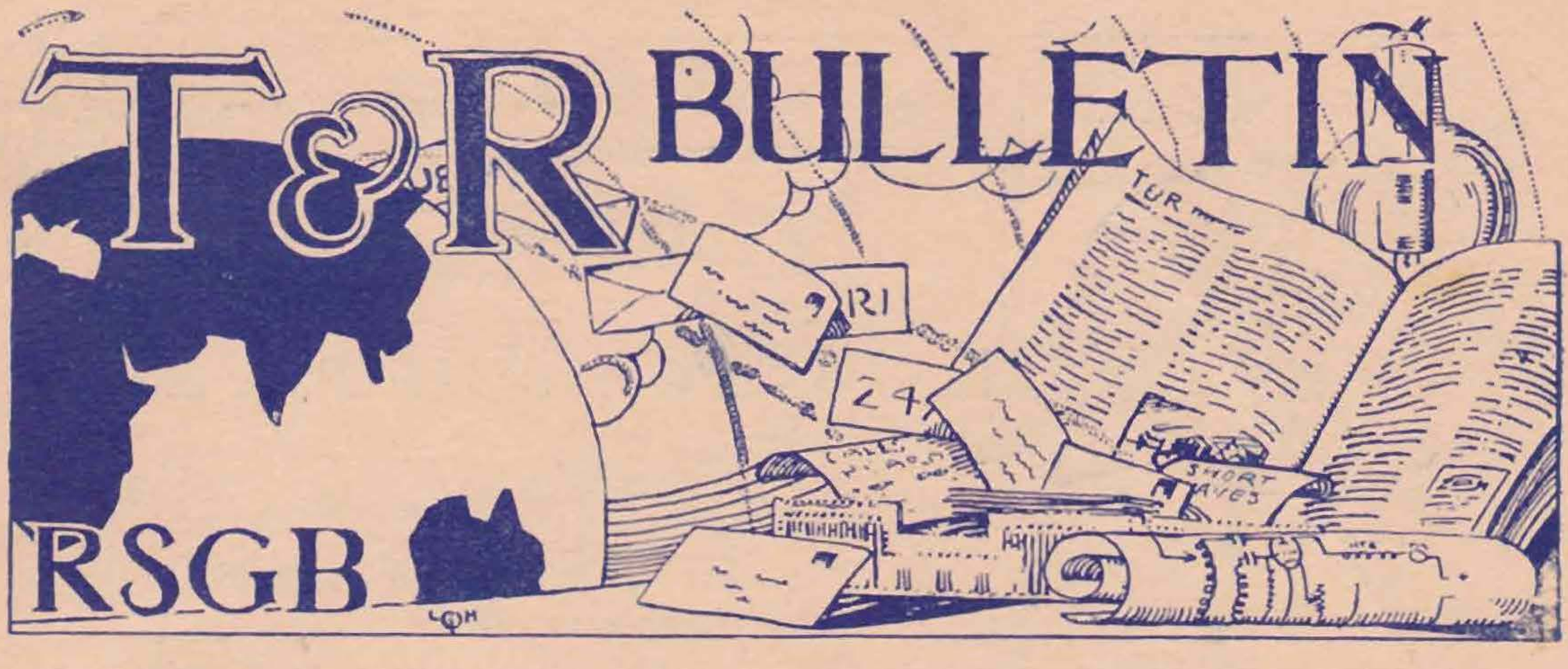

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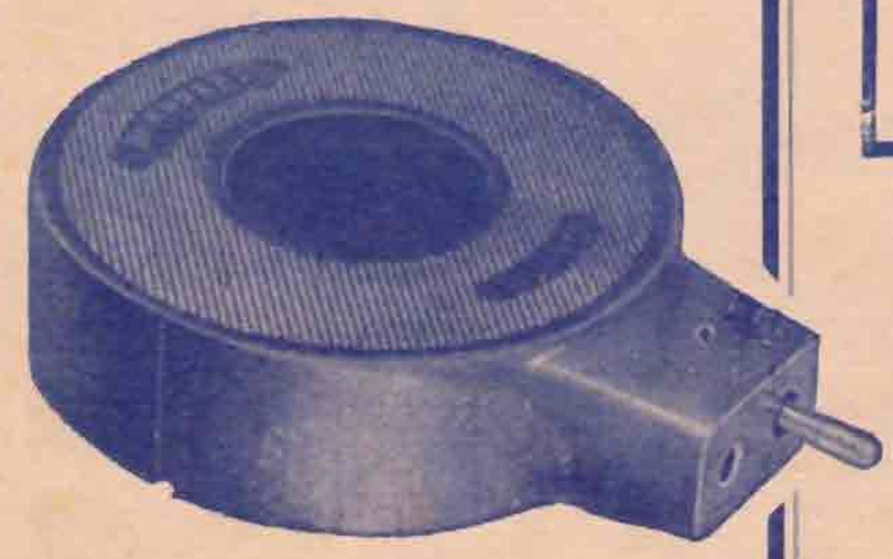

Back view of Burndept Coil.

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In the following letter Mr. Claude S. J. Crooks, of Cossipore, Calcutta, provides substantial proof of the efficiency of Burndept Short Wave Coils.

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T. & R. Bulletin

Devoted to the Interests of the Transmitting Amateur

— The Official Organ of —

THE TRANSMITTER AND RELAY SECTION

of

THE RADIO SOCIETY OF GREAT BRITAIN,
53, Victoria Street, S.W.1

The EDITOR will be glad to receive articles and illustrations within the scope of the BULLETIN. The illustrations should preferably be double size and should be original. Contributions should be addressed to 53, *Victoria Street, S.W.*1., *and marked EDITORIAL, ADVERTISEMENTS, Etc.*

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T. & R. BULLETIN

The only British Wireless Journal Written and Published by Amateurs

APRIL, 1926. No. 9.

EDITORIAL

THE attention of every member is directed to the facilities offered by the QRA and QSL Section, full details of which are given on another page. It is thought that those members who are assisting us in enlarging the membership of the section will find this new section a very useful aid to their recruiting activities. Moreover, those persons who are not yet members will appreciate that this new activity of the T. & R. Section R.S.G.B. offers yet another inducement for them to send in their applications at an early date, for the facilities offered are worth the small subscription charged per annum without other considerations.

Spacing Waves.

Considerable anxiety is being caused by the extended use of spacing waves for keying purposes on the limited wavelength bands at our disposal on short waves. This method of keying is really totally unnecessary with the low powers which we use on these wavelengths, and it is far better to use the method advocated by 2WJ in the first issue of the BULLETIN and used by many amateurs using quite considerable power, i.e., key in the aerial circuit. The use of spacing waves is causing such QRM that we are receiving a considerable amount of correspondence on the matter, amongst which are many urgent requests for us to ask members to refrain from using this method. Hence this appeal. Please don't do it!

Trans-Oceanic Permits.

Those persons who hold the special short wave trans-oceanic permits will have these renewed on April 15, providing that they are still in force. No further applications will be necessary, but any new applications will in future have to be supported by the T. & R. Committee, to whom application for such support will have to be made. This step has been made necessary owing to certain reasons, and it now becomes necessary for the Committee to satisfy itself that the applicant is fully qualified to experiment on these short wavelengths.

Whilst we hear rumours from the B.C.L. world to the effect that enthusiasm is not quite what it was a few months back, we are glad to be able to say that the T. & R. Section has increased considerably in strength during this period and continues to do so. The net result of this is that we are getting into a very strong position so far as negotiating for concessions, etc., is concerned, and that we are able to do certain things which nine months ago were impossible. We hope that in our next issue we shall be able to give you some definite news concerning the transmission of calibrated waves and the standard wavemeter now in course of construction, and steps are being taken to increase the efficiency of our headquarters organisation in order to cope with the ever-increasing quantity of correspondence and applications for membership at present received.

Subscriptions.

We regret to say that there are still many members who have not yet paid their subscriptions due last September and who have not, therefore, received their illuminated membership certificate. We ask you all to send us along those few shillings so that we can get our books up to date.

The 150/200 Metre Amateur Band

A GOOD many experimenters appear to think that the T. & R. Section and the BULLETIN exist only for the benefit of the 23, 45 metre short wave workers. Such is not the case. We have members who are still doing excellent work on the 150/200 band and not a few who still work upon the old 440. We want to see more interest taken in the BULLETIN by those who work on these wave lengths. It is true that most of the present work is done on the shorter waves, but it must be remembered that the British amateur built up his prestige upon the 200 metre band, and there is still scope for valuable work to be done upon that wave length. We want members of the 150/200 metres class to come forward and give us some of their experiences for the benefit of others, both in the form of lectures and articles in the BULLETIN. Anyone who listens in on these wave lengths will notice the distinct and vast improvement which has taken place both in quality and strength since the early days. Telephony has made vast strides, and we hope to be informed of the individual performances in the manner described on the newer methods of modulation and control.

Many of our members are still only working upon the statutory 10 watts, and these deserve the highest praise for the results they achieve. There is nothing like limitation of power in encouraging perfection of efficiency, and the 10 watt man was an adept in this direction, but we want to hear all about it.

We often hear it said that the 200 metre band is dead. Not by any means; it is very much alive, and many of the one time workers who descended temporally to the low wave lengths for DX work are coming back to their old love. We hope that this will serve to re-awaken interest in the higher wave work and assure the 200 metre men that their work is regarded seriously by us as being of the utmost value.

QRA and QSL Section.

WE would like to take this opportunity of thanking all those members who have so very kindly written to us offering help and suggestions for the formation of this section of the T. & R., and especially to the following for useful information forwarded :—

2BAX, 2DR, 5LF, 5NJ, 5WQ, 5XW, 5YK, 5MO, and to 6JV, who advocated a QRA Section in the second issue of the BULLETIN.

We are anxious that this section shall be of real use and assistance to all transmitters, and we ask members to bring to the notice of all non-members they know the facilities now offered under this scheme. Application forms can be obtained from the Section or from 53, Victoria Street, S.W.1.

The routine work is unavoidably heavy, and we ask you to help us by carefully noting the following :—

Do NOT send cards to this Section which are intended for the following countries, but post your cards under cover to each, at the address indicated, where a scheme is in operation for re-distribution.

BELGIUM—c/o Reseau Belge, 11, Rue du Congrès, Brussels.

FRANCE—c/o Journal des 8, Rugles, Eure.

GERMANY—Mr. Rolf Formis, Alexanderstrasse, 31, Stuttgart.

ITALY—Mr. Franco Pugliese, via Borgonuovo, 21, Milano 2.

HOLLAND—Mr. R. Tappenbeck, QRA Bureau, Hoogduin, Noordwijk.

NORWAY—Mr. Leif Salicath, 88, Pilestraedet, Oslo.

POLAND—c/o Radiofon Polski, ul. Wilcza Nr 30, Warszawa.

PORTUGAL—Mr. Eugenio de Avillez (P-1AE), Costa de Castelo 13, Lisboa.

SPAIN—Mr. Miguel Moya, Megia Lequerica, 4, Madrid.

SWEDEN—Mr. Bruno Rolf, Hamngatan 1A, Stockholm.

SWITZERLAND—Dr. W. Merz, Berne-Bumplitz.

AUSTRIA—Mr. G. E. Roth, c/o Radiowelt, Rüdengasse 11, Vienna 111.

SOUTH AFRICA—Mr. Heywood (O-A3E), 91, Berea Park Road, Durban, Natal.

We shall be glad to hear of any other countries that have a fixed address for all QSL's.

For the time being, as an experiment, this Section is prepared to forward cards, for T. & R. members only, to Belgium and France free.

QSL cards are more likely to be received in return, if you put on your own, " QSL via RSGB, Bury, Suffolk." !!! In order that there shall not be any delay in forwarding your cards, it is important that every member should send the Section some stamped addressed envelopes.

These will be filed until they are needed, and should bear the addressees' radio call, printed in bold letters, on the top left-hand corner, and should not be smaller than 6 inches long by 4½ inches deep. The thin foreign variety are preferable.

Finally, we note from the many cards received there are a number of active receiving stations who send cards to stations logged, giving details of their reception in the same manner as between transmitters.

We shall be pleased to entertain application for membership from these stations, upon acceptance of which they will be entitled, among other things, to receive the BULLETIN free, and use this Section as indicated.

For filing and publishing purposes we shall allot them a distinctive number, preceded by the letters B.R.S. (British Receiving Station), and several such numbers have already been allocated.

QSL's WAITING.

GAR, GBM, GBO, GEFT, GFD, GHA.

In addition we hold a large number of cards for British amateur transmitters and British receiving stations, far too numerous to list this month, and we ask your co-operation in making this fact known to all concerned.

QRA's.

2BAX (AA), S. H. Chapple, 17, East Street, Newtown, Huntingdon.

2BBG, R. W. Cope, 197, Northdown Road, Margate.

