suggested the kind of station that should be erected in order to complete the Empire scheme.

At the time the Committee were considering this matter it had not been made known that the experiments which had been conducted during a year or two previously by Marconi in connexion with the short-wave directional system known as the beam system had reached such results as were afterwards made known. When we attempted to adopt the kind of high-power station for this purpose which had been recommended by the Committee, we found that the Marconi people were placing before us the results of their experiments on the beam system. They pointed out that it would be possible to get a service under this system of wireless communication at a very much lower cost than would be possible under a high-power station. We made known to the Dominions what had been placed before us by Marconi as to the merits of the new beam system, and informed the Dominions that if they cared to adopt this system we would be prepared to give corresponding stations in this country. During the discussions we had with the representatives of the Marconi Company that company agreed to co-operate with the Government in whatever policy was decided upon.

Naturally they did not care for the policy of having all the stations owned in this country by the Government, but they said that if that was the Government's decision they would accept it and loyally co-operate with us. They also agreed to carry out any decision that the Dominions might reach in relation to the kind of stations that they would have. If the Dominions preferred to go in for the high-powered stations, the company said they would erect them in accordance with the arrangements made out there. If the Dominions said that they wanted the beam system, the company said they would erect beam stations also.

Canada has definitely decided, and arrangements are being made there, for the erection of a station on the beam system, and I understand now that the same arrangement is being made with Australia and South Africa. It is only right to say that nothing in the "beam" system in any way suggests that it can effectually take the place of high-power stations, either in communicating over long distances at any time or for long-distance communications in all directions simultaneously ; and the Government are convinced that, notwithstanding that we propose to give this "beam" system a fair trial, it is essential that we should go on and complete the high-power Rugby station which our predecessors began.

The agreement provides for erection by the Marconi Company as contractors to the Post Office of a "beam" station for communicating with a corresponding station in Canada, and with provision for its extension so as to provide similar communication with corresponding stations in South Africa, India, and Australia. It becomes the business of the Post Office to provide sites for the company upon which to erect these stations.

The agreement provides that the company shall complete the station communicating with Canada within twenty-six weeks from the date on which the sites for the sending and receiving stations are placed at their disposal, and they also undertake to have a similar station available in Canada for communicating with this country within the same period.

It is provided that the English station is to be capable of communicating at a speed of 100 words per minute during eighteen hours per day. That

would be the average over the year. When that station has been completed there is to be a demonstration.

The company are to demonstrate by actual working that the guarantees which they give are complied with in the actual working. If the Government's engineer-in-chief is satisfied, after a seven days' test of that kind, that the station does comply with and fulfil the guarantees given by the company, then the company will receive 50 per cent. of the cost of the station. The station will then be handed over to the Government, and the Post Office will work it. If after six months it is found that the station is working satisfactorily and in accordance with the guarantees, the company will then receive a further 25 per cent. of the cost. There will be a further period of six months working to see if the system is working throughout all the seasons, and if at the end of a complete year the engineer-in-chief is satisfied that the guarantees in the contract are really embodied in the service, then the company will be paid the remainder amount of the cost."

If the station does not satisfactorily comply with the test at any of the stations any time before we have had the twelve months' test completed, or if the company fail to establish a corresponding station in Canada, it is open to the Postmaster-General to reject the English station altogether, and in that event the company would be under an obligation to return any money which had been paid to them in respect of the stations."

Mr. Hartshorn then proceeded to detail certain provisions for the conclusion of contracts in the event of S. Africa and/or Australia electing to adopt the "beam" system, and concluded with an extremely interesting paragraph on the guaranteed working hours per day for the various parts of the Empire.

"I have already said that the guarantee in connexion with Canada is a speed of 100 words per minute for eighteen hours a day as an average throughout the year. The guarantee in connexion with the other Dominions is the same as to speed, but the guarantee as to hours is as follows: Between England and South Africa there would be 11 hours per day, between England and India 12 hours per day, and between England and Australia 7 hours per day. The Post Office is to pay a royalty of 6¼ per cent. of the gross receipts of the beam stations."

Mathematical Measurement.—Accurate and minute measurement seems to the non-scientific imagination a less lofty and dignified work than the looking for something new. But nearly all the grandest discoveries of science have been the reward of accurate measurement and patient, long-continued labour in the minute sifting of numerical results.—Lord KELVIN. J. J. T.

REVIEWS.

"Electrical Vibration Instruments." By Prof. A. E. Kennelly, edited by Prof. Dugald C. Jackson, C.E., and Prof. Earle R. Hendrick, Ph.D., published in 1923 by the Macmillan Co., New York, and obtainable from Macmillan & Co., Ltd., St. Martin's Street, London, W.C.2, at £2 2s. 0d.

This work is said to be an elementary text-book on the behaviour and tests of telephone receivers, oscillographs and vibration galvanometers. It contains 250 pages and 214 figures, diagrams and oscillograph records.

The matter contained is treated excellently, as one would expect from Prof. Kennelly, and the book should undoubtedly be read and studied by every telephone engineer and others who are connected with the profession of electrical communication. The object of the book is to present, from an electrical engineering standpoint, the characteristics of telephone receivers, and of other vibrational instruments, as reciprocating electric motors, based on researches which have been carried out in the electrical engineering laboratories at the Massachusetts Institute of Technology, and at Harvard University during the past fourteen years.