2BIQ (AA), E. C. Gibbs, 16, Hatter Street, Bury St. Edmunds.

2BLA (AA), G. H. Boughton, 27, Croxton Road, Thetford.

NAJD-NEQQ are U.S.A. naval units at Manilla, P.I.

CHANGE OF ADDRESS.

2JB—J. C. Bird, 1, Stapleford Road, Wembley.

QRA's WANTED.

6BT wants postal QRA of GHA, Malta and G6JH.

2GO wants postal QRA of MAOO.

6BT wants postal QRA of new stations.

G6BT,
QRA and QSL Section,
(T. & R.), R.S.G.B.,
82, York Road,
Bury St. Edmunds, Suffolk.

STOP PRESS.

Send no cards to zero Dutch stations at present as there is trouble with authorities over there.

Supersonic Notes.

By E. J. SIMMONDS, M.I.R.E., F.R.S.A. (2OD).

FOR those experimenters who are interested in the development of the supersonic receiver for the reception of modulated waves on the higher frequencies, the following suggestions relative to the oscillator, and its coupling to the first detector, may be of interest. The standard method of using a " pick-up " coil consisting of a few turns of wire coupled to the local oscillator, and connected in the filament end of the grid coil works well on wavelengths down to 20 metres. Below this wavelength, however, this method tends to become inefficient, mainly because of necessity the grid coil is reduced to a small number of turns, say, four or five, and also in view of the frequencies it is desirable to avoid, as far as possible, any coupling to the grid coil which will increase its resistance, and permit of capacity losses. The writer has been using the following arrangement at G-2OD for some time with considerable success.

The first detector is a D.E.Q. valve functioning by virtue of its anode-bend characteristic, and the local oscillator is coupled to a coil connected in the anode of D.E.Q. valve. A certain amount of useful regeneration may be obtained by arranging this coupling coil to be resonant (approximately) to the frequency being received. For this method to be successful, it is necessary that the local oscillator should provide plenty of energy for transfer to the first detector anode, and the following method of winding the grid and plate coils of the local oscillator will be found desirable. These coils

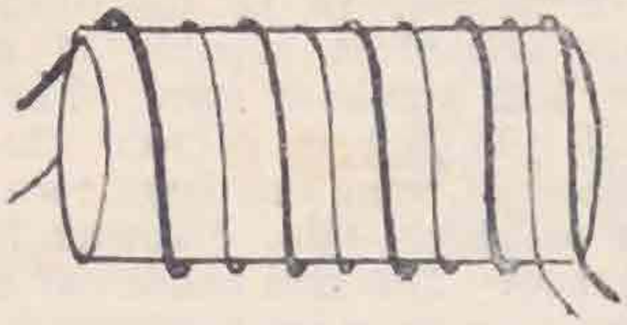
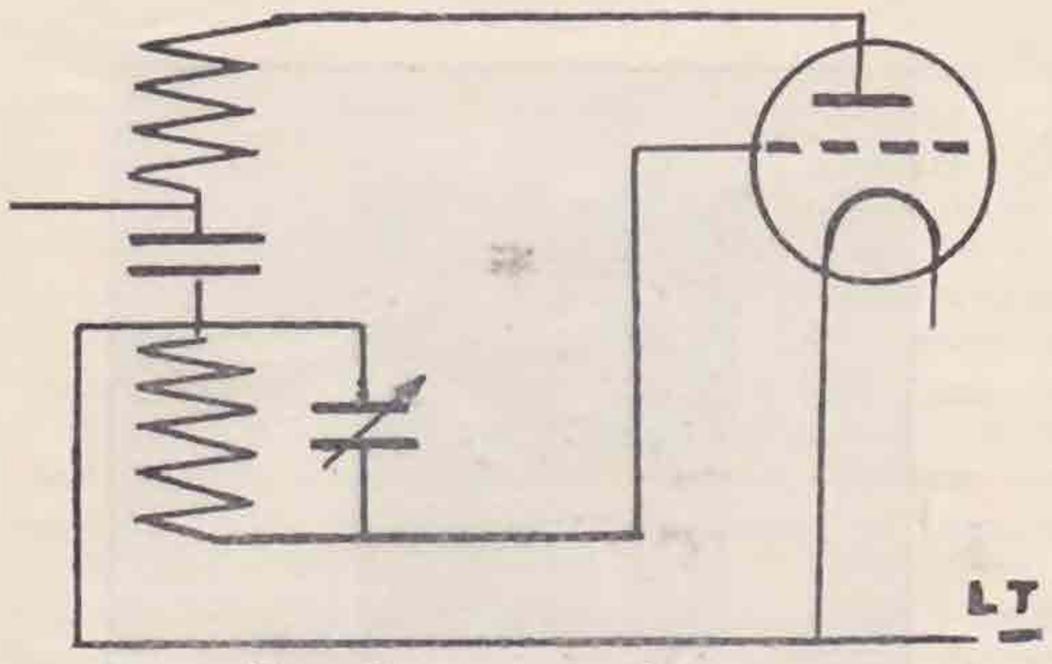


DIAGRAM SHOWING ARRANGEMENT OF GRID AND PLATE WIRES.

should consist of ordinary solenoid form, air-spaced, and supported on ebonite strips spaced 120° apart in the usual way, the point of importance being that the grid and plate coils are wound together on the same former, thus the turns on the coil read alternatively grid turns and plate turns.



THE OSCILLATOR CIRCUIT.

A useful oscillator circuit diagram is here included, which has many advantages for high-frequency work. The by-pass condenser "A" should be arranged close to the low potential ends of the grid and plate coils, and the condenser "B" should have the insulated fixed plates connected to the grid end of coil, the moving vanes being grounded to filament.

This arrangement will quite eliminate body capacity and change of frequency, even on wave-lengths of the order of 5 metres. This of course assumes the use of a condenser having metal end plates, grounded to the rotor.

Carefully plan the connections so that they are as short as possible, and use a D.E.V. valve if possible as oscillator.

CALIBRATED READINGS FOR ALL.

G-2OD will be pleased at any time to give T. & R. members calibrated readings of their wavelength. if they will give him a call when he is working or send a postcard fixing an appointed time. The wavemeter which he will use is a quartz crystal calibrated by N.P.L.

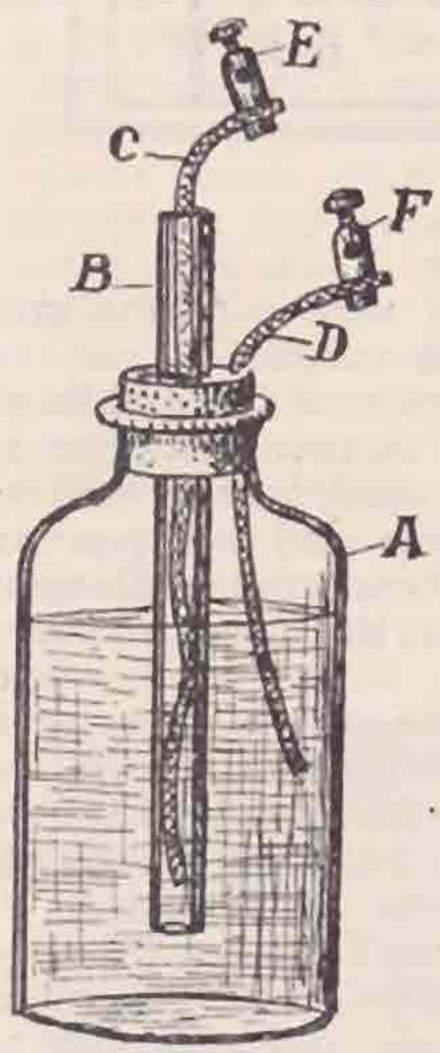
A Makeshift H.T. Voltmeter.

MANY of us have not sufficiently deep pockets to indulge in the purchase of an H.T. voltmeter, but at the same time would like to know the approximate voltage which we are applying to the anode of our valves. The writer has got over this difficulty in the following manner:—

Most of us possess a voltmeter with which we test our H.T. batteries, reading up to 100 volts, and this can be quickly and fairly accurately adapted to the purpose. Frst of all obtain a wide mouthed bottle about 6 inches tall, and a length of glass tube of about ¼in. bore and, say, 8in. long; now bore a hole in the cork of the bottle to accommodate the glass tube sufficiently tight to prevent movement.

Having done this, cut a small niche in the side of the cork sufficiently large to allow a piece of lead strip about 1-16in. by ½in. to be inserted between the cork and the mouth of the bottle with a tight fit.

Next, procure from the local builder or hardware store a piece of lead sheet which will cut to the required sizes, so that you can cut from it two strips, one of which should measure about ½in. wide by, say 7½in. long and the other 3-16in. wide by about 9½ in. long; now take the two pieces and solder or screw a small terminal to one end of each piece of lead. Having done this, slightly "kink" the longer piece so that it will move in and out (or up and down) in the glass tube, so that when you slide same up or down it will remain where left without dropping down to the bottom.



Now take the bottle and fill within 1in. of the top with boiled water (cold) and insert cork with tube, etc., and the other lead strip in the side (sketch is self-explanatory).

The meter may now be calibrated in the following manner:—Obtain sufficient ordinary H.T. batteries to give the meter a full scale deflection (or 100 volts) exactly; now insert the resistance (the bottle affair) in series with one of the leads and adjust the central lead rod until a reading of exactly 10 volts is obtained. The meter is now ready for use on the H.T. of the transmitter up to 1,000 volts, as, when connected across the mains to the transmitter with the resistance in series it will read 20v. when 200 volts are applied and 80 when 800 are applied, and so on.

The writer does not claim any degree of accuracy for this method, neither does he claim that the water resistance will remain constant, but it forms a means of getting an approximate idea of one's H.T. voltage without spending money on an expensive H.T. meter; these resistances also form useful variable grid leaks for low-power transmitters.

G2XV.

AND IDENTIFY YOURSELF.

Some Experiments on 5 Metres.

By E. H. Robinson (G-2VW).

THE following few remarks are not intended to be taken either as the first or last word on the subject of 5-metre work. Experiments are still in a very incomplete stage, and definite conclusions still remain to be arrived at.

First, as regards the circuit for producing 5-metre oscillations. The mere setting up of a transmitter for low power on this wavelength does not present much difficulty. So far, the writer has always used the Hartley circuit on account of its simplicity; Fig. 1 shows all it consists of. A

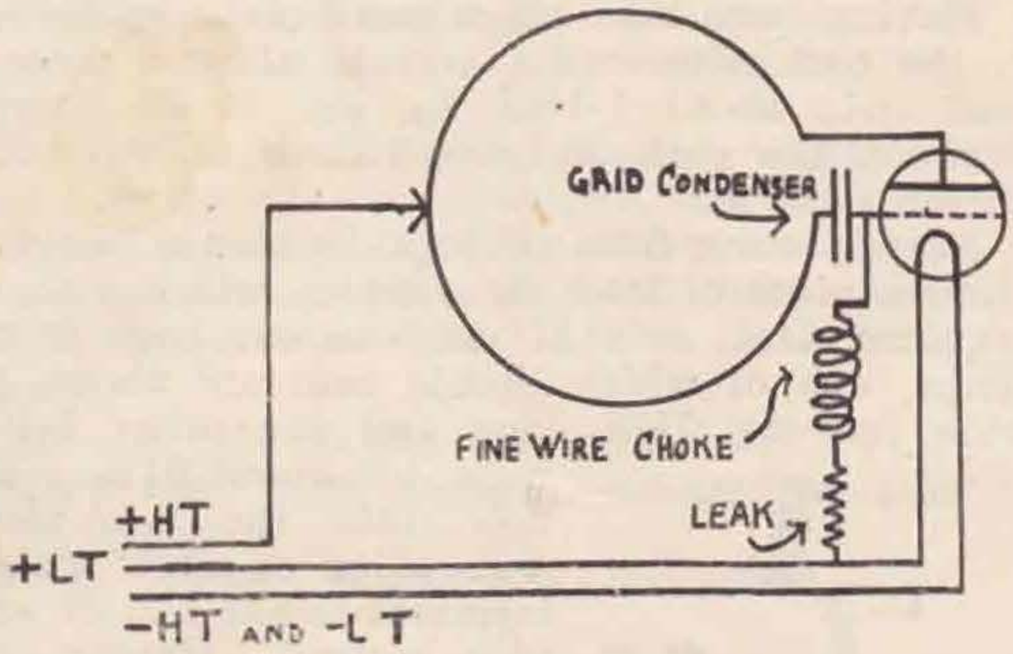


Fig. 1.

one-turn coil of stout copper wire connects grid and anode of the transmitting valve, H.T. supply being fed at a point somewhere near the middle of the turn. The best position of this feed-point is determined by trial. A grid-condenser is used as shown, since we want negative and not positive bias on the grid. The grid is connected to filament through a choke and leak in the usual manner. The grid choke is of the long, narrow kind wound with fine wire, and may be wound with 36 covered wire upon a cylindrical former about ½in. in diamater and 6in. long. The writer prefers this type of choke for short-wave work as it has small end-to-end capacity and, owing to its resistance, is not likely to give trouble with stationary-wave resonance. "Low-loss" chokes may very easily act as "resonance-wave" coils and give rise to worse trouble than a fine wire choke.

The oscillator may be kept a distinct unit from the power supply, only three connecting wires being essential, *i.e.*, H.T. positive, L.T. positive and the common to H.T. negative and L.T. negative. These three leads may be of flex and should be twisted together. In this way the oscillator may be placed on the roof, up the mast or hung out of the window according to desire. If choke control is used for phone work the modulator valve may be kept in the operating room as a permanent fixture, modulated H.T. being fed out to the oscillator. This procedure is remarked upon because it has been found, so far, that the best signal is radiated when the oscillator itself is high rather than when the oscillator feeds an aerial from indoors through a long leading-in wire.

Low-impedance valves like the L.S.5 or D.E.5 seem to oscillate particularly readily, but there is not usually much difficulty in making the normal-impedance 150-watt valves oscillate. The latter may need a good deal of H.T. voltage on the anode before oscillation commences. To obtain a pure C.W. note is not particularly difficult, even when the supply is rectified A.C., although rather more careful smoothing is necessary than with 180-metre work. The chief trouble is usually purely mechanical, as the very slightest vibration makes a terrible wobble in the received heterodyne note.

Fig. 2 shows a portable 5-metre transmitter which was used in a number of experiments. It was constructed primarily as a weak source of tonic train to test the capabilities of the super-regenerative receiver to be described later, but experiments proved it capable of giving good signals over half a mile or more. The valve is an M.O. D.E.5. Behind it is seen the inductance which, instead of being one large turn, consists of two turns of about 4½in. diameter for the sake of compactness. The grid condenser (about .0003 U.F.) is seen edge-on at the bottom left-hand corner of the case. The grid choke, wound on a bit of ebonite tube, is seen tied with string in front of the valve-holder. The grid-leak, which is a Dubilier 100,000 ohm anode resistance, is seen between the valve and the 6-volt accumulator. The latter, in addition to lighting the filament, works the Ford ignition coil in the top right-hand corner. The secondary voltage of the coil is fed to the anode of the valve through the mid-point of the inductance.

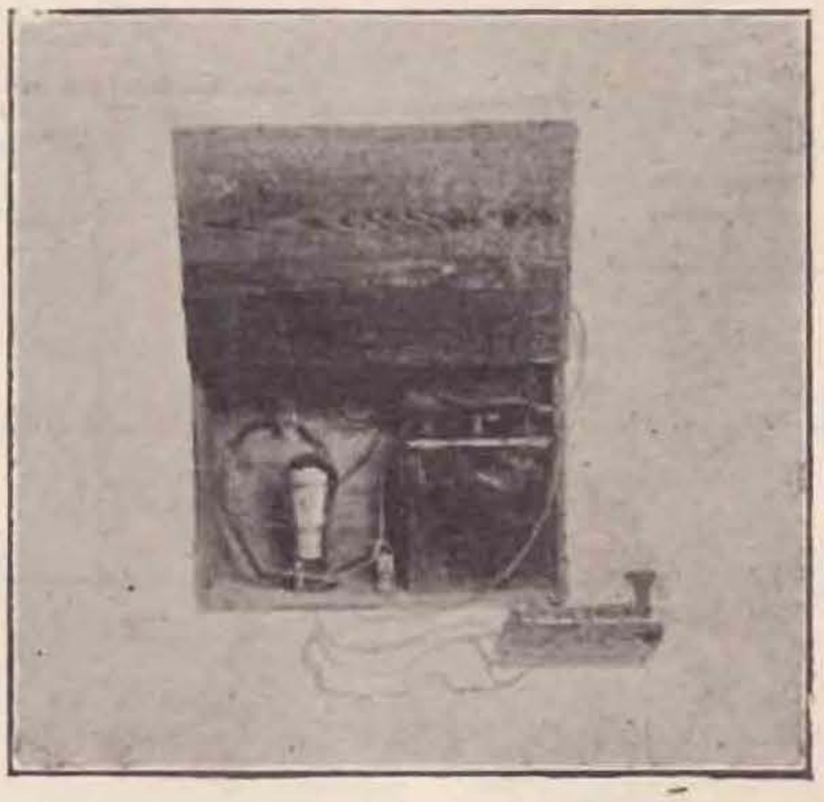


Fig. 2.

The transmitter is therefore a self-contained T.T. set, and when the side is closed down is readily carried about by hand or on 6TM's bicycle. More of this later, however.

Now for some remarks about the type of receiver used. The problem of producing a satisfactory receiver for very short wavelengths is by no means an easy one and requires more attention than the transmitting side. Ordinary H.F. amplification is out of the question, and one has to fall back on the simple regenerative detector with one stage, or possibly two, of L.F. amplification. On 5 metres L.F. amplification is unquestionably of assistance in making faint signals readable since there is very little in the nature of atmospherics and other usual forms of interference to make background noises. The chief bugbear of reception on this wavelength is the QRM from the ignition of motors and the oscillations produced by metal-filament vacuum

lamps. The only other forms of amplification are the supersonic and super-regenerative types. The writer has not tried the first, but has found that super-regeneration is most extraordinarily effective. The latter has the advantage that it can be applied to a simple one-valve receiver by the addition of a quenching unit without any alteration to the existing regenerative detector unit itself.

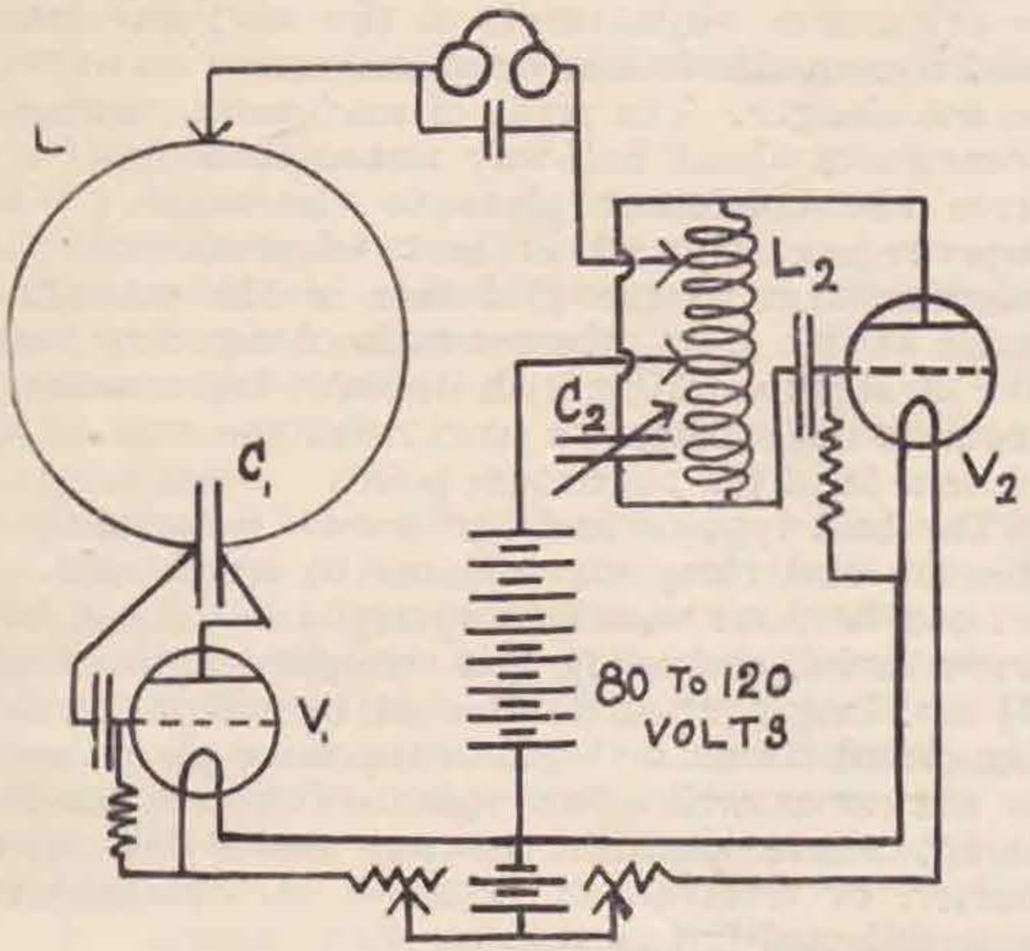


FIG. 3.

Dealing with the detector unit, the most important part of the receiver, this is of the type described in "Experimental Wireless," Vol. II., No. 15. I shall, therefore, not waste space with a detailed description, save to mention that it is a Hartley circuit having one turn 8½ins. in diameter of copper strip, to the ends of which are soldered a pair of plates 4in. by 3in. forming the condenser of the Hartley circuit, tuning being effected by varying the distance between the plates and reaction being controlled by varying the position of the H.T. feed point on the single turn. Fig. 4 is a photograph of the writer's original 5-metre receiver. It is somewhat crudely made, having been evolved bit by bit without any previous knowledge on which to work; nevertheless, the set has been useful in a number of experiments. At the left-hand end of the baseboard is seen the detector unit, while the super-regenerative oscillator (corresponding with V_2, L_2, C_2 in Fig. 3) is at the right-hand end. The detector valve, a V.24 or D.E.V., is mounted under the condenser plates of the 5-metre tuning circuit. Short flex leads connect the grid and anode clips to the condenser plates, the grid lead including a small grid condenser seen on the left of the detector valve. At first the grid and anode clips of the V24 holder were dispensed with, the leads being soldered direct on to the valve-lugs. This precaution, however, has been found to be unnecessary as well as highly inconvenient should it become necessary to remove the valve. At the same time these grid and anode leads should be kept just as short as practicable. H.T. is fed to the valve through the radial arm of springy brass strip which makes contact with the copper ring. By means of a long wooden rod this arm may be moved to vary its point of contact with the ring. This furnishes a reaction control which is manageable and silent provided that the rubbing contact surfaces are well cleaned, and slightly, with a spot of oil or vaseline. A detail to note is that the contact should be definitely located at a point; and for this reason the contact arm bevelled so that only a narrow ridge of it touches the ring.

The tuning control is the large wooden knob on the upright board on the extreme right (Fig. 4). This acts through a shaft on a screw arrangement which varies the distance between the condenser plates of the detector circuit. These plates are sprung apart by the copper ring and compressed by means of the screw. The screw is soldered to the left-hand plate; it must therefore be insulated from the right-hand plate by means of insulating washers and a bush. This bush is the one serious bit of dielectric in the circuit, but seems to give rise to no trouble as long as it is made of good ebonite and kept thoroughly clean. One of the chief objects in this design of 5-metre tuner was to get rid of all solid dielectrics as far as possible. The arrangement has, however, been found to be not quite so rigid as is desirable for a short-wave tuner. In portable experiments, particularly, it is apt to get the shivers badly. It has since been found that ebonite strengthening strips may quite well be added here and there without hindering the working of the set at all. In fact, the writer is at present of the opinion that the thing of first importance on 5 metres is mechanical rigidity and precision of adjustment, and not the elimination of circuit losses. It is probable in any case that the resistance and dielectric losses of the circuit are small compared with the inevitable loss by radiation.