A fair knowledge of mathematics is required to follow the subject but, as stated in the preface, an effort has been made to keep the main text of the book on a nearly uniform level of mathematical simplicity. Propositions of relative complexity, such as may be of interest for further investigation, have been collected into appendices occupying 134 pages.

The Weidmannsche Buchhandlung, Berlin, forwards Number One of the 1st Volume of the "*Electrische Nachrichten-Technik*, a new monthly journal published in the interest and progress of scientific electrical investigation. The journal has been placed under the able directorship of Herr K. W. Wagner, the president of the Technical Section of the German Post Office.

The reasons for launching this enterprise, as expressed by the publishers, are as follows:—"The E.N.T. has been founded because, up to the present, no central organ exists in Germany which deals with practical and scientific information regarding electrical investigation, and for this reason the absence of such a co-ordinating medium has been keenly felt in scientific and industrial circles."

The undertaking has apparently the semi-official support of the high officials of the department (*der ersten Autoritäten des Gebietes*), and the ambition of the management is to create an international and scientific reputation for their new venture. We wish success to the undertaking, but would beg to direct attention to the omission to state whether the half-yearly subscription of 18 (gold) marks includes postage abroad.

J. J. T.

"La Téléphone à Stockholm." Par Anders Lignell, Directeur des Téléphones de Stockholm.

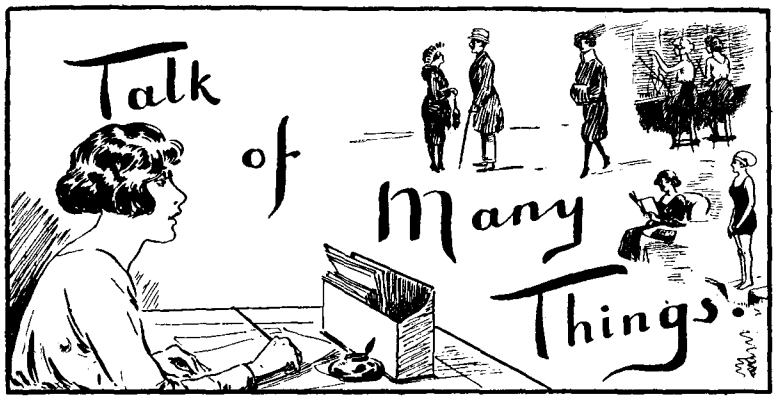
This is an interesting booklet containing a history of the telephone in Stockholm from its introduction in that city in 1880 by the company known as "Stockholms Belltelefon." Service was opened with 97 subscribers, and the total reached 218 by the end of the year. The public, however, were discontented with the charges made by this company, and in 1883 the "Stockholms Allmanna Telephone Company" entered the field under the direction of the celebrated H. J. Cedergren. He obtained 785 subscribers during its first year and surpassed his rivals' 1,490 subscribers in 1884 with a total of 2,288. The activities of the two companies were confined to a radius of 70 kilometres round Stockholm, whilst the State system was all-powerful outside this area. The advent of Storckenfeldt, Director General of Telegraphs in 1890, saw competition from the State system actively carried into Stockholm itself. The two companies worked in common against the State system despite the protests of the Telegraph Administration, and after various tentatives to buy up the rival systems or to delimit their activities to certain zones, the purchase of the private systems was sanctioned by Parliament in 1918 at a price of 46.6 million crowns. The State system had at that date 29,000 subscribers, and that of the companies 72,000. After the amalgamation a mass of variable and complex rates was swept away and uniform charges introduced for the whole country.

In 1885 Stockholm had 22.5 telephones per thousand inhabitants, which then constituted a record. In 1922 it had 292 per 1,000, still leading all other cities in the world and followed by Minneapolis with 234 per 1,000.

Since the fusion of the State and private systems there has been a gradual decrease in the total number of telephones in Stockholm, due to the cessation of duplicate telephones, but the number still remains above 100,000. The conversion of the system to automatic working on the Hultmann-Ericsson system has commenced, and the "Norra Vasa" exchange was put in service with 2,500 subscribers last January. It has an ultimate capacity of 10,000 lines.

The booklet is well illustrated with maps and photographs. It also contains some amusing drawings reproduced from comic journals, showing that even in the "City of Telephones" the service is not without its satirists. There are also good portraits of Cedergren, Ericsson, Storckenfeldt and Herman Rydin, the present Director General of Telegraphs.

WE TELEPHONISTS



A Few Words to Grousers.

SOME of us nowadays waste a good deal of time grousing because life isn't exactly all we would like it to be, and fuss and worry over little troubles and inconveniences as if they were ills of great magnitude.