Next, a few words about the super-regenerative side of the set may be of interest. A quenching frequency just too high to be audible, say 20,000 per second, is used. A separate valve is employed to generate the quenching frequency oscillations, and is incorporated in a unit seen at the right-hand end of the baseboard in Fig. 4. The valve

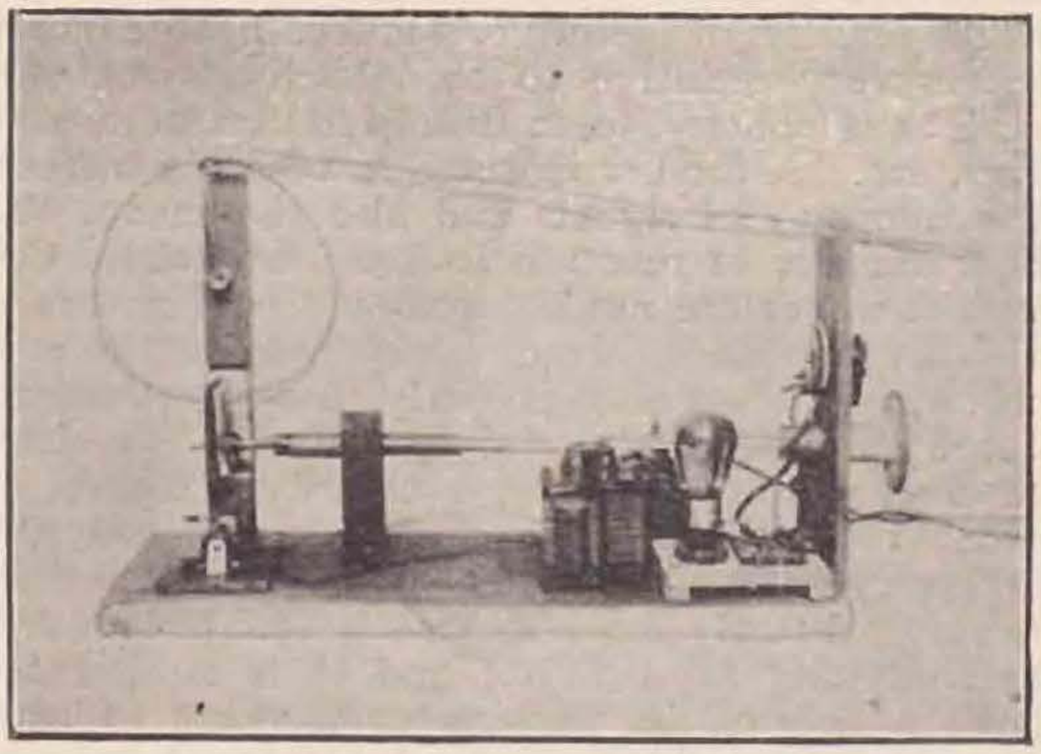


FIG. 4.

used here is a D.E.5. From Fig. 3 it will be seen that the regeneration of the detector circuit L_1 C_1 V_1 is controlled by modulating the H.T. supply with the quenching frequency generated by the long-wave Hartley circuit L_2 C_2 V_2. Connection from the detector circuit is made through the telephones to a tapping on the quenching oscillator inductance. This tapping is chosen so as to give the right amount of quenching effect, and has to be adjusted

by experiment ; it is not critical, and in the writer's set is about two-thirds up the anode-circuit portion of the quencher inductance. C2 is a variable condenser which enables the quenching frequency to be varied at will. Sometimes a slight improvement during reception can be brought about by adjusting this frequency. The writer generally obtains the best results when the quenching frequency is just too high to be heard.

Now I know that many T. & R. members have tried out super-regenerative circuits and that most of them have discarded it as of no practical use. Perhaps this is so on B.C. wavelengths, but who has given it a really fair trial on shorter wavelengths and with a circuit designed to do its job ? At one time radio journals boosted the one-valve, or "flivver," circuit in which one unfortunate valve is made to oscillate at two frequencies at once and expected to produce signals equal to those given by three or four valves in other sets. Such a circuit naturally makes a popular appeal, but it is a technical crime. The idea of super-regeneration is to make a regenerative receiver alternately able and unable to start oscillating. Not only must the frequency of quenching be adjusted to the right value, but it is also important to have the extent and duration of each quenching pulse right. How can anybody expect to have all these under proper control in the one-valve circuit ? The usual result is a mixture of all sorts of radio and audio frequencies in the receiver and a headache for the operator. It seems only logical that one valve should be used as detector-oscillator and another as quencher. But let's get down to 5 metres again.

The method of adjusting the receiver is as follows. The detector valve is switched on and the reaction lever moved until the set is just on the point of oscillating. The quencher valve is next switched on ; this should produce very little extra sound in the phones. The reaction is now increased past the point at which it would normally make the detector valve oscillate. At this stage a slight amount of hissing or mush is heard, but the set is very sensitive to modulated transmissions such as telephony, tonic train, ignition from motor cars, etc. A further increase in reaction increases the intensity of signals and also the mush. The best amount of reaction is found by trial. C.W. carrier-waves are not heterodyned by the receiver in this condition since a super-regenerative receiver, when working properly, has practically no autodyne effect. It simply acts as a crystal receiver which has gone enormously sensitive. In order to receive C.W. a separate heterodyne is necessary. As a matter of fact, a local oscillator working directly on 5 metres is too powerful for heterodyning faint C.W., and it is sufficient to have a heterodyne wavemeter working at about 20 ms. and to beat with one of the harmonics. Even these harmonics have a wipe-out effect sometimes. As an instance of the great amplification brought about by super-regeneration on 5 ms. it may be stated that a telephony transmission, which is so faint that the carrier-wave can just be picked up by the simple regenerative detector alone, is brought up to good readable strength on the speech itself as soon as the super-regeneration is switched on. Incidentally, the carrier-wave, if not very weak, produces a silencing effect on the super-regenerative mush when properly tuned—a very useful and obliging sort of phenomenon. Telephony received by super-regeneration is clear, and does not seem seriously impaired in quality. Of course, when the quenching valve is switched off, the set is a straight one-valve autodyne receiver, and C.W. may be received without the separate heterodyne, but it is relatively very faint. With regard to the position of the reaction arm, adjustments of this vary the tuning slightly. A decrease in reaction causes an increase in wavelength. The point of maximum reaction is somewhere about half-way round the copper ring from one condenser plate to the other. When super-regenerating, it is best to work with the reaction arm to the grid side of this maximum point as this gives a better ratio of signal to mush. For straight working, with no super-regeneration, it seems a little better to work with the arm on the plate side of the maximum point.

The best type of aerial to use for 5-metre transmission and reception remains to be decided. A lot can be done without any aerial at all. A half-wave aerial, consisting of a straight length of wire 2½ ms. long coupled to the set by placing it near the closed circuit coil and in the same plane, seems to answer as well as anything. It seems the best thing, where possible, to put the whole transmitter, or receiver, or both, in as high and unscreened position as possible.

The Power Super Heterodyne.

A Paper Read by Mr. W. K. Alford (2DX) before the T. & R. Section, January 29, 1926.

MR. ALFORD, in opening, referred to the great difficulty in designing a super heterodyne set suitable for all classes of users. As a commercial article it must not be too complicated to handle, the number of controls being restricted as far as possible. Upon the other hand, the experimenter would rightly demand the adjustability of all important and essential functioning parts. This circumstance caused a considerable difficulty in designing.

In the first place a listener might well ask why he should be called upon to use eight valves when a smaller number might receive the same stations upon a simpler principle. Not only was there greater complication and energy consumption, but also a far more cumbersome set. The answer was given in the great selectivity gained and the ability to tune in distant stations in the neighbourhood of large broadcasting stations. As an instance of this, the lecturer mentioned that a set similar to that demonstrated was being used within a quarter of a mile of the London transmitting station 2LO with complete ability to cut out the latter.

As regards operation, Mr. Alford pointed out that in practice the operation was the essence of simplicity directly one became accustomed to the method of tuning.

The super-heterodyne, however, usually suffered from certain drawbacks, the first and most prolific being instability. This had to be met by methods which often reduced the efficiency of the intermediate frequency amplifiers, such as the use of potentiometers and other deliberate methods of

destroying the "u" of the valves and thereby preventing oscillation at the cost of good amplification.

In the second place, there was trouble due to interference upon the intermediate wave band. Owing to the increasing number of commercial stations operating, it was extremely difficult often to find a clear frequency on which the I.F. amplifier might operate.

Of the systems of intermediate frequency coupling we had :—

1. Transformers.
2. Reactance capacity or tuned anode.
3. Resistance coupling.

The reactance capacity system was selected in the instrument shown on account of its adaptability to neutralisation for the purpose of suppressing oscillation and maintaining maximum amplification.

Comparing the advantages and disadvantages of the separate first detector and oscillator with the single valve performing the two functions, the lecturer pointed out that there was very little to choose between the methods in the way of results. As a consequence, the single valve arrangement is desirable with the object of saving not only one expensive valve but also its filament current and controls.

Mr. Alford made a demonstration with a set embodying the principles he discussed. This contained six valves, a combined first detector and oscillator, three intermediate frequency and final detector and note magnifier. In addition, a high frequency valve in a separate unit could be used in front of the set. This had the double advantage of increasing the volume and selectivity, but the objection that it introduced a third condenser to be tuned.

The set used an intermediate frequency of 6,000 metres, and interference upon this frequency was prevented by the use of a specially designed frame aerial embodying two coils of equal number of turns arranged side by side, but connected in opposition to each other One coil was sharply tuned and the other broad. A demonstration of this device was given in which one-half the frame was disconnected and various long wave stations, including Ongar, were heard operating upon the intermediate frequency. Upon reconnecting the other half of the frame this interference entirely disappeared. This arrangement was invented by Mr. P. W. Williams, M.A.

Further demonstrations with the set showed the high efficiency of the arrangements, various B.B.C. and continental stations coming in upon the loud speaker in spite of severe interference from the lift operating in the adjoining B.B.C. premises, the trams upon the Embankment and other influences.

Capt. Ian Fraser, in opening the discussion, referred to the desirability of having the set calibrated. He had a set of this type and considered that calibration was a necessity, especially where a H.F. valve was used. He also stated that, using a H.F. valve, the frame could be dispensed with and the same results obtained as without the H.F. valve, the anode tuning coil acting as an aerial.

He mentioned the fact that the only station which he had difficulty in receiving was Manchester, as at his station in setting the frame to Manchester its reverse direction pointed direct to 2LO. He had, however, received Cardiff, Madrid and other stations, which had only been received with difficulty before.

Mr. E. J. Simmonds (2OD) pointed out that he rather thought the super heterodyne might fail in the reproduction of quality, as sufficient broadness of tuning had to be provided to cover the side bands. He had tested the receiver shown and was surprised to find the quality very excellent.

Mr. S. Ward raised the question of resistance coupling, but the lecturer pointed out the many disadvantages of this, including lack of magnification, broadness of tuning and extra high tension required.

Capt. Hartridge referred to the question of upkeep cost, and mentioned that he had been able to keep the total plate current upon his set down to five milliamperes. He used an intermediate frequency of 3,200 metres.

Mr. Alford replied to the discussion, and it was decided to adjourn the discussion to another evening upon account of the lateness of the hour.*

A further demonstration was given upon the set by the lecturer at the conclusion of the meeting.

A hearty vote of thanks was passed and carried by acclamation to Mr. Alford for his successful lecture.

The attendance at this meeting constituted almost a record in the history of the T. & R. Section and taxed the available seating accommodation to the uttermost.

The range of the receiver shown at the lecture was from 30-3,000 metres and has been used by G2DX for long distance communication with all parts of the world.

Strong telephony has been received on the loud speaker from an Australian amateur station on 35 metres.

Drills for Ebonite.

By C. Bryant, 5XW.

Experimenters often find it necessary to drill pieces of ebonite, and even panels, the method used being by the aid of a morse drill.

After slight use, one usually finds that, owing to the ebonite having made the drill hot, the cutting edge has been impaired, and not everyone can re-set a new cutting edge on this kind of drill, and, moreover, small sizes easily stick and break.

A method of drilling ebonite which is used by the writer, and has the advantage that replacements are cheaper, is to procure short lengths of brass rod and brass wire in various gauges.

This wire can easily be flattened out by placing the end on a flat piece of iron and giving the wire several sharp taps with a hammer. After it has been flattened, all that is necessary is to file the edge to a diamond point of the size of hole it is desired to make, the filed edge being slightly slanted down to the left to produce a cutting edge. Brass is far superior to steel for cutting or boring through ebonite, and it does not heat up so quickly as steel. There is no limit to the size of these bits, or drills. The writer has one made large enough to produce a hole for condensers (one hole fixing), and the cost of a whole set of drills only becomes a matter of a few pence.

I shall be glad to give any further information should anyone be unable to follow these instructions.

*Ed. Note.—This debate took place on March 19.

We Wonder —

If the ham who, after answering 15 calls without result, bought a packet of cigarettes, complete with card, bearing the image of a battleship and the inscription, "Hope on, hope ever"—is still hoping?

* * *

If he is now collecting cigarette or QSL cards?

* * *

If some of those who complain of QRM realise that their own I.C.W. and spacer waves don't help matters much?

* * *

If anyone has thought of starting a fund for distributing 10 watt tubes to high-power stations which like to do local work sometimes?

* * *

If the "i" stations—working with poisonous I.C.W. on 35 metres—have seen the Journal des 8 lately?

* * *

If they realise that most of us agree with what the J de 8 has to say about them (though we might express it differently)?

* * *

How many unlicensed G's are working merrily?

* * *

If the P.M.G. knows about it?

* * *

Whether he is scratching his head?

* * *

If the official D.F. set is any good?

* * *

What attitude licensed stations ought to adopt towards "Pirates"?

* * *

If there may not be some excuse for some of them?

* * *

If in spite of this we can't excuse them?

* * *

If the whole question is not rather a "teaser"?

STULTUS-MAXIMUS.

Radio Rifts.

Sometimes, when usual routes fail or long distance working conditions are bad, Government stations are very glad of our co-operation. Late one night recently 5QV was asked to accept a most urgent and important message. It was promptly shot to its destination. A congratulatory letter received later informed the amateur station its purport had been accomplished just in time.

* * *

Recently heard on the A and NZ allotted W/L. QRM FB? Raw AC European Op. out for a hectic night of DX. 58CEK's sign twice and followed by 47 more of DA-DEE-DA-DEE DEE-DAH-DEE-DAH. No response. N.D., OM, we don't like the colour of your whiskers. Where's that air gun?

* * *

Who is it playing will o' the wisp with 2XV, Cambs.?

* * *

6BT, 82, York Road, Bury St. Edmunds, has a gorgeous collection of foreign stamps.

* * *

2TO is too too busy to tee up his toobes at present.

* * *

Glad to hear our valiant friend in the town of QRMMA tuning up after a spell on the sick list.

* * *

Sling a Hertz, watch the billy blink; when it lights cock a chest like a North Sea skipper, when it doesn't go in and burn magnesium. A top sawyer in Hertz aerial transmission is so elated with his recent successes in DX his nasal probcscis is reported to have snow on the peak.

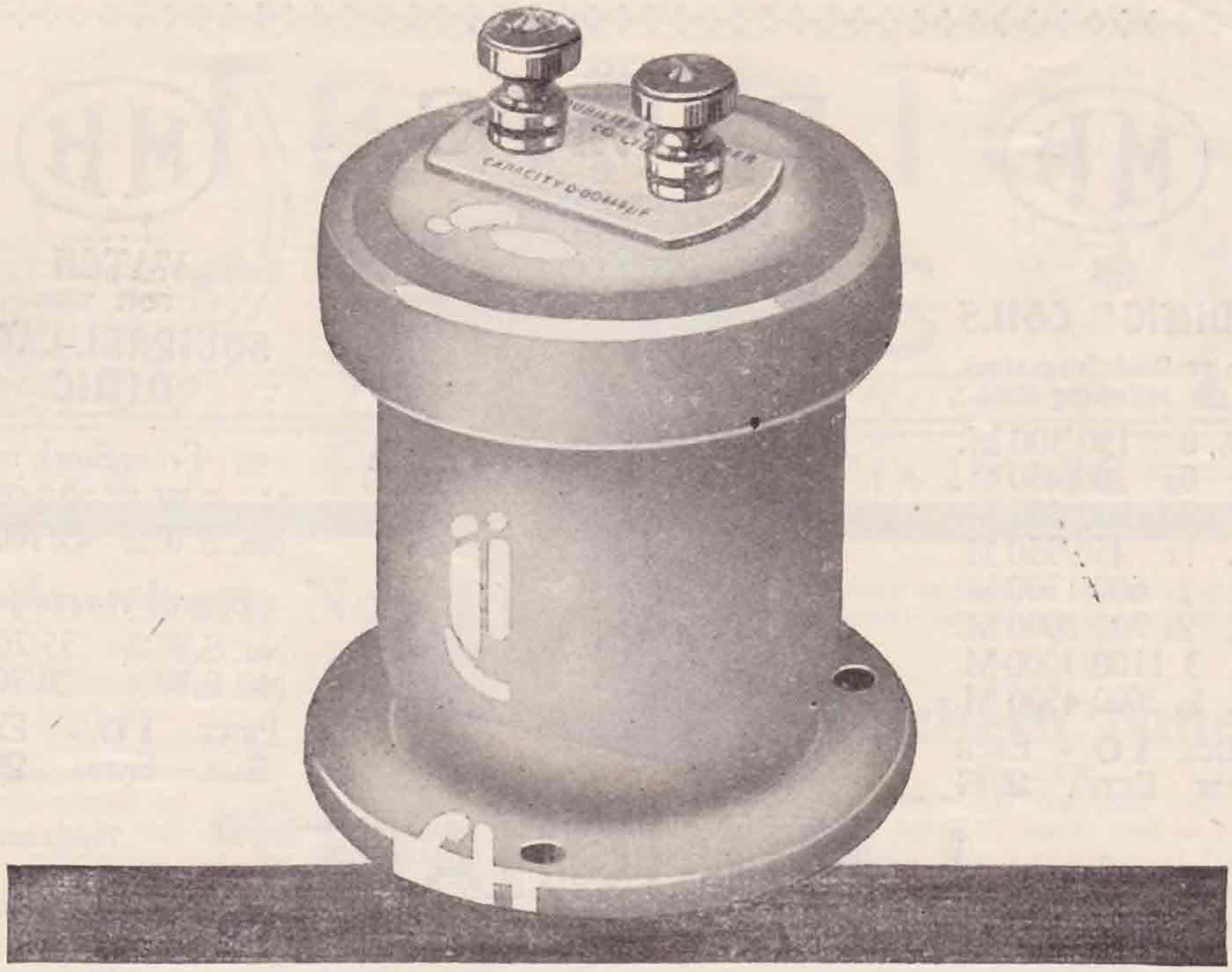
ETHERCOMBER.

I.A.R.U.

2LZ has now been appointed Secretary of the I.A.R.U. in place of 5MO, who has relinquished his appointment on account of private business engagements.

Billy Borrett's Trophy for the G Station which work Canadian Stations the most during the current year.

READ THE ADVERTISEMENTS—THEY ARE INTERESTING.



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The small transmitting condenser illustrated here is one of the many specialised Dubilier products, and is particularly suitable for use in experimental and amateur transmitting stations.

Among the many purposes for which these condensers are used, we would like to mention the following :—

(a) For use in low-power transmitters up to 100 metres as aerial series condensers, oscillating circuit condensers, grid condensers, etc. (Types S.W.A.F. 650, S.W.A.F. 700, S.W.A.F. 750, S.W.A.F. 800.)

(b) As Anode Feed Condensers (Capacity range 0.00005 mfd. to 0.05 mfd. for working voltages up to 6,000 D.C).

(c) As high-frequency by-pass condensers.

(d) As grid condensers.

Condensers for the last three purposes are scheduled as types A.F. 650, A.F. 700, AF 750 and AF 800.

They are enclosed in porcelain containers, so as to insulate the whole condenser when used at a high potential above earth (*e.g.*, as in the case of Anode Feed Condensers). The terminals are mounted on the porcelain lid, and this type of condenser is a most reliable and convenient unit for experimental use.

Prices from **25/-** to **60/-**, according to requirements.

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Southern Notes.

Prepared by G-2LZ.

DX conditions during the past month have been none too good and very few reports have been received. The American signals still seem to come through regularly for a few days and then completely disappear for a few days. I have been unable to link this phenomenon up with any weather conditions so far. Brazilian stations come through very regular, and a few reports concern working with Australians, but there appears to be very little doing with the New Zealanders.

The new QRA and QSL section now being organised by G-6BT is proving a great boon to experimenters for the collection and despatch of QSL cards. It is up to every T. & R. member to join this section, which will result in a great saving of postages on cards.

DX Reports.

6QB has been experimenting with an indoor aerial and counterpoise, and has worked an American station on this with only 10 watts input.

6TD has at last worked Australia, and has had two-way working with sundry U's, PR's, and O's. He is erecting a new 58-foot mast, and has overhauled his power plant, so we hope to hear more of him next month. An error occurred in last month's reports, 6US was credited with 6TD'S DX work. Sorry, OM.

5HJ has increased his power (hi !) to 4 watts, and has worked YS-7XX, I-1BK and FM-8MB. He hopes to hook a U station soon.

5HA is doing remarkably well on low-power. With 5¼ watts and under he has been QSO with PI-3AA, P-3FZ, and U-3LW.

5HS has worked three Australians, and has made several attempts at getting hold of a Z, but so far has been unsuccessful, due, he states, to interference by the Italians on the Z wave band.

5UP is using 2½ watts from dry cells on a LS5 valve and has worked 49 stations to date, which are all Europeans. He has received stations in every country and is now looking out for Alaska. He would like to know if anyone has ever logged Alaska.

5SZ has worked Brazil seven times, also several PR's and A-3BD. He has also done some phone working with Germany, France and Sweden. Three Americans were also worked one evening.

2LZ has only worked to schedule with U-ICAL, making observations on signal strength and weather conditions.

Northern Notes.

By 2DR.

It would appear that the past month has been very variable for DX work, and some Northern hams have had rather lean times, if I may say so. Nevertheless, a considerable amount of work has been done both by high and low-powered stations.

I should like to know what is happening to the hams in the Newcastle district. I hear them on the air and working U'S, BZ's, but never so much as a line from them.

Lancashire men are also very backward in coming forward with reports. Will some kind-hearted person in these areas try and get me a little information for next month, please ?

I hear from OM Editor that there are 2,000 cards awaiting delivery at the QRA and QSL Section, 82, York Road, Bury St. Edmunds, Suffolk. Will all the hams in my area send a stamped addressed envelope or envelopes to this address ? Who knows but what a few surprise packets await you ? Send along your envelopes, hams, and get the full benefit out of your T. & R. membership, and don't forget that if you want cards sending to France or Belgium, the Section will do it for you free of charge. Use the Section and save postage.

This month's reception has been very erratic indeed, and there have been blank nights galore. The Brazilians have been coming in well nearly all the time, but it is rather interesting to note that when they are very good, U's are either unconditionly rotten, or crawling in on their hands and knees. Hwcum OM's ? The U's were very good during the last few days of February, but have been inaudible most of March until the 13th or 14th. A's have also been scarce, and Zedders have not been any too good.

Now for the reports.

Yorkshire.

2XY (Leeds) has worked one BZ, five U's and EGEH. Not as busy a month as usual. He has also been QSO twice in Australia, and also in Saigon (French Indo-China) using a 48-watt input. He has been trying 90 m., but cannot get any one to hear his sigs.

2DR (Shipley) has not worked quite as much as usual. He found that U's, which were coming through with vigour up to February 23, suddenly disappeared, and were not to be found at any time, early morning or late at night, until the early morning of March 3, after which they gradually became stronger until on March 13-14 they were back at usual strength, and coming through in dozens. EGEH has been worked twice, also one DH, who is now in Baghdad. 2APV was the only U worked, except U-NOT, the American cruiser, which was then off Palermo, Sicily.

6YR (Harrogate) is Yorkshire's tame low-power DX man. He must possess the patience of Job to brass-pound U's when his input is well below three watts. He is consistently heard mostly all over Europe, more remarkable is that he gets R6 nearly every time. Having been QSO in U.S.A., he is determined to accomplish two-way working. That's the spirit OM. He complains that there are so many high-powered hams on the air that his feeble sigs. are frequently wiped clean off the ether.

5KZ (Keighley) also uses low-power and has worked over sixty stations this month, mostly with 15 watts, and seems to be QSO all over Europe. He has also worked PE-6YX for the second time, and YS-7XX, but Russia and Denmark have so far eluded him. He says that his howling apparatus is not much better than a collection of junk, but it seems pretty good junk to me, OM.

Lancashire.

5SZ (Morecambe) has been very active this month and sent in an excellent report. Using 150 watts, he has worked four BZ's, three of them twice, A-3BD, three U's, two PR's, P-3GB and M-1DH, besides the usual Europeans. He has also done some good work on phone, having worked BZ-1BD and I-IC, F-RIP, SMUV, and K-18. 5SZ is certainly making things stir somewhat. He has just had a confirmation of his QSO last month with O-AZ4, when using the low power of 25 watts. F.B. He is also QSO India.

5JW (Manchester) sends his first report. Tnx., OM, send them along every month with as many more as you can collect. Pending delivery of a transformer he is using 3 to 6 watts input from dry batteries, and has worked Spain and Madeira, besides many other Europeans. He hopes to get further afield with somewhat increased power in the near future.

5XY (Burnley) is down, or is it up, with scarlet fever. Hard luck, OM. He is doing DX reception on an indoor aerial in his room. Old hams never die, do they ?

5RH (Burnley) is installing a 1,500-volt Mortley generator, so I shall expect to hear something from you next month, OM.

5MS (Lytham) is down from Cambridge again, and expects to be on the air by the time these words are in print.

Will Lancashire hams send in reports to 5XY or myself, please ?

Cheshire.

6TW (Nantwich) is still going great guns on the Hertz, which he finds very satisfactory. He says there is a new comet visible half way between his mast and the house, and wants to know to whom he is to report the fact ! ! ! He had a reply to a test call from NZ, but lost the call-sign through QRN. Very bad luck, OM. Let me have a report next month ; you are the only upholder of the flag in your county so far.

Northumberland.

5DA (Berwick-on-Tweed) has also had rather a lean month, but has been busy helping a new ham to get his transmitter going. He has worked PE-6ZK, P-3EZ and U-1AAO, and is carrying a two-way phone schedule with EAC-9. Power used 30 watts. He reports reception of BZ's very good this month, also O's, but little from U.S.A.