Anyone feeling specially discontented with their lot should ask the Gerrard staff for permission to join them next time they give an entertainment at the Queen's Hospital, Sidcup. Here, as everyone knows, the marvels of Doctor Gillie's facial surgery have been carried out since the early days of the war, and though nearly six years have passed since the Armistice, there are still a large number of men under treatment. Some have still several years of hospital life before them, as those still remaining are the very worst of the cases; but fortunately most of them are now far advanced in treatment, and can feel that their disfigurements are no longer such as to make them fear to mix with their fellow human beings. A visit to the hospital museum will give one a faint idea of what many of them have endured. There one can see models and photographs of the various stages of face re-building by grafting flesh and bone from other parts of the body, and one realises with a shock that some of them, when they came to the Doctor's hands, had little resemblance to human features remaining. The suffering, physical and mental, which they must have endured, appals one, yet they make the best of it, and are bright and cheery—while some of us grumble at the slightest little pain. Those whose friends and relatives came back from the war safe and sound, or without serious disability, ought to feel the greatest thankfulness that they have been spared what so many of these men have suffered. It is easy to forget, when it is not constantly before one, that some of those who did come back have reason to envy sometimes those who are now lying in the peaceful white cemeteries of France and Belgium. To do anything to help render their lives in the present and future more bearable is an opportunity that we ought to welcome with humble gratitude.

W. M. E.

"Valued Units."

They tell me that at the last census there were 37,885,242 persons in England and Wales. I am unmoved. No doubt I ought to vibrate with patriotic fervour but I cannot. Quite likely I should be reflecting upon our country's greatness and on the insignificant handful of people who have so mighty a heritage. I should be picturing outposts of Empire, unfurling and proudly floating Union Jacks, mighty ship of war and commerce. Or perhaps I should be musing upon the industrial greatness of these millions and be picturing their factories and docks, their busy towns and peaceful villages, their smiling fields and hideous slag-heaps, their mansions and their slums. At least I should have purchased a season ticket for the Exhibition at Wembley.

I must confess, however, that no such grand emotions are raking my soul. I really cannot feel interested in 37,000 millions of people. They do not know me and I do not know them. Even if I did I could not feel such a degree of love and friendship for them that I should wish to send them cards on their birthday. My heart is too small and my pocket is not large enough.

But as my eye travels to the right along that line of figures my interest awakens and grows so that by the time I reach the last figure I am furiously curious. Who are the odd two people and why should they be mentioned? How much more important they appear than the 37 million or the 885 thousand or even the 240. I wonder how they came to be last and not lost?

I turned to the census statistics for enlightenment. Perchance therein I should find some mention of these notables. I was not prepared for the remarkable answer I found. The Registrar-General says that there were 19,803,202 females; so the secret is out—*they are ladies.* No doubt fearful that they would resent that ungallant designation "females" he tactfully refrains from saying who they are. I am sorry now that I know so much because I feel "curioser and curioser," but what delightful visions I can conjure. They may be dairymaids or duchesses, charwomen or cleaners or—horrid thought—one may be a princess and the other a pastrycook. How lowering! But whoever they be they had the last word with the 18,082,220 males of this country—a very creditable victory for the ladies.

PERCY FLAGE.

Telephone Rhymes.

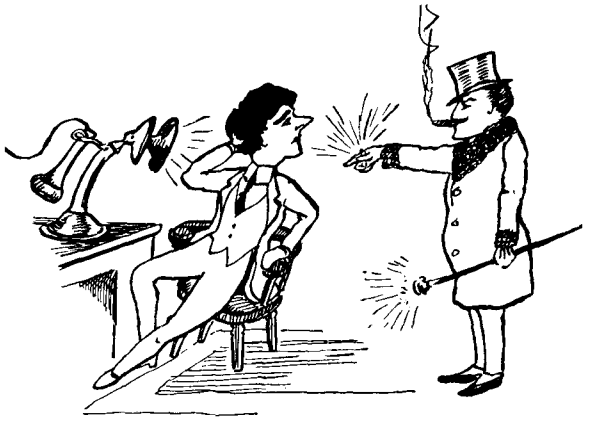
There was a crooked Sub., and he took a crooked view
Of the service on his telephone—the operators too!
His account (he said) was crooked, and he smiled a crooked smile—
Yet on his crooked telephone depended all the while!

C. S.

The Man Who "Sacked the Lot."

Papadopulous Silberstein
(Of an ancient Anglo-Saxon line)
Dreamed one night that the golden age
Had returned to earth, and had reached that stage
When State control had gone by the board,
And private enterprise was restored
To its pristine glory, and, *inter alia*,
The Post Office Pompeys had met their Pharsalia,
And the telephone service had burst its chains,
And the wine of big business flowed in its veins
(Silberstein's style inclined to the florid
For which no mixed metaphor was too horrid).

Further, he dreamed that one sad day,
In what he termed "quite the Post Office way,"
He was cut off thrice and got two wrong numbers
And murmured: "Surely her punishment slumbers.
It is not now as in days of yore,
When knitting and novelettes opened the door
To speedy promotion. That day is past
And perchance to-morrow shall be her last.
I have the Manager's private ear;
Big business himself, he holds me dear
And understands me, for well he knows
That I'm not above favours and *quid pro quos.*
What boots it that big business rules,
If I can't get the sack for a parcel of fools!
He won't offend a good client I know,
Who expects for his *quid* a pretty large *quo*;
For I've a pull in the House and the Press,
And can use it for or against him, I guess."

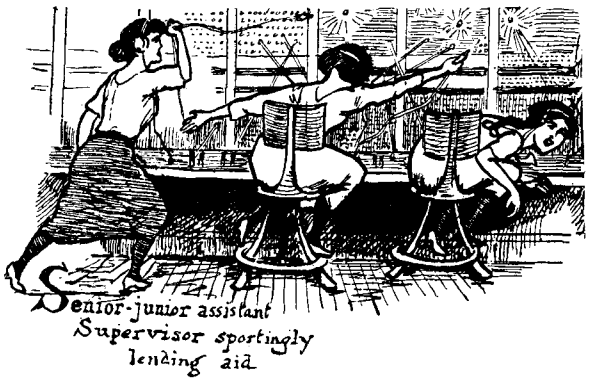


Silberstein accordingly went
And opened his heart to that heart's content
In a torrent of fret, and fume, and fuss,
And finally spake to that Manager thus:
"You stand for efficiency—stand no rot!
Use your authority—sack the lot!"
The Manager looked perturbed awhile,
Then soothed his client with winning smile;
"I owe it," he said, "to a man of your station—
Commercial prince of the British nation—
To redress your grievances. Be it so;
All the girls on your board shall go!"

So with *savoir faire* and consummate tact
Those maidens gently but firmly he sacked;
Girls of varied experience,
Unrivalled skill, and resource immense,
Girls whose voices contained a smile
Girls who plugged in with most finished style;
Bobbed and shingled, and plump and slim,
All had to go at the bidding of him.

Strange that the longer Silberstein dreamed,
The worse the telephone service seemed;
And yet, perhaps, it was scarcely strange
When half-taught learners staffed the exchange;
Fair young flappers, blonde and witching,
Rich in graces, but poor at switching;
Fitfully aided in their distress
By supervisors, trained more or less.

At first our friend forebore to storm
At the sad results of his great reform;
But soon his indignation bubbled
When they were "Sorry that you were troubled."
For ever the cut-offs multiplied
And to the exchange once more he hied,
Where to his friend the manager
Magnanimously he did aver
That those who had lately had the sack
Had had their lesson. "Take them back,"
He counselled suavely, much averse
To own the present lot were still worse.



Obligingly then the chief concurred,
Nay, willingly he sent forth the word
To reinstate each fair penitent
In her office and former emolument.

In vain, for the skilful brood were scattered,
And to their unheeding ears what mattered
His noble offer?—for all were fled,
Some were fiancée, and some were wed,
Some in Los Angeles reigned as queens,
And some were writing for magazines
On modes and milliners penning critiques;
Some were in Barbary looking for Sheikhs,
Some making fortunes designing hats
And living as bacheloresses in flats,
And some were swimming the Channel in parts—
And winning enormous prizes—and hearts!
Not one of the bevy returned in fine
To lighten the sorrows of Silberstein.

W. H. G.

London Telephonists' Society.

The meetings of the L.T.S. again draw nigh—what happiness! and soon with joy the hands we'll press of friends from far (or nearer). Oct. 3, please set apart—the date on which the meetings start; the loyal thoughts that fill each heart, our presence will make clearer. So come, and see the speaker through; remember he's expecting you—from Waltham Cross and Reigate, too; from Albert Docks and Acton. And if you want to talk a lot, come early with the news you've got; whether you've "Wembled"—or have not! or been to Rome—or Clacton.

The President new ground will break, and for a subject he will take "Random Reflections"—which should make a spirited discussion. And so, when he resumes his seat, rise gracefully upon your feet, and then declaim in accents sweet (but *don't* the platform rush on). Oct. 3,—this date impress.—Yours hopefully, THE EDITRESS.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," Telegraph and Telephone Journal, Secretary's Office, G.P.O. (North), London, E.C.

ITALIAN—SOUTH AMERICAN CABLE.

WE hear on good authority that Messrs. Siemens, Brothers & Co., Ltd., of Woolwich, have secured contracts for the manufacture and laying of about 3,200 miles of submarine telegraph cable to connect the Cape Verde Islands with Rio de Janeiro, touching at the island of Fernando Noronha off the northern coast of Brazil. The first section is to be completed by the end of January, 1925, and the whole scheme should be in working order by the end of May, 1925.

"THE LIAR."

A fool there was and he spent his dough
(Even as you and I)
For one of these new fangled radio
That was built for a hundred miles or so,
But the fool thought he ought to get Tokio
(Even as you and I).

Oh, the money it cost,
And the sleep he lost,
And the wonderful lies he planned
To tell to the fellows who hadn't got wise,
And unless they're bugs they'll never get wise
And never will understand.

So the fool stayed up all night and tried
(Even as you and I)
To get the stations away outside
His natural zone just to swell his pride,
When he said he got them, we knew he lied
(Even as you and I).

Oh, the stations he got
And the ones he sought
Are always one and the same
To the radio bug who has learned how to lie,
And we all know how easy one lies
If he's in the radio game.

S. W. LEAVER (in the *Wireless Age*, New York).

ELECTRICAL MAH JONG.