* * *

There are cards for 5XY and 5DA waiting at the QSL Section, so send along your envelopes, OM's.

M-1DH has asked me to announce that he is no longer at his old QRA, but has moved to Baghdad.

2DR.

Irish Notes.

Prepared by 5NJ.

Interest in short wave work continues to grow rapidly in Ireland, there being now many more receiving stations active in both the Free State and the North, while new transmitters are making their appearance slowly but surely. In the South it is now practically certain that a branch of the I.A.R.U. will be formed, and the final arrangements are, I understand, almost completed. While in Northern Ireland a similar attempt is being made, and should meet with success provided all short wave hams come forward and join. By the way there are still many hams in Ireland who are not yet members of the T. & R. Section of the R.S.G.B. Full particulars of this section will gladly be given, on request, either by Headquarters or by 5NJ. It is hoped all Irish short wave hams will join.

The reports of DX this month are not very numerous, but some excellent work has been done, particularly by low power stations. 11B, the pioneer station in the Free State, is continuing his work with U.S.A. on 6 to 7 watts, and seems to have little difficulty "raising" U's if conditions are at all favourable. He has also worked Madeira and sundry other continental stations, being R6 nearly everywhere. Among the U's worked are 1CH, 1BDT and 2AEV.

Mr. H. Goldsbrough, of Tipperary, has just obtained a transmission licence, but is restricted to communicating with Southern Ireland stations at present. He hopes soon, however, to get the full licence through. His list of calls heard is on another page.

The Messrs. O'Dwyer, of Dublin, are still hard at it on the receiving side, and have now received practically all that can be received. They also hope to join the transmitting ranks shortly. (May it be soon, OM. !)

In the North activity seems to be confined mainly to the week-end and some excellent work is being done, particularly by the very low power stations. 6TB has had some extraordinary results with a new type of aerial system, developed upon the lines of an article which appeared in a recent number of "QST." He has been reported R9 in London and Edinburgh and R8 in Newcastle, when his input was 4 watts ! We hope to have particulars of this aerial system when further data has been obtained.

6YW has also been having remarkable results on low power. He has worked 2CC with an input of .035 watts, the power being supplied by 35 volts of flash-lamp batteries at 1 milliampere! He has also worked a station in Wales with a power of .0208 watts, that is, 26 volts at .8 of a milliampere. The valve used is a receiving one, and on this over 80 European stations have been worked with power never exceeding 2 watts. This is surely real DX. We in Ireland are proud of you, OM.!

2WK expects to be on 45 metres when these notes appear. He has already done some work on 9 metres, but found very few people down there with whom to test. Pse QSL his 45 metre signals if you hear him.

5NJ has had a big month's work, having now "hooked" all the outstanding countries and being now QSO practically the whole world, except Japan. Pure DX has now given way to experimental work, and regular schedules are being maintained with a U.S.A. station and with A-3BQ. At the time of writing clear *speech* has been received from 3BQ on three successive occasions, the only thing being a considerable ripple. But very soon this will be smoothed out, O.K. 5NJ has also got speech to Australia, but so far not very satisfactorily. But we are finding out the faults gradually. Maximum power 100 watts. Incidentally this is the first fone ever received in Ireland direct from Australia, and also the first transmission of Irish fone to Australia.

6SQ, another new transmitter, will be on the air when these notes appear. Our Calls Heard appear on another page, and the list is a very good one. 6MU has worked P3FZ on fone using 5 watts only. Is this a record for fone DX? It works out at about 340 miles per watt.

The other hams have not reported, so please let me know your doings by the 10th of the month. This refers to *all* Irish hams.

Mid-Britain Notes.

Prepared by 6JV.

Shropshire.

5SI reports working one "Yank." Several troubles developed during the month (not the least being that he has himself been "off colour") and thinks his accumulators caught the flu too. Anyway, he has had to content himself with 2 watts. This is, of course, a large input for 5SI really, and the power has been adequate to maintain a weekly schedule with 6JV. He reports that 6TD will shortly become a neighbour—F.B. We shall welcome him warmly to the Mid-British gang.

Rutland.

6NO reports being on the air now. He, too, has encountered B.C.L.S., who report interference from his 45m. signals while 5XX is working. He is a little puzzled, for it does not appear to be key clicks.

Cambridge.

By 2XV.

5YK has got his new rectifier going, and his note certainly seems much better. He has worked U1YB on 9 watts and 1DH (Baghdad) on less than 15 watts, being R8 over there.

2XV has worked a few more Yanks, his best DX for the month being a U in Atlanta, where he was reported R5-6. To finish the month he blew his pet 60-watt bottle and is now on 6 watts input to a DE5. He is saving up!

Reports by 10th of month, please.

Northampton.

Mr. Axten has unfortunately left the county and has returned to London for business reasons. And so we want someone to take over from him and to collect reports. Northampton hams please report to 6JV direct meanwhile. Perhaps someone will kindly offer to look after this area?

Warwick.

We are fortunate in securing the services of Mr. E. J. Erith for this county. His card, "Sutton, Surrey," will be remembered by many transmitters. Please report to him in future. Here is his QRA:—246, Kingsbury Road, Erdington, Birmingham. He has been busy already, and forwards an interesting report gathered from 6YU, who says that 6CI, 5SK, 2NB and 6YU are active in Coventry. 6YU thinks very little of February as a DX month, though he reports good reception of most distant countries. CH-2LD and FI-8QQ. have been logged. 6CI is working on very low power. He is using 100v. dry cells on anode of an M.O.R.5 receiving valve. He works Belgium P7 regularly, and has even been QSO with KPL (Prussia). This is DX, OM. Power to you! 5SK has been unlucky with valves. He has worked S5NF on 9 watts and many other European countries. 2NB and 6YU appear to be a joint station. They have worked several Americans, including WYD at Fairfield, Ohio. (Is this a broadcasting station?) GHA and P3FZ (Madiera) are also included in the month's "bag." 6YU has been heard in Tasmania by A7NW. The former is fretting a little because, although QSO N2 last

December, he can't raise Australia in spite of repeated attempts.

Stafford.

6UZ has been trying conclusions with the flu, and seems to have had the worst of it. He has, however, worked U.S.A. districts 1, 3 and 8 on varying powers up to 150 watts. He has rebuilt his fone set and good speech is reported from Glasgow and Paris. His C.W. has been heard in Brazil.

2KK has been trying a Hertz. So far he does not appear to have mastered it entirely, but is pegging away, and hoping for great results when all is O.K.

5FH expects to be on the air again soon.

5JI is a newcomer to the DX game. Best DX to you, OM.

2BRD is experimenting with loose coupling and a 10 watt fone set.

Norfolk.

6JV (Norwich) has finished the short wave super-het and is very pleased with it. He is busy testing and forming conclusions. He has worked U.S.A. districts 1, 2 and 4, also PR 4SA and the usual crop of Europeans, including several "S.M." stations. His maximum available power is 30 watts at present, and he is wondering how to QRO without having to sell something!

We welcome the following applications to membership of T. & R. this month:—

Mr. E. A. Kett, of Saffron Walden (via G2XV).
Mr. W. J. Coyle, of Southend (via G2XV).
Mr. T. S. Wilkin, of Colchester (via G2XV).
Mr. H. J. Pollard, of Rock Ferry (via 6JV).
Mr. A. M. C. Christian, of Rock Ferry (via 6JV).
Mr. P. H. Berry, of Radlet (via 6JV).

Good luck to you all, OM's. May you soon learn of your election, and don't forget to let your district office know what you are doing month by month.

N.B.—Volunteers are still wanted to supervise Leicester, Huntingdon, Northampton, Worcester and Hereford. Who will help us?

The Manchester and District Radio Transmitters' Society.

Since the last issue of the BULLETIN there have been no more reports of DX work sent in. This is due to a variety of reasons. To begin with, our "star turn," 2KW, has gone to live in the Free State, and has not as yet got a transmitter working. 2QB has been down with flu, but I am happy to be able to report that he is R9 again. 5IK is finding that the Hon. Secretary's job is not an easy one, especially when it has to be done in conjunction with other, and more serious, labours. He hopes, however, to be on the air again very soon. 6PL has been very busy trying to earn some cash for investment in a high-power transmitting set, and the work takes most of his spare time.

The Presidential address was given to the Society on February 2, by Dr. L. S. Palmer. It took the form of a lecture and demonstration on short waves. The lecture was most interesting, and I was sorry that only about 50 per cent. of the members turned up.

On February 23, Mr. Butterworth, B.Sc., gave an interesting lecture on rectifying detectors, a subject in which he is at the moment specialising.

(*Concluded at foot of next column*)

The lecture had to be rather sketchy, owing to shortness of time, but even then it covered a great deal of ground.

The Society's annual social evening was held on Friday, February 26, and was a great success.

5JW, a new member of our Society, has a transmitter working on 45 metres and will be very interested to receive reports.

6PL.

Note on Conductivity of the Air and Signal Strength.

By A. WOODMANSEY, M.Sc. (6LU).

The able review of the many factors concerned in the ionisation of the atmosphere, by Mr. G. G. Blake, published in the March BULLETIN, will have been read with interest by all amateurs. Especially so at this station, where measurements of the conductivity of the air have been made during two or three years. Experiments are also being carried out to see whether variations of signal strength are metrically related to variations of conductivity which, of course, is due to ionisation. Whatever the type of radiation which causes (or chiefly causes) the formation of ions in the lower atmosphere, the recorded results here differ enormously. It seems most probable that the ultra-violet band of solar light is the cause, although the writer has a letter from an authority expressing contrary opinion.

The kind of results may be indicated as follows:—

Time.	Comparative figure for conductivity.
Mid-day	10.0
3.30 p.m.	4.4
4.50	2.0
5.00	2.4
8.00 (dark)	0.29
11.00	0.10

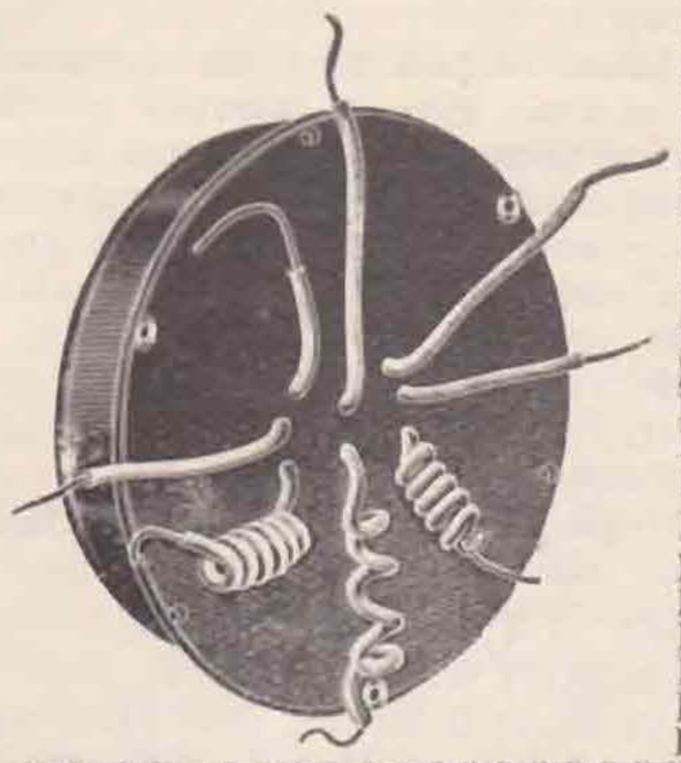
Other results work out by no means so regularly, and there are many anomalies in the records and many difficulties in the method to be straightened out. What is obvious, however, is that the lower air through which the direct wave may be supposed to travel is sometimes 100 times as conductive as at others. (Note: Even at its worst the air is still perhaps the best insulator!)

Much excellent work has been and is being done by many experimenters on the upper conducting stratum (heaviside layer), but little on the lower, viz., the earth. These figures may be of interest:—

Moist cultivated topsoil of this district. Apparent specific gravity, 2.275. Moisture, 20.0 per cent. Salts not estimated. Resistance between opposite faces of a 1 cm. cube, 3,452 ohms. Same earth dry, resistance over 50 megohms. Moist sandy soil. Apparent specific gravity, 2.005. Moisture, 15.3 per cent. Resistance 1 cm. cube 11,100 ohms. Same earth dry, resistance over 50 megohms.

It is hoped to study the question of signal strength in relation to moisture content of the earth in this district.

The signal measurements are being made with the co-operation of Mr. W. Hartley, 6YR, at the short distance of three miles, which not only enables the direct wave to be used but also intervening conditions to be known.



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CHOOSE YOUR DAY

MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY

Please make a cross beside the day of the week on which you prefer the T. & R. Meetings to take place, cut out and slip into an envelope stamped ½d. and post to the Hon. Secretary, T. & R. Section. The meetings are at present held on Fridays, but it is understood that this is not a convenient day for all members. We therefore wish to ascertain your feelings on this matter.—EDITOR.