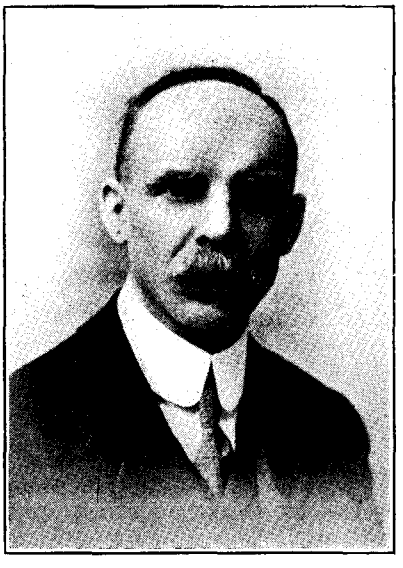
WE have received from the Western Electric Company an attractive souvenir of the British Empire Exhibition in the shape of an ingenious adaptation of the game of Mah Jong, in which the suits take the form of telephones, wireless apparatus, cable and other electrical subjects. It is very prettily got up.

Bona fide electrical dealers who may be interested can obtain a set on application to the Company's stand in the Palace of Engineering, Avenues 9 and 10, Bay 18—20, at the British Empire Exhibition.

RETIREMENT OF MR. R. WARING.

MR. WARING retired on June 30, 1924, from the position of Superintending Engineer, Scotland West District, at the age of 60, after completing 48 years' service with the Post Office.

Mr. Waring commenced service in March, 1876, at a sub-Post-Office in Cheshire, where he learned the rudiments of postal and telegraph business. On Jan. 1, 1882, he was appointed Sorting Clerk and Telegraphist at Liverpool, but he was there only long enough to gain an insight into the working of a large office. In December, 1882, he was transferred to a clerkship in the Engineering Department at Liverpool, where he came into close touch with Mr. J. R. Edwards, who was then Superintending Engineer of the North Wales District.



In September, 1885, he was promoted and transferred to Edinburgh, where he served under the late Mr. J. Gibson, and continued at the Heriot Watt College the scientific and engineering studies began at Liverpool.

In 1890 he was promoted to the rank of second-class Inspector, and in this capacity saw service in the North Wales, North Western, and Irish Midland District. In the last-mentioned district he was responsible for the installation of block signalling apparatus on long sections of the Great Southern and Western Railway of Ireland.

In August, 1897, Mr. Waring was promoted to a first-class engineership under the late Mr. E. Ashton at Liverpool, where he installed the new trunk exchange on the acquisition of the trunk telephone lines from the late National Telephone Company, He also laid the Liverpool section of the first dry core cable between Liverpool and Manchester, and was associated with Mr. F. Tremain in installing experimental Pupin coils.

Eight years later, i.e. in August 1905, Mr. Waring was promoted to the Engineer-in-Chief's Office as a Technical Officer and assisted Mr. DeLattre in preparing for the valuation of the late National Telephone Company's external plant, and for his good work received the thanks of the Postmaster-General.

In April, 1911, he was transferred to the Central Metropolitan District as Assistant Superintending Engineer, where he worked under Mr. (now Sir William) Noble and later under Mr. Moir. In this position he took a prominent part in the arrangements associated with the transfer of the National Telephone Company's plant in London, including the unification of the engineering accounting systems of the Post Office and the National Telephone Company.

His promotion to the rank of Superintending Engineer came in July, 1918, when he was given charge of the Scotland West District with head-quarters at Glasgow on the retirement of the late Mr. D. Stewart, I.S.O.

Colonel Purves presided over a gathering of many of Mr. Waring's old colleagues at head-quarters and in the engineering districts, which was held in the Deputation Room, G.P.O. (North) on Thursday, July 3, in order to say an official good-bye, and also to present several handsome gifts to our old friend.

Apologies for absence were received from Sir William Noble and also from Mr. Alexander Moir, both of whom regretted their inability to be present in order to wish God-speed to an old colleague.

Colonel Purves, in a delightful speech, made reference to the fact that we were not so much saying good-bye to Mr. Waring as welcoming him back to his own home after a period of exile in the remoteness of Scotland, where he had probably been living on porridge and haggis, wearing the kilts and listening to the bagpipes !

Messrs. DeLattre, Gomersall, Capt. Crompton and Messrs. E. Turner, J. W. Atkinson, Gibbon, Elston, Twells, Tattersall and J. E. Taylor referred to the sterling qualities of Mr. Waring and his extraordinary capacity for hard work. Testimony was also given to the particularly disinterested way in which he carried out his duties, and to the assistance he was always ready to give to his fellows.

It was particularly pleasant to hear Mr. Tattersall speak on behalf of the ex-National Telephone Company engineers. He stated that no man in the Post Office could have done more than Mr. Waring for the welfare of the National staff and the maintenance of good relations between the two groups.

Mr. Waring, in responding, expressed his appreciation of the handsome gifts which had been presented to Mrs. Waring and himself, also of the kindly sentiments which had been expressed towards him. He spoke of the amicable relations that had always existed between his colleagues and himself, and indicated that he did not anticipate spending the remainder of his life in idleness.

ABOUT ENTHUSIASM.

BY H. MORGAN (*Contract Branch, London Telephone Service*).

ENTHUSIASM has been defined as "ardent zeal in the pursuit of a laudable object."

Such zeal may take the form of plodding persistency, its existence only being realised by the attainment of the objective.

Growth manifests itself by results, not by processes.

Placidity does not necessarily indicate stagnation.

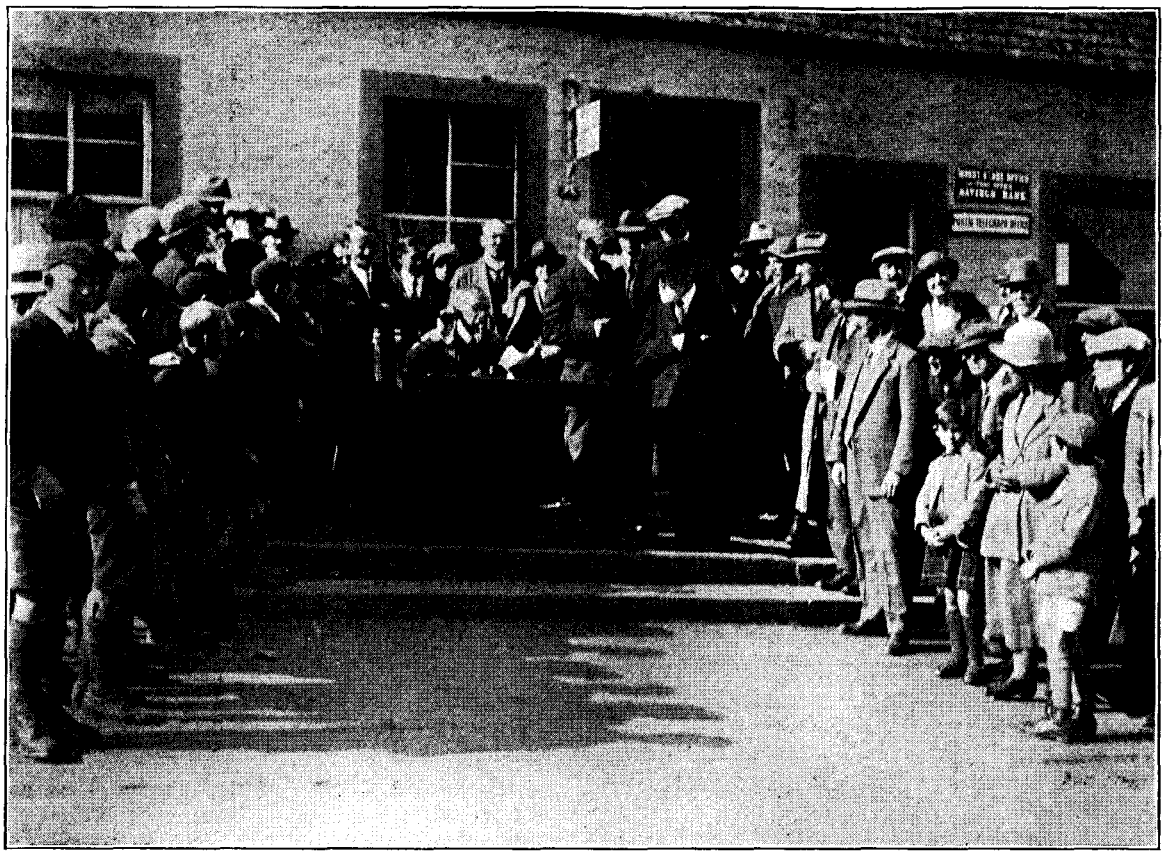
"Still waters run deep," but the power, quietly working unseen and unheard is irresistible ; so with enthusiasm.

When, therefore, we look at the indicator board week by week and see TOTAL TELEPHONE STATIONS IN THE LONDON AREA mounting steadily, too steadily perhaps, but nevertheless surely, towards the half million mark, and the yearly net growth nearly 35,000, do we realise that the figures are an indication of the part played by quiet, steady enthusiasm.

The title under which we serve is surely suggestive of our attitude—London Telephone *Service*.

The word service is categorical, but also all-inclusive. Accounts, contract, development, engineering, traffic. Figuring, canvassing, exploring, providing, operating. The crop of enthusiasm produced by such soil should surely be prolific.

The formula for work can be given as C+E=W, where C=Conviction, E=Enthusiasm, and W=Work, and it appears applicable to telephonic activities.



An American writer points out that we can see a big field through a chink in the fence. It is necessary, however, to see aright.

"Two men looked out from prison bars.
One saw mud, the other saw stars."

The landscape may reveal to one mind undulating pastures and noble trees, but to another good mutton land and plenty of firewood.

We need to realise that both outlooks are necessary, and that they may each give indication of marked enthusiasm in the pursuit of their objective.

To return to our formula, however, the Conviction is that our vocation is *Service*—national, commercial and social.

National, because we link up Empire, aid Government, and assist diplomacy.

Commercial, by the transit of news, share quotations, &c., thus providing channels of communication in the transactions of business, and furnishing opportunity of profit which would be unheard of without the telephone.

Social, affording social amenities and ties which are conducive to happiness and recreation.

A modicum of concentrated thoughtfulness will reveal that this is in no sense a mere picture, but a service that is actually being given continuously, and adding its quota to the production of national greatness and power, commercial ascendancy and progress, social usefulness and charity.

Accounting ledgers well kept. Development possibilities thoroughly explored and reported upon. Canvassing pursued with tactful persistence. Contracts executed with legal and departmental correctness. Engineering requirements and lay-out anticipated and given effect to with prescience and acumen. Traffic operations speedily and pleasantly performed. All these are the processes of telephonic growth, the result of which is seen in arithmetical setting on the notice board with its formal declaration :

INCREASE DURING LAST TWELVE MONTHS=35,200.