Correspondence.

QSC.

To the Editor of T. & R. BULLETIN.

SIR,—May I place before DX men the increasing necessity of keying their own call signs at a reasonable pace, especially if QSO or QSL is expected on the 45 band.

Many are inclined, through constant use, to rattle out their calls at more or less automatic speed, and given QRZ and QRM on top, no one is any the better off.

This week an "all dot" G station called me with bad QRM going on, and while his number was certainly fine, his letter combination might have been anything.

To give another example, I may say that weekly I hold a small class for my signallers, and I notice that while they log foreign stations pretty freely, yet generally I am the only one to get the "G" calls with accuracy.

Were more DX men to take it "that the other man is more of a fool than he might be" as his maxim, when calling an unknown station, I am convinced that fewer calls would remain unanswered.

A. M. HOUSTON FERGUS
(G2ZC and MAG).

To the Editor of T. & R. BULLETIN.

SIR,—The following report may be useful to you.

On Saturday, February 20, between 2,300 and 0000 I succeeded in working three U stations with an input of 4.4 watts, i.e., 220 volts mains. M.A. 20 valve L.S.5.

U.2CFT reported signals R3.
U.3LD " " R5.
U.2BKR " " R3.

On Sunday, February 21, I worked C.8AR, who reported signals a good R4.

I am quite aware that this is nothing unusual, but it may be of interest to the 1 fly-power hams like myself who have not yet been fortunate enough to raise the Yanks.

Wishing you every success,
I am,
Yours faithfully,
CHAS H. GREEN, LYD.

To the Editor of T. & R. BULLETIN.

SIR,—Being only a "receptionist," and a new one at that, I feel nervous about responding to your appeals for members to express their opinions, but possibly some, in fact quite a lot, of the more experienced hams forget that the keen novice of to-day—well, you know the old tag!

Now, if only they would leave out a few CQ's and stick in "their country of origin" more often, intermediaries particularly, they would get far more *and* better reports!

If only we poor little "receptionists" got more than 30 per cent. of replies to cards sent out, we'd be very happy!

If only the hams had a sign or code that reports were only wanted from certain districts or countries, it would save everybody lots of trouble.

If only the hams would give their wavelength more often, and if more of them knew what their wavelength really was—but there, I'm going too far, am I not?

If only we had a QRA Exchange Bureau—and if only—(Oh! shut up!)

But, seriously, those of you who are fortunate enough to run a station give a thought to the "mugs" who sit for hours and hours just listening—and there's as many of us as there are (or is it "is") of you—and don't leave out of your messages or "rag chews" just the information that really matters.

What do the other receptionists think?

Yours, etc.,
"RECEPTIONIST"
(R.S.G.B.—T. & R.), A.R.R.L.

To the Editor of T. & R. BULLETIN.

DEAR ED.,—To-night I worked M-1DH, and he asked me if I would make it known that 1DH was now at *Baghdad*, and not at Mosul. His qra is Southgate, Baghdad, Iraq.

Perhaps a note to this effect in the "Bull" will be useful.

Yours sincerely,
J. W. RIDDIOUGH.

To the Editor of T. & R. BULLETIN.

DEAR OM,—I've got a grouse—no, not a bird, a sort of bubbly feeling that's taken two months to boil up. Sa OM, Hw cmn? Cnt possibly QRT. I must really apologise. I forgot myself. Let's QTA. Oh, that's worse! May I please commence once more? Dear Mr. Editor of the TRANSMITTER AND RELAY BULLETIN of the Radio Society of Great Britain, I beg most humbly as a man who once had a shorthand speed of 150 per (done it again), I mean one hundred and fifty words a minute, to disagree with your correspondent who objects to abbreviations. I am afraid that I can't remember his name or call sign as I am busy house moving, and my "Bulls" (sorry, I mean BULLETINS) are in a box under about 40 QST's (I expect that a few people will know what they are), sundry relays, valve boxes, and other junk. Oh, dear! that's worse still. It is only partly junk. Well anyway, here is the difference of opinion. Can your correspondent differentiate, please, between the two things shorthand and "radioese"? Apparently not. For a matter of convenience he uses shorthand writers in his business to save time in dictating at full length, and from his own letter he obviously cannot write shorthand, as he had to be told how something would correspond in shorthand! Well, well, well. I personally learned shorthand principally as I have never employed (so far) anyone to do what I know nothing about myself. Anyway, shorthand and "radioese" are as similar as chalk and cheese. One can hire a shorthand writer and possibly an operator for an amateur radio station. One, however, is a business proposition, the other either a commercial "op" or, if obtainable, a "ham" (for want of a better word). If one cannot understand ordinary time-saving cuts, it is better to take to gramophone records, but for goodness sake keep to 440 metres!

One employs shorthand writers to save time in business. Likewise one uses "Abbreviations" to save time, and possibly anyone who uses the morse code and does any DX (long distance) will understand them, otherwise he cannot do any DX. Q.E.D. Try it for yourself! Also, most "hams"

are not only DX operators: they have other things to do. Experimental work takes time, and the actual testing is but a small part of the "ham" station routine.

We are surely at liberty to save our time and tempers by using "ham" language and abbreviations.

R. F. PALMER (6TD).

[EDITORIAL NOTE.—Whilst the discussion on this subject has been most interesting, we regret that we must now consider the subject closed. Our policy is to give our readers what they require, and as there is a huge majority for the use of "ham" language, we shall continue to use it within reason. We might say that we have noticed that many foreign stations are able to work British stations without difficulty, and that they inevitably use "ham" language when so doing.]

To the Editor of T. & R. BULLETIN.

DEAR OM,—May I raise my small voice in protest against the growing tendency to make use of the "spacer" method of keying on the 45m band?

This band is already sufficiently congested, and if everyone were to use this method of keying the congestion would be exactly doubled! It is bad enough to have to bear with raw AC stations jamming a band of half a metre or more into which two or three respectable CW's would fit comfortably, and, in the vast majority of cases, it should be quite possible to obtain a steady note without having to resort to this method of keying.

Whilst its use is understandable, and even permissible where absolutely necessary, in the case of the big DX men, I think that it should certainly be discouraged in the case of smaller fry like myself.

Recently, when trying to carry out some tests with a G station, we were hopelessly jammed by no less than three G's using this method of keying.

Of course, I do not know whether the stations were those of members of the T. & R. Section or not.

MENDIP DENNIS (Colonel)
(GW-11B).

To the Editor of T. & R. BULLETIN.

SIR,—With reference to "Southern Notes" in the current issue of the BULLETIN, as a large number of your readers are well aware, I was operating crystal control as far back as September, 1925, and on and off ever since up to last week. The reason why the crystal-controlled outfit is temporarily out of action is the same as the reason that 2SZ's crystal note is no longer heard on the air. Hi!!

It is hoped, however, that I shall soon secure another crystal to take the place of the two late lamented examples.

Yours faithfully,
KENYON SECRETAN.

To the Editor of T. & R. BULLETIN.

DEAR EDDY,—I am very pleased to note that the Section is growing so rapidly. Our one idea must be to maintain this rate of progress.

In this connection, I am prepared to award to the member who proposes the greatest number of new members between now and the end of this year a Sigam Voltmeter, Ammeter, or Milliammeter, range to selection, value 25s. to 32s. 6d.

I hope that this inducement will result in a substantial increase in membership.

Now DX to our "Bull" and 73s to its Editor.

Yours hamfully,
L. BLAND FLAGG (G2-GO).

RADIO G5JK.

To the Editor of T. & R. BULLETIN.

SIR,—It appears that some illegal transmitter in London is running a "miniature broadcasting station," and is using my call sign. He employs the wavelength of 440 metres—a wave which 5JK is not licensed to use. During the past month I have received over a dozen reports from London B.C.L.'s!!

Owing to my having been abroad my station has not been in operation since May last, with the exception of transmissions on February 11 and 14, when I was on 45 metres.

Some of the reports state that the offender gives a London phone number for QSL reports, but, unfortunately, none of those who have sent me reports have been able to pick up the exact number.

I should appreciate the kind assistance of any of my colleagues to track down this unauthorised station, which, it seems, can be heard every Sunday.

Thanking you—Yours faithfully,

LOUIS R. HARPER (G5JK),
Member T. & R., R.S.G.B.

Seafield House, Aberdeen. March 15, 1926.

CRYSTAL CONTROL.

To the Editor of T. & R. BULLETIN.

SIR,—I should be grateful if you would convey to members our desire to have as many experimenters as possible working with us on crystal work. I should like to say that the experimental work is required with the crystals themselves and not in their application to a transmitter. Having procured a crystal that oscillates well, there is no simpler thing than setting it up in a transmitter and allowing the crystal to control the output.

The difficulty is in getting the crystals to function correctly, and a tremendous amount of experimental work would appear to be necessary.

Perhaps it is because most of us like to make the most of our spare time for "DX" coupled with the fact that grinding quartz plates is somewhat out of our line that it seems difficult to get fellows to go into this field of research.

If any of your readers who care to tackle this problem would get into communication with me I should be glad in a few selected cases to let them have quartz plates to experiment with, and would also let them have the results of our experience in this work during the last six months.

For those who may already be working on this subject the following formula for determining wavelength as related to thickness of plate, which has been evolved by me, may prove of value:—

1/1000" equals 2.67 metres.

I would also like to impress upon experimenters the folly of attempting to grind plates having a fundamental wavelength around 45 metres until such time as we have solved the difficulty of the thicker plates. A plate having a natural frequency near 6 megacycles is altogether too frail

(*Concluded on page* 21)

My QRO.

By G5HS.

AFTER working a good many European stations with 5 watts input from the DC mains, I decided to test out various aerial systems on 45 metres with increased power. A neighbouring "ham" had been worrying me for some time to buy a second-hand (vy!) converter and transformer, so at last I gave in. By the time the transformer had been converted and the converter transformed, I was left with 2,000 volts AC and no cash! So after a week of snipping, splashing, crashing and profanity, a chemical rectifier was built! Then a second-hand 250-watter was bought, in apparently perfect condition. The first problem was how to obtain filament current for the thing, and finally the awful method of taking 6 amps from the DC mains via some ex-Government stoves was adopted.

Well, the valve was mounted and the filament lit up all right, and as the rectifier was not ready, I decided to test the valve with 240 volts DC on the plate. After making sure that the circuit was O.K., I switched on the mains. To my surprise the milliameter emitted clouds of smoke and the dial was nicely illuminated by an internal arc!

Finally, a 12 amp. fuse carrying filament and anode current went. I examined the valve, and although the filament was still O.K., the anode current of 6 amps. had cracked the glass at the plate lead-in, and the valve was full of air.

I then sat down and made rude remarks about Ohm's law and things in general.

I took the valve along to the makers and told them that it had burst in trying to consume 1½ kilowatts. They said they thought it might have been soft! In the end I was lucky enough to get it changed for a new one.

I started off very carefully with the new valve, with fuses all over the circuit and exactly the rated filament current, and 1,000 volts C.R.A.C. on the anode. The results were not encouraging—10 watts went in and nothing in particular came out! I then tried 2,000 volts—30 watts went in and I got a small aerial current, but was not received anywhere! I was then desperate so sent out an S.O.S. to 6EI (no prize offered!) to come and help me.

After a week 6EI came round. He first of all increased the filament current dreadfully, then he took all the tappings off the coils and put them back where they had come from. Anyhow, we persuaded 60 watts to go in, and I was just watching the Hertz lamp lighting up for the first time, when the converter stopped dead. I spent an oily half-hour taking it to pieces while 6EI made rude remarks. There was nothing wrong, so I put it together again and it worked. It was a bad night, so we called "test" a few times, then gave it up.

However, next evening I brought a "ham" home to tea, and to show him that the lamp was really lighting up, I called A-3XO. To our great surprise he answered reporting signals as r4. I was rather upset, as this made my first Yank QSO rather a mild affair, but things were brightened up by the breaking of several fuses, one of them downstairs!

I originally meant to make some kind remarks about chemical rectifiers, but after a recent day's work I am less enthusiastic. Anyhow, they are really giving very good service with the help of occasional replacements. I always keep a stock of spare electrodes and fresh solution.

As regards my method of filament supply, it is certainly wasteful, but it has saved me buying a converter or large accumulator, while the stoves heat the room quite well.

Hi!