But which, given another rendition, somewhat more illuminating and visionary for the purposes of this article, might resolve itself into :—

ENTHUSIASM OF TELEPHONE STAFF DURING LAST TWELVE MONTHS=35,200.

OPENING OF A SCOTTISH RURAL EXCHANGE.

THE above picture shows the interest which was taken in the opening of a rural telephone exchange at Kippen in Stirlingshire, a few miles from Stirling. The opening ceremony, as will be observed, took place in the open street, the Post Office not being large enough to accommodate all those interested, and was performed by one of the principal residents; the Chairman and various members of the Parish Council officiated.

The aged Sub-Postmaster, Mr. Robert Dougall, who is over 80 years of age, is in the foreground, and mentioned that he was sub-postmaster when the telegraph was first introduced into the village. The schoolmaster considered the event of sufficient importance to bring along the majority of his scholars so that they might be able in years to come to refer to the fact that they saw the first introduction of the telephone to their native village.

RETIREMENT OF MR. HOWARD EADY, DISTRICT MANAGER (TELEPHONES), EXETER.

THERE was a very large assembly in the British Legion Concert Rooms, Exeter, on July 11, presided over by Mr. W. S. Kay, Chief Clerk, to signify in tangible form the esteem in which Mr. Eady has been held, not only amongst the members of his own personal staff, but also amongst others with whom he has come in contact. On behalf of the District Office Staff, including the Traffic and Contract Sections, and with whom also joined the Surveyor's, Postmaster's, Sectional Engineer's, and Operating Staffs, Mr. Eady was presented with two divan chairs, and a case of pipes.

Mr. O. W. Stevens, the District Manager of the Plymouth District, presented Mr. Eady with a Western Electric wireless loud speaker on behalf of the district managers throughout the country, together with a few of Mr. Eady's old friends in other departments. The members of the Exeter Post Office Fire Brigade, whom Mr. Eady had trained in their fire brigade duties, and had taken a keen interest in the doings of the brigade, presented him with a photograph of the members of the fire brigade, including himself.

The presentation of the two chairs and photograph of the Exeter Post Office Fire Brigade was made by Mr. J. G. Laithwaite, the surveyor of the Western District. Amongst those present and who also spoke feelingly of Mr. Eady's retirement, were Mr. F. Ferguson the Postmaster of Exeter, Mr. F. H. Wise the Sectional Engineer of the Exeter Engineering District, and Mr. T. E. Pengelley the Postmaster of Newton Abbot.

The presentations were followed by a musical programme, contributed to by members of the Post Office and Engineering Staff, with Mr. Eady acting as chairman.

LONDON TELEPHONE SERVICE NOTES.

Cricket Match.

THE second annual cricket match between the Night Staff Cricket League and the L.T.S. Traffic Staff was played at North Dulwich on July 24. The Clerk of the Weather was in a benevolent frame of mind, and the play was enjoyed by the teams and spectators. The scores were much closer than last year when the Night Staff registered an easy victory. The Traffic team batted first scoring 108 runs, the top scorers being Cracknell and Webb with 23 runs apiece. The League responded by knocking up 160, Christie making 74 and Montague 32. The full scores were :—

Traffic Team.		*Night Staff League.*	
Pounds, b. Montague ...	14	Sayer, b. Pounds	0
Porter, b. Montague	21	Christie, b. Pounds	74
Shepherd, lbw. Montague ...	0	Montague, C. Niles, b. Porter	32
Grove, b. Tomms	1	Tomms, b. Cracknell	1
Cracknell, c. Dearnley, b. Ridler	23	Gordon, b. Shepherd	13
Barry, lbw. Tomms	1	Layle, run out	4
Niles, st. Dearnley, b. Montague	4	Dearnley, b. Pounds ...	25
Gerrard, c. Dearnley, b. Montague	8	Chapman, c. Gerrard, b. Pounds	0
Ring, b. Montague	0	Carpenter, b. Pounds ...	7
Webb, not out	23	Westney, c. Pounds, b. Sheppard	0
Mayer, b. Christie	6	Ridler, not out	0
Extras ...	7	Extras ...	4
	108		160

* * * *

Swimming Galas.

Two of the ever-popular swimming fixtures are announced for September, the Imperial and Renown Clubs (Trunk and Toll Exchanges) continuing to hold their fourth annual event at the Holborn Baths on Sept. 9. There will be a full and varied programme, the chief events being the L.T.S. 100 yds. championship and an invitation team race.

Then there is the London Telephone Service Swimming Association's Gala at the Pitfield Street Baths on Sept. 29. This is the great event of the year for L.T.S. swimmers.

The principal events will be the races for the "Pounds" Challenge Cup, the "Prossor" Cup, the Lotos Challenge Shield, and the L.T.S. diving championship will be decided.

The accommodation for spectators is always packed, and those who wish to make sure of seeing the gala should reserve their seats without delay.

Full accounts of both galas will be found in these notes in the October and November issues respectively.

* * * *

Culled from the Exchanges.