A. G. Wood, 5RZ.

I COMPLETED working my 250th Yank this evening. Earlier on I had connected with Z2AC, A3AD, and Pe6ZK. With a sigh of content I switched off, hung up the 'phones, and turned in. I felt very sleepy; very sleepy . . . I reviewed my DX record in which every country in the world had been QSO, with the exception of Japan and one or two small points in the universe. . . . Through all this I heard faintly the buzz of voices, shouts of laughter, and a high, steady note, sending a message . . . what was it? I strained my ears above the general din . . . Spark? Yes! But what was it doing on 45 metres? I hadn't heard a spark station for months . . . GNF! Good Heavens! Good old GNF. I could hear him more clearly now. Yes, it was GNF and below him the familiar rattle of Ostende. Slowly the babble died down, and my thoughts turned again to DX records. I remembered my first Yank and the thrill of pride I had when he came back with a long dit da.a.a.a.a. dit. da da da da dit da. Yes; certainly good times these. 200 watts of D.C. would carry one everywhere these days . . . fine business on . . . what was that voice which kept breaking in and saying something about having some more? . . . My dreams merged into a grey mist and I slept soundly.

* * *

I awoke in broad daylight and lay, gazing dreamily ahead of me. Now, what was the programme for to-day? Ah! yes, of course. That Hertz wanted another 18" taken off, and the grid leak showed a tendency to boil last night. I climbed out of bed, dressed, and, still feeling rather sleepy, wandered into the radio room. There would just be time to settle one or two points of aerial design before breakfast.

The blind was down and the room was in semi-darkness. Groping my way across the room to the switchboard, I stretched out my hand and felt for the main switch. It wasn't there! I put my hand on to the light switch, but it slid down a perfectly blank wall! With a gasp, I blundered across to the window and pulled up the blind. Towering above my head was a four-wire flat-top antenna fully one hundred feet long!

Dazedly, I turned back into the room. On the bench was a loose-coupler, a crystal detector of the Perikon type, and a pair of Sterling head-phones! Not a trace of the 200-watt oscillator, the eight-valve super-het. accumulator bank or high tension supply! My head was aching terribly. As one in a dream, I left the radio room and staggered downstairs.

I sank into my chair and held my head tightly between my hands. Oh! why wouldn't it stop aching for just one minute?

My brother walked in and greeted me with his usual bright "Good morning." I replied under

my breath, and then suddenly a thought arose. "What is 2LO doing this evening, old man?" I asked. "2LO! What on earth are you talking about?" "Do you mean to say you have never heard of 2LO?"—my last legs were slipping away from me—"The London station of the British Broadcasting Company?" He stared at me blankly, smiled feebly, and went on with his breakfast. Oh! how I hated him at that moment! "For the love of Heaven," I shouted, "don't you ever listen to the wireless—why, I saw you only a few evenings ago listening to the Savoy Bands." 'Wireless? Savoy Bands? Is the child mad? You once made me listen to a buzzy noise and told me it was Paris or something. That's all I know about wireless. Aren't you feeling very well?" Indeed, I was not. What on earth was the matter? Where was my 200-watter? The eight-valve Super? And my brand new, shining Hertz antenna? Everything went black, and I remembered no more.

* * *

I awoke in broad daylight with a splitting head. A misty voice was saying: "For the love of Mike, get up man! It's past nine o'clock, and you'll miss your train! Can't you go to a radio dinner without getting absolutely 'tin-hat'"?

Correspondence—(*Concluded from page* 19).

for transmitter work (as I know to my cost), and in view of facility with which the harmonics of a larger plate can be amplified, it is in no manner worth while to use or try to use these very small crystals.

If any of the fellows are keen enough to tackle this subject, I can assure them that it is one of extreme interest, and I shall always be most pleased to give them every possible assistance. In some cases rather special precision tools and instruments are required, and I shall always be happy to gauge plates for thickness, irregularities, frequency, etc., if you care to send them along to me.

Yours faithfully,
KENYON SECRETAN (G5LF).

Small Advertisement.

SURPLUS APPARATUS from the 2OO Station.—Twelve large cells in glass containers, 1 H.P. Motor and L.T. Generator, four-core Armoured Cable, 2 Masts, 1 Valve T250, 1 Kone Loud Speaker, 1 Burndept Ethophone, 32-valve Receivers, 1 small Transmitter Panel, 1 Portable Transmitter, 1 Microphone and Amplifier, etc.—Apply SHAW & KILBURN, LTD., 114, Wardour Street, W.1.

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U—1cpf, 1gp, 1rd, 1all, 1uy, 1za, 1cmp, 1aao, 2fa, 2cjj, 2apv, 2ahm, 4aae, 8sf, 8it, 8xe, 9zt; Z—4as, 2ae, 4ac, 4ak; BZ—1wr, 1ap, 1ib, 1ia; B—4yz, S4, P11, 4tr, u3, v2; F—8pal, 8tk, 8yor, 8pm, 8bbb, 8udi; miscellaneous—sdk, egeh, d7ew, k4cn, n0pm, a2cm, pe62k, pi3aa, pr4sa, gb1, raa8, ky8, vsics, c1dj, i1bk, nowb, i1au, d7mt, a2yi, la4z, n12bb. "I've plenty of bare wall yet."—G. A. Jeapes, G2XV.

Australia—2yh; Brazil—2af, sq1, 1ab, 1ja, 1bd; Costa Rica—cr-2ax; Canary Islands—p3fz; Porto Rico—pr-4rl; Argentine—af4; Cuba—2by; French Indo-China—8qq; New Zealand—2ae, 4ag; U.S.A.—1ahb, 1afy, 1arh, 1ajg, 1akj, 1acp, 1acj, 1bad, 1bke, 1bc, 1bje, 1bz, 1bb, 1bvr, 1cal, 1ckp, 1cmf, 1cmp, 1ccx, 1se, 1sw, 1de, 1qb, 1rd, 1vy, 1pl, 2ahm, 2afm, 2apv, 2amj, 2aky, 2bx, 2bgj, 2bw, 2bsw, 2bm, 2cu, 2cxl, 2cvj, 2gp, 2gk, 2fk, 2mk, 2xq, 2or, 2mm, 2nm, 2wc, 3bvp, 3bta, 8awa; British (telephony)—2kf, 2nm, 2lz, 2vg, 5nj, 5wq, 5yj, 5sz, 6td, 6mu, 6fa; Reinartz—o-v-o and o-v-1.—Geo. A. Heaney (G1-65Q), 5, Dunedin, Antrim Road, Belfast.

G's—2bz, 2fk, 2go, 2ia, 2kf, 2lz, 2mi, 2nm, 2qb, 2wj, 2zg, 5dh, 5fq, 5hj, 5jw, 5ls, 5mb, 5nj, 5rb, 5so, 5sz, 5uw, 5uy, 5wv, 5xo, 5yk, 5za, 6ka, 6mx, 6yz; F—8dk, 8ee, 8gi, 8jf, 8jn, 8vx, ocng; I—1ad, 1al, 1ax, 1ma, 1mi, 1nc, 1qn; N—0aa, oks, opx, owb, pb7, 2pc; B—g6, r2; Spain—ear10, ear18, ear20, ear21, ear23; D—7aa, 7bx; U—1cal, 1cax, 1ch, 2nz, 3cku, 8xp, wq0, w1r, w1z, uss, ntt, not; A—3bd; C—2fo; K—5a; S—2nd; P—3gb, smua; PR—4sa; GW—11b; M—1dh; YS—7xx; miscellaneous—novigo, fl, aga, lpw, gfpp, nsdk, eac9, kpl, e4ast, ntt, not, uss. Scorpion and Cruiser, Pittsburgh, respectively.—Above heard by H. Goldsbrough, Shaftesbury House, Fethard, Co. Tipperary, Irish Free State.

American—1aap, 1gn, 1cmf, 1caj, 1rd, 1ga, 1ka, 1se, 1cb, 1ane, 1aiu, 1aw, 1ao, 2agm, 2agq, 3ara, 3mu, 3bms, 4te, 5ng, 8mk, 8xe, 8gz, 8kw, 8bc, 8am, 9zt, 9xe, 8aly, 8adm, 8it; Australian—3ef, 2tm, 5ag; Belgian—d4, q2, r4, s4, b2, z1, s7, s1, k8; British—2kz, 2qm, 2ii, 2baz, 2xy, 5ma, 5so, 5gs, 5ca, 5nj, 5jw, 6pg, 6cd, 6wt, 6vp, 6rm, 6yu, 6ry, 6al, 6ia, 6yr, 6ko; Dutch—2pz, 0rp, 0ca, 0bx, 0ax, 2pc, 0wb, 0cz; Danish—7ew, 7zm; Finland—2nn, 2nd; French—8moc, 8yor, 8co, 8rz, 8pli, 8tk, 8hm, ocnq, ocmv, 8tk, 8cu, 8gga, 8sss, 8bf, 8bu, 8mj; Germany—k4pf; kpl, ki8; India—hbk; Italian—1ma, 1ay, 1bw; Spain—ear22; Swede—smvj, smuk, smsr, smxu; New Zealand—2ae, 1ax, 4ac, 4ar; American—1se, 1ga, 8bc, 8xe; British—About 20; French—the same; Belgian—four; Danish—7ew; Finnish—2nd; Swedes—smxu, smvj, smsr, smuk; Europe—r6/7; U.S.A.—z4/5.—By 6UZ.

F—8trax, 8rf, 8jn, 8sss, 8hm, 8cr, 8sd, 8pep, 8ww, 8um, 8yor, 8pm, 8nil, 8udi, 8tk, 8gm, 8ric, 8fu, 8sax, 8jmj, 8xe; B—s5, b2, 9e, g33, p7, k5; S—smtx, smvj, smuv, smyu, s2nd, smxu, smua, smri, smsr, smvr, smvt; O—a6n, 4za; L—6cl; E—ear10, ear23, ear24; N—2pc, oea, pell, 0gg, 0vn, 0nm, 0wb, 0aw, 0pz; C—2dq, 1ar, 2bc; FI—8qq; D—7bx; BZ—2af, 1ar, sn1, 1al, 1ib, 1ac; K—4lv; P—3fz; Q—2mk; U—1anm, 1ch, 1rd, 1sg, 2bum, 1rt1, 2cyx, 2cjj, 1afy, 3zg, 1ck, 1aa, 2cyx, 2cvj, 1sw, 1bz, 1cmf, 1bmh, 1cal, 1vc, 1bdp, 1bvb, 8pl, 1bk, 1ck, 1aao, 1wl, 2cxl, 1afy, 1ip, 1aao, 1chq, 8kt, 1rd, 1ahm, 4gy; PR—4sa; Miscellaneous—gb1, gha, kpl, anf, hag, gfp, moiric, da, oedj, gfc. Receivers: O-V-1 (see Jan. Bulletin) and paper heterodyne. Who is BZ SNI pse?

A—(2yi), 2cs, 2tm, 2jw, (2ds), 2cg, (3bd), 3bl, 3xo, 3ef, 5bk, 5lp, 5bo, 5bg, 6ag, 6ls, 6lz; B—b2, (d4); C—1ar; BZ—1ab, 1af, 2af, 5ab, 1ac; E—ear23; F—(8jn), (8nu), (8yor), (8bf), 8ww, 8nu, 8za, 8nn, 8hm, (8tk), (8hsf); FC—8em (Shanghai); G—(2lz) (2nm), 2cc, 2od, (2it), 2xy, 2kf, (5hs), (5lf), 6eh, 6yx, (6nf), (2ao), (6yu), (5nj); I—1as, 1ay, 1mt, 1gn; J—1pp; K—y8; M—1aa; O—a4n, a4z; PR—4sa; Rnrl; S—(su tu); U—(6awt), 6bjx, 6nx, 6ccv, 6akw, 6dag, 6ob, 6hm (1cmp), 1aao; X—2bg; Y—hbk; Z—(1ao), (1fq), (2ac), (2xa), 4ac. Parenthesis ( ) mean QSO. Best 73's, Fi 8qq.—Fi 8QQ: Richard Jamas, 21, Rue Richaud Saigon, Indo-Chine.

G—2atz, 2baz, 2cw, 2ep, 2ab, 2at, 2qb, 2qv, 2xv, 2xy, 5da, 5fq, 5gq, 5in, 5jw, 5ku, 5sk, 5so, 5sz, 5tz, 5uw, 5wq, 5wv, 5xy, 6do, 6dw, 6fa, 6ft, 6jo, 6ko, 6nk, 6pg, 6ry, 6td, 6ut, 6wh, 6yc, 6yv, 6yr; GI—5nj, 6mu, 6qd, 6yw; F's too numerous!; B—h6, p7, z9, k2, i3, u3, z22, c22, e9, s5, s3, k8, s4, b2; N—opm, oes, opx, okz, oza, pc3, pc2, pb7; K—kpl, ky5, kw9, ki8, k14; D—7ch, 7ew, 7zm; miscellaneous—la-1b, sdk, smsr, smux, smuk, l-lag, p-3fz, ntt, not, sql, pe-6yx, 6zk, 6zm, gfc, gfp, gha, ys-7xx, pt3.—G-6QB, L. H. Thomas, 33, Harpenden Road, West Norwood, London, S.E.27.

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