Gerrard.—On Saturday, Aug. 16, a party of the Gerrard Exchange staff and friends made another visit to the Queen's Hospital, Sidcup. The hospital is still at its full strength—500 patients—as though the number of face surgical cases is dwindling, as work is completed and patients discharged, a number of shell shock and neurasthenia cases from elsewhere have been transferred to the vacant wards, the peace and restfulness of the lovely surroundings of the hospital being particularly suitable for nerve cases.

With so large a number, some not well enough to leave the wards, it is a very big undertaking to organise an entertainment for all, but the Gerrard committee find a way to overcome all the difficulties. The caterer and his staff always work as if it were *their* treat, with the result that the tables and ward trolleys are quickly laden with good things, while the many willing helpers work together so excellently that everything goes "on wheels."

About 130 teas were served in the wards, and a supply of good things were sent along to the convalescents who were playing a match in the cricket field. The remainder of the men sat down to tea in the huge dining hall and excellent appetites seemed to be the rule. Anyway, there was little left to be cleared up. Being a fine summer afternoon it was possible after tea to explore the grounds, which are looking very lovely with the smooth lawns, gay flowerbeds and splendid old trees. The hospital mascot—a very friendly jackdaw—was very much in evidence and apparently anxious to do the honours of *his* domain.

Later, instead of the usual whist drive and dance, a concert was given in the Recreation Hut and a programme that was evidently much appreciated concluded, with an excellent human marionette entertainment given by our old friends Messrs. Wilkin and Macgowan. All the men appeared to have a thoroughly good time, and certainly all the visitors enjoyed themselves. Those, like the writer, who are not members of the Gerrard staff felt that it is a privilege to be allowed to take part in these events.

It takes a long time and much hard work for the Gerrard staff to collect the £60 or so that each of these entertainments cost and subscriptions are always welcome. If anyone whose own menfolk have come back from the war safe and sound would like to express their gratitude for what they have been spared by helping to make life a bit brighter for those who gave so much, they should send along a subscription to Gerrard to Miss James, the Chief Supervisor at Gerrard, or Miss Roe, the secretary of the fund.

London Wall.—The day, night, and engineering staffs combined in contributing the sum of £30 towards the funds of the Islington Medical Mission to assist it in sending a number of poor children on a seaside holiday A fine example of co-operation.

PERSONALIA.

LONDON TELEPHONE SERVICE.

PROMOTIONS.

B. PARKER, promoted to Executive Officer.
Miss J. CAVEY and Miss A. M. CHALMERS, promoted to Higher Clerical.

Resignations on account of marriage :—

Miss A. M. PAYNE, Telephonist, of Chiswick Exchange.
Miss E. E. TRURAN, Telephonist, of Museum Exchange.
Miss F. L. PAGE, Telephonist, of Museum Exchange.
Miss F. CLARKE, Telephonist, of Trunk Exchange.
Miss N. A. PAGE, Telephonist, of Trunk Exchange.
Miss I. V. DRYDEN, Telephonist, of Trunk Exchange.
Miss E. M. TRUSS, Telephonist, of Central Exchange.
Miss A. A. HAMMETT, Telephonist, of London Wall Exchange.
Miss W. P. ROBINSON, Telephonist, of London Wall Exchange.
Miss C. A. WOOLVEN, Telephonist, of Victoria Exchange.
Miss G. M. GOULDING, Telephonist, of Victoria Exchange.
Miss E. I. P. PATTERSON, Telephonist, of Victoria Exchange.
Miss M. E. BREWSTER, Telephonist, of Holborn Exchange.
Miss L. M. BRIDGLAND, Telephonist, of Holborn Exchange.
Miss J. B. FLETCHER, Telephonist, of Park Exchange.

Miss J. L. MASTERS, of Dalston, has been promoted to Assistant Supervisor, Class II, at Central.

CENTRAL TELEGRAPH OFFICE.

The following promotions have taken place :—

G. J. MANNERS, Assistant Superintendent, promoted to Superintendent, Lower Grade.
E. M. DIAPOR, Overseer, promoted to Assistant Superintendent.
J. D. LAXTON, Assistant Superintendent, promoted to Superintendent, Lower Grade.
J. H. NELSON, Overseer, promoted Assistant Superintendent.
J. A. BUFFIN, Overseer, promoted to Assistant Superintendent.
J. REES, Overseer, promoted to Assistant Superintendent.
J. J. JONES, Overseer, promoted to Assistant Superintendent.
H. B. WINDER, Overseer, promoted to Assistant Superintendent.
E. J. LLOYD, Telegraphist, promoted to Overseer.
F. A. HUDSON, Telegraphist, promoted to Overseer.
A. P. ORANGE, Telegraphist, promoted to Overseer.
W. G. HODGSON, Assistant Superintendent, promoted to Superintendent, Lower Grade.
A. J. CHERRY (Capt. R. E.) Overseer, promoted to Assistant Superintendent.
J. W. JAMIESON, Overseer, promoted to Assistant Superintendent.
H. S. JORDAN, Telegraphist, promoted to Overseer.
T. E. HODGSON, Telegraphist, promoted to Overseer.
P. E. LONG, Telegraphist, promoted to Overseer.
F. G. KING, Telegraphist, promoted to Overseer.
E. A. KNIGHT, Telegraphist, promoted to Overseer.